

# SCons API Docs

version 4.4

SCons Project

July 30, 2022



# Contents

<b>SCons Project API Documentation</b>	<b>1</b>	SCons.Scanner.LaTeX module	70
SCons package	1	SCons.Scanner.Prog module	71
Module contents	1	SCons.Scanner.RC module	71
Subpackages	1	SCons.Scanner.SWIG module	71
SCons.Node package	1	Module contents	71
Submodules	1	SCons.Script package	74
SCons.Node.Alias module	1	Submodules	74
SCons.Node.FS module	7	SCons.Script.Interactive module	74
SCons.Node.Python module	49	SCons.Script.Main module	75
Module contents	55	SCons.Script.SConsOptions module	82
SCons.Platform package	62	SCons.Script.SConscript module	87
Submodules	62	Module contents	93
SCons.Platform.aix module	62	SCons.Tool package	93
SCons.Platform.cygwin module	62	Module contents	93
SCons.Platform.darwin module	62	SCons.Variables package	95
SCons.Platform.hpux module	63	Submodules	95
SCons.Platform.irix module	63	SCons.Variables.BoolVariable module	95
SCons.Platform.mingw module	63	SCons.Variables.EnumVariable module	96
SCons.Platform.os2 module	63	SCons.Variables.ListVariable module	96
SCons.Platform.posix module	63	SCons.Variables.PackageVariable module	97
SCons.Platform.sunos module	63	SCons.Variables.PathVariable module	98
SCons.Platform.virtualenv module	63	Module contents	99
SCons.Platform.win32 module	64	SCons.compat package	100
Module contents	64	Module contents	100
SCons.Scanner package	66	Submodules	101
Submodules	66	SCons.Action module	101
SCons.Scanner.C module	66	SCons.Builder module	106
SCons.Scanner.D module	69	SCons.CacheDir module	111
SCons.Scanner.Dir module	69	SCons.Conftest module	111
SCons.Scanner.Fortran module	69	SCons.Debug module	115
SCons.Scanner.IDL module	70	SCons.Defaults module	115
		SCons.Environment module	116
		SCons.Errors module	128
		SCons.Executor module	130
		SCons.Job module	133

SCons.Memoize module	135	SCons.Scanner.SWIG module	245
SCons.PathList module	137	Module contents	245
SCons.SConf module	137	SCons.Script package	248
SCons.SConsign module	142	Submodules	248
SCons.Subst module	144	SCons.Script.Interactive module	248
SCons.Taskmaster module	148	SCons.Script.Main module	249
SCons.Util module	154	SCons.Script.SConsOptions module	255
SCons.Warnings module	164	SCons.Script.SConscript module	260
SCons.cpp module	167	Module contents	266
SCons.dblite module	170	SCons.Tool package	267
SCons.exitfuncs module	173	Module contents	267
SCons.compat package	173	SCons.Variables package	269
Module contents	173	Submodules	269
SCons.Node package	174	SCons.Variables.BoolVariable module	269
Submodules	174	SCons.Variables.EnumVariable module	269
SCons.Node.Alias module	174	SCons.Variables.ListVariable module	270
SCons.Node.FS module	180	SCons.Variables.PackageVariable module	271
SCons.Node.Python module	222	SCons.Variables.PathVariable module	271
Module contents	228	Module contents	272
SCons.Platform package	235	<b>Indices and Tables</b>	<b>274</b>
Submodules	235	<b>Index</b>	<b>275</b>
SCons.Platform.aix module	235	<b>Python Module Index</b>	<b>333</b>
SCons.Platform.cygwin module	236		
SCons.Platform.darwin module	236		
SCons.Platform.hpux module	236		
SCons.Platform.irix module	236		
SCons.Platform.mingw module	236		
SCons.Platform.os2 module	236		
SCons.Platform.posix module	236		
SCons.Platform.sunos module	236		
SCons.Platform.virtualenv module	237		
SCons.Platform.win32 module	237		
Module contents	237		
SCons.Scanner package	239		
Submodules	239		
SCons.Scanner.C module	239		
SCons.Scanner.D module	242		
SCons.Scanner.Dir module	242		
SCons.Scanner.Fortran module	243		
SCons.Scanner.IDL module	243		
SCons.Scanner.LaTeX module	243		
SCons.Scanner.Prog module	244		
SCons.Scanner.RC module	245		

# SCons Project API Documentation

This is the internal API Documentation for SCons. The Documentation is generated using the Sphinx tool. The target audience is developers working on SCons itself, so it does not clearly delineate what is “Public API” - interfaces for use in your SCons configuration scripts which have a consistency guarantee, and what is internal, so always keep the SCons manual page around for helping with such determinations.

## SCons package

### Module contents

### Subpackages

SCons.Node package

### Submodules

SCons.Node.Alias module

Alias nodes.

This creates a hash of global Aliases (dummy targets).

`class SCons.Node.Alias.Alias (name)`

Bases: Node

`class Attrs`

Bases: object

shared

BuildInfo

alias of AliasBuildInfo

Decider (function)

GetTag (key)

Return a user-defined tag.

NodeInfo

alias of AliasNodeInfo

Tag (key, value)

Add a user-defined tag.

`_add_child (collection, set, child)`

Adds ‘child’ to ‘collection’, first checking ‘set’ to see if it’s already present.

`_children_get ()`

`_children_reset ()`

`_func_exists`

`_func_get_contents`

`_func_is_derived`

`_func_rexists`

`_func_target_from_source`

`_get_scanner (env, initial_scanner, root_node_scanner, kw)`

`_memo`

`_specific_sources`

`_tags`

`add_dependency (depend)`

Adds dependencies.

`add_ignore (depend)`

Adds dependencies to ignore.

`add_prerequisite (prerequisite)`

Adds prerequisites

`add_source (source)`

Adds sources.

`add_to_implicit (deps)`

`add_to_waiting_parents (node)`  
Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)

`add_to_waiting_s_e (node)`

`add_wkid (wkid)`  
Add a node to the list of kids waiting to be evaluated

`all_children (scan=1)`  
Return a list of all the node's direct children.

`alter_targets ()`  
Return a list of alternate targets for this Node.

`always_build`

`attributes`

`binfo`

`build ()`  
A "builder" for aliases.

`builder`

`builder_set (builder)`

`built ()`  
Called just after this node is successfully built.

`cached`

`changed (node=None, allowcache=False)`  
Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.  
Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an #included .h file) is updated.  
The allowcache option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this changed method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to `changed()`.  
@see: `FS.File.changed()`, `FS.File.release_target_info()`

`changed_since_last_build`

`check_attributes (name)`  
Simple API to check if the node.attributes for name has been set

`children (scan=1)`  
Return a list of the node's direct children, minus those that are ignored by this node.

`children_are_up_to_date ()`  
Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.  
The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`clear ()`  
Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

`clear_memoized_values ()`

`convert ()`

`del_binfo ()`  
Delete the build info from this node.

`depends`

`depends_set`

`disambiguate (must_exist=None)`

`env`

`env_set (env, safe=0)`

`executor`

`executor_cleanup ()`

Let the executor clean up any cached information.

`exists ()`

Does this node exists?

`explain ()`

`for_signature ()`

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

`get_abspath ()`

Return an absolute path to the Node. This will return simply `str(Node)` by default, but for Node types that have a concept of relative path, this might return something different.

`get_binfo ()`

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`

Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`

Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`

Return the set builder, or a specified default value

`get_cachedir_csig ()`

`get_contents ()`

The contents of an alias is the concatenation of the content signatures of all its sources.

`get_csig ()`

Generate a node's content signature, the digested signature of its content.

node - the node cache - alternate node to use for the signature cache returns - the content signature

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`

Return the scanned include lines (implicit dependencies) found in this node.

The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`

Return a list of implicit dependencies for this node.

This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_ninfo ()`

`get_source_scanner (node)`

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`

Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a `Node` to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this `Node`, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some `Nodes` would like to implement a `__getattr__()` method, but putting that in the `Node` type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`has_builder ()`

Return whether this `Node` has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if `node.builder: ...`"). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this `Node` has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a `Node` to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

Alternate check for whether the `Node` is current: If all of our children were up-to-date, then this `Node` was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`linked`

`make_ready ()`

Get a `Node` ready for evaluation.

This is called before the Taskmaster decides if the `Node` is up-to-date or not. Overriding this method allows for a `Node` subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this `Node` has a builder or not.



In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly (“if node.builder: ...”). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`postprocess ()`

Clean up anything we don’t need to hang onto after we’ve been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

`prerequisites`

`pseudo`

`push_to_cache ()`

Try to push a node into a cache

`really_build (**kw)`

Actually build the node.

This is called by the Taskmaster after it’s decided that the Node is out-of-date and must be rebuilt, and after the `prepare()` method has gotten everything, uh, prepared.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

`ref_count`

`release_target_info ()`

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren’t needed any longer after a Node (=File) got built, we don’t have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: `built()` and `File.release_target_info()`

`remove ()`

Remove this Node: no-op by default.

`render_include_tree ()`

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

`reset_executor ()`

Remove cached executor; forces recompute when needed.

`retrieve_from_cache ()`

Try to retrieve the node’s content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

Returns true if the node was successfully retrieved.

`rexists ()`

Does this node exist locally or in a repository?

`scan ()`

Scan this node’s dependents for implicit dependencies.

`scanner_key ()`

```

sconsign ()
    An Alias is not recorded in .sconsign files
select_scanner (scanner)
    Selects a scanner for this Node.
    This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that must use
    their own Scanner and don't select one the Scanner.Selector that's configured for the target.
set_always_build (always_build=1)
    Set the Node's always_build value.
set_executor (executor)
    Set the action executor for this node.
set_explicit (is_explicit)
set_nocache (nocache=1)
    Set the Node's nocache value.
set_noclean (noclean=1)
    Set the Node's noclean value.
set_precious (precious=1)
    Set the Node's precious value.
set_pseudo (pseudo=True)
    Set the Node's precious value.
set_specific_source (source)
set_state (state)
side_effect
side_effects
sources
sources_set
state
store_info
str_for_display ()
target_peers
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
wkids
class SCons.Node.Alias.AliasBuildInfo
    Bases: BuildInfoBase
    bact
    bactsig
    bdepends
    bdependssigs
    bimplicit
    bimplicitssigs
    bsources
    bsourcesigs
    current_version_id = 2
    merge (other)
        Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
        data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
class SCons.Node.Alias.AliasNameSpace (**kwargs)
    Bases: UserDict
    Alias (name, **kw)
    _abc_impl = <_abc_data object>
    clear () → None. Remove all items from D.
    copy ()
    classmethod fromkeys (iterable, value=None)
    get (k[, d]) → D[k] if k in D, else d. d defaults to None.

```

`items ()` → a set-like object providing a view on D's items  
`keys ()` → a set-like object providing a view on D's keys  
`lookup (name, **kw)`  
`pop (k[, d])` → v, remove specified key and return the corresponding value.  
     If key is not found, d is returned if given, otherwise `KeyError` is raised.  
`popitem ()` → (k, v), remove and return some (key, value) pair  
     as a 2-tuple; but raise `KeyError` if D is empty.  
`setdefault (k[, d])` → D.get(k,d), also set D[k]=d if k not in D  
`update ([, E], **F)` → None. Update D from mapping/iterable E and F.  
     If E present and has a `.keys()` method, does: for k in E: D[k] = E[k] If E present and lacks `.keys()` method, does: for  
     (k, v) in E: D[k] = v In either case, this is followed by: for k, v in F.items(): D[k] = v  
`values ()` → an object providing a view on D's values  
**class** `SCons.Node.Alias.AliasNodeInfo`  
     Bases: `NodeInfoBase`  
     `convert (node, val)`  
     `csig`  
     `current_version_id` = 2  
     `field_list` = ['csig']  
     `format (field_list=None, names=0)`  
     `merge (other)`  
         Merge the fields of another object into this object. Already existing information is overwritten by the other instance's  
         data. WARNING: If a '`__dict__`' slot is added, it should be updated instead of replaced.  
     `str_to_node (s)`  
     `update (node)`

`SCons.Node.FS` module

File system nodes.

These Nodes represent the canonical external objects that people think of when they think of building software: files and directories.

This holds a "`default_fs`" variable that should be initialized with an FS that can be used by scripts or modules looking for the canonical default.

**class** `SCons.Node.FS.Base (name, directory, fs)`  
     Bases: `Node`  
     A generic class for file system entries. This class is for when we don't know yet whether the entry being looked up is a file or a directory. Instances of this class can morph into either `Dir` or `File` objects by a later, more precise lookup.  
     Note: this class does not define `__cmp__` and `__hash__` for efficiency reasons. SCons does a lot of comparing of `Node.FS.{Base,Entry,File,Dir}` objects, so those operations must be as fast as possible, which means we want to use Python's built-in object identity comparisons.  
     **class** `Attrs`  
         Bases: `object`  
         `shared`  
     **BuildInfo**  
         alias of `BuildInfoBase`  
     **Decider** (`function`)  
     **GetTag** (`key`)  
         Return a user-defined tag.  
     **NodeInfo**  
         alias of `NodeInfoBase`  
     **RDirs** (`pathlist`)  
         Search for a list of directories in the Repository list.  
     **Rfindalldirs** (`pathlist`)  
         Return all of the directories for a given path list, including corresponding "backing" directories in any repositories.  
         The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up the same path for each target in a given directory.  
     **Tag** (`key, value`)

Add a user-defined tag.

`_Rfindalldirs_key (pathlist)`

`_abspath`

`_add_child (collection, set, child)`  
 Adds 'child' to 'collection', first checking 'set' to see if it's already present.

`_children_get ()`

`_children_reset ()`

`_func_exists`

`_func_get_contents`

`_func_is_derived`

`_func_rexists`

`_func_sconsign`

`_func_target_from_source`

`_get_scanner (env, initial_scanner, root_node_scanner, kw)`

`_get_str ()`

`_glob1 (pattern, ondisk=True, source=False, strings=False)`

`_labspath`

`_local`

`_memo`

`_path`

`_path_elements`

`_proxy`

`_save_str ()`

`_specific_sources`

`_tags`

`_tpath`

`add_dependency (depend)`  
 Adds dependencies.

`add_ignore (depend)`  
 Adds dependencies to ignore.

`add_prerequisite (prerequisite)`  
 Adds prerequisites

`add_source (source)`  
 Adds sources.

`add_to_implicit (deps)`

`add_to_waiting_parents (node)`  
 Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)

`add_to_waiting_s_e (node)`

`add_wkid (wkid)`  
 Add a node to the list of kids waiting to be evaluated

`all_children (scan=1)`  
 Return a list of all the node's direct children.

`alter_targets ()`  
 Return a list of alternate targets for this Node.

`always_build`

`attributes`

`binfo`

`build (**kw)`  
 Actually build the node.  
 This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the `prepare()` method has gotten everything, uh, prepared.  
 This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

`builder`

`builder_set (builder)`

`built ()`

Called just after this node is successfully built.

`cached`

`changed (node=None, allowcache=False)`

Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.

Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an `#included .h` file) is updated.

The `allowcache` option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this `changed` method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to `changed()`.

@see: `FS.File.changed()`, `FS.File.release_target_info()`

`changed_since_last_build`

`check_attributes (name)`

Simple API to check if the node.attributes for name has been set

`children (scan=1)`

Return a list of the node's direct children, minus those that are ignored by this node.

`children_are_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`clear ()`

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

`clear_memoized_values ()`

`cwd`

`del_binfo ()`

Delete the build info from this node.

`depends`

`depends_set`

`dir`

`disambiguate (must_exist=None)`

`duplicate`

`env`

`env_set (env, safe=0)`

`executor`

`executor_cleanup ()`

Let the executor clean up any cached information.

`exists ()`

Does this node exist?

`explain ()`

`for_signature ()`

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

`fs`

Reference to parent Node.FS object

`get_abspath ()`

Get the absolute path of the file.

`get_binfo ()`

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

get\_build\_env ()

Fetch the appropriate Environment to build this node.

get\_build\_scanner\_path (scanner)

Fetch the appropriate scanner path for this node.

get\_builder (default\_builder=None)

Return the set builder, or a specified default value

get\_cachedir\_csig ()

get\_contents ()

Fetch the contents of the entry.

get\_csig ()

get\_dir ()

get\_env ()

get\_env\_scanner (env, kw={})

get\_executor (create=1)

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

get\_found\_includes (env, scanner, path)

Return the scanned include lines (implicit dependencies) found in this node.

The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

get\_implicit\_deps (env, initial\_scanner, path\_func, kw={})

Return a list of implicit dependencies for this node.

This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

get\_internal\_path ()

get\_labspath ()

Get the absolute path of the file.

get\_ninfo ()

get\_path (dir=None)

Return path relative to the current working directory of the Node.FS.Base object that owns us.

get\_path\_elements ()

get\_relpath ()

Get the path of the file relative to the root SConstruct file's directory.

get\_source\_scanner (node)

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies self.has\_builder() is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

get\_state ()

get\_stored\_implicit ()

Fetch the stored implicit dependencies

get\_stored\_info ()

get\_string (for\_signature)

This is a convenience function designed primarily to be used in command generators (i.e., CommandGeneratorActions or Environment variables that are callable), which are called with a for\_signature argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to str(Node) when converting a Node to a string, passing in the for\_signature parameter, such that we will call Node.for\_signature() or str(Node) properly, depending on whether we are calculating a signature or actually constructing a command line.

get\_subst\_proxy ()

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_tpath ()`

`getmtime ()`

`getsize ()`

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when duplicate=0 and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

Default check for whether the Node is current: unknown Node subtypes are always out of date, so they will always get built.

`isdir ()`

`isfile ()`

`islink ()`

`linked`

`lstat ()`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the

`__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`must_be_same (klass)`

This node, which already existed, is being looked up as the specified klass. Raise an exception if it isn't.

`name`

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`postprocess ()`

Clean up anything we don't need to hang onto after we've been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

`prerequisites`

`pseudo`

`push_to_cache ()`

Try to push a node into a cache

`ref_count`

`release_target_info ()`

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: `built()` and `File.release_target_info()`

`remove ()`

Remove this Node: no-op by default.

`render_include_tree ()`

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

`rentry ()`

`reset_executor ()`

Remove cached executor; forces recompute when needed.

`retrieve_from_cache ()`

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

Returns true if the node was successfully retrieved.

`rexists ()`

Does this node exist locally or in a repository?

`rfile ()`

`rstr ()`

A Node.FS.Base object's string representation is its path name.

`sbuilder`

`scan ()`

Scan this node's dependents for implicit dependencies.

`scanner_key ()`



```

select_scanner (scanner)
    Selects a scanner for this Node.
    This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that must use
    their own Scanner and don't select one the Scanner.Selector that's configured for the target.
set_always_build (always_build=1)
    Set the Node's always_build value.
set_executor (executor)
    Set the action executor for this node.
set_explicit (is_explicit)
set_local ()
set_nocache (nocache=1)
    Set the Node's nocache value.
set_noclean (noclean=1)
    Set the Node's noclean value.
set_precious (precious=1)
    Set the Node's precious value.
set_pseudo (pseudo=True)
    Set the Node's precious value.
set_specific_source (source)
set_src_builder (builder)
    Set the source code builder for this node.
set_state (state)
side_effect
side_effects
sources
sources_set
src_builder ()
    Fetch the source code builder for this node.
    If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value
    from its parent directory, and so on up to the file system root).
srcnode ()
    If this node is in a build path, return the node corresponding to its source file. Otherwise, return ourself.
stat ()
state
store_info
str_for_display ()
target_from_source (prefix, suffix, splittest=<function splittest>)
    Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.
    Note that this method can be overridden dynamically for generated files that need different behavior. See
    Tool/swig.py for an example.
target_peers
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
wkids
class SCons.Node.FS.Dir (name, directory, fs)
    Bases: Base
    A class for directories in a file system.
    class Attrs
        Bases: object
        shared
    BuildInfo
        alias of DirBuildInfo
    Decider (function)
    Dir (name, create=True)

```

Looks up or creates a directory node named 'name' relative to this directory.

Entry (name)  
Looks up or creates an entry node named 'name' relative to this directory.

File (name)  
Looks up or creates a file node named 'name' relative to this directory.

GetTag (key)  
Return a user-defined tag.

NodeInfo  
alias of DirNodeInfo

RDirs (pathlist)  
Search for a list of directories in the Repository list.

Rfindalldirs (pathlist)  
Return all of the directories for a given path list, including corresponding "backing" directories in any repositories. The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up the same path for each target in a given directory.

Tag (key, value)  
Add a user-defined tag.

\_Rfindalldirs\_key (pathlist)

\_clearRepositoryCache (duplicate=None)  
Called when we change the repository(ies) for a directory. This clears any cached information that is invalidated by changing the repository.

\_resetDuplicate (node)

\_abspath

\_add\_child (collection, set, child)  
Adds 'child' to 'collection', first checking 'set' to see if it's already present.

\_children\_get ()

\_children\_reset ()

\_create ()  
Create this directory, silently and without worrying about whether the builder is the default or not.

\_func\_exists

\_func\_get\_contents

\_func\_is\_derived

\_func\_rexists

\_func\_sconsign

\_func\_target\_from\_source

\_get\_scanner (env, initial\_scanner, root\_node\_scanner, kw)

\_get\_str ()

\_glob1 (pattern, ondisk=True, source=False, strings=False)  
Globs for and returns a list of entry names matching a single pattern in this directory.  
This searches any repositories and source directories for corresponding entries and returns a Node (or string) relative to the current directory if an entry is found anywhere.  
TODO: handle pattern with no wildcard

\_labspath

\_local

\_memo

\_morph ()  
Turn a file system Node (either a freshly initialized directory object or a separate Entry object) into a proper directory object.  
Set up this directory's entries and hook it into the file system tree. Specify that directories (this Node) don't use signatures for calculating whether they're current.

\_path

\_path\_elements

\_proxy

\_rel\_path\_key (other)

\_save\_str ()

\_sconsign

`_specific_sources`  
`_srcdir_find_file_key (filename)`  
`_tags`  
`_tpath`  
`addRepository (dir)`  
`add_dependency (depend)`  
 Adds dependencies.  
`add_ignore (depend)`  
 Adds dependencies to ignore.  
`add_prerequisite (prerequisite)`  
 Adds prerequisites  
`add_source (source)`  
 Adds sources.  
`add_to_implicit (deps)`  
`add_to_waiting_parents (node)`  
 Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)  
`add_to_waiting_s_e (node)`  
`add_wkid (wkid)`  
 Add a node to the list of kids waiting to be evaluated  
`all_children (scan=1)`  
 Return a list of all the node's direct children.  
`alter_targets ()`  
 Return any corresponding targets in a variant directory.  
`always_build`  
`attributes`  
`binfo`  
`build (**kw)`  
 A null "builder" for directories.  
`builder`  
`builder_set (builder)`  
`built ()`  
 Called just after this node is successfully built.  
`cached`  
`cachedir_csig`  
`cachesig`  
`changed (node=None, allowcache=False)`  
 Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.  
 Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an #included .h file) is updated.  
 The allowcache option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this changed method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to changed().  
 @see: FS.File.changed(), FS.File.release\_target\_info()  
`changed_since_last_build`  
`check_attributes (name)`  
 Simple API to check if the node.attributes for name has been set  
`children (scan=1)`  
 Return a list of the node's direct children, minus those that are ignored by this node.  
`children_are_up_to_date ()`  
 Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The SCons.Node.Alias and SCons.Node.Python.Value subclasses rebind their current() method to this method.

clear ()

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

clear\_memoized\_values ()

contentsig

cwd

del\_binfo ()

Delete the build info from this node.

depends

depends\_set

dir

dir\_on\_disk (name)

dirname

disambiguate (must\_exist=None)

diskcheck\_match ()

do\_duplicate (src)

duplicate

entries

entry\_abspath (name)

entry\_exists\_on\_disk (name)

Searches through the file/dir entries of the current directory, and returns True if a physical entry with the given name could be found.

@see reentry\_exists\_on\_disk

entry\_labspath (name)

entry\_path (name)

entry\_tpath (name)

env

env\_set (env, safe=0)

executor

executor\_cleanup ()

Let the executor clean up any cached information.

exists ()

Does this node exists?

explain ()

file\_on\_disk (name)

for\_signature ()

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the \_\_str\_\_() method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of str() to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

fs

Reference to parent Node.FS object

getRepositories ()

Returns a list of repositories for this directory.

get\_abspath () → str

Get the absolute path of the file.

get\_all\_rdirs ()

get\_binfo ()

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`

Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`

Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`

Return the set builder, or a specified default value

`get_cachedir_csig ()`

`get_contents ()`

Return content signatures and names of all our children separated by new-lines. Ensure that the nodes are sorted.

`get_csig ()`

Compute the content signature for Directory nodes. In general, this is not needed and the content signature is not stored in the `DirNodeInfo`. However, if `get_contents` on a `Dir` node is called which has a child directory, the child directory should return the hash of its contents.

`get_dir ()`

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`

Return this directory's implicit dependencies.

We don't bother caching the results because the scan typically shouldn't be requested more than once (as opposed to scanning .h file contents, which can be requested as many times as the files is #included by other files).

`get_implicit_deps (env, initial_scanner, path_func, kw={})`

Return a list of implicit dependencies for this node.

This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_internal_path ()`

`get_labspath () → str`

Get the absolute path of the file.

`get_ninfo ()`

`get_path (dir=None)`

Return path relative to the current working directory of the `Node.FS.Base` object that owns us.

`get_path_elements ()`

`get_relpath ()`

Get the path of the file relative to the root SConstruct file's directory.

`get_source_scanner (node)`

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`

Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a `Node` to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this `Node`, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use

is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_text_contents ()`

We already emit things in text, so just return the binary version.

`get_timestamp () → int`

Return the latest timestamp from among our children

`get_tpath ()`

`getmtime ()`

`getsize ()`

`glob (pathname, ondisk=True, source=False, strings=False, exclude=None)`

Returns a list of Nodes (or strings) matching a specified pathname pattern.

Pathname patterns follow UNIX shell semantics: `*` matches any-length strings of any characters, `?` matches any character, and `[]` can enclose lists or ranges of characters. Matches do not span directory separators.

The matches take into account Repositories, returning local Nodes if a corresponding entry exists in a Repository (either an in-memory Node or something on disk).

By default, the `glob()` function matches entries that exist on-disk, in addition to in-memory Nodes. Setting the “`ondisk`” argument to `False` (or some other non-true value) causes the `glob()` function to only match in-memory Nodes. The default behavior is to return both the on-disk and in-memory Nodes.

The “`source`” argument, when true, specifies that corresponding source Nodes must be returned if you’re globbing in a build directory (initialized with `VariantDir()`). The default behavior is to return Nodes local to the `VariantDir()`.

The “`strings`” argument, when true, returns the matches as strings, not Nodes. The strings are path names relative to this directory.

The “`exclude`” argument, if not `None`, must be a pattern or a list of patterns following the same UNIX shell semantics. Elements matching a least one pattern of this list will be excluded from the result.

The underlying algorithm is adapted from the `glob.glob()` function in the Python library (but heavily modified), and uses `fnmatch()` under the covers.

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly (“if `node.builder: ...`”). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

If any child is not up-to-date, then this directory isn't, either.

`isdir ()`

`isfile ()`

`islink ()`

`link (srcdir, duplicate)`

Set this directory as the variant directory for the supplied source directory.

`linked`

`lstat ()`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`must_be_same (klass)`

This node, which already existed, is being looked up as the specified klass. Raise an exception if it isn't.

`name`

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`on_disk_entries`

`postprocess ()`

Clean up anything we don't need to hang onto after we've been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

`prerequisites`

`pseudo`

`push_to_cache ()`

Try to push a node into a cache

`rdir ()`

`ref_count`

`rel_path (other)`

Return a path to "other" relative to this directory.

`release_target_info ()`

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: `built()` and `File.release_target_info()`

`released_target_info`

`remove ()`

Remove this Node: no-op by default.

`render_include_tree ()`

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

`rentry ()`

`rentry_exists_on_disk (name)`

Searches through the file/dir entries of the current *and* all its remote directories (repos), and returns True if a physical entry with the given name could be found. The local directory (self) gets searched first, so repositories take a lower precedence regarding the searching order.

@see `entry_exists_on_disk`

`repositories`

`reset_executor ()`

Remove cached executor; forces recompute when needed.

`retrieve_from_cache ()`

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

Returns true if the node was successfully retrieved.

`rexists ()`

Does this node exist locally or in a repository?

`rfile ()`

`root`

`rstr ()`

A Node.FS.Base object's string representation is its path name.

`sbuilder`

`scan ()`

Scan this node's dependents for implicit dependencies.

`scanner_key ()`

A directory does not get scanned.

`scanner_paths`

`sconsign ()`

Return the .sconsign file info for this directory.

`searched`

`select_scanner (scanner)`

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that *must* use their own Scanner and don't select one the Scanner.Selector that's configured for the target.

`set_always_build (always_build=1)`

Set the Node's always\_build value.

`set_executor (executor)`

Set the action executor for this node.

`set_explicit (is_explicit)`

`set_local ()`

`set_nocache (nocache=1)`

Set the Node's nocache value.

`set_noclean (noclean=1)`

Set the Node's noclean value.

`set_precious (precious=1)`

Set the Node's precious value.

`set_pseudo (pseudo=True)`

Set the Node's precious value.

`set_specific_source (source)`



`set_src_builder (builder)`

Set the source code builder for this node.

`set_state (state)`

`side_effect`

`side_effects`

`sources`

`sources_set`

`src_builder ()`

Fetch the source code builder for this node.

If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value from its parent directory, and so on up to the file system root).

`srcdir`

`srcdir_duplicate (name)`

`srcdir_find_file (filename)`

`srcdir_list ()`

`srcnode ()`

Dir has a special need for `srcnode()`...if we have a `srcdir` attribute set, then that *is* our `srcnode`.

`stat ()`

`state`

`store_info`

`str_for_display ()`

`target_from_source (prefix, suffix, splitext=<function splitext>)`

Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.

Note that this method can be overridden dynamically for generated files that need different behavior. See `Tool/swig.py` for an example.

`target_peers`

`up ()`

`variant_dirs`

`visited ()`

Called just after this node has been visited (with or without a build).

`waiting_parents`

`waiting_s_e`

`walk (func, arg)`

Walk this directory tree by calling the specified function for each directory in the tree.

This behaves like the `os.path.walk()` function, but for in-memory `Node.FS.Dir` objects. The function takes the same arguments as the functions passed to `os.path.walk()`:

`func(arg, dirname, fnames)`

Except that "dirname" will actually be the directory *Node*, not the string. The '.' and '..' entries are excluded from fnames. The fnames list may be modified in-place to filter the subdirectories visited or otherwise impose a specific order. The "arg" argument is always passed to `func()` and may be used in any way (or ignored, passing `None` is common).

`wkids`

`class SCons.Node.FS.DirBuildInfo`

Bases: `BuildInfoBase`

`bact`

`bactsig`

`bdepends`

`bdependsigs`

`bimplicit`

`bimplicitigs`

`bsources`

`bsourcesigs`

`current_version_id = 2`

`merge (other)`

Merge the fields of another object into this object. Already existing information is overwritten by the other instance's data. WARNING: If a '\_\_dict\_\_' slot is added, it should be updated instead of replaced.

```

class SCons.Node.FS.DirNodeInfo
    Bases: NodeInfoBase
    convert (node, val)
    current_version_id = 2
    format (field_list=None, names=0)
    fs = None
    merge (other)
        Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
        data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
    str_to_node (s)
    update (node)
class SCons.Node.FS.DiskChecker (type, do, ignore)
    Bases: object
    set (list)
class SCons.Node.FS.Entry (name, directory, fs)
    Bases: Base
    This is the class for generic Node.FS entries—that is, things that could be a File or a Dir, but we're just not sure yet.
    Consequently, the methods in this class really exist just to transform their associated object into the right class when
    the time comes, and then call the same-named method in the transformed class.
    class Attrs
        Bases: object
        shared
    BuildInfo
        alias of BuildInfoBase
    Decider (function)
    GetTag (key)
        Return a user-defined tag.
    NodeInfo
        alias of NodeInfoBase
    RDirs (pathlist)
        Search for a list of directories in the Repository list.
    Rfindalldirs (pathlist)
        Return all of the directories for a given path list, including corresponding "backing" directories in any repositories.
        The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up
        the same path for each target in a given directory.
    Tag (key, value)
        Add a user-defined tag.
    _Rfindalldirs_key (pathlist)
    _abspath
    _add_child (collection, set, child)
        Adds 'child' to 'collection', first checking 'set' to see if it's already present.
    _children_get ()
    _children_reset ()
    _func_exists
    _func_get_contents
    _func_is_derived
    _func_rexists
    _func_sconsign
    _func_target_from_source
    _get_scanner (env, initial_scanner, root_node_scanner, kw)
    _get_str ()
    _glob1 (pattern, ondisk=True, source=False, strings=False)
    _labspath
    _local
    _memo
    _path

```

```

_path_elements
_proxy
_save_str ()
_sconsign
_specific_sources
_tags
_tpath
add_dependency (depend)
    Adds dependencies.
add_ignore (depend)
    Adds dependencies to ignore.
add_prerequisite (prerequisite)
    Adds prerequisites
add_source (source)
    Adds sources.
add_to_implicit (deps)
add_to_waiting_parents (node)
    Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note
    that the returned values are intended to be used to increment a reference count, so don't think you can "clean up"
    this function by using True and False instead...)
add_to_waiting_s_e (node)
add_wkid (wkid)
    Add a node to the list of kids waiting to be evaluated
all_children (scan=1)
    Return a list of all the node's direct children.
alter_targets ()
    Return a list of alternate targets for this Node.
always_build
attributes
binfo
build (**kw)
    Actually build the node.
    This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the
    prepare() method has gotten everything, uh, prepared.
    This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe
    stuff in built().
builder
builder_set (builder)
built ()
    Called just after this node is successfully built.
cached
cachedir_csig
cachesig
changed (node=None, allowcache=False)
    Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to
    compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in
    a Repository) can be used instead.
    Note that we now always check every dependency. We used to short-circuit the check by returning as soon as we
    detected any difference, but we now rely on checking every dependency to make sure that any necessary Node
    information (for example, the content signature of an #included .h file) is updated.
    The allowcache option was added for supporting the early release of the executor/builder structures, right after a
    File target was built. When set to true, the return value of this changed method gets cached for File nodes. Like
    this, the executor isn't needed any longer for subsequent calls to changed().
    @see: FS.File.changed(), FS.File.release_target_info()
changed_since_last_build
check_attributes (name)

```

Simple API to check if the node.attributes for name has been set

children (scan=1)  
Return a list of the node's direct children, minus those that are ignored by this node.

children\_are\_up\_to\_date ()  
Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The SCons.Node.Alias and SCons.Node.Python.Value subclasses rebind their current() method to this method.

clear ()  
Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

clear\_memoized\_values ()

contentsig

cwd

del\_binfo ()  
Delete the build info from this node.

depends

depends\_set

dir

dirname

disambiguate (must\_exist=None)

diskcheck\_match ()

duplicate

entries

env

env\_set (env, safe=0)

executor

executor\_cleanup ()  
Let the executor clean up any cached information.

exists ()  
Does this node exists?

explain ()

for\_signature ()  
Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the \_\_str\_\_() method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of str() to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

fs  
Reference to parent Node.FS object

get\_abspath ()  
Get the absolute path of the file.

get\_binfo ()  
Fetch a node's build information.  
node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature  
This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

get\_build\_env ()  
Fetch the appropriate Environment to build this node.

get\_build\_scanner\_path (scanner)  
Fetch the appropriate scanner path for this node.

get\_builder (default\_builder=None)  
Return the set builder, or a specified default value

get\_cachedir\_csig ()

get\_contents ()

Fetch the contents of the entry. Returns the exact binary contents of the file.

`get_csig ()`

`get_dir ()`

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`

Return the scanned include lines (implicit dependencies) found in this node.

The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`

Return a list of implicit dependencies for this node.

This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_internal_path ()`

`get_labspath ()`

Get the absolute path of the file.

`get_ninfo ()`

`get_path (dir=None)`

Return path relative to the current working directory of the Node.FS.Base object that owns us.

`get_path_elements ()`

`get_relpath ()`

Get the path of the file relative to the root SConstruct file's directory.

`get_source_scanner (node)`

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`

Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_text_contents ()`

Fetch the decoded text contents of a Unicode encoded Entry.

Since this should return the text contents from the file system, we check to see into what sort of subclass we should morph this Entry.

`get_tpath ()`

`getmtime ()`

`getsize ()`

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

Default check for whether the Node is current: unknown Node subtypes are always out of date, so they will always get built.

`isdir ()`

`isfile ()`

`islink ()`

`linked`

`lstat ()`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`must_be_same (klass)`

Called to make sure a Node is a Dir. Since we're an Entry, we can morph into one.

`name`

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`on_disk_entries`

postprocess ()

Clean up anything we don't need to hang onto after we've been built.

precious

prepare ()

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

prerequisites

pseudo

push\_to\_cache ()

Try to push a node into a cache

ref\_count

rel\_path (other)

release\_target\_info ()

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: built() and File.release\_target\_info()

released\_target\_info

remove ()

Remove this Node: no-op by default.

render\_include\_tree ()

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

reentry ()

repositories

reset\_executor ()

Remove cached executor; forces recompute when needed.

retrieve\_from\_cache ()

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in built().

Returns true if the node was successfully retrieved.

rexists ()

Does this node exist locally or in a repository?

rfile ()

We're a generic Entry, but the caller is actually looking for a File at this point, so morph into one.

root

rstr ()

A Node.FS.Base object's string representation is its path name.

sbuilder

scan ()

Scan this node's dependents for implicit dependencies.

scanner\_key ()

scanner\_paths

searched

select\_scanner (scanner)

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that *must* use their own Scanner and don't select one the Scanner.Selector that's configured for the target.

`set_always_build (always_build=1)`

Set the Node's always\_build value.

`set_executor (executor)`

Set the action executor for this node.

`set_explicit (is_explicit)`

`set_local ()`

`set_nocache (nocache=1)`

Set the Node's nocache value.

`set_noclean (noclean=1)`

Set the Node's noclean value.

`set_precious (precious=1)`

Set the Node's precious value.

`set_pseudo (pseudo=True)`

Set the Node's precious value.

`set_specific_source (source)`

`set_src_builder (builder)`

Set the source code builder for this node.

`set_state (state)`

`side_effect`

`side_effects`

`sources`

`sources_set`

`src_builder ()`

Fetch the source code builder for this node.

If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value from its parent directory, and so on up to the file system root).

`srcdir`

`srcnode ()`

If this node is in a build path, return the node corresponding to its source file. Otherwise, return ourself.

`stat ()`

`state`

`store_info`

`str_for_display ()`

`target_from_source (prefix, suffix, splittest=<function splittest>)`

Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.

Note that this method can be overridden dynamically for generated files that need different behavior. See Tool/swig.py for an example.

`target_peers`

`variant_dirs`

`visited ()`

Called just after this node has been visited (with or without a build).

`waiting_parents`

`waiting_s_e`

`wkids`

`class SCons.Node.FS.EntryProxy (subject)`

Bases: Proxy

`__get_abspath ()`

`__get_base_path ()`

Return the file's directory and file name, with the suffix stripped.

`__get_dir ()`

`__get_file ()`

`__get_filebase ()`

`__get_posix_path ()`

Return the path with / as the path separator, regardless of platform.



```

__get_relpath ()
__get_rsrcdir ()
    Returns the directory containing the source node linked to this node via VariantDir(), or the directory of this node if
    not linked.
__get_rsrcnode ()
__get_srcdir ()
    Returns the directory containing the source node linked to this node via VariantDir(), or the directory of this node if
    not linked.
__get_srcnode ()
__get_suffix ()
__get_windows_path ()
    Return the path with as the path separator, regardless of platform.
dictSpecialAttrs = {'abspath': <function EntryProxy.__get_abspath>, 'base': <function
EntryProxy.__get_base_path>, 'dir': <function EntryProxy.__get_dir>, 'file': <function EntryProxy.__get_file>,
'filebase': <function EntryProxy.__get_filebase>, 'posix': <function EntryProxy.__get_posix_path>, 'relpath': <function
EntryProxy.__get_relpath>, 'rsrcdir': <function EntryProxy.__get_rsrcdir>, 'srcpath': <function
EntryProxy.__get_rsrcnode>, 'srcdir': <function EntryProxy.__get_srcdir>, 'srcpath': <function
EntryProxy.__get_srcnode>, 'suffix': <function EntryProxy.__get_suffix>, 'win32': <function
EntryProxy.__get_windows_path>, 'windows': <function EntryProxy.__get_windows_path>}
get ()
    Retrieve the entire wrapped object
exception SCons.Node.FS.EntryProxyAttributeError (entry_proxy, attribute)
    Bases: AttributeError
    An AttributeError subclass for recording and displaying the name of the underlying Entry involved in an AttributeError
    exception.
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
class SCons.Node.FS.FS (path=None)
    Bases: LocalFS
    Dir (name, directory=None, create=True)
        Look up or create a Dir node with the specified name. If the name is a relative path (begins with ./, ../, or a file
        name), then it is looked up relative to the supplied directory node, or to the top level directory of the FS (supplied at
        construction time) if no directory is supplied.
        This method will raise TypeError if a normal file is found at the specified path.
    Entry (name, directory=None, create=1)
        Look up or create a generic Entry node with the specified name. If the name is a relative path (begins with ./, ../, or
        a file name), then it is looked up relative to the supplied directory node, or to the top level directory of the FS
        (supplied at construction time) if no directory is supplied.
    File (name, directory=None, create=1)
        Look up or create a File node with the specified name. If the name is a relative path (begins with ./, ../, or a file
        name), then it is looked up relative to the supplied directory node, or to the top level directory of the FS (supplied at
        construction time) if no directory is supplied.
        This method will raise TypeError if a directory is found at the specified path.
    Glob (pathname, ondisk=True, source=True, strings=False, exclude=None, cwd=None)
        Globs
        This is mainly a shim layer
    PyPackageDir (module_name)
        Locate the directory of a given python module name
        For example scons might resolve to Windows: C:\Python27\Lib\site-packages\scons-2.5.1 Linux: /usr/lib/scons
        This can be useful when we want to determine a toolpath based on a python module name
    Repository (*dirs)
        Specify Repository directories to search.
    VariantDir (variant_dir, src_dir, duplicate=1)
        Link the supplied variant directory to the source directory for purposes of building files.
    _lookup (p, directory, fsclass, create=1)

```

The generic entry point for Node lookup with user-supplied data.

This translates arbitrary input into a canonical Node.FS object of the specified fsclass. The general approach for strings is to turn it into a fully normalized absolute path and then call the root directory's lookup\_abs() method for the heavy lifting.

If the path name begins with '#', it is unconditionally interpreted relative to the top-level directory of this FS. '#' is treated as a synonym for the top-level SConstruct directory, much like '~' is treated as a synonym for the user's home directory in a UNIX shell. So both '#foo' and './foo' refer to the 'foo' subdirectory underneath the top-level SConstruct directory.

If the path name is relative, then the path is looked up relative to the specified directory, or the current directory (self.\_cwd, typically the SConstruct directory) if the specified directory is None.

chdir (dir, change\_os\_dir=0)

Change the current working directory for lookups. If change\_os\_dir is true, we will also change the "real" cwd to match.

chmod (path, mode)

copy (src, dst)

copy2 (src, dst)

exists (path)

get\_max\_drift ()

get\_root (drive)

Returns the root directory for the specified drive, creating it if necessary.

getcwd ()

getmtime (path)

getsize (path)

isdir (path)

isfile (path)

islink (path)

link (src, dst)

listdir (path)

lstat (path)

makedirs (path, mode=511, exist\_ok=False)

mkdir (path, mode=511)

open (path)

readlink (file)

rename (old, new)

scandir (path)

set\_SConstruct\_dir (dir)

set\_max\_drift (max\_drift)

stat (path)

symlink (src, dst)

unlink (path)

variant\_dir\_target\_climb (orig, dir, tail)

Create targets in corresponding variant directories

Climb the directory tree, and look up path names relative to any linked variant directories we find.

Even though this loops and walks up the tree, we don't memoize the return value because this is really only used to process the command-line targets.

class SCons.Node.FS.File (name, directory, fs)

Bases: Base

A class for files in a file system.

class Attrs

Bases: object

shared

BuildInfo

alias of FileBuildInfo

Decider (function)

Dir (name, create=True)

Create a directory node named 'name' relative to the directory of this file.

`Dirs (pathlist)`

Create a list of directories relative to the SConscript directory of this file.

`Entry (name)`

Create an entry node named 'name' relative to the directory of this file.

`File (name)`

Create a file node named 'name' relative to the directory of this file.

`GetTag (key)`

Return a user-defined tag.

`NodeInfo`

alias of `FileNodeInfo`

`RDirs (pathlist)`

Search for a list of directories in the Repository list.

`Rfindalldirs (pathlist)`

Return all of the directories for a given path list, including corresponding "backing" directories in any repositories.

The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up the same path for each target in a given directory.

`Tag (key, value)`

Add a user-defined tag.

`_Rfindalldirs_key (pathlist)`

`_dmap_cache = {}`

`_dmap_sig_cache = {}`

`_abspath`

`_add_child (collection, set, child)`

Adds 'child' to 'collection', first checking 'set' to see if it's already present.

`_add_strings_to_dependency_map (dmap)`

In the case comparing node objects isn't sufficient, we'll add the strings for the nodes to the dependency map  
:return:

`_build_dependency_map (binfo)`

Build mapping from file -> signature

#### Parameters:

- **self** (*self* -) –
- **considered** (*binfo - buildinfo from node being*) –

**Returns:** dictionary of file->signature mappings

`_children_get ()`

`_children_reset ()`

`_createDir ()`

`_func_exists`

`_func_get_contents`

`_func_is_derived`

`_func_rexists`

`_func_sconsign`

`_func_target_from_source`

`_get_found_includes_key (env, scanner, path)`

`_get_previous_signatures (dmap)`

Return a list of corresponding csigs from previous build in order of the node/files in children.

#### Parameters:

- **self** (*self* -) –
- **csig** (*dmap - Dictionary of file ->*) –

**Returns:** List of csigs for provided list of children

`_get_scanner (env, initial_scanner, root_node_scanner, kw)`

`_get_str ()`

`_glob1 (pattern, ondisk=True, source=False, strings=False)`

`_labspath`

`_local`

```

_memo
_morph ()
    Turn a file system node into a File object.
_path
_path_elements
_proxy
_rmv_existing ()
_save_str ()
_sconsign
_specific_sources
_tags
_tpath
add_dependency (depend)
    Adds dependencies.
add_ignore (depend)
    Adds dependencies to ignore.
add_prerequisite (prerequisite)
    Adds prerequisites
add_source (source)
    Adds sources.
add_to_implicit (deps)
add_to_waiting_parents (node)
    Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note
    that the returned values are intended to be used to increment a reference count, so don't think you can "clean up"
    this function by using True and False instead...)
add_to_waiting_s_e (node)
add_wkid (wkid)
    Add a node to the list of kids waiting to be evaluated
all_children (scan=1)
    Return a list of all the node's direct children.
alter_targets ()
    Return any corresponding targets in a variant directory.
always_build
attributes
binfo
build (**kw)
    Actually build the node.
    This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the
    prepare() method has gotten everything, uh, prepared.
    This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe
    stuff in built().
builder
builder_set (builder)
built ()
    Called just after this File node is successfully built.
    Just like for 'release_target_info' we try to release some more target node attributes in order to minimize the overall
    memory consumption.
    @see: release_target_info
cached
cachedir_csig
cachesig
changed (node=None, allowcache=False)
    Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built.
    For File nodes this is basically a wrapper around Node.changed(), but we allow the return value to get cached after
    the reference to the Executor got released in release_target_info().
    @see: Node.changed()

```

changed\_content (target, prev\_ni, repo\_node=None)

changed\_since\_last\_build

changed\_state (target, prev\_ni, repo\_node=None)

changed\_timestamp\_match (target, prev\_ni, repo\_node=None)

Return True if the timestamps don't match or if there is no previous timestamp :param target: :param prev\_ni:

Information about the node from the previous build :return:

changed\_timestamp\_newer (target, prev\_ni, repo\_node=None)

changed\_timestamp\_then\_content (target, prev\_ni, node=None)

Used when decider for file is Timestamp-MD5

**NOTE: If the timestamp hasn't changed this will skip md5'ing the**

file and just copy the prev\_ni provided. If the prev\_ni is wrong. It will propagate it. See: <https://github.com/SCons/scons/issues/2980>

**Parameters:**

- **dependency** (self -) –
- **target** (target -) –
- **.sconsign** (prev\_ni - The NodeInfo object loaded from previous builds) –
- **existence/timestamp** (node - Node instance. Check this node for file) – if specified.

**Returns:** Boolean - Indicates if node(File) has changed.

check\_attributes (name)

Simple API to check if the node.attributes for name has been set

children (scan=1)

Return a list of the node's direct children, minus those that are ignored by this node.

children\_are\_up\_to\_date ()

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The SCons.Node.Alias and SCons.Node.Python.Value subclasses rebind their current() method to this method.

clear ()

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

clear\_memoized\_values ()

contentsig

convert\_copy\_attrs = ['bsources', 'bimplicit', 'bdepends', 'bact', 'bactsig', 'ninfo']

convert\_old\_entry (old\_entry)

convert\_sig\_attrs = ['bsourcesigs', 'bimplicitsigs', 'bdependsigs']

cwd

del\_binfo ()

Delete the build info from this node.

depends

depends\_set

dir

dirname

disambiguate (must\_exist=None)

diskcheck\_match ()

do\_duplicate (src)

duplicate

entries

env

env\_set (env, safe=0)

executor

executor\_cleanup ()

Let the executor clean up any cached information.

exists ()

Does this node exist?

`explain ()`

`find_repo_file ()`

For this node, find if there exists a corresponding file in one or more repositories :return: list of corresponding files in repositories

`find_src_builder ()`

`for_signature ()`

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

`fs`

Reference to parent Node.FS object

`get_abspath ()`

Get the absolute path of the file.

`get_binfo ()`

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`

Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`

Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`

Return the set builder, or a specified default value

`get_cachedir_bsig ()`

Return the signature for a cached file, including its children.

It adds the path of the cached file to the cache signature, because multiple targets built by the same action will all have the same build signature, and we have to differentiate them somehow.

Signature should normally be string of hex digits.

`get_cachedir_csig ()`

Fetch a Node's content signature for purposes of computing another Node's cachesig.

This is a wrapper around the normal `get_csig()` method that handles the somewhat obscure case of using `CacheDir` with the `-n` option. Any files that don't exist would normally be "built" by fetching them from the cache, but the normal `get_csig()` method will try to open up the local file, which doesn't exist because the `-n` option meant we didn't actually pull the file from `cachedir`. But since the file *does* actually exist in the `cachedir`, we can use its contents for the `csig`.

`get_content_hash ()` → str

Compute and return the hash for this file.

`get_contents ()` → bytes

Return the contents of the file as bytes.

`get_contents_sig ()`

A helper method for `get_cachedir_bsig`.

It computes and returns the signature for this node's contents.

`get_csig ()` → str

Generate a node's content signature.

`get_dir ()`

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`

Return the included implicit dependencies in this file. Cache results so we only scan the file once per path regardless of how many times this information is requested.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`  
 Return a list of implicit dependencies for this node.  
 This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_internal_path ()`  
`get_labspath ()`  
 Get the absolute path of the file.

`get_max_drift_csig () → Optional[ str ]`  
 Returns the content signature currently stored for this node if it's been unmodified longer than the `max_drift` value, or the `max_drift` value is 0. Returns None otherwise.

`get_ninfo ()`  
`get_path (dir=None)`  
 Return path relative to the current working directory of the `Node.FS.Base` object that owns us.

`get_path_elements ()`  
`get_relpath ()`  
 Get the path of the file relative to the root SConstruct file's directory.

`get_size () → int`  
`get_source_scanner (node)`  
 Fetch the source scanner for the specified node  
 NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.  
 Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.  
 This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`  
`get_stored_implicit ()`  
 Fetch the stored implicit dependencies

`get_stored_info ()`  
`get_string (for_signature)`  
 This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.  
 Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`  
 This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`  
`get_target_scanner ()`  
`get_text_contents () → str`  
 Return the contents of the file in text form.  
 This attempts to figure out what the encoding of the text is based upon the BOM bytes, and then decodes the contents so that it's a valid python string.

`get_timestamp () → int`  
`get_tpath ()`  
`getmtime ()`  
`getsize ()`  
`has_builder ()`  
 Return whether this Node has a builder or not.  
 In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if `node.builder: ...`"). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the

`__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`  
 Return whether this Node has an explicit builder  
 This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`has_src_builder ()`  
 Return whether this Node has a source builder or not.  
 If this Node doesn't have an explicit source code builder, this is where we figure out, on the fly, if there's a transparent source code builder for it.  
 Note that if we found a source builder, we also set the `self.builder` attribute, so that all of the methods that actually *build* this file don't have to do anything different.

`hash_chunksize = 65536`

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`  
 Returns true if this node is an conftest node

`is_derived ()`  
 Returns true if this node is derived (i.e. built).  
 This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`  
 Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`  
 Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`  
 Check for whether the Node is current In all cases `self` is the target we're checking to see if it's up to date

`isdir ()`

`isfile ()`

`islink ()`

`linked`

`lstat ()`

`make_ready ()`  
 Get a Node ready for evaluation.  
 This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`  
 Return whether this Node has a builder or not.  
 In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if `node.builder: ...`"). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`must_be_same (klass)`  
 This node, which already existed, is being looked up as the specified klass. Raise an exception if it isn't.

`name`

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`



noclean

on\_disk\_entries

postprocess ()

Clean up anything we don't need to hang onto after we've been built.

precious

prepare ()

Prepare for this file to be created.

prerequisites

pseudo

push\_to\_cache ()

Try to push the node into a cache

ref\_count

rel\_path (other)

release\_target\_info ()

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

We'd like to remove a lot more attributes like self.sources and self.sources\_set, but they might get used in a next build step. For example, during configuration the source files for a built E{\*}.o file are used to figure out which linker to use for the resulting Program (gcc vs. g++)! That's why we check for the 'keep\_targetinfo' attribute, config Nodes and the Interactive mode just don't allow an early release of most variables.

In the same manner, we can't simply remove the self.attributes here. The smart linking relies on the shared flag, and some parts of the java Tool use it to transport information about nodes...

@see: built() and Node.release\_target\_info()

released\_target\_info

remove ()

Remove this file.

render\_include\_tree ()

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

rentry ()

repositories

reset\_executor ()

Remove cached executor; forces recompute when needed.

retrieve\_from\_cache ()

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in built().

Returns true if the node was successfully retrieved.

rexists ()

Does this node exist locally or in a repository?

rfile ()

root

rstr ()

A Node.FS.Base object's string representation is its path name.

sbuilder

scan ()

Scan this node's dependents for implicit dependencies.

scanner\_key ()

scanner\_paths

searched

select\_scanner (scanner)

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that *must* use their own Scanner and don't select one the Scanner.Selector that's configured for the target.

set\_always\_build (always\_build=1)

Set the Node's always\_build value.

```

set_executor (executor)
    Set the action executor for this node.
set_explicit (is_explicit)
set_local ()
set_nocache (nocache=1)
    Set the Node's nocache value.
set_noclean (noclean=1)
    Set the Node's noclean value.
set_precious (precious=1)
    Set the Node's precious value.
set_pseudo (pseudo=True)
    Set the Node's precious value.
set_specific_source (source)
set_src_builder (builder)
    Set the source code builder for this node.
set_state (state)
side_effect
side_effects
sources
sources_set
src_builder ()
    Fetch the source code builder for this node.
    If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value
    from its parent directory, and so on up to the file system root).
srcdir
srcnode ()
    If this node is in a build path, return the node corresponding to its source file. Otherwise, return ourself.
stat ()
state
store_info
str_for_display ()
target_from_source (prefix, suffix, splitext=<function splitext>)
    Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.
    Note that this method can be overridden dynamically for generated files that need different behavior. See
    Tool/swig.py for an example.
target_peers
variant_dirs
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
wkids
class SCons.Node.FS.FileBuildInfo
    Bases: BuildInfoBase
    This is info loaded from sconsign.

Attributes unique to FileBuildInfo:
    dependency_map : Caches file->csig mapping
        for all dependencies. Currently this is only used when using MD5-timestamp decider. It's used to ensure that
        we copy the correct csig from the previous build to be written to .sconsign when current build is done.
        Previously the matching of csig to file was strictly by order they appeared in bdepends, bsources, or
        bimplicit, and so a change in order or count of any of these could yield writing wrong csig, and then false
        positive rebuilds

    bact
    bactsig
    bdepends

```

```

bdependsigs
bimplicit
bimplicitsigs
bsources
bsourcesigs
convert_from_sconsign (dir, name)
    Converts a newly-read FileBuildInfo object for in-SCons use
    For normal up-to-date checking, we don't have any conversion to perform—but we're leaving this method here to
    make that clear.
convert_to_sconsign ()
    Converts this FileBuildInfo object for writing to a .sconsign file
    This replaces each Node in our various dependency lists with its usual string representation: relative to the
    top-level SConstruct directory, or an absolute path if it's outside.
current_version_id = 2
dependency_map
format (names=0)
merge (other)
    Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
    data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
prepare_dependencies ()
    Prepares a FileBuildInfo object for explaining what changed
    The bsources, bdepends and bimplicit lists have all been stored on disk as paths relative to the top-level
    SConstruct directory. Convert the strings to actual Nodes (for use by the --debug=explain code and
    --implicit-cache).
exception SCons.Node.FS.FileBuildInfoFileToCsigMappingError
    Bases: Exception
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
class SCons.Node.FS.FileFinder
    Bases: object
    _find_file_key (filename, paths, verbose=None)
    filedir_lookup (p, fd=None)
        A helper method for find_file() that looks up a directory for a file we're trying to find. This only creates the Dir Node
        if it exists on-disk, since if the directory doesn't exist we know we won't find any files in it... :-)
        It would be more compact to just use this as a nested function with a default keyword argument (see the
        commented-out version below), but that doesn't work unless you have nested scopes, so we define it here just so
        this work under Python 1.5.2.
    find_file (filename, paths, verbose=None)
        Find a node corresponding to either a derived file or a file that exists already.
        Only the first file found is returned, and none is returned if no file is found.
        filename: A filename to find paths: A list of directory path nodes to search in. Can be represented as a list, a tuple,
        or a callable that is called with no arguments and returns the list or tuple.
        returns The node created from the found file.
class SCons.Node.FS.FileNodeInfo
    Bases: NodeInfoBase
    convert (node, val)
    csig
    current_version_id = 2
    field_list = ['csig', 'timestamp', 'size']
    format (field_list=None, names=0)
    fs = None
    merge (other)
        Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
        data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
    size

```

```

    str_to_node (s)
    timestamp
    update (node)
SCons.Node.FS.LinkFunc (target, source, env)
    Relative paths cause problems with symbolic links, so we use absolute paths, which may be a problem for people
    who want to move their soft-linked src-trees around. Those people should use the 'hard-copy' mode, softlinks cannot
    be used for that; at least I have no idea how ...
class SCons.Node.FS.LocalFS
    Bases: object
    This class implements an abstraction layer for operations involving a local file system. Essentially, this wraps any
    function in the os, os.path or shutil modules that we use to actually go do anything with or to the local file system.
    Note that there's a very good chance we'll refactor this part of the architecture in some way as we really implement
    the interface(s) for remote file system Nodes. For example, the right architecture might be to have this be a subclass
    instead of a base class. Nevertheless, we're using this as a first step in that direction.
    We're not using chdir() yet because the calling subclass method needs to use os.chdir() directly to avoid recursion.
    Will we really need this one?
    chmod (path, mode)
    copy (src, dst)
    copy2 (src, dst)
    exists (path)
    getmtime (path)
    getsize (path)
    isdir (path)
    isfile (path)
    islink (path)
    link (src, dst)
    listdir (path)
    lstat (path)
    makedirs (path, mode=511, exist_ok=False)
    mkdir (path, mode=511)
    open (path)
    readlink (file)
    rename (old, new)
    scandir (path)
    stat (path)
    symlink (src, dst)
    unlink (path)
SCons.Node.FS.LocalString (target, source, env)
SCons.Node.FS.MkdirFunc (target, source, env)
class SCons.Node.FS.RootDir (drive, fs)
    Bases: Dir
    A class for the root directory of a file system.
    This is the same as a Dir class, except that the path separator ('/' or '\') is actually part of the name, so we don't need
    to add a separator when creating the path names of entries within this directory.
class Attrs
    Bases: object
    shared
BuildInfo
    alias of DirBuildInfo
Decider (function)
Dir (name, create=True)
    Looks up or creates a directory node named 'name' relative to this directory.
Entry (name)
    Looks up or creates an entry node named 'name' relative to this directory.
File (name)
    Looks up or creates a file node named 'name' relative to this directory.

```

GetTag (*key*)

Return a user-defined tag.

NodeInfo

alias of DirNodeInfo

RDirs (*pathlist*)

Search for a list of directories in the Repository list.

Rfindalldirs (*pathlist*)

Return all of the directories for a given path list, including corresponding “backing” directories in any repositories.

The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up the same path for each target in a given directory.

Tag (*key*, *value*)

Add a user-defined tag.

\_Rfindalldirs\_key (*pathlist*)

\_abspath

\_add\_child (*collection*, *set*, *child*)

Adds ‘child’ to ‘collection’, first checking ‘set’ to see if it’s already present.

\_children\_get ()

\_children\_reset ()

\_create ()

Create this directory, silently and without worrying about whether the builder is the default or not.

\_func\_exists

\_func\_get\_contents

\_func\_is\_derived

\_func\_rexists

\_func\_sconsign

\_func\_target\_from\_source

\_get\_scanner (*env*, *initial\_scanner*, *root\_node\_scanner*, *kw*)

\_get\_str ()

\_glob1 (*pattern*, *ondisk=True*, *source=False*, *strings=False*)

Globs for and returns a list of entry names matching a single pattern in this directory.

This searches any repositories and source directories for corresponding entries and returns a Node (or string) relative to the current directory if an entry is found anywhere.

TODO: handle pattern with no wildcard

\_labspath

\_local

\_lookupDict

\_lookup\_abs (*p*, *klass*, *create=1*)

Fast (?) lookup of a *normalized* absolute path.

This method is intended for use by internal lookups with already-normalized path data. For general-purpose lookups, use the FS.Entry(), FS.Dir() or FS.File() methods.

The caller is responsible for making sure we’re passed a normalized absolute path; we merely let Python’s dictionary look up and return the One True Node.FS object for the path.

If a Node for the specified “p” doesn’t already exist, and “create” is specified, the Node may be created after recursive invocation to find or create the parent directory or directories.

\_memo

\_morph ()

Turn a file system Node (either a freshly initialized directory object or a separate Entry object) into a proper directory object.

Set up this directory’s entries and hook it into the file system tree. Specify that directories (this Node) don’t use signatures for calculating whether they’re current.

\_path

\_path\_elements

\_proxy

\_rel\_path\_key (*other*)

\_save\_str ()

\_sconsign

`_specific_sources`  
`_srcdir_find_file_key (filename)`  
`_tags`  
`_tpath`  
`abspath`  
`addRepository (dir)`  
`add_dependency (depend)`  
     Adds dependencies.  
`add_ignore (depend)`  
     Adds dependencies to ignore.  
`add_prerequisite (prerequisite)`  
     Adds prerequisites  
`add_source (source)`  
     Adds sources.  
`add_to_implicit (deps)`  
`add_to_waiting_parents (node)`  
     Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)  
`add_to_waiting_s_e (node)`  
`add_wkid (wkid)`  
     Add a node to the list of kids waiting to be evaluated  
`all_children (scan=1)`  
     Return a list of all the node's direct children.  
`alter_targets ()`  
     Return any corresponding targets in a variant directory.  
`always_build`  
`attributes`  
`binfo`  
`build (**kw)`  
     A null "builder" for directories.  
`builder`  
`builder_set (builder)`  
`built ()`  
     Called just after this node is successfully built.  
`cached`  
`cachedir_csig`  
`cachesig`  
`changed (node=None, allowcache=False)`  
     Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.  
     Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an #included .h file) is updated.  
     The allowcache option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this changed method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to changed().  
     @see: FS.File.changed(), FS.File.release\_target\_info()  
`changed_since_last_build`  
`check_attributes (name)`  
     Simple API to check if the node.attributes for name has been set  
`children (scan=1)`  
     Return a list of the node's direct children, minus those that are ignored by this node.  
`children_are_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The SCons.Node.Alias and SCons.Node.Python.Value subclasses rebind their current() method to this method.

clear ()

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

clear\_memoized\_values ()

contentsig

cwd

del\_binfo ()

Delete the build info from this node.

depends

depends\_set

dir

dir\_on\_disk (name)

dirname

disambiguate (must\_exist=None)

diskcheck\_match ()

do\_duplicate (src)

duplicate

entries

entry\_abspath (name)

entry\_exists\_on\_disk (name)

Searches through the file/dir entries of the current directory, and returns True if a physical entry with the given name could be found.

@see reentry\_exists\_on\_disk

entry\_labspath (name)

entry\_path (name)

entry\_tpath (name)

env

env\_set (env, safe=0)

executor

executor\_cleanup ()

Let the executor clean up any cached information.

exists ()

Does this node exist?

explain ()

file\_on\_disk (name)

for\_signature ()

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the \_\_str\_\_() method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of str() to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

fs

Reference to parent Node.FS object

getRepositoryes ()

Returns a list of repositories for this directory.

get\_abspath () → str

Get the absolute path of the file.

get\_all\_rdirs ()

get\_binfo ()

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`

Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`

Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`

Return the set builder, or a specified default value

`get_cachedir_csig ()`

`get_contents ()`

Return content signatures and names of all our children separated by new-lines. Ensure that the nodes are sorted.

`get_csig ()`

Compute the content signature for Directory nodes. In general, this is not needed and the content signature is not stored in the `DirNodeInfo`. However, if `get_contents` on a `Dir` node is called which has a child directory, the child directory should return the hash of its contents.

`get_dir ()`

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`

Return this directory's implicit dependencies.

We don't bother caching the results because the scan typically shouldn't be requested more than once (as opposed to scanning `.h` file contents, which can be requested as many times as the file is `#included` by other files).

`get_implicit_deps (env, initial_scanner, path_func, kw={})`

Return a list of implicit dependencies for this node.

This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_internal_path ()`

`get_labspath () → str`

Get the absolute path of the file.

`get_ninfo ()`

`get_path (dir=None)`

Return path relative to the current working directory of the `Node.FS.Base` object that owns us.

`get_path_elements ()`

`get_relpath ()`

Get the path of the file relative to the root SConstruct file's directory.

`get_source_scanner (node)`

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`

Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a `Node` to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`



This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_text_contents ()`

We already emit things in text, so just return the binary version.

`get_timestamp () → int`

Return the latest timestamp from among our children

`get_tpath ()`

`getmtime ()`

`getsize ()`

`glob (pathname, ondisk=True, source=False, strings=False, exclude=None)`

Returns a list of Nodes (or strings) matching a specified pathname pattern.

Pathname patterns follow UNIX shell semantics: `*` matches any-length strings of any characters, `?` matches any character, and `[]` can enclose lists or ranges of characters. Matches do not span directory separators.

The matches take into account Repositories, returning local Nodes if a corresponding entry exists in a Repository (either an in-memory Node or something on disk).

By default, the `glob()` function matches entries that exist on-disk, in addition to in-memory Nodes. Setting the “`ondisk`” argument to `False` (or some other non-true value) causes the `glob()` function to only match in-memory Nodes. The default behavior is to return both the on-disk and in-memory Nodes.

The “`source`” argument, when true, specifies that corresponding source Nodes must be returned if you’re globbing in a build directory (initialized with `VariantDir()`). The default behavior is to return Nodes local to the `VariantDir()`.

The “`strings`” argument, when true, returns the matches as strings, not Nodes. The strings are path names relative to this directory.

The “`exclude`” argument, if not `None`, must be a pattern or a list of patterns following the same UNIX shell semantics. Elements matching a least one pattern of this list will be excluded from the result.

The underlying algorithm is adapted from the `glob.glob()` function in the Python library (but heavily modified), and uses `fnmatch()` under the covers.

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly (“if `node.builder: ...`”). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

If any child is not up-to-date, then this directory isn't, either.

`isdir ()`

`isfile ()`

`islink ()`

`link (srcdir, duplicate)`

Set this directory as the variant directory for the supplied source directory.

`linked`

`lstat ()`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`must_be_same (klass)`

This node, which already existed, is being looked up as the specified klass. Raise an exception if it isn't.

`name`

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`on_disk_entries`

`path`

`postprocess ()`

Clean up anything we don't need to hang onto after we've been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

`prerequisites`

`pseudo`

`push_to_cache ()`

Try to push a node into a cache

`rdir ()`

`ref_count`

`rel_path (other)`

Return a path to "other" relative to this directory.

`release_target_info ()`

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: `built()` and `File.release_target_info()`

`released_target_info`

`remove ()`

Remove this Node: no-op by default.

`render_include_tree ()`

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

`reentry ()`

`reentry_exists_on_disk (name)`

Searches through the file/dir entries of the current *and* all its remote directories (repos), and returns True if a physical entry with the given name could be found. The local directory (self) gets searched first, so repositories take a lower precedence regarding the searching order.

@see `entry_exists_on_disk`

`repositories`

`reset_executor ()`

Remove cached executor; forces recompute when needed.

`retrieve_from_cache ()`

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

Returns true if the node was successfully retrieved.

`rexists ()`

Does this node exist locally or in a repository?

`rfile ()`

`root`

`rstr ()`

A Node.FS.Base object's string representation is its path name.

`sbuilder`

`scan ()`

Scan this node's dependents for implicit dependencies.

`scanner_key ()`

A directory does not get scanned.

`scanner_paths`

`sconsign ()`

Return the .sconsign file info for this directory.

`searched`

`select_scanner (scanner)`

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that *must* use their own Scanner and don't select one the Scanner.Selector that's configured for the target.

`set_always_build (always_build=1)`

Set the Node's always\_build value.

`set_executor (executor)`

Set the action executor for this node.

`set_explicit (is_explicit)`

`set_local ()`

`set_nocache (nocache=1)`

Set the Node's nocache value.

`set_noclean (noclean=1)`

Set the Node's noclean value.

`set_precious (precious=1)`

Set the Node's precious value.

`set_pseudo (pseudo=True)`

Set the Node's precious value.

`set_specific_source (source)`

`set_src_builder (builder)`

Set the source code builder for this node.

`set_state (state)`

`side_effect`

`side_effects`

`sources`

`sources_set`

`src_builder ()`

Fetch the source code builder for this node.

If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value from its parent directory, and so on up to the file system root).

`srcdir`

`srcdir_duplicate (name)`

`srcdir_find_file (filename)`

`srcdir_list ()`

`srcnode ()`

Dir has a special need for `srcnode()`...if we have a `srcdir` attribute set, then that *is* our `srcnode`.

`stat ()`

`state`

`store_info`

`str_for_display ()`

`target_from_source (prefix, suffix, splitext=<function splitext>)`

Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.

Note that this method can be overridden dynamically for generated files that need different behavior. See

Tool/swig.py for an example.

`target_peers`

`up ()`

`variant_dirs`

`visited ()`

Called just after this node has been visited (with or without a build).

`waiting_parents`

`waiting_s_e`

`walk (func, arg)`

Walk this directory tree by calling the specified function for each directory in the tree.

This behaves like the `os.path.walk()` function, but for in-memory `Node.FS.Dir` objects. The function takes the same arguments as the functions passed to `os.path.walk()`:

`func(arg, dirname, fnames)`

Except that "dirname" will actually be the directory *Node*, not the string. The "." and ".." entries are excluded from fnames. The fnames list may be modified in-place to filter the subdirectories visited or otherwise impose a specific order. The "arg" argument is always passed to `func()` and may be used in any way (or ignored, passing None is common).

`wkids`

`SCons.Node.FS.UnlinkFunc (target, source, env)`

`class SCons.Node.FS._Null`

Bases: `object`

`SCons.Node.FS._classEntry`

alias of `Entry`

`SCons.Node.FS._copy_func (fs, src, dest)`

`SCons.Node.FS._hardlink_func (fs, src, dst)`

`SCons.Node.FS._my_normcase (x)`

`SCons.Node.FS._my_splitdrive (p)`

`SCons.Node.FS._softlink_func (fs, src, dst)`

`SCons.Node.FS.diskcheck_types ()`

`SCons.Node.FS.do_diskcheck_match (node, predicate, errorfmt)`

`SCons.Node.FS.find_file (filename, paths, verbose=None)`

Find a node corresponding to either a derived file or a file that exists already.

Only the first file found is returned, and none is returned if no file is found.

filename: A filename to find paths: A list of directory path *nodes* to search in. Can be represented as a list, a tuple, or a callable that is called with no arguments and returns the list or tuple.

returns The node created from the found file.

`SCons.Node.FS.get_MkdirBuilder ()`

`SCons.Node.FS.get_default_fs ()`

`SCons.Node.FS.has_glob_magic (s)`

`SCons.Node.FS.ignore_diskcheck_match (node, predicate, errorfmt)`

`SCons.Node.FS.initialize_do_splitdrive ()`

`SCons.Node.FS.invalidate_node_memos (targets)`

Invalidate the memoized values of all Nodes (files or directories) that are associated with the given entries. Has been added to clear the cache of nodes affected by a direct execution of an action (e.g. Delete/Copy/Chmod). Existing Node caches become inconsistent if the action is run through `Execute()`. The argument *targets* can be a single Node object or filename, or a sequence of Nodes/filenames.

`SCons.Node.FS.needs_normpath_match (string, pos=0, endpos=9223372036854775807)`

Matches zero or more characters at the beginning of the string.

`SCons.Node.FS.save_strings (val)`

`SCons.Node.FS.sconsign_dir (node)`

Return the `.sconsign` file info for this directory, creating it first if necessary.

`SCons.Node.FS.sconsign_none (node)`

`SCons.Node.FS.set_diskcheck (list)`

`SCons.Node.FS.set_duplicate (duplicate)`

`SCons.Node.Python` module

Python nodes.

`class SCons.Node.Python.Value (value, built_value=None, name=None)`

Bases: Node

A class for Python variables, typically passed on the command line or generated by a script, but not from a file or some other source.

`class Attrs`

Bases: object

shared

BuildInfo

alias of ValueBuildInfo

Decider (function)

GetTag (key)

Return a user-defined tag.

NodeInfo

alias of ValueNodeInfo

Tag (key, value)

Add a user-defined tag.

`_add_child (collection, set, child)`

Adds 'child' to 'collection', first checking 'set' to see if it's already present.

`_children_get ()`

`_children_reset ()`

`_func_exists`

`_func_get_contents`

`_func_is_derived`

`_func_rexists`

`_func_target_from_source`

`_get_scanner (env, initial_scanner, root_node_scanner, kw)`

`_memo`

`_specific_sources`

`_tags`

`add_dependency (depend)`

Adds dependencies.

`add_ignore (depend)`

Adds dependencies to ignore.

`add_prerequisite (prerequisite)`

Adds prerequisites

`add_source (source)`

Adds sources.

`add_to_implicit (deps)`

`add_to_waiting_parents (node)`

Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)

`add_to_waiting_s_e (node)`

`add_wkid (wkid)`

Add a node to the list of kids waiting to be evaluated

`all_children (scan=1)`

Return a list of all the node's direct children.

`alter_targets ()`

Return a list of alternate targets for this Node.

`always_build`

`attributes`

`binfo`

`build (**kw)`

Actually build the node.

This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the `prepare()` method has gotten everything, uh, prepared.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

`builder`

`builder_set (builder)`

`built ()`

Called just after this node is successfully built.

`cached`

`changed (node=None, allowcache=False)`

Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.

Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an `#included .h` file) is updated.

The `allowcache` option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this `changed` method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to `changed()`.

@see: `FS.File.changed()`, `FS.File.release_target_info()`

`changed_since_last_build`

`check_attributes (name)`

Simple API to check if the node.attributes for name has been set

`children (scan=1)`

Return a list of the node's direct children, minus those that are ignored by this node.

`children_are_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`clear ()`

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

`clear_memoized_values ()`

`del_binfo ()`  
Delete the build info from this node.

`depends`

`depends_set`

`disambiguate (must_exist=None)`

`env`

`env_set (env, safe=0)`

`executor`

`executor_cleanup ()`  
Let the executor clean up any cached information.

`exists ()`  
Does this node exists?

`explain ()`

`for_signature ()`  
Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

`get_abspath ()`  
Return an absolute path to the Node. This will return simply `str(Node)` by default, but for Node types that have a concept of relative path, this might return something different.

`get_binfo ()`  
Fetch a node's build information.  
node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature  
This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`  
Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`  
Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`  
Return the set builder, or a specified default value

`get_cachedir_csig ()`

`get_contents () → bytes`  
Get contents for signature calculations.

`get_csig (calc=None)`  
Because we're a Python value node and don't have a real timestamp, we get to ignore the calculator and just use the value contents.  
Returns string. Ideally string of hex digits. (Not bytes)

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`  
Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`  
Return the scanned include lines (implicit dependencies) found in this node.  
The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`  
Return a list of implicit dependencies for this node.



This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_ninfo ()`

`get_source_scanner (node)`

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`

Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_text_contents ()` → str

By the assumption that the `node.built_value` is a deterministic product of the sources, the contents of a Value are the concatenation of all the contents of its sources. As the value need not be built when `get_contents()` is called, we cannot use the actual `node.built_value`.

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if `node.builder: ...`"). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`



Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The SCons.Node.Alias and SCons.Node.Python.Value subclasses rebind their `current()` method to this method.

`linked`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`postprocess ()`

Clean up anything we don't need to hang onto after we've been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

`prerequisites`

`pseudo`

`push_to_cache ()`

Try to push a node into a cache

`read ()`

Return the value. If necessary, the value is built.

`ref_count`

`release_target_info ()`

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: `built()` and `File.release_target_info()`

`remove ()`

Remove this Node: no-op by default.

`render_include_tree ()`

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

```

reset_executor ()
    Remove cached executor; forces recompute when needed.
retrieve_from_cache ()
    Try to retrieve the node's content from a cache
    This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe
    stuff in built().
    Returns true if the node was successfully retrieved.
reexists ()
    Does this node exist locally or in a repository?
scan ()
    Scan this node's dependents for implicit dependencies.
scanner_key ()
select_scanner (scanner)
    Selects a scanner for this Node.
    This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that must use
    their own Scanner and don't select one the Scanner.Selector that's configured for the target.
set_always_build (always_build=1)
    Set the Node's always_build value.
set_executor (executor)
    Set the action executor for this node.
set_explicit (is_explicit)
set_nocache (nocache=1)
    Set the Node's nocache value.
set_noclean (noclean=1)
    Set the Node's noclean value.
set_precious (precious=1)
    Set the Node's precious value.
set_pseudo (pseudo=True)
    Set the Node's precious value.
set_specific_source (source)
set_state (state)
side_effect
side_effects
sources
sources_set
state
store_info
str_for_display ()
target_peers
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
wkids
write (built_value)
    Set the value of the node.
class SCons.Node.Python.ValueBuildInfo
    Bases: BuildInfoBase
    bact
    bactsig
    bdepends
    bdependsigns
    bimplicit
    bimplicitsigns
    bsources
    bsourcesigns

```

```

current_version_id = 2
merge(other)
    Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
    data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
class SCons.Node.Python.ValueNodeInfo
    Bases: NodeInfoBase
    convert(node, val)
    csig
    current_version_id = 2
    field_list = ['csig']
    format(field_list=None, names=0)
    merge(other)
        Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
        data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
    str_to_node(s)
    update(node)
SCons.Node.Python.ValueWithMemo(value, built_value=None, name=None)
    Memoized Value() node factory.

```

#### Module contents

The Node package for the SCons software construction utility.

This is, in many ways, the heart of SCons.

A Node is where we encapsulate all of the dependency information about any thing that SCons can build, or about any thing which SCons can use to build some other thing. The canonical “thing,” of course, is a file, but a Node can also represent something remote (like a web page) or something completely abstract (like an Alias).

Each specific type of “thing” is specifically represented by a subclass of the Node base class: Node.FS.File for files, Node.Alias for aliases, etc. Dependency information is kept here in the base class, and information specific to files/aliases/etc. is in the subclass. The goal, if we’ve done this correctly, is that any type of “thing” should be able to depend on any other type of “thing.”

```
SCons.Node.Annotate(node)
```

```
class SCons.Node.BuildInfoBase
```

Bases: object

The generic base class for build information for a Node.

This is what gets stored in a .sconsign file for each target file. It contains a NodeInfo instance for this node (signature information that’s specific to the type of Node) and direct attributes for the generic build stuff we have to track: sources, explicit dependencies, implicit dependencies, and action information.

```
bact
```

```
bactsig
```

```
bdepends
```

```
bdependssigs
```

```
bimplicit
```

```
bimplicitssigs
```

```
bsources
```

```
bsourcesigs
```

```
current_version_id = 2
```

```
merge(other)
```

Merge the fields of another object into this object. Already existing information is overwritten by the other instance's data. WARNING: If a ‘\_\_dict\_\_’ slot is added, it should be updated instead of replaced.

```
class SCons.Node.Node
```

Bases: object

The base Node class, for entities that we know how to build, or use to build other Nodes.

```
class Attrs
```

Bases: object

```
shared
```

## BuildInfo

alias of BuildInfoBase

Decider (function)

GetTag (key)

Return a user-defined tag.

## NodeInfo

alias of NodeInfoBase

Tag (key, value)

Add a user-defined tag.

\_add\_child (collection, set, child)

Adds 'child' to 'collection', first checking 'set' to see if it's already present.

\_children\_get ()

\_children\_reset ()

\_func\_exists

\_func\_get\_contents

\_func\_is\_derived

\_func\_rexists

\_func\_target\_from\_source

\_get\_scanner (env, initial\_scanner, root\_node\_scanner, kw)

\_memo

\_specific\_sources

\_tags

add\_dependency (depend)

Adds dependencies.

add\_ignore (depend)

Adds dependencies to ignore.

add\_prerequisite (prerequisite)

Adds prerequisites

add\_source (source)

Adds sources.

add\_to\_implicit (deps)

add\_to\_waiting\_parents (node)

Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)

add\_to\_waiting\_s\_e (node)

add\_wkid (wkid)

Add a node to the list of kids waiting to be evaluated

all\_children (scan=1)

Return a list of all the node's direct children.

alter\_targets ()

Return a list of alternate targets for this Node.

always\_build

attributes

binfo

build (\*\*kw)

Actually build the node.

This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the prepare() method has gotten everything, uh, prepared.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in built().

builder

builder\_set (builder)

built ()

Called just after this node is successfully built.

cached

`changed (node=None, allowcache=False)`

Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.

Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an `#included .h` file) is updated.

The `allowcache` option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this `changed` method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to `changed()`.

@see: `FS.File.changed()`, `FS.File.release_target_info()`

`changed_since_last_build`

`check_attributes (name)`

Simple API to check if the node.attributes for name has been set

`children (scan=1)`

Return a list of the node's direct children, minus those that are ignored by this node.

`children_are_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`clear ()`

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

`clear_memoized_values ()`

`del_binfo ()`

Delete the build info from this node.

`depends`

`depends_set`

`disambiguate (must_exist=None)`

`env`

`env_set (env, safe=0)`

`executor`

`executor_cleanup ()`

Let the executor clean up any cached information.

`exists ()`

Does this node exist?

`explain ()`

`for_signature ()`

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

`get_abspath ()`

Return an absolute path to the Node. This will return simply `str(Node)` by default, but for Node types that have a concept of relative path, this might return something different.

`get_binfo ()`

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`

Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`

Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`  
 Return the set builder, or a specified default value

`get_cachedir_csig ()`  
`get_contents ()`  
 Fetch the contents of the entry.

`get_csig ()`  
`get_env ()`  
`get_env_scanner (env, kw={})`  
`get_executor (create=1)`  
 Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`  
 Return the scanned include lines (implicit dependencies) found in this node.  
 The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`  
 Return a list of implicit dependencies for this node.  
 This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_ninfo ()`  
`get_source_scanner (node)`  
 Fetch the source scanner for the specified node  
 NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.  
 Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.  
 This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`  
`get_stored_implicit ()`  
 Fetch the stored implicit dependencies

`get_stored_info ()`  
`get_string (for_signature)`  
 This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.  
 Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`  
 This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`  
`get_target_scanner ()`  
`has_builder ()`  
 Return whether this Node has a builder or not.  
 In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if `node.builder: ...`"). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`  
 Return whether this Node has an explicit builder  
 This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

ignore\_set

implicit

implicit\_set

includes

is\_conftest ()

Returns true if this node is an conftest node

is\_derived ()

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when duplicate=0 and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

is\_explicit

is\_literal ()

Always pass the string representation of a Node to the command interpreter literally.

is\_sconscript ()

Returns true if this node is an sconscript

is\_up\_to\_date ()

Default check for whether the Node is current: unknown Node subtypes are always out of date, so they will always get built.

linked

make\_ready ()

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

missing ()

multiple\_side\_effect\_has\_builder ()

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

new\_binfo ()

new\_ninfo ()

ninfo

nocache

noclean

postprocess ()

Clean up anything we don't need to hang onto after we've been built.

precious

prepare ()

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

prerequisites

pseudo

push\_to\_cache ()

Try to push a node into a cache

ref\_count

release\_target\_info ()

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: `built()` and `File.release_target_info()`

`remove ()`

Remove this Node: no-op by default.

`render_include_tree ()`

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

`reset_executor ()`

Remove cached executor; forces recompute when needed.

`retrieve_from_cache ()`

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

Returns true if the node was successfully retrieved.

`rexists ()`

Does this node exist locally or in a repository?

`scan ()`

Scan this node's dependents for implicit dependencies.

`scanner_key ()`

`select_scanner (scanner)`

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, `Node.FS.Dir`) that *must* use their own `Scanner` and don't select one the `Scanner.Selector` that's configured for the target.

`set_always_build (always_build=1)`

Set the Node's `always_build` value.

`set_executor (executor)`

Set the action executor for this node.

`set_explicit (is_explicit)`

`set_nocache (nocache=1)`

Set the Node's `nocache` value.

`set_noclean (noclean=1)`

Set the Node's `noclean` value.

`set_precious (precious=1)`

Set the Node's `precious` value.

`set_pseudo (pseudo=True)`

Set the Node's `precious` value.

`set_specific_source (source)`

`set_state (state)`

`side_effect`

`side_effects`

`sources`

`sources_set`

`state`

`store_info`

`target_peers`

`visited ()`

Called just after this node has been visited (with or without a build).

`waiting_parents`

`waiting_s_e`

`wkids`

`class SCons.Node.NodeInfoBase`

Bases: `object`

The generic base class for signature information for a Node.



Node subclasses should subclass NodeInfoBase to provide their own logic for dealing with their own Node-specific signature information.

```

convert (node, val)
current_version_id = 2
format (field_list=None, names=0)
merge (other)
    Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
    data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
update (node)
class SCons.Node.NodeList (initlist=None)
    Bases: UserList
    _abc_impl = <_abc_data object>
    append (item)
        S.append(value) – append value to the end of the sequence
    clear () → None -- remove all items from S
    copy ()
    count (value) → integer -- return number of occurrences of value
    extend (other)
        S.extend(iterable) – extend sequence by appending elements from the iterable
    index (value[, start[, stop]]) → integer -- return first index of value.
        Raises ValueError if the value is not present.
        Supporting start and stop arguments is optional, but recommended.
    insert (i, item)
        S.insert(index, value) – insert value before index
    pop ([, index]) → item -- remove and return item at index (default last).
        Raise IndexError if list is empty or index is out of range.
    remove (item)
        S.remove(value) – remove first occurrence of value. Raise ValueError if the value is not present.
    reverse ()
        S.reverse() – reverse IN PLACE
    sort (*args, **kwargs)
class SCons.Node.Walker (node, kids_func=<function get_children>, cycle_func=<function
ignore_cycle>, eval_func=<function do_nothing>)
    Bases: object
    An iterator for walking a Node tree.
    This is depth-first, children are visited before the parent. The Walker object can be initialized with any node, and
    returns the next node on the descent with each get_next() call. get the children of a node instead of calling 'children'.
    'cycle_func' is an optional function that will be called when a cycle is detected.
    This class does not get caught in node cycles caused, for example, by C header file include loops.
    get_next ()
        Return the next node for this walk of the tree.
        This function is intentionally iterative, not recursive, to sidestep any issues of stack size limitations.
    is_done ()
SCons.Node.changed_since_last_build_alias (node, target, prev_ni, repo_node=None)
SCons.Node.changed_since_last_build_entry (node, target, prev_ni, repo_node=None)
SCons.Node.changed_since_last_build_node (node, target, prev_ni, repo_node=None)
    Must be overridden in a specific subclass to return True if this Node (a dependency) has changed since the last time
    it was used to build the specified target. prev_ni is this Node's state (for example, its file timestamp, length, maybe
    content signature) as of the last time the target was built.
    Note that this method is called through the dependency, not the target, because a dependency Node must be able to
    use its own logic to decide if it changed. For example, File Nodes need to obey if we're configured to use timestamps,
    but Python Value Nodes never use timestamps and always use the content. If this method were called through the
    target, then each Node's implementation of this method would have to have more complicated logic to handle all the
    different Node types on which it might depend.
SCons.Node.changed_since_last_build_python (node, target, prev_ni, repo_node=None)
SCons.Node.changed_since_last_build_state_changed (node, target, prev_ni, repo_node=None)

```

`SCons.Node.classname (obj)`  
`SCons.Node.decide_source (node, target, prev_ni, repo_node=None)`  
`SCons.Node.decide_target (node, target, prev_ni, repo_node=None)`  
`SCons.Node.do_nothing (node, parent)`  
`SCons.Node.do_nothing_node (node)`  
`SCons.Node.exists_always (node)`  
`SCons.Node.exists_base (node)`  
`SCons.Node.exists_entry (node)`  
Return if the Entry exists. Check the file system to see what we should turn into first. Assume a file if there's no directory.  
`SCons.Node.exists_file (node)`  
`SCons.Node.exists_none (node)`  
`SCons.Node.get_children (node, parent)`  
`SCons.Node.get_contents_dir (node)`  
Return content signatures and names of all our children separated by new-lines. Ensure that the nodes are sorted.  
`SCons.Node.get_contents_entry (node)`  
Fetch the contents of the entry. Returns the exact binary contents of the file.  
`SCons.Node.get_contents_file (node)`  
`SCons.Node.get_contents_none (node)`  
`SCons.Node.ignore_cycle (node, stack)`  
`SCons.Node.is_derived_node (node)`  
Returns true if this node is derived (i.e. built).  
`SCons.Node.is_derived_none (node)`  
`SCons.Node.rexists_base (node)`  
`SCons.Node.rexists_node (node)`  
`SCons.Node.rexists_none (node)`  
`SCons.Node.store_info_file (node)`  
`SCons.Node.store_info_pass (node)`  
`SCons.Node.target_from_source_base (node, prefix, suffix, splitext)`  
`SCons.Node.target_from_source_none (node, prefix, suffix, splitext)`

`SCons.Platform` package

Submodules

`SCons.Platform.aix` module

Platform-specific initialization for IBM AIX systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic `SCons.Platform.Platform()` selection method.

`SCons.Platform.aix.generate (env)`  
`SCons.Platform.aix.get_xlc (env, xlc=None, packages=[])`

`SCons.Platform.cygwin` module

Platform-specific initialization for Cygwin systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic `SCons.Platform.Platform()` selection method.

`SCons.Platform.cygwin.generate (env)`

`SCons.Platform.darwin` module

Platform-specific initialization for Mac OS X systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic `SCons.Platform.Platform()` selection method.

`SCons.Platform.darwin.generate (env)`

### SCons.Platform.hpux module

Platform-specific initialization for HP-UX systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.hpux.generate (env)

### SCons.Platform.iris module

Platform-specific initialization for SGI IRIX systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.iris.generate (env)

### SCons.Platform.mingw module

Platform-specific initialization for the MinGW system.

### SCons.Platform.os2 module

Platform-specific initialization for OS/2 systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.os2.generate (env)

### SCons.Platform.posix module

Platform-specific initialization for POSIX (Linux, UNIX, etc.) systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.posix.escape (arg)

escape shell special characters

SCons.Platform.posix.exec\_popen3 (l, env, stdout, stderr)

SCons.Platform.posix.exec\_subprocess (l, env)

SCons.Platform.posix.generate (env)

SCons.Platform.posix.piped\_env\_spawn (sh, escape, cmd, args, env, stdout, stderr)

SCons.Platform.posix.subprocess\_spawn (sh, escape, cmd, args, env)

### SCons.Platform.sunos module

Platform-specific initialization for Sun systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.sunos.generate (env)

### SCons.Platform.virtualenv module

'Platform' support for a Python virtualenv.

SCons.Platform.virtualenv.ImportVirtualenv (env)

Copies virtualenv-related environment variables from OS environment to env[ 'ENV' ] and prepends virtualenv's PATH to env[ 'ENV' ][ 'PATH' ].

SCons.Platform.virtualenv.IsInVirtualenv (path)

Returns True, if **path** is under virtualenv's home directory. If not, or if we don't use virtualenv, returns False.

SCons.Platform.virtualenv.Virtualenv ()

Returns path to the virtualenv home if scons is executing within a virtualenv or None, if not.

SCons.Platform.virtualenv.\_enable\_virtualenv\_default ()

SCons.Platform.virtualenv.\_ignore\_virtualenv\_default ()

`SCons.Platform.virtualenv._inject_venv_path (env, path_list=None)`

Modify environment such that SCons will take into account its virtualenv when running external tools.

`SCons.Platform.virtualenv._inject_venv_variables (env)`

`SCons.Platform.virtualenv._is_path_in (path, base)`

Returns true if **path** is located under the **base** directory.

`SCons.Platform.virtualenv._running_in_virtualenv ()`

Returns True if scons is executed within a virtualenv

`SCons.Platform.virtualenv.select_paths_in_venv (path_list)`

Returns a list of paths from **path\_list** which are under virtualenv's home directory.

`SCons.Platform.win32` module

Platform-specific initialization for Win32 systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic `SCons.Platform.Platform()` selection method.

`class SCons.Platform.win32.ArchDefinition (arch, synonyms=[])`

Bases: object

Determine which windows CPU were running on. A class for defining architecture-specific settings and logic.

`SCons.Platform.win32.escape (x)`

`SCons.Platform.win32.exec_spawn (1, env)`

`SCons.Platform.win32.generate (env)`

`SCons.Platform.win32.get_architecture (arch=None)`

Returns the definition for the specified architecture string.

If no string is specified, the system default is returned (as defined by the `PROCESSOR_ARCHITECTURE` or `PROCESSOR_ARCHITEW6432` environment variables).

`SCons.Platform.win32.get_program_files_dir ()`

Get the location of the program files directory

`SCons.Platform.win32.get_system_root ()`

`SCons.Platform.win32.piped_spawn (sh, escape, cmd, args, env, stdout, stderr)`

`SCons.Platform.win32.spawn (sh, escape, cmd, args, env)`

`SCons.Platform.win32.spawnve (mode, file, args, env)`

Module contents

SCons platform selection.

Looks for modules that define a callable object that can modify a construction environment as appropriate for a given platform.

Note that we take a more simplistic view of "platform" than Python does. We're looking for a single string that determines a set of tool-independent variables with which to initialize a construction environment. Consequently, we'll examine both `sys.platform` and `os.name` (and anything else that might come in to play) in order to return some specification which is unique enough for our purposes.

Note that because this subsystem just *selects* a callable that can modify a construction environment, it's possible for people to define their own "platform specification" in an arbitrary callable function. No one needs to use or tie in to this subsystem in order to roll their own platform definition.

`SCons.Platform.DefaultToolList (platform, env)`

Select a default tool list for the specified platform.

`SCons.Platform.Platform (name='darwin')`

Select a canned Platform specification.

`class SCons.Platform.PlatformSpec (name, generate)`

Bases: object

`class SCons.Platform.TempFileMunge (cmd, cmdstr=None)`

Bases: object

Convert long command lines to use a temporary file.

You can set an Environment variable (usually `TEMPFILE`) to this, then call it with a string argument, and it will perform temporary file substitution on it. This is used to circumvent limitations on the length of command lines. Example:

```
env["TEMPFILE"] = TempFileMunge
env["LINKCOM"] = "${TEMPFILE(' $LINK $TARGET $SOURCES', '$LINKCOMSTR')}"
```

By default, the name of the temporary file used begins with a prefix of '@'. This may be configured for other tool chains by setting the `TEMPFILEPREFIX` variable. Example:

```
env["TEMPFILEPREFIX"] = '-@'      # diab compiler
env["TEMPFILEPREFIX"] = '-via'    # arm tool chain
env["TEMPFILEPREFIX"] = ''       # (the empty string) PC Lint
```

You can configure the extension of the temporary file through the `TEMPFILESUFFIX` variable, which defaults to '.lnk' (see comments in the code below). Example:

```
env["TEMPFILESUFFIX"] = '.lnk'    # PC Lint
```

Entries in the temporary file are separated by the value of the `TEMPFILEARGJOIN` variable, which defaults to an OS-appropriate value.

A default argument escape function is `SCons.Subst.quote_spaces`. If you need to apply extra operations on a command argument before writing to a temporary file (fix Windows slashes, normalize paths, etc.), please set `TEMPFILEARGESCFUNC` variable to a custom function. Example:

```
import sys
import re
from SCons.Subst import quote_spaces

WINPATHSEP_RE = re.compile(r"\"([^\"]|\\|\\$)\"")

def tempfile_arg_esc_func(arg):
    arg = quote_spaces(arg)
    if sys.platform != "win32":
        return arg
    # GCC requires double Windows slashes, let's use UNIX separator
    return WINPATHSEP_RE.sub(r"/█", arg)

env["TEMPFILEARGESCFUNC"] = tempfile_arg_esc_func
```

```
_print_cmd_str(target, source, env, cmdstr)
```

`SCons.Platform.platform_default()`

Return the platform string for our execution environment.

The returned value should map to one of the `SCons/Platform/*.py` files. Since `scons` is architecture independent, though, we don't care about the machine architecture.

`SCons.Platform.platform_module(name='darwin')`

Return the imported module for the platform.

This looks for a module name that matches the specified argument. If the name is unspecified, we fetch the appropriate default for our execution environment.

## SCons Project API Documentation

SCons.Scanner package

Submodules

SCons.Scanner.C module

Dependency scanner for C/C++ code.

SCons.Scanner.C.CConditionalScanner ()

Return an advanced conditional Scanner instance for scanning source files

Interprets C/C++ Preprocessor conditional syntax (#ifdef, #if, defined, #else, #elif, etc.).

SCons.Scanner.C.CScanner ()

Return a prototype Scanner instance for scanning source files that use the C pre-processor

class SCons.Scanner.C.SConsCPPConditionalScanner (\*args, \*\*kwargs)

Bases: PreProcessor

SCons-specific subclass of the cpp.py module's processing.

We subclass this so that: 1) we can deal with files represented by Nodes, not strings; 2) we can keep track of the files that are missing.

\_do\_if\_else\_condition (condition)

Common logic for evaluating the conditions on #if, #ifdef and #ifndef lines.

\_match\_tuples (tuples)

\_parse\_tuples (contents)

\_process\_tuples (tuples, file=None)

all\_include (t)

do\_define (t)

Default handling of a #define line.

do\_elif (t)

Default handling of a #elif line.

do\_else (t)

Default handling of a #else line.

do\_endif (t)

Default handling of a #endif line.

do\_if (t)

Default handling of a #if line.

do\_ifdef (t)

Default handling of a #ifdef line.

do\_ifndef (t)

Default handling of a #ifndef line.

do\_import (t)

Default handling of a #import line.

do\_include (t)

Default handling of a #include line.

do\_include\_next (t)

Default handling of a #include line.

do\_nothing (t)

Null method for when we explicitly want the action for a specific preprocessor directive to do nothing.

do\_undef (t)

Default handling of a #undef line.

eval\_expression (t)

Evaluates a C preprocessor expression.

This is done by converting it to a Python equivalent and eval()ing it in the C preprocessor namespace we use to track #define values.

finalize\_result (fname)

find\_include\_file (t)

Finds the #include file for a given preprocessor tuple.

initialize\_result (fname)

process\_contents (contents)

Pre-processes a file contents.

Is used by tests

`process_file (file)`  
Pre-processes a file.  
This is the main internal entry point.

`read_file (file)`

`resolve_include (t)`  
Resolve a tuple-ized `#include` line.  
This handles recursive expansion of values without `""` or `<>` surrounding the name until an initial `"` or `<` is found, to handle `#include FILE` where `FILE` is a `#define` somewhere else.

`restore ()`  
Pops the previous dispatch table off the stack and makes it the current one.

`save ()`  
Pushes the current dispatch table on the stack and re-initializes the current dispatch table to the default.

`scons_current_file (t)`

`start_handling_includes (t=None)`  
Causes the PreProcessor object to start processing `#import`, `#include` and `#include_next` lines.  
This method will be called when a `#if`, `#ifdef`, `#ifndef` or `#elif` evaluates True, or when we reach the `#else` in a `#if`, `#ifdef`, `#ifndef` or `#elif` block where a condition already evaluated False.

`stop_handling_includes (t=None)`  
Causes the PreProcessor object to stop processing `#import`, `#include` and `#include_next` lines.  
This method will be called when a `#if`, `#ifdef`, `#ifndef` or `#elif` evaluates False, or when we reach the `#else` in a `#if`, `#ifdef`, `#ifndef` or `#elif` block where a condition already evaluated True.

`tupleize (contents)`  
Turns the contents of a file into a list of easily-processed tuples describing the CPP lines in the file.  
The first element of each tuple is the line's preprocessor directive (`#if`, `#include`, `#define`, etc., minus the initial `#`).  
The remaining elements are specific to the type of directive, as pulled apart by the regular expression.

`class SCons.Scanner.C.SConsCPPConditionalScanner (name, variable)`  
Bases: object  
The SCons wrapper around a `cpp.py` scanner.  
This is the actual glue between the calling conventions of generic SCons scanners, and the (subclass of) `cpp.py` class that knows how to look for `#include` lines with reasonably real C-preprocessor-like evaluation of `#if/#ifdef/#else/#elif` lines.

`recurse_nodes (nodes)`

`select (node)`

`class SCons.Scanner.C.SConsCPPScanner (*args, **kwargs)`  
Bases: PreProcessor  
SCons-specific subclass of the `cpp.py` module's processing.  
We subclass this so that: 1) we can deal with files represented by Nodes, not strings; 2) we can keep track of the files that are missing.

`_do_if_else_condition (condition)`  
Common logic for evaluating the conditions on `#if`, `#ifdef` and `#ifndef` lines.

`_match_tuples (tuples)`

`_parse_tuples (contents)`

`_process_tuples (tuples, file=None)`

`all_include (t)`

`do_define (t)`  
Default handling of a `#define` line.

`do_elif (t)`  
Default handling of a `#elif` line.

`do_else (t)`  
Default handling of a `#else` line.

`do_endif (t)`  
Default handling of a `#endif` line.

`do_if (t)`  
Default handling of a `#if` line.

`do_ifdef (t)`



Default handling of a `#ifdef` line.

`do_ifndef (t)`  
 Default handling of a `#ifndef` line.

`do_import (t)`  
 Default handling of a `#import` line.

`do_include (t)`  
 Default handling of a `#include` line.

`do_include_next (t)`  
 Default handling of a `#include` line.

`do_nothing (t)`  
 Null method for when we explicitly want the action for a specific preprocessor directive to do nothing.

`do_undef (t)`  
 Default handling of a `#undef` line.

`eval_expression (t)`  
 Evaluates a C preprocessor expression.  
 This is done by converting it to a Python equivalent and `eval()`ing it in the C preprocessor namespace we use to track `#define` values.

`finalize_result (fname)`

`find_include_file (t)`  
 Finds the `#include` file for a given preprocessor tuple.

`initialize_result (fname)`

`process_contents (contents)`  
 Pre-processes a file contents.  
 Is used by tests

`process_file (file)`  
 Pre-processes a file.  
 This is the main internal entry point.

`read_file (file)`

`resolve_include (t)`  
 Resolve a tuple-sized `#include` line.  
 This handles recursive expansion of values without `""` or `<>` surrounding the name until an initial `"` or `<` is found, to handle `#include FILE` where `FILE` is a `#define` somewhere else.

`restore ()`  
 Pops the previous dispatch table off the stack and makes it the current one.

`save ()`  
 Pushes the current dispatch table on the stack and re-initializes the current dispatch table to the default.

`scons_current_file (t)`

`start_handling_includes (t=None)`  
 Causes the PreProcessor object to start processing `#import`, `#include` and `#include_next` lines.  
 This method will be called when a `#if`, `#ifdef`, `#ifndef` or `#elif` evaluates True, or when we reach the `#else` in a `#if`, `#ifdef`, `#ifndef` or `#elif` block where a condition already evaluated False.

`stop_handling_includes (t=None)`  
 Causes the PreProcessor object to stop processing `#import`, `#include` and `#include_next` lines.  
 This method will be called when a `#if`, `#ifdef`, `#ifndef` or `#elif` evaluates False, or when we reach the `#else` in a `#if`, `#ifdef`, `#ifndef` or `#elif` block where a condition already evaluated True.

`tupleize (contents)`  
 Turns the contents of a file into a list of easily-processed tuples describing the CPP lines in the file.  
 The first element of each tuple is the line's preprocessor directive (`#if`, `#include`, `#define`, etc., minus the initial `#`).  
 The remaining elements are specific to the type of directive, as pulled apart by the regular expression.

`class SCons.Scanner.C.SConsCPPScannerWrapper (name, variable)`  
 Bases: `object`  
 The SCons wrapper around a `cpp.py` scanner.  
 This is the actual glue between the calling conventions of generic SCons scanners, and the (subclass of) `cpp.py` class that knows how to look for `#include` lines with reasonably real C-preprocessor-like evaluation of `#if/#ifdef/#else/#elif` lines.

`recurse_nodes (nodes)`



```
select (node)
SCons.Scanner.C.dictify_CPPDEFINES (env) → dict
Returns CPPDEFINES converted to a dict.
```

SCons.Scanner.D module

Scanner for the Digital Mars “D” programming language.

Coded by Andy Friesen, 17 Nov 2003

```
class SCons.Scanner.D.D
    Bases: Classic
    static _recurse_all_nodes (nodes)
    static _recurse_no_nodes (nodes)
    add_scanner (skey, scanner)
    add_skey (skey)
        Add a skey to the list of skeys
    find_include (include, source_dir, path)
    find_include_names (node)
    get_skeys (env=None)
    path (env, dir=None, target=None, source=None)
    scan (node, path=())
    select (node)
    static sort_key (include)
SCons.Scanner.D.DScanner ()
    Return a prototype Scanner instance for scanning D source files
```

SCons.Scanner.Dir module

```
SCons.Scanner.Dir.DirEntryScanner (**kwargs)
    Return a prototype Scanner instance for “scanning” directory Nodes for their in-memory entries
SCons.Scanner.Dir.DirScanner (**kwargs)
    Return a prototype Scanner instance for scanning directories for on-disk files
SCons.Scanner.Dir.do_not_scan (k)
SCons.Scanner.Dir.only_dirs (nodes)
SCons.Scanner.Dir.scan_in_memory (node, env, path=())
    “Scans” a Node.FS.Dir for its in-memory entries.
SCons.Scanner.Dir.scan_on_disk (node, env, path=())
    Scans a directory for on-disk files and directories therein.
    Looking up the entries will add these to the in-memory Node tree representation of the file system, so all we have to
    do is just that and then call the in-memory scanning function.
```

SCons.Scanner.Fortran module

Dependency scanner for Fortran code.

```
class SCons.Scanner.Fortran.F90Scanner (name, suffixes, path_variable, use_regex, incl_regex,
def_regex, *args, **kwargs)
    Bases: Classic
    A Classic Scanner subclass for Fortran source files which takes into account both USE and INCLUDE statements.
    This scanner will work for both F77 and F90 (and beyond) compilers.
    Currently, this scanner assumes that the include files do not contain USE statements. To enable the ability to deal
    with USE statements in include files, add logic right after the module names are found to loop over each include file,
    search for and locate each USE statement, and append each module name to the list of dependencies. Caching the
    search results in a common dictionary somewhere so that the same include file is not searched multiple times would
    be a smart thing to do.
    static _recurse_all_nodes (nodes)
    static _recurse_no_nodes (nodes)
    add_scanner (skey, scanner)
    add_skey (skey)
```

Add a key to the list of keys

```
static find_include(include, source_dir, path)
find_include_names(node)
get_keys(env=None)
path(env, dir=None, target=None, source=None)
scan(node, env, path=())
select(node)
static sort_key(include)
```

SCons.Scanner.Fortran.FortranScan(path\_variable='FORTRANPATH')

Return a prototype Scanner instance for scanning source files for Fortran USE & INCLUDE statements

SCons.Scanner.IDL module

Dependency scanner for IDL (Interface Definition Language) files.

SCons.Scanner.IDL.IDLScan()

Return a prototype Scanner instance for scanning IDL source files

SCons.Scanner.LaTeX module

Dependency scanner for LaTeX code.

class SCons.Scanner.LaTeX.FindENVPATHDirs(variable)

Bases: object

A class to bind a specific E{\*}PATH variable name to a function that will return all of the E{\*}path directories.

class SCons.Scanner.LaTeX.LaTeX(name, suffixes, graphics\_extensions, \*args, \*\*kwargs)

Bases: ScannerBase

Class for scanning LaTeX files for included files.

Unlike most scanners, which use regular expressions that just return the included file name, this returns a tuple consisting of the keyword for the inclusion ("include", "includegraphics", "input", or "bibliography"), and then the file name itself. Based on a quick look at LaTeX documentation, it seems that we should append .tex suffix for the "include" keywords, append .tex if there is no extension for the "input" keyword, and need to add .bib for the "bibliography" keyword that does not accept extensions by itself.

Finally, if there is no extension for an "includegraphics" keyword latex will append .ps or .eps to find the file, while pdftex may use .pdf, .jpg, .tif, .mps, or .png.

The actual subset and search order may be altered by DeclareGraphicsExtensions command. This complication is ignored. The default order corresponds to experimentation with TeX:

```
$ latex --version
pdfTeX 3.141592-1.21a-2.2 (Web2C 7.5.4)
kpathsea version 3.5.4
```

**The order is:**

['.eps', '.ps'] for latex ['.png', '.pdf', '.jpg', '.tif'].

Another difference is that the search path is determined by the type of the file being searched: env['TEXINPUTS'] for "input" and "include" keywords env['TEXINPUTS'] for "includegraphics" keyword env['TEXINPUTS'] for "lstinputlisting" keyword env['BIBINPUTS'] for "bibliography" keyword env['BSTINPUTS'] for "bibliographystyle" keyword env['INDEXSTYLE'] for "makeindex" keyword, no scanning support needed just allows user to set it if needed.

FIXME: also look for the class or style in document[class|style]{} FIXME: also look for the argument of bibliographystyle{}

```
_latex_names(include_type, filename)
```

```
static _recurse_all_nodes(nodes)
```

```
static _recurse_no_nodes(nodes)
```

```
add_scanner(skey, scanner)
```

```
add_skey(skey)
```

Add a skey to the list of skeys

```
canonical_text(text)
```

Standardize an input TeX-file contents.

**Currently:**

- removes comments, unwrapping comment-wrapped lines.

```

env_variables = ['TEXINPUTS', 'BIBINPUTS', 'BSTINPUTS', 'INDEXSTYLE']
find_include(include, source_dir, path)
get_keys(env=None)
keyword_paths = {'addbibresource': 'BIBINPUTS', 'addglobalbib': 'BIBINPUTS', 'addsectionbib': 'BIBINPUTS',
'bibliography': 'BIBINPUTS', 'bibliographystyle': 'BSTINPUTS', 'include': 'TEXINPUTS', 'includegraphics':
'TEXINPUTS', 'input': 'TEXINPUTS', 'lstinputlisting': 'TEXINPUTS', 'makeindex': 'INDEXSTYLE', 'usepackage':
'TEXINPUTS'}
path(env, dir=None, target=None, source=None)
scan(node, sub_dir='.')
scan_recurse(node, path=())
    do a recursive scan of the top level target file This lets us search for included files based on the directory of the
    main file just as latex does
select(node)
sort_key(include)
two_arg_commands = ['import', 'subimport', 'includefrom', 'subincludefrom', 'inputfrom', 'subinputfrom']
SCons.Scanner.LaTeX.LaTeXScanner()
    Return a prototype Scanner instance for scanning LaTeX source files when built with latex.
SCons.Scanner.LaTeX.PDFLaTeXScanner()
    Return a prototype Scanner instance for scanning LaTeX source files when built with pdflatex.
class SCons.Scanner.LaTeX._Null
    Bases: object
SCons.Scanner.LaTeX._null
    alias of _Null
SCons.Scanner.LaTeX.modify_env_var(env, var, abspath)

```

SCons.Scanner.Prog module

Dependency scanner for program files.

SCons.Scanner.Prog.ProgramScanner(\*\*kwargs)

Return a prototype Scanner instance for scanning executable files for static-lib dependencies

SCons.Scanner.Prog.\_subst\_libs(env, libs)

Substitute environment variables and split into list.

SCons.Scanner.Prog.scan(node, env, libpath=())

Scans program files for static-library dependencies.

It will search the LIBPATH environment variable for libraries specified in the LIBS variable, returning any files it finds as dependencies.

SCons.Scanner.RC module

Dependency scanner for RC (Interface Definition Language) files.

SCons.Scanner.RC.RCScan()

Return a prototype Scanner instance for scanning RC source files

SCons.Scanner.RC.no\_tlb(nodes)

Filter out .tlb files as they are binary and shouldn't be scanned.

SCons.Scanner.SWIG module

Dependency scanner for SWIG code.

SCons.Scanner.SWIG.SWIGScanner()

Module contents

The Scanner package for the SCons software construction utility.

SCons.Scanner.Base

alias of ScannerBase

```
class SCons.Scanner.Classic (name, suffixes, path_variable, regex, *args, **kwargs)
```

Bases: Current

A Scanner subclass to contain the common logic for classic CPP-style include scanning, but which can be customized to use different regular expressions to find the includes.

Note that in order for this to work “out of the box” (without overriding the `find_include()` and `sort_key1()` methods), the regular expression passed to the constructor must return the name of the include file in group 0.

```
static _recurse_all_nodes (nodes)
```

```
static _recurse_no_nodes (nodes)
```

```
add_scanner (skey, scanner)
```

```
add_skey (skey)
```

Add a skey to the list of skeys

```
static find_include (include, source_dir, path)
```

```
find_include_names (node)
```

```
get_skeys (env=None)
```

```
path (env, dir=None, target=None, source=None)
```

```
scan (node, path=())
```

```
select (node)
```

```
static sort_key (include)
```

```
class SCons.Scanner.ClassicCPP (name, suffixes, path_variable, regex, *args, **kwargs)
```

Bases: Classic

A Classic Scanner subclass which takes into account the type of bracketing used to include the file, and uses classic CPP rules for searching for the files based on the bracketing.

Note that in order for this to work, the regular expression passed to the constructor must return the leading bracket in group 0, and the contained filename in group 1.

```
static _recurse_all_nodes (nodes)
```

```
static _recurse_no_nodes (nodes)
```

```
add_scanner (skey, scanner)
```

```
add_skey (skey)
```

Add a skey to the list of skeys

```
find_include (include, source_dir, path)
```

```
find_include_names (node)
```

```
get_skeys (env=None)
```

```
path (env, dir=None, target=None, source=None)
```

```
scan (node, path=())
```

```
select (node)
```

```
sort_key (include)
```

```
class SCons.Scanner.Current (*args, **kwargs)
```

Bases: ScannerBase

A class for scanning files that are source files (have no builder) or are derived files and are current (which implies that they exist, either locally or in a repository).

```
static _recurse_all_nodes (nodes)
```

```
static _recurse_no_nodes (nodes)
```

```
add_scanner (skey, scanner)
```

```
add_skey (skey)
```

Add a skey to the list of skeys

```
get_skeys (env=None)
```

```
path (env, dir=None, target=None, source=None)
```

```
select (node)
```

```
class SCons.Scanner.FindPathDirs (variable)
```

Bases: object

Class to bind a specific `E{*}PATH` variable name to a function that will return all of the `E{*}path` directories.

```
SCons.Scanner.Scanner (function, *args, **kwargs)
```

Factory function to create a Scanner Object.

Creates the appropriate Scanner based on the type of “function”.

TODO: Deprecate this some day. We've moved the functionality inside the ScannerBase class and really don't need this factory function any more. It was, however, used by some of our Tool modules, so the call probably ended up in various people's custom modules patterned on SCons code.

```
class SCons.Scanner.ScannerBase (function, name='NONE', argument=<class 'SCons.Scanner._Null'>,
keys=<class 'SCons.Scanner._Null'>, path_function=None, node_class=<class
'SCons.Node.FS.Base'>, node_factory=None, scan_check=None, recursive=None)
```

Bases: object

Base class for dependency scanners.

Implements straightforward, single-pass scanning of a single file.

A Scanner is usually set up with a scanner function (and optionally a path function), but can also be a kind of dispatcher which passes control to other Scanners.

A scanner function takes three arguments: a Node to scan for dependencies, the construction environment to use, and an optional tuple of paths (as generated by the optional path function). It must return a list containing the Nodes for all the direct dependencies of the file.

The optional path function is called to return paths that can be searched for implicit dependency files. It takes five arguments: a construction environment, a Node for the directory containing the SConscript file that defined the primary target, a list of target nodes, a list of source nodes, and the optional argument for this instance.

Examples:

```
s = Scanner(my_scanner_function)
s = Scanner(function=my_scanner_function)
s = Scanner(function=my_scanner_function, argument='foo')
```

#### Parameters:

- **function** – either a scanner function taking two or three arguments and returning a list of File Nodes; or a mapping of keys to other Scanner objects.
- **name** – an optional name for identifying this scanner object (defaults to “NONE”).
- **argument** – an optional argument that will be passed to both *function* and *path\_function*.
- **skeys** – an optional list argument that can be used to determine if this scanner can be used for a given Node. In the case of File nodes, for example, the *skeys* would be file suffixes.
- **path\_function** – an optional function which returns a tuple of the directories that can be searched for implicit dependency files. May also return a callable which is called with no args and returns the tuple (supporting Bindable class).
- **node\_class** – optional class of Nodes which this scan will return. If not specified, defaults to SCons.Node.FS.Base. If *node\_class* is None, then this scanner will not enforce any Node conversion and will return the raw results from *function*.
- **node\_factory** – optional factory function to be called to translate the raw results returned by *function* into the expected *node\_class* objects.
- **scan\_check** – optional function to be called to first check whether this node really needs to be scanned.
- **recursive** – optional specifier of whether this scanner should be invoked recursively on all of the implicit dependencies it returns (for example *#include* lines in C source files, which may refer to header files which should themselves be scanned). May be a callable, which will be called to filter the list of nodes found to select a subset for recursive scanning (the canonical example being only recursively scanning subdirectories within a directory). The default is to not do recursive scanning.

```
static _recurse_all_nodes (nodes)
static _recurse_no_nodes (nodes)
add_scanner (skey, scanner)
add_skey (skey)
```

Add a key to the list of skeys

`get_skeys (env=None)`

`path (env, dir=None, target=None, source=None)`

`select (node)`

`class SCons.Scanner.Selector (mapping, *args, **kwargs)`

Bases: `ScannerBase`

A class for selecting a more specific scanner based on the `scanner_key()` (suffix) for a specific Node.

TODO: This functionality has been moved into the inner workings of the `ScannerBase` class, and this class will be deprecated at some point. (It was never exposed directly as part of the public interface, although it is used by the `Scanner()` factory function that was used by various Tool modules and therefore was likely a template for custom modules that may be out there.)

`static _recurse_all_nodes (nodes)`

`static _recurse_no_nodes (nodes)`

`add_scanner (skey, scanner)`

`add_skey (skey)`

Add a key to the list of skeys

`get_skeys (env=None)`

`path (env, dir=None, target=None, source=None)`

`select (node)`

`class SCons.Scanner._Null`

Bases: `object`

`SCons.Scanner._null`

alias of `_Null`

SCons.Script package

Submodules

SCons.Script.Interactive module

SCons interactive mode.

`class SCons.Script.Interactive.SConsInteractiveCmd (**kw)`

Bases: `Cmd`

`build [TARGETS]` Build the specified TARGETS and their dependencies. 'b' is a synonym. `clean [TARGETS]` Clean (remove) the specified TARGETS and their dependencies. 'c' is a synonym. `exit` Exit SCons interactive mode. `help [COMMAND]` Prints help for the specified COMMAND. 'h' and '?' are synonyms. `shell [COMMANDLINE]` Execute COMMANDLINE in a subshell. 'sh' and '!' are synonyms. `version` Prints SCons version information.

`_do_one_help (arg)`

`_doc_to_help (obj)`

`_strip_initial_spaces (s)`

`cmdloop (intro=None)`

Repeatedly issue a prompt, accept input, parse an initial prefix off the received input, and dispatch to action methods, passing them the remainder of the line as argument.

`columnize (list, displaywidth=80)`

Display a list of strings as a compact set of columns.

Each column is only as wide as necessary. Columns are separated by two spaces (one was not legible enough).

`complete (text, state)`

Return the next possible completion for 'text'.

If a command has not been entered, then complete against command list. Otherwise try to call `complete_<command>` to get list of completions.

`complete_help (*args)`

`completedefault (*ignored)`

Method called to complete an input line when no command-specific `complete_*`() method is available.

By default, it returns an empty list.

`completenames (text, *ignored)`

`default (argv)`

Called on an input line when the command prefix is not recognized.

If this method is not overridden, it prints an error message and returns.

`do_EOF (argv)`

`do_build (argv)`

build [TARGETS] Build the specified TARGETS and their dependencies. 'b' is a synonym.

`do_clean (argv)`

clean [TARGETS] Clean (remove) the specified TARGETS and their dependencies. 'c' is a synonym.

`do_exit (argv)`

exit Exit SCons interactive mode.

`do_help (argv)`

help [COMMAND] Prints help for the specified COMMAND. 'h' and '?' are synonyms.

`do_shell (argv)`

shell [COMMANDLINE] Execute COMMANDLINE in a subshell. 'sh' and '!' are synonyms.

`do_version (argv)`

version Prints SCons version information.

`doc_header = 'Documented commands (type help <topic>):'`

`doc_leader = "`

`emptyline ()`

Called when an empty line is entered in response to the prompt.

If this method is not overridden, it repeats the last nonempty command entered.

`get_names ()`

`identchars = 'abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789_'`

`intro = None`

`lastcmd = "`

`misc_header = 'Miscellaneous help topics:'`

`nohelp = '*** No help on %s'`

`onecmd (line)`

Interpret the argument as though it had been typed in response to the prompt.

This may be overridden, but should not normally need to be; see the `precmd()` and `postcmd()` methods for useful execution hooks. The return value is a flag indicating whether interpretation of commands by the interpreter should stop.

`parseline (line)`

Parse the line into a command name and a string containing the arguments. Returns a tuple containing (command, args, line). 'command' and 'args' may be None if the line couldn't be parsed.

`postcmd (stop, line)`

Hook method executed just after a command dispatch is finished.

`postloop ()`

Hook method executed once when the `cmdloop()` method is about to return.

`precmd (line)`

Hook method executed just before the command line is interpreted, but after the input prompt is generated and issued.

`preloop ()`

Hook method executed once when the `cmdloop()` method is called.

`print_topics (header, cmds, cmdlen, maxcol)`

`prompt = '(Cmd) '`

`ruler = '='`

`synonyms = {'b': 'build', 'c': 'clean', 'h': 'help', 'scons': 'build', 'sh': 'shell'}`

`undoc_header = 'Undocumented commands:'`

`use_rawinput = 1`

`SCons.Script.Interactive.interact (fs, parser, options, targets, target_top)`

SCons.Script.Main module

The `main()` function used by the `scons` script.

Architecturally, this *is* the `scons` script, and will likely only be called from the external "scons" wrapper. Consequently, anything here should not be, or be considered, part of the build engine. If it's something that we expect other software to want to use, it should go in some other module. If it's specific to the "scons" script invocation, it goes here.



```
SCons.Script.Main.AddOption (*args, **kw)
class SCons.Script.Main.BuildTask (tm, targets, top, node)
    Bases: OutOfDateTask
    An SCons build task.
    _abc_impl = <_abc_data object>
    _exception_raise ()
        Raises a pending exception that was recorded while getting a Task ready for execution.
    _no_exception_to_raise ()
    display (message)
        Hook to allow the calling interface to display a message.
        This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out
        what Node should be built next, the actual target list may be altered, along with a message describing the
        alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see
        those messages.
    do_failed (status=2)
    exc_clear ()
        Clears any recorded exception.
        This also changes the "exception_raise" attribute to point to the appropriate do-nothing method.
    exc_info ()
        Returns info about a recorded exception.
    exception_set (exception=None)
        Records an exception to be raised at the appropriate time.
        This also changes the "exception_raise" attribute to point to the method that will, in fact
    execute ()
        Called to execute the task.
        This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe
        stuff in prepare(), executed() or failed().
    executed ()
        Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's
        callback methods.
        This may have been a do-nothing operation (to preserve build order), so we must check the node's state before
        deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call
        "visited()", which will handle any post-visit actions that must take place regardless of whether or not the target was
        an actual built target or a source Node.
    executed_with_callbacks ()
        Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's
        callback methods.
        This may have been a do-nothing operation (to preserve build order), so we must check the node's state before
        deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call
        "visited()", which will handle any post-visit actions that must take place regardless of whether or not the target was
        an actual built target or a source Node.
    executed_without_callbacks ()
        Called when the task has been successfully executed and the Taskmaster instance doesn't want to call the Node's
        callback methods.
    fail_continue ()
        Explicit continue-the-build failure.
        This sets failure status on the target nodes and all of their dependent parent nodes.
        Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on
        up-to-date nodes when using Configure().
    fail_stop ()
        Explicit stop-the-build failure.
        This sets failure status on the target nodes and all of their dependent parent nodes.
        Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on
        up-to-date nodes when using Configure().
    failed ()
        Default action when a task fails: stop the build.
```



Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Make a task ready for execution

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the “scons -c” option.

`make_ready_current ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what’s necessary.

`needs_execute ()`

Returns True (indicating this Task should be executed) if this Task’s target state indicates it needs executing, which has already been determined by an earlier up-to-date check.

`postprocess ()`

Post-processes a task after it’s been executed.

This examines all the targets just built (or not, we don’t care if the build was successful, or even if there was no build because everything was up-to-date) to see if they have any waiting parent Nodes, or Nodes waiting on a common side effect, that can be put back on the candidates list.

`prepare ()`

Called just before the task is executed.

This is mainly intended to give the target Nodes a chance to unlink underlying files and make all necessary directories before the Action is actually called to build the targets.

`trace_message (method, node, description='node')`

`class SCons.Script.Main.CleanTask (tm, targets, top, node)`

Bases: AlwaysTask

An SCons clean task.

`_abc_impl = <_abc_data object>`

`_clean_targets (remove=True)`

`_exception_raise ()`

Raises a pending exception that was recorded while getting a Task ready for execution.

`_get_files_to_clean ()`

`_no_exception_to_raise ()`

`display (message)`

Hook to allow the calling interface to display a message.

This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out what Node should be built next, the actual target list may be altered, along with a message describing the alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see those messages.

`exc_clear ()`

Clears any recorded exception.

This also changes the “exception\_raise” attribute to point to the appropriate do-nothing method.

`exc_info ()`

Returns info about a recorded exception.

`exception_set (exception=None)`

Records an exception to be raised at the appropriate time.

This also changes the “exception\_raise” attribute to point to the method that will, in fact

`execute ()`

Called to execute the task.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `prepare()`, `executed()` or `failed()`.

`executed ()`

Called when the task has been successfully executed and the Taskmaster instance doesn’t want to call the Node’s callback methods.

`executed_with_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node's state before deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call "visited()", which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_without_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance doesn't want to call the Node's callback methods.

`fail_continue ()`

Explicit continue-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fail_stop ()`

Explicit stop-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`failed ()`

Default action when a task fails: stop the build.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fs_delete (path, pathstr, remove=True)`

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the "scons -c" option.

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the "scons -c" option.

`make_ready_current ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what's necessary.

`needs_execute ()`

Always returns True (indicating this Task should always be executed).

Subclasses that need this behavior (as opposed to the default of only executing Nodes that are out of date w.r.t. their dependencies) can use this as follows:

**class MyTaskSubclass(SCons.Taskmaster.Task):**

    needs\_execute = SCons.Taskmaster.AlwaysTask.needs\_execute

`postprocess ()`

Post-processes a task after it's been executed.

This examines all the targets just built (or not, we don't care if the build was successful, or even if there was no build because everything was up-to-date) to see if they have any waiting parent Nodes, or Nodes waiting on a common side effect, that can be put back on the candidates list.

`prepare ()`

Called just before the task is executed.

This is mainly intended to give the target Nodes a chance to unlink underlying files and make all necessary directories before the Action is actually called to build the targets.

`remove ()`

`show ()`

```

    trace_message (method, node, description='node')
class SCons.Script.Main.CountStats
    Bases: Stats
    do_append (label)
    do_nothing (*args, **kw)
    do_print ()
    enable (outfp)
class SCons.Script.Main.FakeOptionParser
    Bases: object
    A do-nothing option parser, used for the initial OptionsParser variable.
    During normal SCons operation, the OptionsParser is created right away by the main() function. Certain tests scripts
    however, can introspect on different Tool modules, the initialization of which can try to add a new, local option to an
    otherwise uninitialized OptionsParser object. This allows that introspection to happen without blowing up.
class FakeOptionValues
    Bases: object
    add_local_option (*args, **kw)
    values = <SCons.Script.Main.FakeOptionParser.FakeOptionValues object>
SCons.Script.Main.GetBuildFailures ()
SCons.Script.Main.GetOption (name)
class SCons.Script.Main.MemStats
    Bases: Stats
    do_append (label)
    do_nothing (*args, **kw)
    do_print ()
    enable (outfp)
SCons.Script.Main.PrintHelp (file=None)
SCons.Script.Main.Progress (*args, **kw)
class SCons.Script.Main.Progressor (obj, interval=1, file=None, overwrite=False)
    Bases: object
    count = 0
    erase_previous ()
    prev = ""
    replace_string (node)
    spinner (node)
    string (node)
    target_string = '$TARGET'
    write (s)
class SCons.Script.Main.QuestionTask (tm, targets, top, node)
    Bases: AlwaysTask
    An SCons task for the -q (question) option.
    _abc_impl = <_abc_data object>
    _exception_raise ()
        Raises a pending exception that was recorded while getting a Task ready for execution.
    _no_exception_to_raise ()
    display (message)
        Hook to allow the calling interface to display a message.
        This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out
        what Node should be built next, the actual target list may be altered, along with a message describing the
        alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see
        those messages.
    exc_clear ()
        Clears any recorded exception.
        This also changes the "exception_raise" attribute to point to the appropriate do-nothing method.
    exc_info ()
        Returns info about a recorded exception.
    exception_set (exception=None)

```

Records an exception to be raised at the appropriate time.

This also changes the “exception\_raise” attribute to point to the method that will, in fact

`execute ()`

Called to execute the task.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `prepare()`, `executed()` or `failed()`.

`executed ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node’s callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node’s state before deciding whether it was “built”, in which case we call the appropriate Node method. In any event, we always call “`visited()`”, which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_with_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node’s callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node’s state before deciding whether it was “built”, in which case we call the appropriate Node method. In any event, we always call “`visited()`”, which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_without_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance doesn’t want to call the Node’s callback methods.

`fail_continue ()`

Explicit continue-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fail_stop ()`

Explicit stop-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`failed ()`

Default action when a task fails: stop the build.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what’s necessary.

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the “`scons -c`” option.

`make_ready_current ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what’s necessary.

`needs_execute ()`

Always returns True (indicating this Task should always be executed).

Subclasses that need this behavior (as opposed to the default of only executing Nodes that are out of date w.r.t. their dependencies) can use this as follows:

```
class MyTaskSubclass(SCons.Taskmaster.Task):
```

```
    needs_execute = SCons.Taskmaster.AlwaysTask.needs_execute
```

```

postprocess ()
    Post-processes a task after it's been executed.
    This examines all the targets just built (or not, we don't care if the build was successful, or even if there was no
    build because everything was up-to-date) to see if they have any waiting parent Nodes, or Nodes waiting on a
    common side effect, that can be put back on the candidates list.

prepare ()
    Called just before the task is executed.
    This is mainly intended to give the target Nodes a chance to unlink underlying files and make all necessary
    directories before the Action is actually called to build the targets.

trace_message (method, node, description='node')
exception SCons.Script.Main.SConsPrintHelpException
    Bases: Exception
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
SCons.Script.Main.SetOption (name, value)
class SCons.Script.Main.Stats
    Bases: object
    do_nothing (*args, **kw)
    enable (outfp)
class SCons.Script.Main.TreePrinter (derived=False, prune=False, status=False, sLineDraw=False)
    Bases: object
    display (t)
    get_all_children (node)
    get_derived_children (node)
SCons.Script.Main._SConstruct_exists (dirname="", repositories=[], filelist=None)
    This function checks that an SConstruct file exists in a directory. If so, it returns the path of the file. By default, it
    checks the current directory.
SCons.Script.Main._build_targets (fs, options, targets, target_top)
SCons.Script.Main._create_path (plist)
SCons.Script.Main._exec_main (parser, values)
SCons.Script.Main._load_all_site_scons_dirs (topdir, verbose=False)
    Load all of the predefined site_scons dir. Order is significant; we load them in order from most generic
    (machine-wide) to most specific (topdir). The verbose argument is only for testing.
SCons.Script.Main._load_site_scons_dir (topdir, site_dir_name=None)
    Load the site directory under topdir.
    If a site dir name is supplied use it, else use default "site_scons" Prepend site dir to sys.path. If a "site_tools" subdir
    exists, prepend to toolpath. Import "site_init.py" from site dir if it exists.
SCons.Script.Main._main (parser)
SCons.Script.Main._scons_internal_error ()
    Handle all errors but user errors. Print out a message telling the user what to do in this case and print a normal trace.
SCons.Script.Main._scons_internal_warning (e)
    Slightly different from _scons_user_warning in that we use the current call stack rather than sys.exc_info() to get our
    stack trace. This is used by the warnings framework to print warnings.
SCons.Script.Main._scons_syntax_error (e)
    Handle syntax errors. Print out a message and show where the error occurred.
SCons.Script.Main._scons_user_error (e)
    Handle user errors. Print out a message and a description of the error, along with the line number and routine where
    it occurred. The file and line number will be the deepest stack frame that is not part of SCons itself.
SCons.Script.Main._scons_user_warning (e)
    Handle user warnings. Print out a message and a description of the warning, along with the line number and routine
    where it occurred. The file and line number will be the deepest stack frame that is not part of SCons itself.
SCons.Script.Main._set_debug_values (options)
SCons.Script.Main.find_deepest_user_frame (tb)
    Find the deepest stack frame that is not part of SCons.
    Input is a "pre-processed" stack trace in the form returned by traceback.extract_tb() or traceback.extract_stack()

```

```

SCons.Script.Main.main ()
SCons.Script.Main.path_string (label, module)
SCons.Script.Main.python_version_deprecated (version=sys.version_info(major=3, minor=7, micro=13,
releaselevel='final', serial=0))
SCons.Script.Main.python_version_string ()
SCons.Script.Main.python_version_unsupported (version=sys.version_info(major=3, minor=7, micro=13,
releaselevel='final', serial=0))
SCons.Script.Main.revert_io ()
SCons.Script.Main.test_load_all_site_scons_dirs (d)
SCons.Script.Main.version_string (label, module)

```

SCons.Script.SConsOptions module

SCons.Script.SConsOptions.Parser (version)

Returns a parser object initialized with the standard SCons options.

Add options in the order we want them to show up in the `-H` help text, basically alphabetical. Each `op.add_option()` call should have a consistent format:

```

op.add_option("-L", "--long-option-name",
              nargs=1, type="string",
              dest="long_option_name", default='foo',
              action="callback", callback=opt_long_option,
              help="help text goes here",
              metavar="VAR")

```

Even though the `optparse` module constructs reasonable default destination names from the long option names, we're going to be explicit about each one for easier readability and so this code will at least show up when grepping the source for option attribute names, or otherwise browsing the source code.

```

class SCons.Script.SConsOptions.SConsIndentedHelpFormatter (indent_increment=2,
max_help_position=24, width=None, short_first=1)

```

Bases: `IndentedHelpFormatter`

`NO_DEFAULT_VALUE = 'none'`

`_format_text (text)`

Format a paragraph of free-form text for inclusion in the help output at the current indentation level.

`dedent ()`

`expand_default (option)`

`format_description (description)`

`format_epilog (epilog)`

`format_heading (heading)`

Translates heading to "SCons Options"

Heading of "Options" changed to "SCons Options." Unfortunately, we have to do this here, because those titles are hard-coded in the `optparse` calls.

`format_option (option)`

Customized option formatter.

A copy of the normal `optparse.IndentedHelpFormatter.format_option()` method. This has been snarfed so we can modify text wrapping to our liking:

- add our own regular expression that doesn't break on hyphens (so things like `--no-print-directory` don't get broken).
- wrap the list of options themselves when it's too long (the `wrapper.fill(opts)` call below).
- set the subsequent\_indent when wrapping the help\_text.

The help for each option consists of two parts:

- the opt strings and metavariables e.g. ("`-x`", or "`-fFILENAME, -file=FILENAME`")
- the user-supplied help string e.g. ("turn on expert mode", "read data from FILENAME")

If possible, we write both of these on the same line:

```
-x          turn on expert mode
```

But if the opt string list is too long, we put the help string on a second line, indented to the same column it would start in if it fit on the first line:

```
-fFILENAME, --file=FILENAME
    read data from FILENAME
```

`format_option_strings (option)`

Return a comma-separated list of option strings & metavariables.

`format_usage (usage)`

Formats the usage message.

`indent ()`

`set_long_opt_delimiter (delim)`

`set_parser (parser)`

`set_short_opt_delimiter (delim)`

`store_option_strings (parser)`

`class SCons.Script.SConsOptions.SConsOption (*opts, **attrs)`

Bases: Option

`ACTIONS = ('store', 'store_const', 'store_true', 'store_false', 'append', 'append_const', 'count', 'callback', 'help', 'version')`

`ALWAYS_TYPED_ACTIONS = ('store', 'append')`

`ATTRS = ['action', 'type', 'dest', 'default', 'nargs', 'const', 'choices', 'callback', 'callback_args', 'callback_kwargs', 'help', 'metavar']`

`CHECK_METHODS = [<function Option._check_action>, <function Option._check_type>, <function Option._check_choice>, <function Option._check_dest>, <function Option._check_const>, <function Option._check_nargs>, <function Option._check_callback>, <function SConsOption._check_nargs_optional>]`

`CONST_ACTIONS = ('store_const', 'append_const', 'store', 'append', 'callback')`

`STORE_ACTIONS = ('store', 'store_const', 'store_true', 'store_false', 'append', 'append_const', 'count')`

`TYPED_ACTIONS = ('store', 'append', 'callback')`

`TYPES = ('string', 'int', 'long', 'float', 'complex', 'choice')`

`TYPE_CHECKER = {'choice': <function check_choice>, 'complex': <function check_builtin>, 'float': <function check_builtin>, 'int': <function check_builtin>, 'long': <function check_builtin>}`

`_check_action ()`

`_check_callback ()`

`_check_choice ()`

`_check_const ()`

`_check_dest ()`

`_check_nargs ()`

`_check_nargs_optional ()`

`_check_opt_strings (opts)`

`_check_type ()`

`_set_attrs (attrs)`

`_set_opt_strings (opts)`

`check_value (opt, value)`

`convert_value (opt, value)`

`get_opt_string ()`

`process (opt, value, values, parser)`

`take_action (action, dest, opt, value, values, parser)`

`takes_value ()`

`class SCons.Script.SConsOptions.SConsOptionGroup (parser, title, description=None)`

Bases: OptionGroup

A subclass for SCons-specific option groups.

The only difference between this and the base class is that we print the group's help text flush left, underneath their own title but lined up with the normal "SCons Options".



```

_check_conflict (option)
_create_option_list ()
_create_option_mappings ()
_share_option_mappings (parser)
add_option (Option)
add_option (opt_str, ..., kwarg=val, ...) → None
add_options (option_list)
destroy ()
    see OptionParser.destroy().
format_description (formatter)
format_help (formatter)
    Format an option group's help text.
    The title is dedented so it's flush with the "SCons Options" title we print at the top.
format_option_help (formatter)
get_description ()
get_option (opt_str)
has_option (opt_str)
remove_option (opt_str)
set_conflict_handler (handler)
set_description (description)
set_title (title)
class SCons.Script.SConsOptions.SConsOptionParser (usage=None, option_list=None,
option_class=<class 'optparse.Option'>, version=None, conflict_handler='error',
description=None, formatter=None, add_help_option=True, prog=None, epilog=None)
    Bases: OptionParser
    _add_help_option ()
    _add_version_option ()
    _check_conflict (option)
    _create_option_list ()
    _create_option_mappings ()
    _get_all_options ()
    _get_args (args)
    _init_parsing_state ()
    _match_long_opt (opt: string) → string
        Determine which long option string 'opt' matches, ie. which one it is an unambiguous abbreviation for. Raises
        BadOptionError if 'opt' doesn't unambiguously match any long option string.
    _populate_option_list (option_list, add_help=True)
    _process_args (largs, rargs, values)
        _process_args(largs : [string],
            rargs : [string], values : Values)
        Process command-line arguments and populate 'values', consuming options and arguments from 'rargs'. If
        'allow_interspersed_args' is false, stop at the first non-option argument. If true, accumulate any interspersed
        non-option arguments in 'largs'.
    _process_long_opt (rargs, values)
        SCons-specific processing of long options.
        This is copied directly from the normal optparse._process_long_opt() method, except that, if configured to
        do so, we catch the exception thrown when an unknown option is encountered and just stick it back on the
        "leftover" arguments for later (re-)processing. This is because we may see the option definition later, while
        processing SCons script files.
    _process_short_opts (rargs, values)
    _share_option_mappings (parser)
add_local_option (*args, **kw)
    Adds a local option to the parser.
    This is initiated by an AddOption() call to add a user-defined command-line option. We add the option to a separate
    option group for the local options, creating the group if necessary.

```



```

add_option (Option)
add_option (opt_str, ..., kwarg=val, ...) → None
add_option_group (*args, **kwargs)
add_options (option_list)
check_values (values: Values, args: [string])
    -> (values : Values, args : [string])
    Check that the supplied option values and leftover arguments are valid. Returns the option values and leftover
    arguments (possibly adjusted, possibly completely new – whatever you like). Default implementation just returns
    the passed-in values; subclasses may override as desired.
destroy ()
    Declare that you are done with this OptionParser. This cleans up reference cycles so the OptionParser (and all
    objects referenced by it) can be garbage-collected promptly. After calling destroy(), the OptionParser is unusable.
disable_interspersed_args ()
    Set parsing to stop on the first non-option. Use this if you have a command processor which runs another
    command that has options of its own and you want to make sure these options don't get confused.
enable_interspersed_args ()
    Set parsing to not stop on the first non-option, allowing interspersing switches with command arguments. This is
    the default behavior. See also disable_interspersed_args() and the class documentation description of the attribute
    allow_interspersed_args.
error (msg: string)
    Print a usage message incorporating 'msg' to stderr and exit. If you override this in a subclass, it should not return
    – it should either exit or raise an exception.
exit (status=0, msg=None)
expand_prog_name (s)
format_description (formatter)
format_epilog (formatter)
format_help (formatter=None)
format_option_help (formatter=None)
get_default_values ()
get_description ()
get_option (opt_str)
get_option_group (opt_str)
get_prog_name ()
get_usage ()
get_version ()
has_option (opt_str)
parse_args (args=None, values=None)
    parse_args(args : [string] = sys.argv[1:],
        values : Values = None)
    -> (values : Values, args : [string])
    Parse the command-line options found in 'args' (default: sys.argv[1:]). Any errors result in a call to 'error()', which
    by default prints the usage message to stderr and calls sys.exit() with an error message. On success returns a pair
    (values, args) where 'values' is a Values instance (with all your option values) and 'args' is the list of arguments left
    over after parsing options.
preserve_unknown_options = False
print_help (file: file = stdout)
    Print an extended help message, listing all options and any help text provided with them, to 'file' (default stdout).
print_usage (file: file = stdout)
    Print the usage message for the current program (self.usage) to 'file' (default stdout). Any occurrence of the string
    "%prog" in self.usage is replaced with the name of the current program (basename of sys.argv[0]). Does nothing if
    self.usage is empty or not defined.
print_version (file: file = stdout)
    Print the version message for this program (self.version) to 'file' (default stdout). As with print_usage(), any
    occurrence of "%prog" in self.version is replaced by the current program's name. Does nothing if self.version is
    empty or undefined.

```

```
remove_option (opt_str)
reparse_local_options ()
```

Re-parse the leftover command-line options.

Parse options stored in *self.largs*, so that any value overridden on the command line is immediately available if the user turns around and does a `GetOption()` right away.

We mimic the processing of the single args in the original `OptionParser _process_args()`, but here we allow exact matches for long-opts only (no partial argument names!). Otherwise there could be problems in `add_local_option()` below. When called from there, we try to reparse the command-line arguments that

1. haven't been processed so far (*self.largs*), but

2. are possibly not added to the list of options yet.

So, when we only have a value for “myargument” so far, a command-line argument of “myarg=test” would set it, per the behaviour of `_match_long_opt()`, which allows for partial matches of the option name, as long as the common prefix appears to be unique. This would lead to further confusion, because we might want to add another option “myarg” later on (see issue #2929).

```
set_conflict_handler (handler)
set_default (dest, value)
set_defaults (**kwargs)
set_description (description)
set_process_default_values (process)
set_usage (usage)
standard_option_list = []
```

```
class SCons.Script.SConsOptions.SConsValues (defaults)
```

Bases: `Values`

Holder class for uniform access to SCons options, regardless of whether or not they can be set on the command line or in the SConscript files (using the `SetOption()` function).

A SCons option value can originate three different ways:

1. set on the command line;

2. set in an SConscript file;

3. the default setting (from the `op.add_option()` calls in the `Parser()` function, below).

The command line always overrides a value set in a SConscript file, which in turn always overrides default settings. Because we want to support user-specified options in the SConscript file itself, though, we may not know about all of the options when the command line is first parsed, so we can't make all the necessary precedence decisions at the time the option is configured.

The solution implemented in this class is to keep these different sets of settings separate (command line, SConscript file, and default) and to override the `__getattr__()` method to check them in turn. This should allow the rest of the code to just fetch values as attributes of an instance of this class, without having to worry about where they came from.

Note that not all command line options are settable from SConscript files, and the ones that are must be explicitly added to the “settable” list in this class, and optionally validated and coerced in the `set_option()` method.

```
_update (dict, mode)
_update_careful (dict)
```

Update the option values from an arbitrary dictionary, but only use keys from `dict` that already have a corresponding attribute in `self`. Any keys in `dict` without a corresponding attribute are silently ignored.

```
_update_loose (dict)
```

Update the option values from an arbitrary dictionary, using all keys from the dictionary regardless of whether they have a corresponding attribute in `self` or not.

```
ensure_value (attr, value)
read_file (filename, mode='careful')
read_module (modname, mode='careful')
set_option (name, value)
```

Sets an option from an SConscript file.

**Raises:** `UserError` – invalid or malformed option (“error in your script”)

```

settable = ['clean', 'diskcheck', 'duplicate', 'experimental', 'hash_chunksize', 'hash_format', 'help', 'implicit_cache',
            'implicit_deps_changed', 'implicit_deps_unchanged', 'max_drift', 'md5_chunksize', 'no_exec', 'no_progress',
            'num_jobs', 'random', 'silent', 'stack_size', 'warn', 'disable_execute_ninja', 'disable_ninja', 'skip_ninja_regen']
SCons.Script.SConsOptions.diskcheck_convert (value)

```

## SCons.Script.SConscript module

This module defines the Python API provided to SConscript files.

SCons.Script.SConscript.BuildDefaultGlobals ()

Create a dictionary containing all the default globals for SConstruct and SConscript files.

SCons.Script.SConscript.Configure (\*args, \*\*kw)

class SCons.Script.SConscript.DefaultEnvironmentCall (method\_name, subst=0)

Bases: object

A class that implements “global function” calls of Environment methods by fetching the specified method from the DefaultEnvironment’s class. Note that this uses an intermediate proxy class instead of calling the DefaultEnvironment method directly so that the proxy can override the subst() method and thereby prevent expansion of construction variables (since from the user’s point of view this was called as a global function, with no associated construction environment).

class SCons.Script.SConscript.Frame (fs, exports, sconscrip)

Bases: object

A frame on the SConstruct/SConscript call stack

SCons.Script.SConscript.Return (\*vars, \*\*kw)

class SCons.Script.SConscript.SConsEnvironment (platform=None, tools=None, toolpath=None,

variables=None, parse\_flags=None, \*\*kw)

Bases: Base

An Environment subclass that contains all of the methods that are particular to the wrapper SCons interface and which aren’t (or shouldn’t be) part of the build engine itself.

Note that not all of the methods of this class have corresponding global functions, there are some private methods.

Action (\*args, \*\*kw)

AddMethod (function, name=None)

Adds the specified function as a method of this construction environment with the specified name. If the name is omitted, the default name is the name of the function itself.

AddPostAction (files, action)

AddPreAction (files, action)

Alias (target, source=[], action=None, \*\*kw)

AlwaysBuild (\*targets)

Append (\*\*kw)

Append values to construction variables in an Environment.

The variable is created if it is not already present.

AppendENVPath (name, newpath, envname='ENV', sep=':', delete\_existing=False)

Append path elements to the path *name* in the *envname* dictionary for this environment. Will only add any particular path once, and will normpath and normcase all paths to help assure this. This can also handle the case where the env variable is a list instead of a string.

If *delete\_existing* is False, a *newpath* element already in the path will not be moved to the end (it will be left where it is).

AppendUnique (delete\_existing=False, \*\*kw)

Append values to existing construction variables in an Environment, if they’re not already there. If *delete\_existing* is True, removes existing values first, so values move to end.

Builder (\*\*kw)

CacheDir (path, custom\_class=None)

Clean (targets, files)

Clone (tools=[], toolpath=None, parse\_flags=None, \*\*kw)

Return a copy of a construction Environment.

The copy is like a Python “deep copy”—that is, independent copies are made recursively of each objects—except that a reference is copied when an object is not deep-copyable (like a function). There are no references to any mutable objects in the original Environment.

Command (target, source, action, \*\*kw)

Builds the supplied target files from the supplied source files using the supplied action. Action may be any type that the Builder constructor will accept for an action.

Configure (\*args, \*\*kw)

Decider (function)

Default (\*targets)

Depends (target, dependency)

Explicitly specify that 'target's depend on 'dependency'.

Detect (progs)

Return the first available program from one or more possibilities.

**Parameters:** **progs** (str or list) – one or more command names to check for

Dictionary (\*args)

Return construction variables from an environment.

**Parameters:** \*args (optional) – variable names to look up

**Returns:** If args omitted, the dictionary of all construction variables. If one arg, the corresponding value is returned. If more than one arg, a list of values is returned.

**Raises:** **KeyError** – if any of args is not in the construction environment.

Dir (name, \*args, \*\*kw)

Dump (key=None, format='pretty')

Return construction variables serialized to a string.

**Parameters:**

- **key** (optional) – if None, format the whole dict of variables. Else format the value of key (Default value = None)
- **format** (str, optional) – specify the format to serialize to. "pretty" generates a pretty-printed string, "json" a JSON-formatted string. (Default value = "pretty")

EnsurePythonVersion (major, minor)

Exit abnormally if the Python version is not late enough.

EnsureSConsVersion (major, minor, revision=0)

Exit abnormally if the SCons version is not late enough.

Entry (name, \*args, \*\*kw)

Environment (\*\*kw)

Execute (action, \*args, \*\*kw)

Directly execute an action through an Environment

Exit (value=0)

Export (\*vars, \*\*kw)

File (name, \*args, \*\*kw)

FindFile (file, dirs)

FindInstalledFiles ()

returns the list of all targets of the Install and InstallAs Builder.

FindIdxes (paths, prefix, suffix)

Search a list of paths for something that matches the prefix and suffix.

**Parameters:**

- **paths** – the list of paths or nodes.
- **prefix** – construction variable for the prefix.
- **suffix** – construction variable for the suffix.

Returns: the matched path or None

FindSourceFiles (node='.')

returns a list of all source files.

Flatten (sequence)

GetBuildPath (files)

GetLaunchDir ()

GetOption (name)

Glob (pattern, ondisk=True, source=False, strings=False, exclude=None)

Help (text, append=False)

Ignore (target, dependency)

Ignore a dependency.

Import (\*vars)

Literal (string)

Local (\*targets)

MergeFlags (args, unique=True) → None

Merge flags into construction variables.

Merges the flags from `args` into this construction environment. If `args` is not a dict, it is first converted to one with flags distributed into appropriate construction variables. See `ParseFlags()`.

**Parameters:**

- **args** – flags to merge
- **unique** – merge flags rather than appending (default: True). When merging, path variables are retained from the front, other construction variables from the end.

NoCache (\*targets)

Tags a target so that it will not be cached

NoClean (\*targets)

Tags a target so that it will not be cleaned by -c

Override (overrides)

Produce a modified environment whose variables are overridden by the overrides dictionaries. “overrides” is a dictionary that will override the variables of this environment.

This function is much more efficient than `Clone()` or creating a new `Environment` because it doesn’t copy the construction environment dictionary, it just wraps the underlying construction environment, and doesn’t even create a wrapper object if there are no overrides.

ParseConfig (command, function=None, unique=True)

Parse the result of running a command to update construction vars.

Use `function` to parse the output of running `command` in order to modify the current environment.

**Parameters:**

- **command** – a string or a list of strings representing a command and its arguments.
- **function** – called to process the result of `command`, which will be passed as `args`. If `function` is omitted or `None`, `MergeFlags()` is used. Takes 3 args (`env`, `args`, `unique`)
- **unique** – whether no duplicate values are allowed (default true)

ParseDepends (filename, must\_exist=None, only\_one=False)

Parse a mkdep-style file for explicit dependencies. This is completely abusable, and should be unnecessary in the “normal” case of proper SCons configuration, but it may help make the transition from a Make hierarchy easier for some people to swallow. It can also be genuinely useful when using a tool that can write a .d file, but for which writing a scanner would be too complicated.

ParseFlags (\*flags) → dict

Return a dict of parsed flags.

Parse `flags` and return a dict with the flags distributed into the appropriate construction variable names. The flags are treated as a typical set of command-line flags for a GNU-style toolchain, such as might have been generated by one of the {foo}-config scripts, and used to populate the entries based on knowledge embedded in this method - the choices are not expected to be portable to other toolchains.

If one of the `flags` strings begins with a bang (exclamation mark), it is assumed to be a command and the rest of the string is executed; the result of that evaluation is then added to the dict.

Platform (platform)

Precious (\*targets)

Prepend (\*\*kw)

Prepend values to construction variables in an `Environment`.

The variable is created if it is not already present.

PrependENVPath (name, newpath, envname='ENV', sep=':', delete\_existing=True)

Prepend path elements to the path *name* in the *envname* dictionary for this environment. Will only add any particular path once, and will normpath and normcase all paths to help assure this. This can also handle the case where the env variable is a list instead of a string.

If *delete\_existing* is False, a *newpath* component already in the path will not be moved to the front (it will be left where it is).

**PrependUnique** (*delete\_existing=False, \*\*kw*)

Prepend values to existing construction variables in an Environment, if they're not already there. If *delete\_existing* is True, removes existing values first, so values move to front.

**Pseudo** (*\*targets*)

**PyPackageDir** (*modulename*)

**RemoveMethod** (*function*)

Removes the specified function's MethodWrapper from the *added\_methods* list, so we don't re-bind it when making a clone.

**Replace** (*\*\*kw*)

Replace existing construction variables in an Environment with new construction variables and/or values.

**Replaces** (*path, old\_prefix, old\_suffix, new\_prefix, new\_suffix*)

Replace *old\_prefix* with *new\_prefix* and *old\_suffix* with *new\_suffix*.

*env* - Environment used to interpolate variables. *path* - the path that will be modified. *old\_prefix* - construction variable for the old prefix. *old\_suffix* - construction variable for the old suffix. *new\_prefix* - construction variable for the new prefix. *new\_suffix* - construction variable for the new suffix.

**Repository** (*\*dirs, \*\*kw*)

**Requires** (*target, prerequisite*)

Specify that 'prerequisite' must be built before 'target', (but 'target' does not actually depend on 'prerequisite' and need not be rebuilt if it changes).

**SConscript** (*\*ls, \*\*kw*)

Execute SCons configuration files.

**Parameters:** *\*ls* (*str* or *list*) – configuration file(s) to execute.

**Keyword**

**Arguments:**

- **dirs** (*list*) – execute SConscript in each listed directory.
- **name** (*str*) – execute script 'name' (used only with 'dirs').
- **exports** (*list* or *dict*) – locally export variables the called script(s) can import.
- **variant\_dir** (*str*) – mirror sources needed for the build in a variant directory to allow building in it.
- **duplicate** (*bool*) – physically duplicate sources instead of just adjusting paths of derived files (used only with 'variant\_dir') (default is True).
- **must\_exist** (*bool*) – fail if a requested script is missing (default is False, default is deprecated).

**Returns:** list of variables returned by the called script

**Raises:** **UserError** – a script is not found and such exceptions are enabled.

**SConscriptChdir** (*flag*)

**SConsignFile** (*name='.sconsign', dbm\_module=None*)

**Scanner** (*\*args, \*\*kw*)

**SetDefault** (*\*\*kw*)

**SetOption** (*name, value*)

**SideEffect** (*side\_effect, target*)

Tell scons that *side\_effects* are built as side effects of building targets.

**Split** (*arg*)

This function converts a string or list into a list of strings or Nodes. This makes things easier for users by allowing files to be specified as a white-space separated list to be split.

**The input rules are:**

- A single string containing names separated by spaces. These will be split apart at the spaces.



- A single Node instance
  - A list containing either strings or Node instances. Any strings in the list are not split at spaces.
- In all cases, the function returns a list of Nodes and strings.

`Tool(tool, toolpath=None, **kwargs) → Tool`

`Value(value, built_value=None, name=None)`

`VariantDir(variant_dir, src_dir, duplicate=1)`

`WhereIs(prog, path=None, pathext=None, reject=None)`

Find prog in the path.

`_canonicalize(path)`

Allow Dirs and strings beginning with # for top-relative.

Note this uses the current env's fs (in self).

`_changed_build(dependency, target, prev_ni, repo_node=None)`

`_changed_content(dependency, target, prev_ni, repo_node=None)`

`_changed_source(dependency, target, prev_ni, repo_node=None)`

`_changed_timestamp_match(dependency, target, prev_ni, repo_node=None)`

`_changed_timestamp_newer(dependency, target, prev_ni, repo_node=None)`

`_changed_timestamp_then_content(dependency, target, prev_ni, repo_node=None)`

`_exceeds_version(major, minor, v_major, v_minor)`

Return 1 if 'major' and 'minor' are greater than the version in 'v\_major' and 'v\_minor', and 0 otherwise.

`_find_toolpath_dir(tp)`

`_get_SConscript_filenames(ls, kw)`

Convert the parameters passed to `SConscript()` calls into a list of files and export variables. If the parameters are invalid, throws `SCons.Errors.UserError`. Returns a tuple (l, e) where l is a list of SConscript filenames and e is a list of exports.

`_get_major_minor_revision(version_string)`

Split a version string into major, minor and (optionally) revision parts.

This is complicated by the fact that a version string can be something like 3.2b1.

`_gsm()`

`_init_special()`

Initial the dispatch tables for special handling of special construction variables.

`_update(other)`

Private method to update an environment's consvar dict directly.

Bypasses the normal checks that occur when users try to set items.

`_update_onlynew(other)`

Private method to add new items to an environment's consvar dict.

Only adds items from *other* whose keys do not already appear in the existing dict; values from *other* are not used for replacement. Bypasses the normal checks that occur when users try to set items.

`arg2nodes(args, node_factory=<class 'SCons.Environment._Null'>, lookup_list=<class 'SCons.Environment._Null'>, **kw)`

`backtick(command) → str`

Emulate command substitution.

Provides behavior conceptually like POSIX Shell notation for running a command in backquotes (backticks) by running *command* and returning the resulting output string.

This is not really a public API any longer, it is provided for the use of `ParseFlags()` (which supports it using a syntax of `!command`) and `ParseConfig()`.

**Raises:** **OSError** – if the external command returned non-zero exit status.

`get(key, default=None)`

Emulates the `get()` method of dictionaries.

`get_CacheDir()`

`get_builder(name)`

Fetch the builder with the specified name from the environment.

`get_factory(factory, default='File')`

Return a factory function for creating Nodes for this construction environment.

`get_scanner(skey)`

Find the appropriate scanner given a key (usually a file suffix).

```

get_src_sig_type ()
get_tgt_sig_type ()
gvars ()
items ()
    Emulates the items() method of dictionaries.
keys ()
    Emulates the keys() method of dictionaries.
lvars ()
scanner_map_delete (kw=None)
    Delete the cached scanner map (if we need to).
setdefault (key, default=None)
    Emulates the setdefault() method of dictionaries.
subst (string, raw=0, target=None, source=None, conv=None, executor=None)
    Recursively interpolates construction variables from the Environment into the specified string, returning the
    expanded result. Construction variables are specified by a $ prefix in the string and begin with an initial underscore
    or alphabetic character followed by any number of underscores or alphanumeric characters. The construction
    variable names may be surrounded by curly braces to separate the name from trailing characters.
subst_kw (kw, raw=0, target=None, source=None)
subst_list (string, raw=0, target=None, source=None, conv=None, executor=None)
    Calls through to SCons.Subst.scons_subst_list(). See the documentation for that function.
subst_path (path, target=None, source=None)
    Substitute a path list, turning EntryProxies into Nodes and leaving Nodes (and other objects) as-is.
subst_target_source (string, raw=0, target=None, source=None, conv=None, executor=None)
    Recursively interpolates construction variables from the Environment into the specified string, returning the
    expanded result. Construction variables are specified by a $ prefix in the string and begin with an initial underscore
    or alphabetic character followed by any number of underscores or alphanumeric characters. The construction
    variable names may be surrounded by curly braces to separate the name from trailing characters.
validate_CacheDir_class (custom_class=None)
    Validate the passed custom CacheDir class, or if no args are passed, validate the custom CacheDir class from the
    environment.
values ()
    Emulates the values() method of dictionaries.
exception SCons.Script.SConscript.SConscriptReturn
    Bases: Exception
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
SCons.Script.SConscript.SConscript_exception (file=<_io.TextIOWrapper name='<stderr>' mode='w'
encoding='utf-8'>)
    Print an exception stack trace just for the SConscript file(s). This will show users who have Python errors where the
    problem is, without cluttering the output with all of the internal calls leading up to where we exec the SConscript.
SCons.Script.SConscript._SConscript (fs, *files, **kw)
SCons.Script.SConscript.annotate (node)
    Annotate a node with the stack frame describing the SConscript file and line number that created it.
SCons.Script.SConscript.compute_exports (exports)
    Compute a dictionary of exports given one of the parameters to the Export() function or the exports argument to
    SConscript().
SCons.Script.SConscript.get_DefaultEnvironmentProxy ()
SCons.Script.SConscript.get_calling_namespaces ()
    Return the locals and globals for the function that called into this module in the current call stack.
SCons.Script.SConscript.handle_missing_SConscript (f, must_exist=None)
    Take appropriate action on missing file in SConscript() call.
    Print a warning or raise an exception on missing file, unless missing is explicitly allowed by the must_exist value. On
    first warning, print a deprecation message.

```



**Parameters:**

- **f** (*str*) – path of missing configuration file
- **must\_exist** (*bool*) – if true, fail. If false, but not `None`, allow the file to be missing. The default is `None`, which means issue the warning. The default is deprecated.

**Raises:** **UserError** – if `must_exist` is true or if `global SCons.Script._no_missing_sconscript` is true.

## Module contents

The `main()` function used by the `scons` script.

Architecturally, this is the `scons` script, and will likely only be called from the external “`scons`” wrapper. Consequently, anything here should not be, or be considered, part of the build engine. If it’s something that we expect other software to want to use, it should go in some other module. If it’s specific to the “`scons`” script invocation, it goes here.

`SCons.Script.HelpFunction` (*text*, *append=False*)

`class SCons.Script.TargetList` (*initlist=None*)

Bases: `UserList`

`_abc_impl = <_abc_data object>`

`_add_Default` (*list*)

`_clear` ()

`_do_nothing` (*\*args*, *\*\*kw*)

`append` (*item*)

`S.append(value)` – append value to the end of the sequence

`clear` () → `None` -- remove all items from `S`

`copy` ()

`count` (*value*) → integer -- return number of occurrences of *value*

`extend` (*other*)

`S.extend(iterable)` – extend sequence by appending elements from the iterable

`index` (*value*[, *start*[, *stop*]]) → integer -- return first index of *value*.

Raises `ValueError` if the *value* is not present.

Supporting *start* and *stop* arguments is optional, but recommended.

`insert` (*i*, *item*)

`S.insert(index, value)` – insert *value* before *index*

`pop` ([, *index*]) → *item* -- remove and return *item* at *index* (default last).

Raise `IndexError` if list is empty or *index* is out of range.

`remove` (*item*)

`S.remove(value)` – remove first occurrence of *value*. Raise `ValueError` if the *value* is not present.

`reverse` ()

`S.reverse()` – reverse *IN PLACE*

`sort` (*\*args*, *\*\*kws*)

`SCons.Script.Variables` (*files=None*, *args={}*)

`SCons.Script._Add_Arguments` (*alist*)

`SCons.Script._Add_Targets` (*tlist*)

`SCons.Script._Get_Default_Targets` (*d*, *fs*)

`SCons.Script._Set_Default_Targets` (*env*, *tlist*)

`SCons.Script._Set_Default_Targets_Has_Been_Called` (*d*, *fs*)

`SCons.Script._Set_Default_Targets_Has_Not_Been_Called` (*d*, *fs*)

`SCons.Script.set_missing_sconscript_error` (*flag=1*)

Set behavior on missing file in `SConscript()` call.

**Returns:** previous value

SCons.Tool package

## Module contents

SCons tool selection.

Looks for modules that define a callable object that can modify a construction environment as appropriate for a given tool (or tool chain).

Note that because this subsystem just *selects* a callable that can modify a construction environment, it's possible for people to define their own "tool specification" in an arbitrary callable function. No one needs to use or tie in to this subsystem in order to roll their own tool specifications.

`SCons.Tool.CreateJarBuilder (env)`

The Jar builder expects a list of class files which it can package into a jar file.

The jar tool provides an interface for passing other types of java files such as .java, directories or swig interfaces and will build them to class files in which it can package into the jar.

`SCons.Tool.CreateJavaClassDirBuilder (env)`

`SCons.Tool.CreateJavaClassFileBuilder (env)`

`SCons.Tool.CreateJavaFileBuilder (env)`

`SCons.Tool.CreateJavaHBuilder (env)`

`SCons.Tool.FindAllTools (tools, env)`

`SCons.Tool.FindTool (tools, env)`

`SCons.Tool.Initializers (env)`

`class SCons.Tool.Tool (name, toolpath=None, **kwargs)`

Bases: object

`_tool_module ()`

Try to load a tool module.

This will hunt in the toolpath for both a Python file (toolname.py) and a Python module (toolname directory), then try the regular import machinery, then fallback to try a zipfile.

`class SCons.Tool.ToolInitializer (env, tools, names)`

Bases: object

A class for delayed initialization of Tools modules.

Instances of this class associate a list of Tool modules with a list of Builder method names that will be added by those Tool modules. As part of instantiating this object for a particular construction environment, we also add the appropriate ToolInitializerMethod objects for the various Builder methods that we want to use to delay Tool searches until necessary.

`apply_tools (env)`

Searches the list of associated Tool modules for one that exists, and applies that to the construction environment.

`remove_methods (env)`

Removes the methods that were added by the tool initialization so we no longer copy and re-bind them when the construction environment gets cloned.

`class SCons.Tool.ToolInitializerMethod (name, initializer)`

Bases: object

This is added to a construction environment in place of a method(s) normally called for a Builder (env.Object, env.StaticObject, etc.). When called, it has its associated ToolInitializer object search the specified list of tools and apply the first one that exists to the construction environment. It then calls whatever builder was (presumably) added to the construction environment in place of this particular instance.

`get_builder (env)`

Returns the appropriate real Builder for this method name after having the associated ToolInitializer object apply the appropriate Tool module.

`SCons.Tool.createCFileBuilders (env)`

This is a utility function that creates the CFile/CXXFile Builders in an Environment if they are not there already.

If they are there already, we return the existing ones.

This is a separate function because soooo many Tools use this functionality.

The return is a 2-tuple of (CFile, CXXFile)

`SCons.Tool.createLoadableModuleBuilder (env, loadable_module_suffix='$_LDMODULESUFFIX')`

This is a utility function that creates the LoadableModule Builder in an Environment if it is not there already.

If it is already there, we return the existing one.

**Parameters:** `loadable_module_suffix` – The suffix specified for the loadable module builder

`SCons.Tool.createObjBuilders (env)`

This is a utility function that creates the StaticObject and SharedObject Builders in an Environment if they are not there already.

If they are there already, we return the existing ones.

This is a separate function because soooo many Tools use this functionality.

The return is a 2-tuple of (StaticObject, SharedObject)

SCons.Tool.createProgBuilder (*env*)

This is a utility function that creates the Program Builder in an Environment if it is not there already.

If it is already there, we return the existing one.

SCons.Tool.createSharedLibBuilder (*env*, *shlib\_suffix*='\$\_SHLIBSUFFIX')

This is a utility function that creates the SharedLibrary Builder in an Environment if it is not there already.

If it is already there, we return the existing one.

**Parameters:** **shlib\_suffix** – The suffix specified for the shared library builder

SCons.Tool.createStaticLibBuilder (*env*)

This is a utility function that creates the StaticLibrary Builder in an Environment if it is not there already.

If it is already there, we return the existing one.

SCons.Tool.find\_program\_path (*env*, *key\_program*, *default\_paths*=None, *add\_path*=False) → Optional[str]

Find the location of a tool using various means.

Mainly for windows where tools aren't all installed in /usr/bin, etc.

**Parameters:**

- **env** – Current Construction Environment.
- **key\_program** – Tool to locate.
- **default\_paths** – List of additional paths this tool might be found in.
- **add\_path** – If true, add path found if it was from *default\_paths*.

SCons.Tool.tool\_list (*platform*, *env*)

SCons.Variables package

Submodules

SCons.Variables.BoolVariable module

Variable type for true/false Variables.

Usage example:

```
opts = Variables()
opts.Add(BoolVariable('embedded', 'build for an embedded system', 0))
...
if env['embedded'] == 1:
    ...
```

SCons.Variables.BoolVariable.BoolVariable (*key*, *help*, *default*) → Tuple[str, str, str, Callable, Callable]

Return a tuple describing a boolean SCons Variable.

The input parameters describe a boolean option. Returns a tuple including the correct converter and validator. The *help* text will have (yes|no) automatically appended to show the valid values. The result is usable as input to Add().

SCons.Variables.BoolVariable.\_text2bool (*val*) → bool

Converts strings to True/False.

If *val* looks like it expresses a bool-like value, based on the TRUE\_STRINGS and FALSE\_STRINGS tuples, return the appropriate value.

This is usable as a converter function for SCons Variables.

**Raises:** **ValueError** – if the string cannot be converted.

SCons.Variables.BoolVariable.\_validator (*key*, *val*, *env*) → None

Validates the given value to be either true or false.

This is usable as a validator function for SCons Variables.

**Raises:**

- **KeyError** – if key is not set in env
- **UserError** – if key does not validate.

SCons.Variables.EnumVariable module

Variable type for enumeration Variables.

Enumeration variables allow selection of one from a specified set of values.

Usage example:

```
opts = Variables()
opts.Add(
    EnumVariable(
        'debug',
        help='debug output and symbols',
        default='no',
        allowed_values=('yes', 'no', 'full'),
        map={},
        ignorecase=2,
    )
)
...
if env['debug'] == 'full':
    ...
```

SCons.Variables.EnumVariable.EnumVariable (key, help, default, allowed\_values, map={}, ignorecase=0) → Tuple[str, str, str, Callable, Callable]

Return a tuple describing an enumeration SCons Variable.

The input parameters describe an option with only certain values allowed. Returns A tuple including an appropriate converter and validator. The result is usable as input to Add().

*key* and *default* are passed directly on to Add().

*help* is the descriptive part of the help text, and will have the allowed values automatically appended.

*allowed\_values* is a list of strings, which are the allowed values for this option.

The *map*-dictionary may be used for converting the input value into canonical values (e.g. for aliases).

The value of *ignorecase* defines the behaviour of the validator:

- 0: the validator/converter are case-sensitive.
- 1: the validator/converter are case-insensitive.
- 2: the validator/converter is case-insensitive and the converted value will always be lower-case.

The *validator* tests whether the value is in the list of allowed values. The *converter* converts input values according to the given *map*-dictionary (unmapped input values are returned unchanged).

SCons.Variables.ListVariable module

Variable type for list Variables.

A 'list' option may either be 'all', 'none' or a list of names separated by comma. After the option has been processed, the option value holds either the named list elements, all list elements or no list elements at all.

Usage example:

```
list_of_libs = Split('x11 gl qt ical')

opts = Variables()
opts.Add(
```

```

    ListVariable(
        'shared',
        help='libraries to build as shared libraries',
        default='all',
        elems=list_of_libs,
    )
)
...
for lib in list_of_libs:
    if lib in env['shared']:
        env.SharedObject(...)
    else:
        env.Object(...)

```

SCons.Variables.ListVariable.ListVariable (key, help, default, names, map={}) → Tuple[str, str, str, None, Callable]

Return a tuple describing a list SCons Variable.

The input parameters describe a 'list' option. Returns a tuple including the correct converter and validator. The result is usable for input to Add().

*help* will have text appended indicating the legal values (not including any extra names from *map*).

*map* can be used to map alternative names to the ones in *names* - that is, a form of alias.

A 'list' option may either be 'all', 'none' or a list of names (separated by commas).

SCons.Variables.ListVariable.\_converter (val, allowedElems, mapdict) → \_ListVariable

SCons.Variables.PackageVariable module

Variable type for package Variables.

To be used whenever a 'package' may be enabled/disabled and the package path may be specified.

Given these options

```

x11=no    (disables X11 support)
x11=yes   (will search for the package installation dir)
x11=/usr/local/X11 (will check this path for existence)

```

Can be used as a replacement for autoconf's --with-xxx=yyy

```

opts = Variables()
opts.Add(
    PackageVariable(
        key='x11',
        help='use X11 installed here (yes = search some places)',
        default='yes'
    )
)
...
if env['x11'] == True:
    dir = ... # search X11 in some standard places ...
    env['x11'] = dir
if env['x11']:
    ... # build with x11 ...

```

SCons.Variables.PackageVariable.PackageVariable (key, help, default, searchfunc=None) → Tuple[str, str, str, Callable, Callable]

Return a tuple describing a package list SCons Variable.

The input parameters describe a 'package list' option. Returns a tuple including the correct converter and validator appended. The result is usable as input to `Add()`.

A 'package list' option may either be 'all', 'none' or a pathname string. This information is appended to *help*.

`SCons.Variables.PackageVariable._converter(val)`

`SCons.Variables.PackageVariable._validator(key, val, env, searchfunc) → None`

`SCons.Variables.PathVariable` module

Variable type for path Variables.

To be used whenever a user-specified path override setting should be allowed.

### Arguments to PathVariable are:

- *key* - name of this option on the command line (e.g. "prefix")
- *help* - help string for option
- *default* - default value for this option
- *validator* - [optional] validator for option value. Predefined are:
  - *PathAccept* - accepts any path setting; no validation
  - *PathIsDir* - path must be an existing directory
  - *PathIsDirCreate* - path must be a dir; will create
  - *PathIsFile* - path must be a file
  - *PathExists* - path must exist (any type) [default]

The *validator* is a function that is called and which should return True or False to indicate if the path is valid. The arguments to the validator function are: (*key*, *val*, *env*). *key* is the name of the option, *val* is the path specified for the option, and *env* is the environment to which the Options have been added.

Usage example:

```
opts = Variables()
opts.Add(
    PathVariable(
        'qtdir',
        help='where the root of Qt is installed',
        default=qtdir,
        validator=PathIsDir,
    )
)
opts.Add(
    PathVariable(
        'qt_includes',
        help='where the Qt includes are installed',
        default='%qtdir/includes',
        validator=PathIsDirCreate,
    )
)
opts.Add(
    PathVariable(
        'qt_libraries',
        help='where the Qt library is installed',
        default='%qtdir/lib',
    )
)
```

## Module contents

Adds user-friendly customizable variables to an SCons build.

`class SCons.Variables.Variables (files=None, args=None, is_global=True)`

Bases: object

Holds all the options, updates the environment with the variables, and renders the help text.

If `is_global` is true, this is a singleton, create only once.

**Parameters:**

- **files** (*optional*) – List of option configuration files to load (backward compatibility). If a single string is passed it is automatically placed in a file list (Default value = None)
- **args** (*optional*) – dictionary to override values set from *files*. (Default value = None)
- **is\_global** (*optional*) – global instance? (Default value = True)

`Add (key, *args, **kwargs) → None`

Adds an option.

**Parameters:**

- **key** – the name of the variable, or a 5-tuple (or list). If a tuple, and there are no additional arguments, the tuple is unpacked into the four named kwargs from below. If a tuple and there are additional arguments, the first word of the tuple is taken as the key, and the remainder as aliases.
- **\*args** – optional positional arguments, corresponding to the four named kwargs below.

**Keyword Arguments:**

- **help** – help text for the options (Default value = "")
- **default** – default value for option (Default value = None)
- **validator** – function called to validate the option's value (Default value = None)
- **converter** – function to be called to convert the option's value before putting it in the environment. (Default value = None)
- **\*\*kwargs** – arbitrary keyword arguments used by the variable itself.

`AddVariables (*optlist) → None`

Adds a list of options.

Each list element is a tuple/list of arguments to be passed on to the underlying method for adding options.

Example:

```
opt.AddVariables(
    ('debug', '', 0),
    ('CC', 'The C compiler'),
    ('VALIDATE', 'An option for testing validation', 'notset', validator, None),
)
```

`FormatVariableHelpText (env, key, help, default, actual, aliases=None) → str`

`GenerateHelpText (env, sort=None) → str`

Generates the help text for the options.

**Parameters:**

- **env** – an environment that is used to get the current values of the options.
- **sort** – Either a comparison function used for sorting (must take two arguments and return -1, 0 or 1) or a boolean to indicate if it should be sorted.

`Save (filename, env) → None`

Save the options to a file.

Saves all the options which have non-default settings to the given file as Python expressions. This file can then be used to load the options for a subsequent run. This can be used to create an option cache file.

**Parameters:**

- **filename** – Name of the file to save into
- **env** – the environment get the option values from

UnknownVariables () → dict

Returns unknown variables.

Identifies options that were not known, declared options in this object.

Update (env, args=None) → None

Updates an environment with the option variables.

**Parameters:**

- **env** – the environment to update.
- **args** (*optional*) – a dictionary of keys and values to update in *env*. If omitted, uses the variables from the commandline.

\_do\_add (key, help="", default=None, validator=None, converter=None, \*\*kwargs) → None

aliasfmt = '\n%s: %s\n default: %s\n actual: %s\n aliases: %s\n'

fmt = '\n%s: %s\n default: %s\n actual: %s\n'

instance = None

keys () → list

Returns the keywords for the options.

SCons.compat package

Module contents

SCons compatibility package for old Python versions

This subpackage holds modules that provide backwards-compatible implementations of various things from newer Python versions that we cannot count on because SCons still supported older Pythons.

Other code will not generally reference things in this package through the SCons.compat namespace. The modules included here add things to the builtins namespace or the global module list so that the rest of our code can use the objects and names imported here regardless of Python version. As a result, if this module is used, it should violate the normal convention for imports (standard library imports first, then program-specific imports, each ordered alphabetically) and needs to be listed first.

The rest of the things here will be in individual compatibility modules that are either: 1) suitably modified copies of the future modules that we want to use; or 2) backwards compatible re-implementations of the specific portions of a future module's API that we want to use.

**GENERAL WARNINGS:** Implementations of functions in the SCons.compat modules are *NOT* guaranteed to be fully compliant with these functions in later versions of Python. We are only concerned with adding functionality that we actually use in SCons, so be wary if you lift this code for other uses. (That said, making these more nearly the same as later, official versions is still a desirable goal, we just don't need to be obsessive about it.)

We name the compatibility modules with an initial '`_scons`' (for example, `_scons_subprocess.py` is our compatibility module for subprocess) so that we can still try to import the real module name and fall back to our compatibility module if we get an `ImportError`. The `import_as()` function defined below loads the module as the "real" name (without the '`_scons`'), after which all of the "import {module}" statements in the rest of our code will find our pre-loaded compatibility module.

```
class SCons.compat.NoSlotsPyPy (name, bases, dct)
```

Bases: type

Metaclass for PyPy compatitbility.

PyPy does not work well with `__slots__` and `__class__` assignment.

mro ()

Return a type's method resolution order.

```
SCons.compat.rename_module (new, old)
```

Attempt to import the old module and load it under the new name. Used for purely cosmetic name changes in Python 3.x.



## Submodules

### SCons.Action module

#### SCons Actions.

Information about executing any sort of action that can build one or more target Nodes (typically files) from one or more source Nodes (also typically files) given a specific Environment.

The base class here is `ActionBase`. The base class supplies just a few utility methods and some generic methods for displaying information about an Action in response to the various commands that control printing.

A second-level base class is `_ActionAction`. This extends `ActionBase` by providing the methods that can be used to show and perform an action. True Action objects will subclass `_ActionAction`; Action factory class objects will subclass `ActionBase`.

The heavy lifting is handled by subclasses for the different types of actions we might execute:

CommandAction CommandGeneratorAction FunctionAction ListAction

The subclasses supply the following public interface methods used by other modules:

#### `__call__()`

THE public interface, “calling” an Action object executes the command or Python function. This also takes care of printing a pre-substitution command for debugging purposes.

#### `get_contents()`

Fetches the “contents” of an Action for signature calculation plus the varlist. This is what gets checksummed to decide if a target needs to be rebuilt because its action changed.

#### `genstring()`

Returns a string representation of the Action *without* command substitution, but allows a `CommandGeneratorAction` to generate the right action based on the specified target, source and env. This is used by the Signature subsystem (through the Executor) to obtain an (imprecise) representation of the Action operation for informative purposes.

Subclasses also supply the following methods for internal use within this module:

#### `__str__()`

Returns a string approximation of the Action; no variable substitution is performed.

#### `execute()`

The internal method that really, truly, actually handles the execution of a command or Python function. This is used so that the `__call__()` methods can take care of displaying any pre-substitution representations, and *then* execute an action without worrying about the specific Actions involved.

#### `get_presig()`

Fetches the “contents” of a subclass for signature calculation. The varlist is added to this to produce the Action’s contents. TODO(?): Change this to always return bytes and not str?

#### `strfunction()`

Returns a substituted string representation of the Action. This is used by the `_ActionAction.show()` command to display the command/function that will be executed to generate the target(s).

There is a related independent `ActionCaller` class that looks like a regular Action, and which serves as a wrapper for arbitrary functions that we want to let the user specify the arguments to now, but actually execute later (when an out-of-date check determines that it’s needed to be executed, for example). Objects of this class are returned by an `ActionFactory` class that provides a `__call__()` method as a convenient way for wrapping up the functions.

`SCons.Action.Action(act, *args, **kw)`

A factory for action objects.

`class SCons.Action.ActionBase`

Bases: object

Base class for all types of action objects that can be held by other objects (Builders, Executors, etc.) This provides the common methods for manipulating and combining those actions.

```
batch_key (env, target, source)
genstring (target, source, env)
get_contents (target, source, env)
get_targets (env, executor)
```

Returns the type of targets (\$TARGETS, \$CHANGED\_TARGETS) used by this action.

```
get_varlist (target, source, env, executor=None)
no_batch_key (env, target, source)
presub_lines (env)
```

```
class SCons.Action.ActionCaller (parent, args, kw)
```

Bases: object

A class for delaying calling an Action function with specific (positional and keyword) arguments until the Action is actually executed.

This class looks to the rest of the world like a normal Action object, but what it's really doing is hanging on to the arguments until we have a target, source and env to use for the expansion.

```
get_contents (target, source, env)
strfunction (target, source, env)
subst (s, target, source, env)
subst_args (target, source, env)
subst_kw (target, source, env)
```

```
class SCons.Action.ActionFactory (actfunc, strfunc, convert=<function ActionFactory.<lambda>>)
```

Bases: object

A factory class that will wrap up an arbitrary function as an SCons-executable Action object.

The real heavy lifting here is done by the ActionCaller class. We just collect the (positional and keyword) arguments that we're called with and give them to the ActionCaller object we create, so it can hang onto them until it needs them.

```
class SCons.Action.CommandAction (cmd, **kw)
```

Bases: \_ActionAction

Class for command-execution actions.

```
_get_implicit_deps_heavyweight (target, source, env, executor, icd_int)
```

Heavyweight dependency scanning involves scanning more than just the first entry in an action string. The exact behavior depends on the value of icd\_int. Only files are taken as implicit dependencies; directories are ignored.

If icd\_int is an integer value, it specifies the number of entries to scan for implicit dependencies. Action strings are also scanned after a &&. So for example, if icd\_int=2 and the action string is "cd <some\_dir> && \$PYTHON \$SCRIPT\_PATH <another\_path>", the implicit dependencies would be the path to the python binary and the path to the script.

If icd\_int is None, all entries are scanned for implicit dependencies.

```
_get_implicit_deps_lightweight (target, source, env, executor)
```

Lightweight dependency scanning involves only scanning the first entry in an action string, even if it contains &&.

```
batch_key (env, target, source)
```

```
execute (target, source, env, executor=None)
```

Execute a command action.

This will handle lists of commands as well as individual commands, because construction variable substitution may turn a single "command" into a list. This means that this class can actually handle lists of commands, even though that's not how we use it externally.

```
genstring (target, source, env)
```

```
get_contents (target, source, env)
```

```
get_implicit_deps (target, source, env, executor=None)
```

Return the implicit dependencies of this action's command line.

```
get_presig (target, source, env, executor=None)
```

Return the signature contents of this action's command line.

This strips \$(-\$) and everything in between the string, since those parts don't affect signatures.

```
get_targets (env, executor)
```

Returns the type of targets (\$TARGETS, \$CHANGED\_TARGETS) used by this action.

```
get_varlist (target, source, env, executor=None)
```

```

no_batch_key (env, target, source)
presub_lines (env)
print_cmd_line (s, target, source, env)
    In python 3, and in some of our tests, sys.stdout is a String io object, and it takes unicode strings only This code
    assumes s is a regular string.
process (target, source, env, executor=None)
strfunction (target, source, env, executor=None)
class SCons.Action.CommandGeneratorAction (generator, kw)
    Bases: ActionBase
    Class for command-generator actions.
    _generate (target, source, env, for_signature, executor=None)
    batch_key (env, target, source)
    genstring (target, source, env, executor=None)
    get_contents (target, source, env)
    get_implicit_deps (target, source, env, executor=None)
    get_presig (target, source, env, executor=None)
        Return the signature contents of this action's command line.
        This strips $(-$) and everything in between the string, since those parts don't affect signatures.
    get_targets (env, executor)
        Returns the type of targets ($TARGETS, $CHANGED_TARGETS) used by this action.
    get_varlist (target, source, env, executor=None)
    no_batch_key (env, target, source)
    presub_lines (env)
class SCons.Action.FunctionAction (execfunction, kw)
    Bases: _ActionAction
    Class for Python function actions.
    batch_key (env, target, source)
    execute (target, source, env, executor=None)
    function_name ()
    genstring (target, source, env)
    get_contents (target, source, env)
    get_implicit_deps (target, source, env)
    get_presig (target, source, env)
        Return the signature contents of this callable action.
    get_targets (env, executor)
        Returns the type of targets ($TARGETS, $CHANGED_TARGETS) used by this action.
    get_varlist (target, source, env, executor=None)
    no_batch_key (env, target, source)
    presub_lines (env)
    print_cmd_line (s, target, source, env)
        In python 3, and in some of our tests, sys.stdout is a String io object, and it takes unicode strings only This code
        assumes s is a regular string.
    strfunction (target, source, env, executor=None)
class SCons.Action.LazyAction (var, kw)
    Bases: CommandGeneratorAction, CommandAction
    A LazyAction is a kind of hybrid generator and command action for strings of the form "$VAR". These strings normally
    expand to other strings (think "$CCCOM" to "$CC -c -o $TARGET $SOURCE"), but we also want to be able to
    replace them with functions in the construction environment. Consequently, we want lazy evaluation and creation of
    an Action in the case of the function, but that's overkill in the more normal case of expansion to other strings.
    So we do this with a subclass that's both a generator and a command action. The overridden methods all do a quick
    check of the construction variable, and if it's a string we just call the corresponding CommandAction method to do the
    heavy lifting. If not, then we call the same-named CommandGeneratorAction method. The
    CommandGeneratorAction methods work by using the overridden _generate() method, that is, our own way of
    handling "generation" of an action based on what's in the construction variable.
    _generate (target, source, env, for_signature, executor=None)
    _generate_cache (env)

```

```

_get_implicit_deps_heavyweight (target, source, env, executor, icd_int)
    Heavyweight dependency scanning involves scanning more than just the first entry in an action string. The exact
    behavior depends on the value of icd_int. Only files are taken as implicit dependencies; directories are ignored.
    If icd_int is an integer value, it specifies the number of entries to scan for implicit dependencies. Action strings are
    also scanned after a &&. So for example, if icd_int=2 and the action string is "cd <some_dir> && $PYTHON
    $SCRIPT_PATH <another_path>", the implicit dependencies would be the path to the python binary and the path
    to the script.
    If icd_int is None, all entries are scanned for implicit dependencies.
_get_implicit_deps_lightweight (target, source, env, executor)
    Lightweight dependency scanning involves only scanning the first entry in an action string, even if it contains &&.
batch_key (env, target, source)
execute (target, source, env, executor=None)
    Execute a command action.
    This will handle lists of commands as well as individual commands, because construction variable substitution may
    turn a single "command" into a list. This means that this class can actually handle lists of commands, even though
    that's not how we use it externally.
genstring (target, source, env, executor=None)
get_contents (target, source, env)
get_implicit_deps (target, source, env, executor=None)
    Return the implicit dependencies of this action's command line.
get_parent_class (env)
get_presig (target, source, env)
    Return the signature contents of this action's command line.
    This strips $(-$) and everything in between the string, since those parts don't affect signatures.
get_targets (env, executor)
    Returns the type of targets ($TARGETS, $CHANGED_TARGETS) used by this action.
get_varlist (target, source, env, executor=None)
no_batch_key (env, target, source)
presub_lines (env)
print_cmd_line (s, target, source, env)
    In python 3, and in some of our tests, sys.stdout is a String io object, and it takes unicode strings only This code
    assumes s is a regular string.
process (target, source, env, executor=None)
strfunction (target, source, env, executor=None)
class SCons.Action.ListAction (actionlist)
    Bases: ActionBase
    Class for lists of other actions.
    batch_key (env, target, source)
    genstring (target, source, env)
    get_contents (target, source, env)
    get_implicit_deps (target, source, env)
    get_presig (target, source, env)
    Return the signature contents of this action list.
    Simple concatenation of the signatures of the elements.
    get_targets (env, executor)
    Returns the type of targets ($TARGETS, $CHANGED_TARGETS) used by this action.
    get_varlist (target, source, env, executor=None)
    no_batch_key (env, target, source)
    presub_lines (env)
class SCons.Action._ActionAction (cmdstr=<class 'SCons.Action._null'>, strfunction=<class
'SCons.Action._null'>, varlist=(), presub=<class 'SCons.Action._null'>, chdir=None,
exitstatfunc=None, batch_key=None, targets='$TARGETS', **kw)
    Bases: ActionBase
    Base class for actions that create output objects.
    batch_key (env, target, source)
    genstring (target, source, env)

```

`get_contents (target, source, env)`

`get_targets (env, executor)`

Returns the type of targets (\$TARGETS, \$CHANGED\_TARGETS) used by this action.

`get_varlist (target, source, env, executor=None)`

`no_batch_key (env, target, source)`

`presub_lines (env)`

`print_cmd_line (s, target, source, env)`

In python 3, and in some of our tests, sys.stdout is a String io object, and it takes unicode strings only This code assumes s is a regular string.

`SCons.Action._actionAppend (act1, act2)`

`SCons.Action._callable_contents (obj)`

Return the signature contents of a callable Python object.

`SCons.Action._code_contents (code, docstring=None)`

Return the signature contents of a code object.

By providing direct access to the code object of the function, Python makes this extremely easy. Hooray!

Unfortunately, older versions of Python include line number indications in the compiled byte code. Boo! So we remove the line number byte codes to prevent recompilations from moving a Python function.

**See:**

- <https://docs.python.org/2/library/inspect.html>
- <http://python-reference.readthedocs.io/en/latest/docs/code/index.html>

For info on what each co\_ variable provides

The signature is as follows (should be byte/chars): `co_argcount`, `len(co_varnames)`, `len(co_cellvars)`, `len(co_freevars)`, ( comma separated signature for each object in `co_consts` ), ( comma separated signature for each object in `co_names` ), ( The bytecode with line number bytecodes removed from `co_code` )

`co_argcount` - Returns the number of positional arguments (including arguments with default values). `co_varnames` -

Returns a tuple containing the names of the local variables (starting with the argument names). `co_cellvars` - Returns a tuple containing the names of local variables that are referenced by nested functions. `co_freevars` - Returns a tuple containing the names of free variables. (?) `co_consts` - Returns a tuple containing the literals used by the bytecode.

`co_names` - Returns a tuple containing the names used by the bytecode. `co_code` - Returns a string representing the sequence of bytecode instructions.

`SCons.Action._do_create_action (act, kw)`

This is the actual "implementation" for the Action factory method, below. This handles the fact that passing lists to Action() itself has different semantics than passing lists as elements of lists.

The former will create a ListAction, the latter will create a CommandAction by converting the inner list elements to strings.

`SCons.Action._do_create_keywords (args, kw)`

This converts any arguments after the action argument into their equivalent keywords and adds them to the kw argument.

`SCons.Action._do_create_list_action (act, kw)`

A factory for list actions. Convert the input list into Actions and then wrap them in a ListAction.

`SCons.Action._function_contents (func)`

The signature is as follows (should be byte/chars): `< _code_contents (see above) from func.__code__ >`, ( comma separated `_object_contents` for function argument defaults ), ( comma separated `_object_contents` for any closure contents )

**See also:** <https://docs.python.org/3/reference/datamodel.html>

- `func.__code__` - The code object representing the compiled function body.
- `func.__defaults__` - A tuple containing default argument values for those arguments that have defaults, or None if no arguments have a default value
- `func.__closure__` - None or a tuple of cells that contain bindings for the function's free variables.

**Returns:** Signature contents of a function. (in bytes)

`class SCons.Action._null`

Bases: object

`SCons.Action._object_contents (obj)`

Return the signature contents of any Python object.

We have to handle the case where object contains a code object since it can be pickled directly.

`SCons.Action._object_instance_content (obj)`

Returns consistant content for a action class or an instance thereof

**Parameters:**

- *obj* Should be either an action class or an instance thereof

**Returns:** bytearray or bytes representing the obj suitable for generating a signature from.

`SCons.Action._resolve_shell_env (env, target, source)`

First get default environment. Then if `SHELL_ENV_GENERATORS` is set and is iterable, call each callable in that list to allow it to alter the created execution environment.

`SCons.Action._string_from_cmd_list (cmd_list)`

Takes a list of command line arguments and returns a pretty representation for printing.

`SCons.Action._subproc (scons_env, cmd, error='ignore', **kw)`

Wrapper for subprocess which pulls from construction env.

Use for calls to subprocess which need to interpolate values from an SCons construction environment into the environment passed to subprocess. Adds an error-handling argument. Adds ability to specify `std{in,out,err}` with “devnull” tag.

`SCons.Action.default_exitstatfunc (s)`

`SCons.Action.get_default_ENV (env)`

A fiddlin’ little function that has an ‘import SCons.Environment’ which can’t be moved to the top level without creating an import loop. Since this import creates a local variable named ‘SCons’, it blocks access to the global variable, so we move it here to prevent complaints about local variables being used uninitialized.

`SCons.Action.rfile (n)`

## SCons.Builder module

`SCons.Builder`

Builder object subsystem.

A Builder object is a callable that encapsulates information about how to execute actions to create a target Node (file) from source Nodes (files), and how to create those dependencies for tracking.

The main entry point here is the `Builder()` factory method. This provides a procedural interface that creates the right underlying Builder object based on the keyword arguments supplied and the types of the arguments.

The goal is for this external interface to be simple enough that the vast majority of users can create new Builders as necessary to support building new types of files in their configurations, without having to dive any deeper into this subsystem.

The base class here is `BuilderBase`. This is a concrete base class which does, in fact, represent the Builder objects that we (or users) create.

There is also a proxy that looks like a Builder:

`CompositeBuilder`

This proxies for a Builder with an action that is actually a dictionary that knows how to map file suffixes to a specific action. This is so that we can invoke different actions (compilers, compile options) for different flavors of source files.

Builders and their proxies have the following public interface methods used by other modules:

- **`__call__()`**

THE public interface. Calling a Builder object (with the use of internal helper methods) sets up the target and source dependencies, appropriate mapping to a specific action, and the environment manipulation necessary for overridden construction variable. This also takes care of warning about possible mistakes in keyword arguments.

- **`add_emitter()`**



Adds an emitter for a specific file suffix, used by some Tool modules to specify that (for example) a yacc invocation on a .y can create a .h *and* a .c file.

- **add\_action()**

Adds an action for a specific file suffix, heavily used by Tool modules to add their specific action(s) for turning a source file into an object file to the global static and shared object file Builders.

There are the following methods for internal use within this module:

- **\_execute()**

The internal method that handles the heavily lifting when a Builder is called. This is used so that the `__call__()` methods can set up warning about possible mistakes in keyword-argument overrides, and *then* execute all of the steps necessary so that the warnings only occur once.

- **get\_name()**

Returns the Builder's name within a specific Environment, primarily used to try to return helpful information in error messages.

- **adjust\_suffix()**

- **get\_prefix()**

- **get\_suffix()**

- **get\_src\_suffix()**

- **set\_src\_suffix()**

Miscellaneous stuff for handling the prefix and suffix manipulation we use in turning source file names into target file names.

`SCons.Builder.Builder(**kw)`

A factory for builder objects.

```
class SCons.Builder.BuilderBase (action=None, prefix='', suffix='', src_suffix='',
target_factory=None, source_factory=None, target_scanner=None, source_scanner=None,
emitter=None, multi=0, env=None, single_source=0, name=None, chdir=<class
'SCons.Builder._Null'>, is_explicit=1, src_builder=None, ensure_suffix=False, **overrides)
```

Bases: object

Base class for Builders, objects that create output nodes (files) from input nodes (files).

`_adjustixes (files, pre, suf, ensure_suffix=False)`

`_create_nodes (env, target=None, source=None)`

Create and return lists of target and source nodes.

`_execute (env, target, source, overwarn={}, executor_kw={})`

`_get_sdict (env)`

Returns a dictionary mapping all of the source suffixes of all `src_builders` of this Builder to the underlying Builder that should be called first.

This dictionary is used for each target specified, so we save a lot of extra computation by memoizing it for each construction environment.

Note that this is re-computed each time, not cached, because there might be changes to one of our source Builders (or one of their source Builders, and so on, and so on...) that we can't "see."

The underlying methods we call cache their computed values, though, so we hope repeatedly aggregating them into a dictionary like this won't be too big a hit. We may need to look for a better way to do this if performance data show this has turned into a significant bottleneck.

`_get_src_builders_key (env)`

`_subst_src_suffixes_key (env)`

`add_emitter (suffix, emitter)`

Add a suffix-emitter mapping to this Builder.

This assumes that emitter has been initialized with an appropriate dictionary type, and will throw a `TypeError` if not, so the caller is responsible for knowing that this is an appropriate method to call for the Builder in question.

`add_src_builder (builder)`

Add a new Builder to the list of `src_builders`.

This requires wiping out cached values so that the computed lists of source suffixes get re-calculated.

`adjust_suffix (suff)`

`get_name (env)`

Attempts to get the name of the Builder.

Look at the BUILDERS variable of env, expecting it to be a dictionary containing this Builder, and return the key of the dictionary. If there's no key, then return a directly-configured name (if there is one) or the name of the class (by default).

`get_prefix (env, sources=[])`

`get_src_builders (env)`

Returns the list of source Builders for this Builder.

This exists mainly to look up Builders referenced as strings in the 'BUILDER' variable of the construction environment and cache the result.

`get_src_suffix (env)`

Get the first src\_suffix in the list of src\_suffixes.

`get_suffix (env, sources=[])`

`set_src_suffix (src_suffix)`

`set_suffix (suffix)`

`splitext (path, env=None)`

`src_builder_sources (env, source, overwarn={})`

`src_suffixes (env)`

Returns the list of source suffixes for all src\_builders of this Builder.

This is essentially a recursive descent of the src\_builder "tree." (This value isn't cached because there may be changes in a src\_builder many levels deep that we can't see.)

`subst_src_suffixes (env)`

The suffix list may contain construction variable expansions, so we have to evaluate the individual strings. To avoid doing this over and over, we memoize the results for each construction environment.

`class SCons.Builder.CallableSelector`

Bases: Selector

A callable dictionary that will, in turn, call the value it finds if it can.

`clear ()` → None. Remove all items from od.

`copy ()` → a shallow copy of od

`fromkeys (value=None)`

Create a new ordered dictionary with keys from iterable and values set to value.

`get (key, default=None, /)`

Return the value for key if key is in the dictionary, else default.

`items ()` → a set-like object providing a view on D's items

`keys ()` → a set-like object providing a view on D's keys

`move_to_end (key, last=True)`

Move an existing element to the end (or beginning if last is false).

Raise KeyError if the element does not exist.

`pop (k[, d])` → v, remove specified key and return the corresponding

value. If key is not found, d is returned if given, otherwise KeyError is raised.

`popitem (last=True)`

Remove and return a (key, value) pair from the dictionary.

Pairs are returned in LIFO order if last is true or FIFO order if false.

`setdefault (key, default=None)`

Insert key with a value of default if key is not in the dictionary.

Return the value for key if key is in the dictionary, else default.

`update ([, E], **F)` → None. Update D from dict/iterable E and F.

If E is present and has a .keys() method, then does: for k in E: D[k] = E[k] If E is present and lacks a .keys() method, then does: for k, v in E: D[k] = v In either case, this is followed by: for k in F: D[k] = F[k]

`values ()` → an object providing a view on D's values

`class SCons.Builder.CompositeBuilder (builder, cmdgen)`

Bases: Proxy

A Builder Proxy whose main purpose is to always have a DictCmdGenerator as its action, and to provide access to the DictCmdGenerator's add\_action() method.



```

    add_action (suffix, action)
    get ()
        Retrieve the entire wrapped object
class SCons.Builder.DictCmdGenerator (mapping=None, source_ext_match=True)
    Bases: Selector
    This is a callable class that can be used as a command generator function. It holds on to a dictionary mapping file
    suffixes to Actions. It uses that dictionary to return the proper action based on the file suffix of the source file.
    add_action (suffix, action)
        Add a suffix-action pair to the mapping.
    clear () → None. Remove all items from od.
    copy () → a shallow copy of od
    fromkeys (value=None)
        Create a new ordered dictionary with keys from iterable and values set to value.
    get (key, default=None, /)
        Return the value for key if key is in the dictionary, else default.
    items () → a set-like object providing a view on D's items
    keys () → a set-like object providing a view on D's keys
    move_to_end (key, last=True)
        Move an existing element to the end (or beginning if last is false).
        Raise KeyError if the element does not exist.
    pop (k[, d]) → v, remove specified key and return the corresponding
        value. If key is not found, d is returned if given, otherwise KeyError is raised.
    popitem (last=True)
        Remove and return a (key, value) pair from the dictionary.
        Pairs are returned in LIFO order if last is true or FIFO order if false.
    setdefault (key, default=None)
        Insert key with a value of default if key is not in the dictionary.
        Return the value for key if key is in the dictionary, else default.
    src_suffixes ()
    update ([, E], **F) → None. Update D from dict/iterable E and F.
        If E is present and has a .keys() method, then does: for k in E: D[k] = E[k] If E is present and lacks a .keys()
        method, then does: for k, v in E: D[k] = v In either case, this is followed by: for k in F: D[k] = F[k]
    values () → an object providing a view on D's values
class SCons.Builder.DictEmitter
    Bases: Selector
    A callable dictionary that maps file suffixes to emitters. When called, it finds the right emitter in its dictionary for the
    suffix of the first source file, and calls that emitter to get the right lists of targets and sources to return. If there's no
    emitter for the suffix in its dictionary, the original target and source are returned.
    clear () → None. Remove all items from od.
    copy () → a shallow copy of od
    fromkeys (value=None)
        Create a new ordered dictionary with keys from iterable and values set to value.
    get (key, default=None, /)
        Return the value for key if key is in the dictionary, else default.
    items () → a set-like object providing a view on D's items
    keys () → a set-like object providing a view on D's keys
    move_to_end (key, last=True)
        Move an existing element to the end (or beginning if last is false).
        Raise KeyError if the element does not exist.
    pop (k[, d]) → v, remove specified key and return the corresponding
        value. If key is not found, d is returned if given, otherwise KeyError is raised.
    popitem (last=True)
        Remove and return a (key, value) pair from the dictionary.
        Pairs are returned in LIFO order if last is true or FIFO order if false.
    setdefault (key, default=None)
        Insert key with a value of default if key is not in the dictionary.

```

Return the value for key if key is in the dictionary, else default.

update ([, E], \*\*F) → None. Update D from dict/iterable E and F.

If E is present and has a .keys() method, then does: for k in E: D[k] = E[k] If E is present and lacks a .keys() method, then does: for k, v in E: D[k] = v In either case, this is followed by: for k in F: D[k] = F[k]

values () → an object providing a view on D's values

class SCons.Builder.EmitterProxy (var)

Bases: object

This is a callable class that can act as a Builder emitter. It holds on to a string that is a key into an Environment dictionary, and will look there at actual build time to see if it holds a callable. If so, we will call that as the actual emitter.

class SCons.Builder.ListEmitter (initlist=None)

Bases: UserList

A callable list of emitters that calls each in sequence, returning the result.

\_abc\_impl = <\_abc\_data object>

append (item)

S.append(value) – append value to the end of the sequence

clear () → None -- remove all items from S

copy ()

count (value) → integer -- return number of occurrences of value

extend (other)

S.extend(iterable) – extend sequence by appending elements from the iterable

index (value[, start[, stop]]) → integer -- return first index of value.

Raises ValueError if the value is not present.

Supporting start and stop arguments is optional, but recommended.

insert (i, item)

S.insert(index, value) – insert value before index

pop ([, index]) → item -- remove and return item at index (default last).

Raise IndexError if list is empty or index is out of range.

remove (item)

S.remove(value) – remove first occurrence of value. Raise ValueError if the value is not present.

reverse ()

S.reverse() – reverse *IN PLACE*

sort (\*args, \*\*kwargs)

class SCons.Builder.OverrideWarner (mapping)

Bases: UserDict

A class for warning about keyword arguments that we use as overrides in a Builder call.

This class exists to handle the fact that a single Builder call can actually invoke multiple builders. This class only emits the warnings once, no matter how many Builders are invoked.

\_abc\_impl = <\_abc\_data object>

clear () → None. Remove all items from D.

copy ()

classmethod fromkeys (iterable, value=None)

get (k[, d]) → D[k] if k in D, else d. d defaults to None.

items () → a set-like object providing a view on D's items

keys () → a set-like object providing a view on D's keys

pop (k[, d]) → v, remove specified key and return the corresponding value.

If key is not found, d is returned if given, otherwise KeyError is raised.

popitem () → (k, v), remove and return some (key, value) pair as a 2-tuple; but raise KeyError if D is empty.

setdefault (k[, d]) → D.get(k,d), also set D[k]=d if k not in D

update ([, E], \*\*F) → None. Update D from mapping/iterable E and F.

If E is present and has a .keys() method, does: for k in E: D[k] = E[k] If E is present and lacks .keys() method, does: for (k, v) in E: D[k] = v In either case, this is followed by: for k, v in F.items(): D[k] = v

values () → an object providing a view on D's values

warn ()

class SCons.Builder.\_Null

Bases: object

`SCons.Builder._node_errors (builder, env, tlist, slist)`

Validate that the lists of target and source nodes are legal for this builder and environment. Raise errors or issue warnings as appropriate.

`SCons.Builder._null`

alias of `_Null`

`SCons.Builder.is_a_Builder (obj)`

“Returns True if the specified obj is one of our Builder classes.

The test is complicated a bit by the fact that CompositeBuilder is a proxy, not a subclass of BuilderBase.

`SCons.Builder.match_splitext (path, suffixes=[])`

## SCons.CacheDir module

CacheDir support

`class SCons.CacheDir.CacheDir (path)`

Bases: object

`CacheDebug (fmt, target, cachefile)`

`_readconfig (path)`

Read the cache config.

If directory or config file do not exist, create. Take advantage of Py3 capability in `os.makedirs()` and in file `open()`: just try the operation and handle failure appropriately.

Omit the check for old cache format, assume that's old enough there will be none of those left to worry about.

**Parameters:** `path` – path to the cache directory

`cachepath (node)`

*classmethod* `copy_from_cache (env, src, dst)`

*classmethod* `copy_to_cache (env, src, dst)`

`get_cachedir_csig (node)`

*property* `hit_ratio`

`is_enabled ()`

`is_readonly ()`

*property* `misses`

`push (node)`

`push_if_forced (node)`

`retrieve (node)`

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

Note that there's a special trick here with the execute flag (one that's not normally done for other actions). Basically if the user requested a `no_exec (-n)` build, then `SCons.Action.execute_actions` is set to 0 and when any action is called, it does its showing but then just returns zero instead of actually calling the action execution operation. The problem for caching is that if the file does NOT exist in cache then the `CacheRetrieveString` won't return anything to show for the task, but the `Action.__call__` won't call `CacheRetrieveFunc`; instead it just returns zero, which makes the code below think that the file was successfully retrieved from the cache, therefore it doesn't do any subsequent building. However, the `CacheRetrieveString` didn't print anything because it didn't actually exist in the cache, and no more build actions will be performed, so the user just sees nothing. The fix is to tell `Action.__call__` to always execute the `CacheRetrieveFunc` and then have the latter explicitly check `SCons.Action.execute_actions` itself.

`SCons.CacheDir.CachePushFunc (target, source, env)`

`SCons.CacheDir.CacheRetrieveFunc (target, source, env)`

`SCons.CacheDir.CacheRetrieveString (target, source, env)`

## SCons.Conftest module

Autoconf-like configuration support

The purpose of this module is to define how a check is to be performed.

A context class is used that defines functions for carrying out the tests, logging and messages. The following methods and members must be present:

**context.Display(msg)**

Function called to print messages that are normally displayed for the user. Newlines are explicitly used. The text should also be written to the logfile!

**context.Log(msg)**

Function called to write to a log file.

**context.BuildProg(text, ext)**

Function called to build a program, using “ext” for the file extension. Must return an empty string for success, an error message for failure. For reliable test results building should be done just like an actual program would be build, using the same command and arguments (including configure results so far).

**context.CompileProg(text, ext)**

Function called to compile a program, using “ext” for the file extension. Must return an empty string for success, an error message for failure. For reliable test results compiling should be done just like an actual source file would be compiled, using the same command and arguments (including configure results so far).

**context.AppendLIBS(lib\_name\_list)**

Append “lib\_name\_list” to the value of LIBS. “lib\_namelist” is a list of strings. Return the value of LIBS before changing it (any type can be used, it is passed to SetLIBS() later.)

**context.PrependLIBS(lib\_name\_list)**

Prepend “lib\_name\_list” to the value of LIBS. “lib\_namelist” is a list of strings. Return the value of LIBS before changing it (any type can be used, it is passed to SetLIBS() later.)

**context.SetLIBS(value)**

Set LIBS to “value”. The type of “value” is what AppendLIBS() returned. Return the value of LIBS before changing it (any type can be used, it is passed to SetLIBS() later.)

**context.headerfilename**

Name of file to append configure results to, usually “confdefs.h”. The file must not exist or be empty when starting. Empty or None to skip this (some tests will not work!).

**context.config\_h (may be missing).**

If present, must be a string, which will be filled with the contents of a config\_h file.

**context.vardict**

Dictionary holding variables used for the tests and stores results from the tests, used for the build commands. Normally contains “CC”, “LIBS”, “CPPFLAGS”, etc.

**context.havedict**

Dictionary holding results from the tests that are to be used inside a program. Names often start with “HAVE\_”. These are zero (feature not present) or one (feature present). Other variables may have any value, e.g., “PERLVERSION” can be a number and “SYSTEMNAME” a string.

**SCons.Conftest.CheckBuilder (context, text=None, language=None)**

Configure check to see if the compiler works. Note that this uses the current value of compiler and linker flags, make sure \$CFLAGS, \$CPPFLAGS and \$LIBS are set correctly. “language” should be “C” or “C++” and is used to select the compiler. Default is “C”. “text” may be used to specify the code to be build. Returns an empty string for success, an error message for failure.

**SCons.Conftest.CheckCC (context)**

Configure check for a working C compiler.

This checks whether the C compiler, as defined in the \$CC construction variable, can compile a C source file. It uses the current \$CCCOM value too, so that it can test against non working flags.

**SCons.Conftest.CheckCXX (context)**

Configure check for a working CXX compiler.

This checks whether the CXX compiler, as defined in the \$CXX construction variable, can compile a CXX source file. It uses the current \$CXXCOM value too, so that it can test against non working flags.

**SCons.Conftest.CheckDeclaration (context, symbol, includes=None, language=None)**

Checks whether symbol is declared.

Use the same test as `autoconf`, that is test whether the symbol is defined as a macro or can be used as an r-value.

**Parameters:**

- **symbol** – str the symbol to check
- **includes** – str Optional “header” can be defined to include a header file.
- **language** – str only C and C++ supported.

**Returns:** bool True if the check failed, False if succeeded.

**Return type:** status

`SCons.ConfTest.CheckFunc (context, function_name, header=None, language=None)`

Configure check for a function “function\_name”. “language” should be “C” or “C++” and is used to select the compiler. Default is “C”. Optional “header” can be defined to define a function prototype, include a header file or anything else that comes before `main()`. Sets `HAVE_function_name` in `context.havedict` according to the result. Note that this uses the current value of compiler and linker flags, make sure `$CFLAGS`, `$CPPFLAGS` and `$LIBS` are set correctly. Returns an empty string for success, an error message for failure.

`SCons.ConfTest.CheckHeader (context, header_name, header=None, language=None, include_quotes=None)`

Configure check for a C or C++ header file “header\_name”. Optional “header” can be defined to do something before including the header file (unusual, supported for consistency). “language” should be “C” or “C++” and is used to select the compiler. Default is “C”. Sets `HAVE_header_name` in `context.havedict` according to the result. Note that this uses the current value of compiler and linker flags, make sure `$CFLAGS` and `$CPPFLAGS` are set correctly. Returns an empty string for success, an error message for failure.

`SCons.ConfTest.CheckLib (context, libs, func_name=None, header=None, extra_libs=None, call=None, language=None, autoadd=1, append=True)`

Configure check for a C or C++ libraries “libs”. Searches through the list of libraries, until one is found where the test succeeds. Tests if “func\_name” or “call” exists in the library. Note: if it exists in another library the test succeeds anyway! Optional “header” can be defined to include a header file. If not given a default prototype for “func\_name” is added. Optional “extra\_libs” is a list of library names to be added after “lib\_name” in the build command. To be used for libraries that “lib\_name” depends on. Optional “call” replaces the call to “func\_name” in the test code. It must consist of complete C statements, including a trailing “;”. Both “func\_name” and “call” arguments are optional, and in that case, just linking against the libs is tested. “language” should be “C” or “C++” and is used to select the compiler. Default is “C”. Note that this uses the current value of compiler and linker flags, make sure `$CFLAGS`, `$CPPFLAGS` and `$LIBS` are set correctly. Returns an empty string for success, an error message for failure.

`SCons.ConfTest.CheckMember (context, aggregate_member, header=None, language=None)`

Configure check for a C or C++ member “aggregate\_member”. Optional “header” can be defined to include a header file. “language” should be “C” or “C++” and is used to select the compiler. Default is “C”. Note that this uses the current value of compiler and linker flags, make sure `$CFLAGS`, `$CPPFLAGS` and `$LIBS` are set correctly.

**Parameters:**

- **aggregate\_member** – str the member to check. For example, ‘struct tm.tm\_gmtime’.
- **includes** – str Optional “header” can be defined to include a header file.
- **language** – str only C and C++ supported.

Returns the status (0 or False = Passed, True/non-zero = Failed).

`SCons.ConfTest.CheckProg (context, prog_name)`

Configure check for a specific program.

Check whether program `prog_name` exists in path. If it is found, returns the path for it, otherwise returns None.

`SCons.ConfTest.CheckSHCC (context)`

Configure check for a working shared C compiler.

This checks whether the C compiler, as defined in the `$SHCC` construction variable, can compile a C source file. It uses the current `$SHCCCOM` value too, so that it can test against non working flags.

`SCons.ConfTest.CheckSHCXX (context)`

Configure check for a working shared CXX compiler.

This checks whether the CXX compiler, as defined in the `$SHCXX` construction variable, can compile a CXX source file. It uses the current `$SHCXXCOM` value too, so that it can test against non working flags.

`SCons.ConfTest.CheckType (context, type_name, fallback=None, header=None, language=None)`

Configure check for a C or C++ type “type\_name”. Optional “header” can be defined to include a header file. “language” should be “C” or “C++” and is used to select the compiler. Default is “C”. Sets HAVE\_type\_name in context.havedict according to the result. Note that this uses the current value of compiler and linker flags, make sure \$CFLAGS, \$CPPFLAGS and \$LIBS are set correctly. Returns an empty string for success, an error message for failure.

SCons.Conftest.CheckTypeSize (context, type\_name, header=None, language=None, expect=None)

This check can be used to get the size of a given type, or to check whether the type is of expected size.

**Parameters:**

- **type** (-) – str the type to check
- **includes** (-) – sequence list of headers to include in the test code before testing the type
- **language** (-) – str ‘C’ or ‘C++’
- **expect** (-) – int if given, will test whether the type has the given number of bytes. If not given, will automatically find the size.
- **Returns** – statusint0 if the check failed, or the found size of the type if the check succeeded.

SCons.Conftest.\_Have (context, key, have, comment=None)

Store result of a test in context.havedict and context.headerfilename.

**Parameters:**

- **key** - is a “HAVE\_abc” name. It is turned into all CAPITALS and non-alphanumerics are replaced by an underscore.
- **have** - value as it should appear in the header file, include quotes when desired and escape special characters!
- **comment** is the C comment to add above the line defining the symbol (the comment is automatically put inside a /\* \*/). If None, no comment is added.

**The value of “have” can be:**

- 1 - Feature is defined, add “#define key”.
- 0 - Feature is not defined, add “/\* #undef key \*/”. Adding “undef” is what autoconf does. Not useful for the compiler, but it shows that the test was done.
- number - Feature is defined to this number “#define key have”. Doesn’t work for 0 or 1, use a string then.
- string - Feature is defined to this string “#define key have”.

SCons.Conftest.\_LogFailed (context, text, msg)

Write to the log about a failed program. Add line numbers, so that error messages can be understood.

SCons.Conftest.\_YesNoResult (context, ret, key, text, comment=None)

Handle the result of a test with a “yes” or “no” result.

**Parameters:**

- **ret** is the return value: empty if OK, error message when not.
- **key** is the name of the symbol to be defined (HAVE\_foo).
- **text** is the source code of the program used for testing.
- **comment** is the C comment to add above the line defining the symbol (the comment is automatically put inside a /\* \*/). If None, no comment is added.

SCons.Conftest.\_check\_empty\_program (context, comp, text, language, use\_shared=False)

Return 0 on success, 1 otherwise.

SCons.Conftest.\_lang2suffix (lang)

Convert a language name to a suffix. When “lang” is empty or None C is assumed. Returns a tuple (lang, suffix, None) when it works. For an unrecognized language returns (None, None, msg).

**Where:**

- lang = the unified language name



- `suffix` = the suffix, including the leading dot
- `msg` = an error message

## SCons.Debug module

Code for debugging SCons internal things.

Shouldn't be needed by most users. Quick shortcuts:

```
from SCons.Debug import caller_trace caller_trace()
```

```
SCons.Debug.Trace (msg, tracefile=None, mode='w', tstamp=False)
```

Write a trace message.

Write messages when debugging which do not interfere with stdout. Useful in tests, which monitor stdout and would break with unexpected output. Trace messages can go to the console (which is opened as a file), or to a disk file; the `tracefile` argument persists across calls unless overridden.

### Parameters:

- **`tracefile`** – file to write trace message to. If omitted, write to the previous trace file (default: console).
- **`mode`** – file open mode (default: 'w')
- **`tstamp`** – write relative timestamps with trace. Outputs time since scons was started, and time since last trace (default: False)

```
SCons.Debug._dump_one_caller (key, file, level=0)
```

```
SCons.Debug.caller_stack ()
```

return caller's stack

```
SCons.Debug.caller_trace (back=0)
```

Trace caller stack and save info into global dicts, which are printed automatically at the end of SCons execution.

```
SCons.Debug.countLoggedInstances (classes, file=<_io.TextIOWrapper name='<stdout>' mode='w' encoding='utf-8'>)
```

```
SCons.Debug.dumpLoggedInstances (classes, file=<_io.TextIOWrapper name='<stdout>' mode='w' encoding='utf-8'>)
```

```
SCons.Debug.dump_caller_counts (file=<_io.TextIOWrapper name='<stdout>' mode='w' encoding='utf-8'>)
```

```
SCons.Debug.fetchLoggedInstances (classes=*)
```

```
SCons.Debug.func_shorten (func_tuple)
```

```
SCons.Debug.listLoggedInstances (classes, file=<_io.TextIOWrapper name='<stdout>' mode='w' encoding='utf-8'>)
```

```
SCons.Debug.logInstanceCreation (instance, name=None)
```

```
SCons.Debug.memory ()
```

```
SCons.Debug.string_to_classes (s)
```

## SCons.Defaults module

Builders and other things for the local site.

Here's where we'll duplicate the functionality of `autoconf` until we move it into the installation procedure or use something like `qmake`.

The code that reads the registry to find MSVC components was borrowed from `distutils.msvccompiler`.

```
SCons.Defaults.DefaultEnvironment (*args, **kw)
```

Initial public entry point for creating the default construction Environment.

After creating the environment, we overwrite our name (`DefaultEnvironment`) with the `_fetch_DefaultEnvironment()` function, which more efficiently returns the initialized default construction environment without checking for its existence.

(This function still exists with its `_default_check` because someone else (*cough* `Script/__init__.py` *cough*) may keep a reference to this function. So we can't use the fully functional idiom of having the name originally be a something that *only* creates the construction environment and then overwrites the name.)

```
class SCons.Defaults.NullCmdGenerator (cmd)
```

Bases: object

This is a callable class that can be used in place of other command generators if you don't want them to do anything. The `__call__` method for this class simply returns the thing you instantiated it with.

Example usage: `env["DO_NOTHING"] = NullCmdGenerator env["LINKCOM"] = "${DO_NOTHING('$LINK $SOURCES $TARGET')}"`

`SCons.Defaults.SharedFlagChecker (source, target, env)`

`SCons.Defaults.SharedObjectEmitter (target, source, env)`

`SCons.Defaults.StaticObjectEmitter (target, source, env)`

`class SCons.Defaults.Variable_Method_Caller (variable, method)`

Bases: object

A class for finding a construction variable on the stack and calling one of its methods.

We use this to support "construction variables" in our string `eval()`s that actually stand in for methods—specifically, use of "RDirs" in call to `_concat` that should actually execute the "TARGET.RDirs" method. (We used to support this by creating a little "build dictionary" that mapped RDirs to the method, but this got in the way of Memoizing construction environments, because we had to create new environment objects to hold the variables.)

`SCons.Defaults.__lib_either_version_flag (env, version_var1, version_var2, flags_var)`

if `$version_var1` or `$version_var2` is not empty, returns `env[flags_var]`, otherwise returns None :param env: :param version\_var1: :param version\_var2: :param flags\_var: :return:

`SCons.Defaults.__libversionflags (env, version_var, flags_var)`

if `version_var` is not empty, returns `env[flags_var]`, otherwise returns None :param env: :param version\_var: :param flags\_var: :return:

`SCons.Defaults._concat (prefix, items_iter, suffix, env, f=<function <lambda>>, target=None, source=None, affect_signature=True)`

Creates a new list from 'items\_iter' by first interpolating each element in the list using the 'env' dictionary and then calling `f` on the list, and finally calling `_concat_ixes` to concatenate 'prefix' and 'suffix' onto each element of the list.

`SCons.Defaults._concat_ixes (prefix, items_iter, suffix, env)`

Creates a new list from 'items\_iter' by concatenating the 'prefix' and 'suffix' arguments onto each element of the list. A trailing space on 'prefix' or leading space on 'suffix' will cause them to be put into separate list elements rather than being concatenated.

`SCons.Defaults._defines (prefix, defs, suffix, env, target=None, source=None, c=<function _concat_ixes>)`

A wrapper around `_concat_ixes` that turns a list or string into a list of C preprocessor command-line definitions.

`SCons.Defaults._fetch_DefaultEnvironment (*args, **kw)`

Returns the already-created default construction environment.

`SCons.Defaults._stripixes (prefix, itms, suffix, stripprefixes, stripsuffixes, env, c=None)`

This is a wrapper around `_concat()`/`_concat_ixes()` that checks for the existence of prefixes or suffixes on list items and strips them where it finds them. This is used by tools (like the GNU linker) that need to turn something like 'libfoo.a' into '-lfoo'.

`SCons.Defaults.chmod_func (dest, mode)`

`SCons.Defaults.chmod_strfunc (dest, mode)`

`SCons.Defaults.copy_func (dest, src, symlinks=True)`

If `symlinks` (is true), then a symbolic link will be shallow copied and recreated as a symbolic link; otherwise, copying a symbolic link will be equivalent to copying the symbolic link's final target regardless of symbolic link depth.

`SCons.Defaults.delete_func (dest, must_exist=0)`

`SCons.Defaults.delete_strfunc (dest, must_exist=0)`

`SCons.Defaults.get_paths_str (dest)`

`SCons.Defaults.mkdir_func (dest)`

`SCons.Defaults.move_func (dest, src)`

`SCons.Defaults.processDefines (defs)`

process defines, resolving strings, lists, dictionaries, into a list of strings

`SCons.Defaults.touch_func (dest)`

## SCons.Environment module

Base class for construction Environments.

These are the primary objects used to communicate dependency and construction information to the build engine.



Keyword arguments supplied when the construction Environment is created are construction variables used to initialize the Environment.

```
class SCons.Environment.Base (platform=None, tools=None, toolpath=None, variables=None,
parse_flags=None, **kw)
```

Bases: SubstitutionEnvironment

Base class for “real” construction Environments.

These are the primary objects used to communicate dependency and construction information to the build engine.

Keyword arguments supplied when the construction Environment is created are construction variables used to initialize the Environment.

Action (\*args, \*\*kw)

AddMethod (function, name=None)

Adds the specified function as a method of this construction environment with the specified name. If the name is omitted, the default name is the name of the function itself.

AddPostAction (files, action)

AddPreAction (files, action)

Alias (target, source=[], action=None, \*\*kw)

AlwaysBuild (\*targets)

Append (\*\*kw)

Append values to construction variables in an Environment.

The variable is created if it is not already present.

AppendENVPPath (name, newpath, envname='ENV', sep=':', delete\_existing=False)

Append path elements to the path *name* in the *envname* dictionary for this environment. Will only add any particular path once, and will normpath and normcase all paths to help assure this. This can also handle the case where the env variable is a list instead of a string.

If *delete\_existing* is False, a *newpath* element already in the path will not be moved to the end (it will be left where it is).

AppendUnique (delete\_existing=False, \*\*kw)

Append values to existing construction variables in an Environment, if they’re not already there. If *delete\_existing* is True, removes existing values first, so values move to end.

Builder (\*\*kw)

CacheDir (path, custom\_class=None)

Clean (targets, files)

Clone (tools=[], toolpath=None, parse\_flags=None, \*\*kw)

Return a copy of a construction Environment.

The copy is like a Python “deep copy”—that is, independent copies are made recursively of each objects—except that a reference is copied when an object is not deep-copyable (like a function). There are no references to any mutable objects in the original Environment.

Command (target, source, action, \*\*kw)

Builds the supplied target files from the supplied source files using the supplied action. Action may be any type that the Builder constructor will accept for an action.

Configure (\*args, \*\*kw)

Decider (function)

Depends (target, dependency)

Explicitly specify that ‘target’s depend on ‘dependency’.

Detect (progs)

Return the first available program from one or more possibilities.

**Parameters:** **progs** (*str or list*) – one or more command names to check for

Dictionary (\*args)

Return construction variables from an environment.

**Parameters:** **\*args** (*optional*) – variable names to look up

**Returns:** If *args* omitted, the dictionary of all construction variables. If one arg, the corresponding value is returned. If more than one arg, a list of values is returned.

**Raises:** **KeyError** – if any of *args* is not in the construction environment.

Dir (name, \*args, \*\*kw)

Dump (key=None, format='pretty')

Return construction variables serialized to a string.

**Parameters:**

- **key** (*optional*) – if None, format the whole dict of variables. Else format the value of *key* (Default value = None)
- **format** (*str, optional*) – specify the format to serialize to. “pretty” generates a pretty-printed string, “json” a JSON-formatted string. (Default value = “pretty”)

Entry (name, \*args, \*\*kw)

Environment (\*\*kw)

Execute (action, \*args, \*\*kw)

Directly execute an action through an Environment

File (name, \*args, \*\*kw)

FindFile (file, dirs)

FindInstalledFiles ()

returns the list of all targets of the Install and InstallAs Builder.

FindIdxes (paths, prefix, suffix)

Search a list of paths for something that matches the prefix and suffix.

**Parameters:**

- **paths** – the list of paths or nodes.
- **prefix** – construction variable for the prefix.
- **suffix** – construction variable for the suffix.

Returns: the matched path or None

FindSourceFiles (node='.')

returns a list of all source files.

Flatten (sequence)

GetBuildPath (files)

Glob (pattern, ondisk=True, source=False, strings=False, exclude=None)

Ignore (target, dependency)

Ignore a dependency.

Literal (string)

Local (\*targets)

MergeFlags (args, unique=True) → None

Merge flags into construction variables.

Merges the flags from *args* into this construction environment. If *args* is not a dict, it is first converted to one with flags distributed into appropriate construction variables. See ParseFlags().

**Parameters:**

- **args** – flags to merge
- **unique** – merge flags rather than appending (default: True). When merging, path variables are retained from the front, other construction variables from the end.

NoCache (\*targets)

Tags a target so that it will not be cached

NoClean (\*targets)

Tags a target so that it will not be cleaned by -c

Override (overrides)

Produce a modified environment whose variables are overridden by the overrides dictionaries. “overrides” is a dictionary that will override the variables of this environment.

This function is much more efficient than Clone() or creating a new Environment because it doesn’t copy the construction environment dictionary, it just wraps the underlying construction environment, and doesn’t even create a wrapper object if there are no overrides.

ParseConfig (command, function=None, unique=True)

Parse the result of running a command to update construction vars.

Use *function* to parse the output of running *command* in order to modify the current environment.

**Parameters:**

- **command** – a string or a list of strings representing a command and its arguments.
- **function** – called to process the result of `command`, which will be passed as `args`. If `function` is omitted or `None`, `MergeFlags()` is used. Takes 3 args (`env`, `args`, `unique`)
- **unique** – whether no duplicate values are allowed (default true)

`ParseDepends (filename, must_exist=None, only_one=False)`

Parse a mkdep-style file for explicit dependencies. This is completely abusable, and should be unnecessary in the “normal” case of proper SCons configuration, but it may help make the transition from a Make hierarchy easier for some people to swallow. It can also be genuinely useful when using a tool that can write a .d file, but for which writing a scanner would be too complicated.

`ParseFlags (*flags) → dict`

Return a dict of parsed flags.

Parse `flags` and return a dict with the flags distributed into the appropriate construction variable names. The flags are treated as a typical set of command-line flags for a GNU-style toolchain, such as might have been generated by one of the {foo}-config scripts, and used to populate the entries based on knowledge embedded in this method - the choices are not expected to be portable to other toolchains.

If one of the `flags` strings begins with a bang (exclamation mark), it is assumed to be a command and the rest of the string is executed; the result of that evaluation is then added to the dict.

`Platform (platform)`

`Precious (*targets)`

`Prepend (**kw)`

Prepend values to construction variables in an Environment.

The variable is created if it is not already present.

`PrependENVPath (name, newpath, envname='ENV', sep=':', delete_existing=True)`

Prepend path elements to the path `name` in the `envname` dictionary for this environment. Will only add any particular path once, and will normpath and normcase all paths to help assure this. This can also handle the case where the env variable is a list instead of a string.

If `delete_existing` is False, a `newpath` component already in the path will not be moved to the front (it will be left where it is).

`PrependUnique (delete_existing=False, **kw)`

Prepend values to existing construction variables in an Environment, if they’re not already there. If `delete_existing` is True, removes existing values first, so values move to front.

`Pseudo (*targets)`

`PyPackageDir (modulename)`

`RemoveMethod (function)`

Removes the specified function’s MethodWrapper from the `added_methods` list, so we don’t re-bind it when making a clone.

`Replace (**kw)`

Replace existing construction variables in an Environment with new construction variables and/or values.

`Replacexes (path, old_prefix, old_suffix, new_prefix, new_suffix)`

Replace `old_prefix` with `new_prefix` and `old_suffix` with `new_suffix`.

`env` - Environment used to interpolate variables. `path` - the path that will be modified. `old_prefix` - construction variable for the old prefix. `old_suffix` - construction variable for the old suffix. `new_prefix` - construction variable for the new prefix. `new_suffix` - construction variable for the new suffix.

`Repository (*dirs, **kw)`

`Requires (target, prerequisite)`

Specify that ‘prerequisite’ must be built before ‘target’, (but ‘target’ does not actually depend on ‘prerequisite’ and need not be rebuilt if it changes).

`SConsignFile (name='.sconsign', dbm_module=None)`

`Scanner (*args, **kw)`

`SetDefault (**kw)`

`SideEffect (side_effect, target)`

Tell scons that `side_effects` are built as side effects of building targets.

`Split (arg)`

This function converts a string or list into a list of strings or Nodes. This makes things easier for users by allowing files to be specified as a white-space separated list to be split.

**The input rules are:**

- A single string containing names separated by spaces. These will be split apart at the spaces.
- A single Node instance
- A list containing either strings or Node instances. Any strings in the list are not split at spaces.

In all cases, the function returns a list of Nodes and strings.

`Tool(tool, toolpath=None, **kwargs) → Tool`

`Value(value, built_value=None, name=None)`

`VariantDir(variant_dir, src_dir, duplicate=1)`

`WhereIs(prog, path=None, pathext=None, reject=None)`

Find prog in the path.

`_canonicalize(path)`

Allow Dirs and strings beginning with # for top-relative.

Note this uses the current env's fs (in self).

`_changed_build(dependency, target, prev_ni, repo_node=None)`

`_changed_content(dependency, target, prev_ni, repo_node=None)`

`_changed_source(dependency, target, prev_ni, repo_node=None)`

`_changed_timestamp_match(dependency, target, prev_ni, repo_node=None)`

`_changed_timestamp_newer(dependency, target, prev_ni, repo_node=None)`

`_changed_timestamp_then_content(dependency, target, prev_ni, repo_node=None)`

`_find_toolpath_dir(tp)`

`_gsm()`

`_init_special()`

Initial the dispatch tables for special handling of special construction variables.

`_update(other)`

Private method to update an environment's consvar dict directly.

Bypasses the normal checks that occur when users try to set items.

`_update_onlynew(other)`

Private method to add new items to an environment's consvar dict.

Only adds items from *other* whose keys do not already appear in the existing dict; values from *other* are not used for replacement. Bypasses the normal checks that occur when users try to set items.

`arg2nodes(args, node_factory=<class 'SCons.Environment._Null'>, lookup_list=<class 'SCons.Environment._Null'>, **kw)`

`backtick(command) → str`

Emulate command substitution.

Provides behavior conceptually like POSIX Shell notation for running a command in backquotes (backticks) by running *command* and returning the resulting output string.

This is not really a public API any longer, it is provided for the use of `ParseFlags()` (which supports it using a syntax of `!command`) and `ParseConfig()`.

**Raises:** **OSError** – if the external command returned non-zero exit status.

`get(key, default=None)`

Emulates the `get()` method of dictionaries.

`get_CacheDir()`

`get_builder(name)`

Fetch the builder with the specified name from the environment.

`get_factory(factory, default='File')`

Return a factory function for creating Nodes for this construction environment.

`get_scanner(skey)`

Find the appropriate scanner given a key (usually a file suffix).

`get_src_sig_type()`

`get_tgt_sig_type()`

`gvars()`

`items ()`  
 Emulates the `items()` method of dictionaries.

`keys ()`  
 Emulates the `keys()` method of dictionaries.

`lvars ()`

`scanner_map_delete (kw=None)`  
 Delete the cached scanner map (if we need to).

`setdefault (key, default=None)`  
 Emulates the `setdefault()` method of dictionaries.

`subst (string, raw=0, target=None, source=None, conv=None, executor=None)`  
 Recursively interpolates construction variables from the Environment into the specified string, returning the expanded result. Construction variables are specified by a \$ prefix in the string and begin with an initial underscore or alphabetic character followed by any number of underscores or alphanumeric characters. The construction variable names may be surrounded by curly braces to separate the name from trailing characters.

`subst_kw (kw, raw=0, target=None, source=None)`

`subst_list (string, raw=0, target=None, source=None, conv=None, executor=None)`  
 Calls through to `SCons.Subst.scons_subst_list()`. See the documentation for that function.

`subst_path (path, target=None, source=None)`  
 Substitute a path list, turning `EntryProxies` into `Nodes` and leaving `Nodes` (and other objects) as-is.

`subst_target_source (string, raw=0, target=None, source=None, conv=None, executor=None)`  
 Recursively interpolates construction variables from the Environment into the specified string, returning the expanded result. Construction variables are specified by a \$ prefix in the string and begin with an initial underscore or alphabetic character followed by any number of underscores or alphanumeric characters. The construction variable names may be surrounded by curly braces to separate the name from trailing characters.

`validate_CacheDir_class (custom_class=None)`  
 Validate the passed custom `CacheDir` class, or if no args are passed, validate the custom `CacheDir` class from the environment.

`values ()`  
 Emulates the `values()` method of dictionaries.

**class SCons.Environment.BuilderDict (mapping, env)**  
 Bases: `UserDict`  
 This is a dictionary-like class used by an Environment to hold the Builders. We need to do this because every time someone changes the Builders in the Environment's BUILDERS dictionary, we must update the Environment's attributes.

`_abc_impl = <_abc_data object>`

`clear ()` → None. Remove all items from D.

`copy ()`

**classmethod** `fromkeys (iterable, value=None)`

`get (k[, d])` → D[k] if k in D, else d. d defaults to None.

`items ()` → a set-like object providing a view on D's items

`keys ()` → a set-like object providing a view on D's keys

`pop (k[, d])` → v, remove specified key and return the corresponding value.  
 If key is not found, d is returned if given, otherwise `KeyError` is raised.

`popitem ()` → (k, v), remove and return some (key, value) pair as a 2-tuple; but raise `KeyError` if D is empty.

`setdefault (k[, d])` → D.get(k,d), also set D[k]=d if k not in D

`update ([, E], **F)` → None. Update D from mapping/iterable E and F.  
 If E present and has a `.keys()` method, does: for k in E: D[k] = E[k] If E present and lacks `.keys()` method, does: for (k, v) in E: D[k] = v In either case, this is followed by: for k, v in F.items(): D[k] = v

`values ()` → an object providing a view on D's values

**class SCons.Environment.BuilderWrapper (obj, method, name=None)**  
 Bases: `MethodWrapper`  
 A `MethodWrapper` subclass that that associates an environment with a Builder.  
 This mainly exists to wrap the `__call__()` function so that all calls to Builders can have their argument lists massaged in the same way (treat a lone argument as the source, treat two arguments as target then source, make sure both target and source are lists) without having to have cut-and-paste code to do it.

As a bit of obsessive backwards compatibility, we also intercept attempts to get or set the “env” or “builder” attributes, which were the names we used before we put the common functionality into the MethodWrapper base class. We’ll keep this around for a while in case people shipped Tool modules that reached into the wrapper (like the Tool/qt.py module does, or did). There shouldn’t be a lot attribute fetching or setting on these, so a little extra work shouldn’t hurt.

`clone (new_object)`

Returns an object that re-binds the underlying “method” to the specified new object.

`SCons.Environment.NoSubstitutionProxy (subject)`

An entry point for returning a proxy subclass instance that overrides the `subst*()` methods so they don’t actually perform construction variable substitution. This is specifically intended to be the shim layer in between global function calls (which don’t want construction variable substitution) and the `DefaultEnvironment()` (which would substitute variables if left to its own devices).

We have to wrap this in a function that allows us to delay definition of the class until it’s necessary, so that when it subclasses `Environment` it will pick up whatever `Environment` subclass the wrapper interface might have assigned to `SCons.Environment.Environment`.

`class SCons.Environment.OverrideEnvironment (subject, overrides=None)`

Bases: `Base`

A proxy that overrides variables in a wrapped construction environment by returning values from an overrides dictionary in preference to values from the underlying subject environment.

This is a lightweight (I hope) proxy that passes through most use of attributes to the underlying `Environment.Base` class, but has just enough additional methods defined to act like a real construction environment with overridden values. It can wrap either a `Base` construction environment, or another `OverrideEnvironment`, which can in turn nest arbitrary `OverrideEnvironments`...

Note that we do *not* call the underlying base class (`SubstitutionEnvironment`) initialization, because we get most of those from proxying the attributes of the subject construction environment. But because we subclass `SubstitutionEnvironment`, this class also has inherited `arg2nodes()` and `subst*()` methods; those methods can’t be proxied because they need *this* object’s methods to fetch the values from the overrides dictionary.

`Action (*args, **kw)`

`AddMethod (function, name=None)`

Adds the specified function as a method of this construction environment with the specified name. If the name is omitted, the default name is the name of the function itself.

`AddPostAction (files, action)`

`AddPreAction (files, action)`

`Alias (target, source=[], action=None, **kw)`

`AlwaysBuild (*targets)`

`Append (**kw)`

Append values to construction variables in an `Environment`.

The variable is created if it is not already present.

`AppendENVPath (name, newpath, envname='ENV', sep=':', delete_existing=False)`

Append path elements to the path *name* in the *envname* dictionary for this environment. Will only add any particular path once, and will normpath and normcase all paths to help assure this. This can also handle the case where the env variable is a list instead of a string.

If *delete\_existing* is `False`, a *newpath* element already in the path will not be moved to the end (it will be left where it is).

`AppendUnique (delete_existing=False, **kw)`

Append values to existing construction variables in an `Environment`, if they’re not already there. If *delete\_existing* is `True`, removes existing values first, so values move to end.

`Builder (**kw)`

`CacheDir (path, custom_class=None)`

`Clean (targets, files)`

`Clone (tools=[], toolpath=None, parse_flags=None, **kw)`

Return a copy of a construction `Environment`.

The copy is like a Python “deep copy”—that is, independent copies are made recursively of each objects—except that a reference is copied when an object is not deep-copyable (like a function). There are no references to any mutable objects in the original `Environment`.

`Command (target, source, action, **kw)`



Builds the supplied target files from the supplied source files using the supplied action. Action may be any type that the Builder constructor will accept for an action.

Configure (\*args, \*\*kw)

Decider (function)

Depends (target, dependency)

Explicitly specify that 'target's depend on 'dependency'.

Detect (progs)

Return the first available program from one or more possibilities.

**Parameters:** **progs** (*str or list*) – one or more command names to check for

Dictionary (\*args)

Return construction variables from an environment.

**Parameters:** \*args (*optional*) – variable names to look up

**Returns:** If *args* omitted, the dictionary of all construction variables. If one arg, the corresponding value is returned. If more than one arg, a list of values is returned.

**Raises:** **KeyError** – if any of *args* is not in the construction environment.

Dir (name, \*args, \*\*kw)

Dump (key=None, format='pretty')

Return construction variables serialized to a string.

**Parameters:**

- **key** (*optional*) – if None, format the whole dict of variables. Else format the value of *key* (Default value = None)
- **format** (*str, optional*) – specify the format to serialize to. “pretty” generates a pretty-printed string, “json” a JSON-formatted string. (Default value = “pretty”)

Entry (name, \*args, \*\*kw)

Environment (\*\*kw)

Execute (action, \*args, \*\*kw)

Directly execute an action through an Environment

File (name, \*args, \*\*kw)

FindFile (file, dirs)

FindInstalledFiles ()

returns the list of all targets of the Install and InstallAs Builder.

FindIdxes (paths, prefix, suffix)

Search a list of paths for something that matches the prefix and suffix.

**Parameters:**

- **paths** – the list of paths or nodes.
- **prefix** – construction variable for the prefix.
- **suffix** – construction variable for the suffix.

Returns: the matched path or None

FindSourceFiles (node='.')

returns a list of all source files.

Flatten (sequence)

GetBuildPath (files)

Glob (pattern, ondisk=True, source=False, strings=False, exclude=None)

Ignore (target, dependency)

Ignore a dependency.

Literal (string)

Local (\*targets)

MergeFlags (args, unique=True) → None

Merge flags into construction variables.

Merges the flags from *args* into this construction environent. If *args* is not a dict, it is first converted to one with flags distributed into appropriate construction variables. See ParseFlags().

**Parameters:**

- **args** – flags to merge
- **unique** – merge flags rather than appending (default: True). When merging, path variables are retained from the front, other construction variables from the end.

NoCache (\*targets)

Tags a target so that it will not be cached

NoClean (\*targets)

Tags a target so that it will not be cleaned by -c

Override (overrides)

Produce a modified environment whose variables are overridden by the overrides dictionaries. “overrides” is a dictionary that will override the variables of this environment.

This function is much more efficient than Clone() or creating a new Environment because it doesn't copy the construction environment dictionary, it just wraps the underlying construction environment, and doesn't even create a wrapper object if there are no overrides.

ParseConfig (command, function=None, unique=True)

Parse the result of running a command to update construction vars.

Use function to parse the output of running command in order to modify the current environment.

**Parameters:**

- **command** – a string or a list of strings representing a command and its arguments.
- **function** – called to process the result of command, which will be passed as args. If function is omitted or None, MergeFlags() is used. Takes 3 args (env, args, unique)
- **unique** – whether no duplicate values are allowed (default true)

ParseDepends (filename, must\_exist=None, only\_one=False)

Parse a mkdep-style file for explicit dependencies. This is completely abusable, and should be unnecessary in the “normal” case of proper SCons configuration, but it may help make the transition from a Make hierarchy easier for some people to swallow. It can also be genuinely useful when using a tool that can write a .d file, but for which writing a scanner would be too complicated.

ParseFlags (\*flags) → dict

Return a dict of parsed flags.

Parse flags and return a dict with the flags distributed into the appropriate construction variable names. The flags are treated as a typical set of command-line flags for a GNU-style toolchain, such as might have been generated by one of the {foo}-config scripts, and used to populate the entries based on knowledge embedded in this method - the choices are not expected to be portable to other toolchains.

If one of the flags strings begins with a bang (exclamation mark), it is assumed to be a command and the rest of the string is executed; the result of that evaluation is then added to the dict.

Platform (platform)

Precious (\*targets)

Prepend (\*\*kw)

Prepend values to construction variables in an Environment.

The variable is created if it is not already present.

PrependENVPath (name, newpath, envname='ENV', sep='.', delete\_existing=True)

Prepend path elements to the path name in the envname dictionary for this environment. Will only add any particular path once, and will normpath and normcase all paths to help assure this. This can also handle the case where the env variable is a list instead of a string.

If delete\_existing is False, a newpath component already in the path will not be moved to the front (it will be left where it is).

PrependUnique (delete\_existing=False, \*\*kw)

Prepend values to existing construction variables in an Environment, if they're not already there. If delete\_existing is True, removes existing values first, so values move to front.

Pseudo (\*targets)

PyPackageDir (modulename)

RemoveMethod (function)

Removes the specified function's MethodWrapper from the added\_methods list, so we don't re-bind it when making a clone.



`Replace (**kw)`

Replace existing construction variables in an Environment with new construction variables and/or values.

`Replacelxes (path, old_prefix, old_suffix, new_prefix, new_suffix)`

Replace `old_prefix` with `new_prefix` and `old_suffix` with `new_suffix`.

`env` - Environment used to interpolate variables. `path` - the path that will be modified. `old_prefix` - construction variable for the old prefix. `old_suffix` - construction variable for the old suffix. `new_prefix` - construction variable for the new prefix. `new_suffix` - construction variable for the new suffix.

`Repository (*dirs, **kw)`

`Requires (target, prerequisite)`

Specify that 'prerequisite' must be built before 'target', (but 'target' does not actually depend on 'prerequisite' and need not be rebuilt if it changes).

`SConsignFile (name='.sconsign', dbm_module=None)`

`Scanner (*args, **kw)`

`SetDefault (**kw)`

`SideEffect (side_effect, target)`

Tell scons that side\_effects are built as side effects of building targets.

`Split (arg)`

This function converts a string or list into a list of strings or Nodes. This makes things easier for users by allowing files to be specified as a white-space separated list to be split.

**The input rules are:**

- A single string containing names separated by spaces. These will be split apart at the spaces.
- A single Node instance
- A list containing either strings or Node instances. Any strings in the list are not split at spaces.

In all cases, the function returns a list of Nodes and strings.

`Tool (tool, toolpath=None, **kwargs) → Tool`

`Value (value, built_value=None, name=None)`

`VariantDir (variant_dir, src_dir, duplicate=1)`

`WhereIs (prog, path=None, pathext=None, reject=None)`

Find prog in the path.

`_canonicalize (path)`

Allow Dirs and strings beginning with # for top-relative.

Note this uses the current env's fs (in self).

`_changed_build (dependency, target, prev_ni, repo_node=None)`

`_changed_content (dependency, target, prev_ni, repo_node=None)`

`_changed_source (dependency, target, prev_ni, repo_node=None)`

`_changed_timestamp_match (dependency, target, prev_ni, repo_node=None)`

`_changed_timestamp_newer (dependency, target, prev_ni, repo_node=None)`

`_changed_timestamp_then_content (dependency, target, prev_ni, repo_node=None)`

`_find_toolpath_dir (tp)`

`_gsm ()`

`_init_special ()`

Initial the dispatch tables for special handling of special construction variables.

`_update (other)`

Private method to update an environment's consvar dict directly.

Bypasses the normal checks that occur when users try to set items.

`_update_onlynew (other)`

Update a dict with new keys.

Unlike the `.update` method, if the key is already present, it is not replaced.

`arg2nodes (args, node_factory=<class 'SCons.Environment._Null'>, lookup_list=<class 'SCons.Environment._Null'>, **kw)`

`backtick (command) → str`

Emulate command substitution.

Provides behavior conceptually like POSIX Shell notation for running a command in backquotes (backticks) by running `command` and returning the resulting output string.

This is not really a public API any longer, it is provided for the use of `ParseFlags()` (which supports it using a syntax of `!command`) and `ParseConfig()`.

**Raises:** **OSError** – if the external command returned non-zero exit status.

```
get (key, default=None)
    Emulates the get() method of dictionaries.
get_CacheDir ()
get_builder (name)
    Fetch the builder with the specified name from the environment.
get_factory (factory, default='File')
    Return a factory function for creating Nodes for this construction environment.
get_scanner (skey)
    Find the appropriate scanner given a key (usually a file suffix).
get_src_sig_type ()
get_tgt_sig_type ()
gvars ()
items ()
    Emulates the items() method of dictionaries.
keys ()
    Emulates the keys() method of dictionaries.
lvars ()
scanner_map_delete (kw=None)
    Delete the cached scanner map (if we need to).
setdefault (key, default=None)
    Emulates the setdefault() method of dictionaries.
subst (string, raw=0, target=None, source=None, conv=None, executor=None)
    Recursively interpolates construction variables from the Environment into the specified string, returning the
    expanded result. Construction variables are specified by a $ prefix in the string and begin with an initial underscore
    or alphabetic character followed by any number of underscores or alphanumeric characters. The construction
    variable names may be surrounded by curly braces to separate the name from trailing characters.
subst_kw (kw, raw=0, target=None, source=None)
subst_list (string, raw=0, target=None, source=None, conv=None, executor=None)
    Calls through to SCons.Subst.scons_subst_list(). See the documentation for that function.
subst_path (path, target=None, source=None)
    Substitute a path list, turning EntryProxies into Nodes and leaving Nodes (and other objects) as-is.
subst_target_source (string, raw=0, target=None, source=None, conv=None, executor=None)
    Recursively interpolates construction variables from the Environment into the specified string, returning the
    expanded result. Construction variables are specified by a $ prefix in the string and begin with an initial underscore
    or alphabetic character followed by any number of underscores or alphanumeric characters. The construction
    variable names may be surrounded by curly braces to separate the name from trailing characters.
validate_CacheDir_class (custom_class=None)
    Validate the passed custom CacheDir class, or if no args are passed, validate the custom CacheDir class from the
    environment.
values ()
    Emulates the values() method of dictionaries.
class SCons.Environment.SubstitutionEnvironment (**kw)
    Bases: object
    Base class for different flavors of construction environments.
    This class contains a minimal set of methods that handle construction variable expansion and conversion of strings to
    Nodes, which may or may not be actually useful as a stand-alone class. Which methods ended up in this class is
    pretty arbitrary right now. They're basically the ones which we've empirically determined are common to the different
    construction environment subclasses, and most of the others that use or touch the underlying dictionary of
    construction variables.
    Eventually, this class should contain all the methods that we determine are necessary for a "minimal" interface to the
    build engine. A full "native Python" SCons environment has gotten pretty heavyweight with all of the methods and
    Tools and construction variables we've jammed in there, so it would be nice to have a lighter weight alternative for
```

interfaces that don't need all of the bells and whistles. (At some point, we'll also probably rename this class "Base," since that more reflects what we want this class to become, but because we've released comments that tell people to subclass `Environment.Base` to create their own flavors of construction environment, we'll save that for a future refactoring when this class actually becomes useful.)

`AddMethod (function, name=None)`

Adds the specified function as a method of this construction environment with the specified name. If the name is omitted, the default name is the name of the function itself.

`MergeFlags (args, unique=True) → None`

Merge flags into construction variables.

Merges the flags from `args` into this construction environment. If `args` is not a dict, it is first converted to one with flags distributed into appropriate construction variables. See `ParseFlags()`.

**Parameters:**

- **args** – flags to merge
- **unique** – merge flags rather than appending (default: `True`). When merging, path variables are retained from the front, other construction variables from the end.

`Override (overrides)`

Produce a modified environment whose variables are overridden by the `overrides` dictionaries. "overrides" is a dictionary that will override the variables of this environment.

This function is much more efficient than `Clone()` or creating a new `Environment` because it doesn't copy the construction environment dictionary, it just wraps the underlying construction environment, and doesn't even create a wrapper object if there are no overrides.

`ParseFlags (*flags) → dict`

Return a dict of parsed flags.

Parse `flags` and return a dict with the flags distributed into the appropriate construction variable names. The flags are treated as a typical set of command-line flags for a GNU-style toolchain, such as might have been generated by one of the {foo}-config scripts, and used to populate the entries based on knowledge embedded in this method - the choices are not expected to be portable to other toolchains.

If one of the `flags` strings begins with a bang (exclamation mark), it is assumed to be a command and the rest of the string is executed; the result of that evaluation is then added to the dict.

`RemoveMethod (function)`

Removes the specified function's `MethodWrapper` from the `added_methods` list, so we don't re-bind it when making a clone.

`_init_special ()`

Initial the dispatch tables for special handling of special construction variables.

`arg2nodes (args, node_factory=<class 'SCons.Environment._Null'>, lookup_list=<class 'SCons.Environment._Null'>, **kw)`

`backtick (command) → str`

Emulate command substitution.

Provides behavior conceptually like POSIX Shell notation for running a command in backquotes (backticks) by running `command` and returning the resulting output string.

This is not really a public API any longer, it is provided for the use of `ParseFlags()` (which supports it using a syntax of `!command`) and `ParseConfig()`.

**Raises:** **OSError** – if the external command returned non-zero exit status.

`get (key, default=None)`

Emulates the `get()` method of dictionaries.

`gvars ()`

`items ()`

Emulates the `items()` method of dictionaries.

`keys ()`

Emulates the `keys()` method of dictionaries.

`lvars ()`

`setdefault (key, default=None)`

Emulates the `setdefault()` method of dictionaries.

`subst (string, raw=0, target=None, source=None, conv=None, executor=None)`

Recursively interpolates construction variables from the Environment into the specified string, returning the expanded result. Construction variables are specified by a \$ prefix in the string and begin with an initial underscore or alphabetic character followed by any number of underscores or alphanumeric characters. The construction variable names may be surrounded by curly braces to separate the name from trailing characters.

`subst_kw (kw, raw=0, target=None, source=None)`

`subst_list (string, raw=0, target=None, source=None, conv=None, executor=None)`

Calls through to `SCons.Subst.scons_subst_list()`. See the documentation for that function.

`subst_path (path, target=None, source=None)`

Substitute a path list, turning EntryProxies into Nodes and leaving Nodes (and other objects) as-is.

`subst_target_source (string, raw=0, target=None, source=None, conv=None, executor=None)`

Recursively interpolates construction variables from the Environment into the specified string, returning the expanded result. Construction variables are specified by a \$ prefix in the string and begin with an initial underscore or alphabetic character followed by any number of underscores or alphanumeric characters. The construction variable names may be surrounded by curly braces to separate the name from trailing characters.

`values ()`

Emulates the `values()` method of dictionaries.

`class SCons.Environment._Null`

Bases: `object`

`SCons.Environment._del_SCANNERS (env, key)`

`SCons.Environment._delete_duplicates (l, keep_last)`

Delete duplicates from a sequence, keeping the first or last.

`SCons.Environment._null`

alias of `_Null`

`SCons.Environment._set_BUILDERS (env, key, value)`

`SCons.Environment._set_SCANNERS (env, key, value)`

`SCons.Environment._set_future_reserved (env, key, value)`

`SCons.Environment._set_reserved (env, key, value)`

`SCons.Environment.alias_builder (env, target, source)`

`SCons.Environment.apply_tools (env, tools, toolpath)`

`SCons.Environment.copy_non_reserved_keywords (dict)`

`SCons.Environment.default_copy_from_cache (env, src, dst)`

`SCons.Environment.default_copy_to_cache (env, src, dst)`

`SCons.Environment.default_decide_source (dependency, target, prev_ni, repo_node=None)`

`SCons.Environment.default_decide_target (dependency, target, prev_ni, repo_node=None)`

`SCons.Environment.is_valid_construction_var (varstr)`

Return if the specified string is a legitimate construction variable.

## SCons.Errors module

SCons exception classes.

Used to handle internal and user errors in SCons.

*exception* `SCons.Errors.BuildError (node=None, errstr='Unknown error', status=2, exitstatus=2, filename=None, executor=None, action=None, command=None, exc_info=(None, None, None))`

Bases: `Exception`

SCons Errors that can occur while building.

Information about the cause of the build error

`errstr`

a description of the error message

`status`

the return code of the action that caused the build error. Must be set to a non-zero value even if the build error is not due to an action returning a non-zero returned code.

`exitstatus`

SCons exit status due to this build error. Must be nonzero unless due to an explicit `Exit()` call. Not always the same as `status`, since actions return a status code that should be respected, but SCons typically exits with 2 irrespective of the return value of the failed action.

`filename`

The name of the file or directory that caused the build error. Set to None if no files are associated with this error. This might be different from the target being built. For example, failure to create the directory in which the target file will appear. It can be None if the error is not due to a particular filename.

`exc_info`

Info about exception that caused the build error. Set to (None, None, None) if this build error is not due to an exception.

Information about the what caused the build error

`node`

the error occurred while building this target node(s)

`executor`

the executor that caused the build to fail (might be None if the build failures is not due to the executor failing)

`action`

the action that caused the build to fail (might be None if the build failures is not due to the an action failure)

`command`

the command line for the action that caused the build to fail (might be None if the build failures is not due to the an action failure)

`args`

`with_traceback ()`

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Errors.ExplicitExit (node=None, status=None, \*args)

Bases: Exception

`args`

`with_traceback ()`

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Errors.InternalError

Bases: Exception

`args`

`with_traceback ()`

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Errors.MSVCErrors

Bases: OSError

`args`

`characters_written`

`errno`

POSIX exception code

`filename`

exception filename

`filename2`

second exception filename

`strerror`

exception strerror

`with_traceback ()`

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Errors.SConsEnvironmentError

Bases: Exception

`args`

`with_traceback ()`

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Errors.StopError

Bases: Exception

`args`

`with_traceback ()`

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Errors.UserError

Bases: Exception

`args`

`with_traceback ()`

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

`SCons.Errors.convert_to_BuildError (status, exc_info=None)`

Convert a return code to a BuildError Exception.

The *buildError.status* we set here will normally be used as the exit status of the “scons” process.

#### Parameters:

- **status** – can either be a return code or an Exception.
- **exc\_info** (*tuple, optional*) – explicit exception information.

## SCons.Executor module

Execute actions with specific lists of target and source Nodes.

`SCons.Executor.AddBatchExecutor (key, executor)`

`class SCons.Executor.Batch (targets=[], sources=[])`

Bases: object

Remembers exact association between targets and sources of executor.

`sources`

`targets`

`class SCons.Executor.Executor (action, env=None, override_list=[{}], targets=[], sources=[], builder_kw={})`

Bases: object

A class for controlling instances of executing an action.

This largely exists to hold a single association of an action, environment, list of environment override dictionaries, targets and sources for later processing as needed.

`_changed_sources_list`

`_changed_targets_list`

`_do_execute`

`_execute_str`

`_get_changed_sources (*args, **kw)`

`_get_changed_targets (*args, **kw)`

`_get_changes ()`

`_get_source (*args, **kw)`

`_get_sources (*args, **kw)`

`_get_target (*args, **kw)`

`_get_targets (*args, **kw)`

`_get_unchanged_sources (*args, **kw)`

`_get_unchanged_targets (*args, **kw)`

`_get_unignored_sources_key (node, ignore=())`

`_memo`

`_unchanged_sources_list`

`_unchanged_targets_list`

`action_list`

`add_batch (targets, sources)`

Add pair of associated target and source to this Executor’s list. This is necessary for “batch” Builders that can be called repeatedly to build up a list of matching target and source files that will be used in order to update multiple target files at once from multiple corresponding source files, for tools like MSVC that support it.

`add_post_action (action)`

`add_pre_action (action)`

`add_sources (sources)`

Add source files to this Executor’s list. This is necessary for “multi” Builders that can be called repeatedly to build up a source file list for a given target.

`batches`

`builder_kw`

`cleanup ()`

`env`

`get_action_list ()`

```

get_action_side_effects ()
    Returns all side effects for all batches of this Executor used by the underlying Action.
get_action_targets ()
get_all_children ()
    Returns all unique children (dependencies) for all batches of this Executor.
    The Taskmaster can recognize when it's already evaluated a Node, so we don't have to make this list unique for its
    intended canonical use case, but we expect there to be a lot of redundancy (long lists of batched .cc files
    #including the same .h files over and over), so removing the duplicates once up front should save the Taskmaster
    a lot of work.
get_all_prerequisites ()
    Returns all unique (order-only) prerequisites for all batches of this Executor.
get_all_sources ()
    Returns all sources for all batches of this Executor.
get_all_targets ()
    Returns all targets for all batches of this Executor.
get_build_env ()
    Fetch or create the appropriate build Environment for this Executor.
get_build_scanner_path (scanner)
    Fetch the scanner path for this executor's targets and sources.
get_contents ()
    Fetch the signature contents. This is the main reason this class exists, so we can compute this once and cache it
    regardless of how many target or source Nodes there are.
    Returns bytes
get_implicit_deps ()
    Return the executor's implicit dependencies, i.e. the nodes of the commands to be executed.
get_kw (kw={})
get_lvars ()
get_sources ()
get_timestamp ()
    Fetch a time stamp for this Executor. We don't have one, of course (only files do), but this is the interface used by
    the timestamp module.
get_unignored_sources (node, ignore=())
lvars
nullify ()
overridelist
post_actions
pre_actions
prepare ()
    Preparatory checks for whether this Executor can go ahead and (try to) build its targets.
scan (scanner, node_list)
    Scan a list of this Executor's files (targets or sources) for implicit dependencies and update all of the targets with
    them. This essentially short-circuits an N*M scan of the sources for each individual target, which is a hell of a lot
    more efficient.
scan_sources (scanner)
scan_targets (scanner)
set_action_list (action)
SCons.Executor.GetBatchExecutor (key)
class SCons.Executor.Null (*args, **kw)
    Bases: object
    A null Executor, with a null build Environment, that does nothing when the rest of the methods call it.
    This might be able to disappear when we refactor things to disassociate Builders from Nodes entirely, so we're not
    going to worry about unit tests for this—at least for now.
    _changed_sources_list
    _changed_targets_list
    _do_execute
    _execute_str

```



```

_memo
_morph ()
    Morph this Null executor to a real Executor object.
_unchanged_sources_list
_unchanged_targets_list
action_list
add_post_action (action)
add_pre_action (action)
batches
builder_kw
cleanup ()
env
get_action_list ()
get_action_side_effects ()
get_action_targets ()
get_all_children ()
get_all_prerequisites ()
get_all_sources ()
get_all_targets ()
get_build_env ()
get_build_scanner_path ()
get_contents ()
get_unignored_sources (*args, **kw)
lvars
overridelist
post_actions
pre_actions
prepare ()
set_action_list (action)
class SCons.Executor.NullEnvironment (*args, **kwargs)
    Bases: Null
    SCons = <module 'SCons' from '/Users/bdbaddog/devel/scons/git/as_scons/SCons/__init__.py'>
    _CacheDir = <SCons.CacheDir.CacheDir object>
    _CacheDir_path = None
    get_CacheDir ()
class SCons.Executor.TSList (func)
    Bases: UserList
    A class that implements $TARGETS or $SOURCES expansions by wrapping an executor Method. This class is used
    in the Executor.lvars() to delay creation of NodeList objects until they're needed.
    Note that we subclass collections.UserList purely so that the is_Sequence() function will identify an object of this
    class as a list during variable expansion. We're not really using any collections.UserList methods in practice.
    _abc_impl = <_abc_data object>
    append (item)
        S.append(value) – append value to the end of the sequence
    clear () → None -- remove all items from S
    copy ()
    count (value) → integer -- return number of occurrences of value
    extend (other)
        S.extend(iterable) – extend sequence by appending elements from the iterable
    index (value[, start[, stop]]) → integer -- return first index of value.
        Raises ValueError if the value is not present.
        Supporting start and stop arguments is optional, but recommended.
    insert (i, item)
        S.insert(index, value) – insert value before index
    pop ([, index]) → item -- remove and return item at index (default last).
        Raise IndexError if list is empty or index is out of range.

```



```

remove (item)
    S.remove(value) – remove first occurrence of value. Raise ValueError if the value is not present.
reverse ()
    S.reverse() – reverse IN PLACE
sort (*args, **kwargs)
class SCons.Executor.TSObject (func)
    Bases: object
    A class that implements $TARGET or $SOURCE expansions by wrapping an Executor method.
SCons.Executor.execute_action_list (obj, target, kw)
    Actually execute the action list.
SCons.Executor.execute_actions_str (obj)
SCons.Executor.execute_nothing (obj, target, kw)
SCons.Executor.execute_null_str (obj)
SCons.Executor.get_NullEnvironment ()
    Use singleton pattern for Null Environments.
SCons.Executor.rfile (node)
    A function to return the results of a Node's rfile() method, if it exists, and the Node itself otherwise (if it's a Value
    Node, e.g.).

```

## SCons.Job module

Serial and Parallel classes to execute build tasks.

The Jobs class provides a higher level interface to start, stop, and wait on jobs.

```

class SCons.Job.InterruptState
    Bases: object
    set ()
class SCons.Job.Jobs (num, taskmaster)
    Bases: object
    An instance of this class initializes N jobs, and provides methods for starting, stopping, and waiting on all N jobs.
    _reset_sig_handler ()
        Restore the signal handlers to their previous state (before the call to _setup_sig_handler()).
    _setup_sig_handler ()
        Setup an interrupt handler so that SCons can shutdown cleanly in various conditions:

        a. SIGINT: Keyboard interrupt
        b. SIGTERM: kill or system shutdown
        c. SIGHUP: Controlling shell exiting
    We handle all of these cases by stopping the taskmaster. It turns out that it's very difficult to stop the build process
    by throwing asynchronously an exception such as KeyboardInterrupt. For example, the python Condition variables
    (threading.Condition) and queues do not seem to be asynchronous-exception-safe. It would require adding a
    whole bunch of try/finally block and except KeyboardInterrupt all over the place.
    Note also that we have to be careful to handle the case when SCons forks before executing another process. In
    that case, we want the child to exit immediately.
    run (postfunc=<function Jobs.<lambda>>)
        Run the jobs.
        postfunc() will be invoked after the jobs has run. It will be invoked even if the jobs are interrupted by a keyboard
        interrupt (well, in fact by a signal such as either SIGINT, SIGTERM or SIGHUP). The execution of postfunc() is
        protected against keyboard interrupts and is guaranteed to run to completion.
    were_interrupted ()
        Returns whether the jobs were interrupted by a signal.
class SCons.Job.Parallel (taskmaster, num, stack_size)
    Bases: object
    This class is used to execute tasks in parallel, and is somewhat less efficient than Serial, but is appropriate for
    parallel builds.
    This class is thread safe.

```

```

start ()
    Start the job. This will begin pulling tasks from the taskmaster and executing them, and return when there are no
    more tasks. If a task fails to execute (i.e. execute() raises an exception), then the job will stop.
class SCons.Job.Serial (taskmaster)
    Bases: object
    This class is used to execute tasks in series, and is more efficient than Parallel, but is only appropriate for
    non-parallel builds. Only one instance of this class should be in existence at a time.
    This class is not thread safe.
    start ()
        Start the job. This will begin pulling tasks from the taskmaster and executing them, and return when there are no
        more tasks. If a task fails to execute (i.e. execute() raises an exception), then the job will stop.
class SCons.Job.ThreadPool (num, stack_size, interrupted)
    Bases: object
    This class is responsible for spawning and managing worker threads.
    cleanup ()
        Shuts down the thread pool, giving each worker thread a chance to shut down gracefully.
    get ()
        Remove and return a result tuple from the results queue.
    preparation_failed (task)
    put (task)
        Put task into request queue.
class SCons.Job.Worker (requestQueue, resultsQueue, interrupted)
    Bases: Thread
    A worker thread waits on a task to be posted to its request queue, dequeues the task, executes it, and posts a tuple
    including the task and a boolean indicating whether the task executed successfully.
    _bootstrap ()
    _bootstrap_inner ()
    _delete ()
        Remove current thread from the dict of currently running threads.
    _exc_info ()
        exc_info() -> (type, value, traceback)
        Return information about the most recent exception caught by an except clause in the current stack frame or in an
        older stack frame.
    _initialized = False
    _reset_internal_locks (is_alive)
    _set_ident ()
    _set_tstate_lock ()
        Set a lock object which will be released by the interpreter when the underlying thread state (see pystate.h) gets
        deleted.
    _stop ()
    _wait_for_tstate_lock (block=True, timeout=-1)
property daemon
    A boolean value indicating whether this thread is a daemon thread.
    This must be set before start() is called, otherwise RuntimeError is raised. Its initial value is inherited from the
    creating thread; the main thread is not a daemon thread and therefore all threads created in the main thread
    default to daemon = False.
    The entire Python program exits when only daemon threads are left.
getName ()
property ident
    Thread identifier of this thread or None if it has not been started.
    This is a nonzero integer. See the get_ident() function. Thread identifiers may be recycled when a thread exits and
    another thread is created. The identifier is available even after the thread has exited.
isAlive ()
    Return whether the thread is alive.
    This method is deprecated, use is_alive() instead.
isDaemon ()

```

`is_alive ()`

Return whether the thread is alive.

This method returns True just before the `run()` method starts until just after the `run()` method terminates. The module function `enumerate()` returns a list of all alive threads.

`join (timeout=None)`

Wait until the thread terminates.

This blocks the calling thread until the thread whose `join()` method is called terminates – either normally or through an unhandled exception or until the optional timeout occurs.

When the timeout argument is present and not None, it should be a floating point number specifying a timeout for the operation in seconds (or fractions thereof). As `join()` always returns None, you must call `is_alive()` after `join()` to decide whether a timeout happened – if the thread is still alive, the `join()` call timed out.

When the timeout argument is not present or None, the operation will block until the thread terminates.

A thread can be `join()`ed many times.

`join()` raises a `RuntimeError` if an attempt is made to join the current thread as that would cause a deadlock. It is also an error to `join()` a thread before it has been started and attempts to do so raises the same exception.

*property* `name`

A string used for identification purposes only.

It has no semantics. Multiple threads may be given the same name. The initial name is set by the constructor.

`run ()`

Method representing the thread's activity.

You may override this method in a subclass. The standard `run()` method invokes the callable object passed to the object's constructor as the target argument, if any, with sequential and keyword arguments taken from the `args` and `kwargs` arguments, respectively.

`setDaemon (daemonic)`

`setName (name)`

`start ()`

Start the thread's activity.

It must be called at most once per thread object. It arranges for the object's `run()` method to be invoked in a separate thread of control.

This method will raise a `RuntimeError` if called more than once on the same thread object.

## SCons.Memoize module

Decorator-based memoizer to count caching stats.

A decorator-based implementation to count hits and misses of the computed values that various methods cache in memory.

Use of this modules assumes that wrapped methods be coded to cache their values in a consistent way. In particular, it requires that the class uses a dictionary named “`_memo`” to store the cached values.

Here is an example of wrapping a method that returns a computed value, with no input parameters:

```
@SCons.Memoize.CountMethodCall
def foo(self):

    try:
        return self._memo['foo']
    except KeyError:
        pass

    result = self.compute_foo_value()

    self._memo['foo'] = result

    return result
```

Here is an example of wrapping a method that will return different values based on one or more input arguments:

```
def _bar_key(self, argument):                                # Memoization
    return argument                                         # Memoization

@SCons.Memoize.CountDictCall(_bar_key)
def bar(self, argument):

    memo_key = argument                                    # Memoization
    try:                                                    # Memoization
        memo_dict = self._memo['bar']                      # Memoization
    except KeyError:                                        # Memoization
        memo_dict = {}                                     # Memoization
        self._memo['dict'] = memo_dict                    # Memoization
    else:                                                    # Memoization
        try:                                                # Memoization
            return memo_dict[memo_key]                      # Memoization
        except KeyError:                                    # Memoization
            pass                                             # Memoization

    result = self.compute_bar_value(argument)

    memo_dict[memo_key] = result                            # Memoization

    return result
```

Deciding what to cache is tricky, because different configurations can have radically different performance tradeoffs, and because the tradeoffs involved are often so non-obvious. Consequently, deciding whether or not to cache a given method will likely be more of an art than a science, but should still be based on available data from this module. Here are some VERY GENERAL guidelines about deciding whether or not to cache return values from a method that's being called a lot:

– **The first question to ask is, “Can we change the calling code**

so this method isn't called so often?” Sometimes this can be done by changing the algorithm. Sometimes the *caller* should be memoized, not the method you're looking at.

The memoized function should be timed with multiple configurations to make sure it doesn't inadvertently slow down some other configuration.

– **When memoizing values based on a dictionary key composed of**

input arguments, you don't need to use all of the arguments if some of them don't affect the return values.

`class SCons.Memoize.CountDict (cls_name, method_name, keymaker)`

Bases: Counter

A counter class for memoized values stored in a dictionary, with keys based on the method's input arguments.

A CountDict object is instantiated in a decorator for each of the class's methods that memoizes its return value in a dictionary, indexed by some key that can be computed from one or more of its input arguments.

`count (*args, **kw)`

Counts whether the computed key value is already present in the memoization dictionary (a hit) or not (a miss).

`display ()`

`key ()`

`SCons.Memoize.CountDictCall (keyfunc)`

Decorator for counting memoizer hits/misses while accessing dictionary values with a key-generating function. Like CountMethodCall above, it wraps the given method fn and uses a CountDict object to keep track of the caching statistics. The dict-key function keyfunc has to get passed in the decorator call and gets stored in the CountDict instance. Wrapping gets enabled by calling EnableMemoization().

`SCons.Memoize.CountMethodCall (fn)`

Decorator for counting memoizer hits/misses while retrieving a simple value in a class method. It wraps the given method fn and uses a CountValue object to keep track of the caching statistics. Wrapping gets enabled by calling EnableMemoization().

```
class SCons.Memoize.CountValue (cls_name, method_name)
```

Bases: Counter

A counter class for simple, atomic memoized values.

A CountValue object should be instantiated in a decorator for each of the class's methods that memoizes its return value by simply storing the return value in its \_memo dictionary.

```
count (*args, **kw)
```

Counts whether the memoized value has already been set (a hit) or not (a miss).

```
display ()
```

```
key ()
```

```
class SCons.Memoize.Counter (cls_name, method_name)
```

Bases: object

Base class for counting memoization hits and misses.

We expect that the initialization in a matching decorator will fill in the correct class name and method name that represents the name of the function being counted.

```
display ()
```

```
key ()
```

```
SCons.Memoize.Dump (title=None)
```

Dump the hit/miss count for all the counters collected so far.

```
SCons.Memoize.EnableMemoization ()
```

## SCons.PathList module

Handle lists of directory paths.

These are the path lists that get set as CPPPATH, LIBPATH, etc.) with as much caching of data and efficiency as we can, while still keeping the evaluation delayed so that we Do the Right Thing (almost) regardless of how the variable is specified.

```
SCons.PathList.PathList (pathlist)
```

Returns the cached \_PathList object for the specified pathlist, creating and caching a new object as necessary.

```
class SCons.PathList._PathList (pathlist)
```

Bases: object

An actual PathList object.

```
subst_path (env, target, source)
```

Performs construction variable substitution on a pre-digested PathList for a specific target and source.

```
SCons.PathList.node_conv (obj)
```

This is the "string conversion" routine that we have our substitutions use to return Nodes, not strings. This relies on the fact that an EntryProxy object has a get() method that returns the underlying Node that it wraps, which is a bit of architectural dependence that we might need to break or modify in the future in response to additional requirements.

## SCons.SConf module

Autoconf-like configuration support.

In other words, SConf allows to run tests on the build machine to detect capabilities of system and do some things based on result: generate config files, header files for C/C++, update variables in environment.

Tests on the build system can detect if compiler sees header files, if libraries are installed, if some command line options are supported etc.

```
SCons.SConf.CheckCC (context)
```

```
SCons.SConf.CheckCHeader (context, header, include_quotes='')
```

A test for a C header file.

```
SCons.SConf.CheckCXX (context)
```

```
SCons.SConf.CheckCXXHeader (context, header, include_quotes='')
```

A test for a C++ header file.

```
class SCons.SConf.CheckContext (sconf)
```

Bases: object

Provides a context for configure tests. Defines how a test writes to the screen and log file.

A typical test is just a callable with an instance of CheckContext as first argument:

```
def CheckCustom(context, ...):
```

```
    context.Message('Checking my weird test ... ') ret = myWeirdTestFunction(...) context.Result(ret)
```

Often, myWeirdTestFunction will be one of context.TryCompile/context.TryLink/context.TryRun. The results of those are cached, for they are only rebuild, if the dependencies have changed.

```
AppendLIBS (lib_name_list)
```

```
BuildProg (text, ext)
```

```
CompileProg (text, ext)
```

```
CompileSharedObject (text, ext)
```

```
Display (msg)
```

```
Log (msg)
```

```
Message (text)
```

Inform about what we are doing right now, e.g. 'Checking for SOMETHING ... '

```
PrependLIBS (lib_name_list)
```

```
Result (res)
```

Inform about the result of the test. If res is not a string, displays 'yes' or 'no' depending on whether res is evaluated as true or false. The result is only displayed when self.did\_show\_result is not set.

```
RunProg (text, ext)
```

```
SetLIBS (val)
```

```
TryAction (*args, **kw)
```

```
TryBuild (*args, **kw)
```

```
TryCompile (*args, **kw)
```

```
TryLink (*args, **kw)
```

```
TryRun (*args, **kw)
```

```
SCons.SConf.CheckDeclaration (context, declaration, includes="", language=None)
```

```
SCons.SConf.CheckFunc (context, function_name, header=None, language=None)
```

```
SCons.SConf.CheckHeader (context, header, include_quotes='<>', language=None)
```

A test for a C or C++ header file.

```
SCons.SConf.CheckLib (context, library=None, symbol='main', header=None, language=None, autoadd=1)
```

A test for a library. See also CheckLibWithHeader. Note that library may also be None to test whether the given symbol compiles without flags.

```
SCons.SConf.CheckLibWithHeader (context, libs, header, language, call=None, autoadd=1)
```

Another (more sophisticated) test for a library. Checks, if library and header is available for language (may be 'C' or 'CXX'). Call maybe be a valid expression \_with\_ a trailing ';'. As in CheckLib, we support library=None, to test if the call compiles without extra link flags.

```
SCons.SConf.CheckMember (context, aggregate_member, header=None, language=None)
```

Returns the status (False : failed, True : ok).

```
SCons.SConf.CheckProg (context, prog_name)
```

Simple check if a program exists in the path. Returns the path for the application, or None if not found.

```
SCons.SConf.CheckSHCC (context)
```

```
SCons.SConf.CheckSHCXX (context)
```

```
SCons.SConf.CheckType (context, type_name, includes="", language=None)
```

```
SCons.SConf.CheckTypeSize (context, type_name, includes="", language=None, expect=None)
```

```
exception SCons.SConf.ConfigureCacheError (target)
```

Bases: SConfError

Raised when a use explicitly requested the cache feature, but the test is run the first time.

args

with\_traceback ()

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

```
exception SCons.SConf.ConfigureDryRunError (target)
```

Bases: SConfError

Raised when a file or directory needs to be updated during a Configure process, but the user requested a dry-run

args

```

with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
SCons.SConf.CreateConfigHBuilder (env)
    Called if necessary just before the building targets phase begins.
SCons.SConf.NeedConfigHBuilder ()
SCons.SConf.SConf (*args, **kw)
class SCons.SConf.SConfBase (env, custom_tests={}, conf_dir='$CONFIGUREDIRENTRY',
log_file='$CONFIGURELOG', config_h=None, _depth=0)
    Bases: object
    This is simply a class to represent a configure context. After creating a SConf object, you can call any tests. After
    finished with your tests, be sure to call the Finish() method, which returns the modified environment. Some words
    about caching: In most cases, it is not necessary to cache Test results explicitly. Instead, we use the scons
    dependency checking mechanism. For example, if one wants to compile a test program (SConf.TryLink), the
    compiler is only called, if the program dependencies have changed. However, if the program could not be compiled in
    a former SConf run, we need to explicitly cache this error.
AddTest (test_name, test_instance)
    Adds test_class to this SConf instance. It can be called with self.test_name(...)
AddTests (tests)
    Adds all the tests given in the tests dictionary to this SConf instance
BuildNodes (nodes)
    Tries to build the given nodes immediately. Returns 1 on success, 0 on error.
Define (name, value=None, comment=None)
    Define a pre processor symbol name, with the optional given value in the current config header.
    If value is None (default), then #define name is written. If value is not none, then #define name value is written.
    comment is a string which will be put as a C comment in the header, to explain the meaning of the value
    (appropriate C comments will be added automatically).
Finish ()
    Call this method after finished with your tests: env = sconf.Finish()
class TestWrapper (test, sconf)
    Bases: object
    A wrapper around Tests (to ensure sanity)
TryAction (action, text=None, extension="")
    Tries to execute the given action with optional source file contents <text> and optional source file extension
    <extension>, Returns the status (0 : failed, 1 : ok) and the contents of the output file.
TryBuild (builder, text=None, extension="")
    Low level TryBuild implementation. Normally you don't need to call that - you can use TryCompile / TryLink /
    TryRun instead
TryCompile (text, extension)
    Compiles the program given in text to an env.Object, using extension as file extension (e.g. '.c'). Returns 1, if
    compilation was successful, 0 otherwise. The target is saved in self.lastTarget (for further processing).
TryLink (text, extension)
    Compiles the program given in text to an executable env.Program, using extension as file extension (e.g. '.c').
    Returns 1, if compilation was successful, 0 otherwise. The target is saved in self.lastTarget (for further processing).
TryRun (text, extension)
    Compiles and runs the program given in text, using extension as file extension (e.g. '.c'). Returns (1, outputStr) on
    success, (0, "") otherwise. The target (a file containing the program's stdout) is saved in self.lastTarget (for further
    processing).
_createDir (node)
_shutdown ()
    Private method. Reset to non-piped spawn
_startup ()
    Private method. Set up logstream, and set the environment variables necessary for a piped build
pspawn_wrapper (sh, escape, cmd, args, env)
    Wrapper function for handling piped spawns.
    This looks to the calling interface (in Action.py) like a "normal" spawn, but associates the call with the PSPAWN
    variable from the construction environment and with the streams to which we want the output logged. This gets slid

```



into the construction environment as the SPAWN variable so Action.py doesn't have to know or care whether it's spawning a piped command or not.

`class SCons.SConf.SConfBuildInfo`

Bases: FileBuildInfo

Special build info for targets of configure tests. Additional members are result (did the builder succeed last time?) and string, which contains messages of the original build phase.

bact

bactsig

bdepends

bdependsigs

bimplicit

bimplicitigs

bources

bourcesigs

`convert_from_sconsign (dir, name)`

Converts a newly-read FileBuildInfo object for in-SCons use

For normal up-to-date checking, we don't have any conversion to perform—but we're leaving this method here to make that clear.

`convert_to_sconsign ()`

Converts this FileBuildInfo object for writing to a .sconsign file

This replaces each Node in our various dependency lists with its usual string representation: relative to the top-level SConstruct directory, or an absolute path if it's outside.

`current_version_id = 2`

`dependency_map`

`format (names=0)`

`merge (other)`

Merge the fields of another object into this object. Already existing information is overwritten by the other instance's data. WARNING: If a '\_\_dict\_\_' slot is added, it should be updated instead of replaced.

`prepare_dependencies ()`

Prepares a FileBuildInfo object for explaining what changed

The bources, bdepends and bimplicit lists have all been stored on disk as paths relative to the top-level SConstruct directory. Convert the strings to actual Nodes (for use by the `-debug=explain` code and `-implicit-cache`).

result

`set_build_result (result, string)`

string

`class SCons.SConf.SConfBuildTask (tm, targets, top, node)`

Bases: AlwaysTask

This is almost the same as SCons.Script.BuildTask. Handles SConfErrors correctly and knows about the current cache\_mode.

`_abc_impl = <_abc_data object>`

`_exception_raise ()`

Raises a pending exception that was recorded while getting a Task ready for execution.

`_no_exception_to_raise ()`

`collect_node_states ()`

`display (message)`

Hook to allow the calling interface to display a message.

This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out what Node should be built next, the actual target list may be altered, along with a message describing the alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see those messages.

`display_cached_string (bi)`

Logs the original builder messages, given the SConfBuildInfo instance bi.

`exc_clear ()`

Clears any recorded exception.

This also changes the "exception\_raise" attribute to point to the appropriate do-nothing method.

`exc_info ()`

Returns info about a recorded exception.

`exception_set (exception=None)`

Records an exception to be raised at the appropriate time.

This also changes the “`exception_raise`” attribute to point to the method that will, in fact

`execute ()`

Called to execute the task.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `prepare()`, `executed()` or `failed()`.

`executed ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node’s callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node’s state before deciding whether it was “built”, in which case we call the appropriate Node method. In any event, we always call “`visited()`”, which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_with_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node’s callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node’s state before deciding whether it was “built”, in which case we call the appropriate Node method. In any event, we always call “`visited()`”, which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_without_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance doesn’t want to call the Node’s callback methods.

`fail_continue ()`

Explicit continue-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fail_stop ()`

Explicit stop-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`failed ()`

Default action when a task fails: stop the build.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what’s necessary.

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the “`scons -c`” option.

`make_ready_current ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what’s necessary.

`needs_execute ()`

Always returns True (indicating this Task should always be executed).

Subclasses that need this behavior (as opposed to the default of only executing Nodes that are out of date w.r.t. their dependencies) can use this as follows:

**class MyTaskSubclass(SCons.Taskmaster.Task):**

```

    needs_execute = SCons.Taskmaster.AlwaysTask.needs_execute
postprocess ()
    Post-processes a task after it's been executed.
    This examines all the targets just built (or not, we don't care if the build was successful, or even if there was no
    build because everything was up-to-date) to see if they have any waiting parent Nodes, or Nodes waiting on a
    common side effect, that can be put back on the candidates list.
prepare ()
    Called just before the task is executed.
    This is mainly intended to give the target Nodes a chance to unlink underlying files and make all necessary
    directories before the Action is actually called to build the targets.
trace_message (method, node, description='node')
exception SCons.SConf.SConfError (msg)
    Bases: UserError
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.SConf.SConfWarning
    Bases: SConsWarning
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
SCons.SConf.SetBuildType (buildtype)
SCons.SConf.SetCacheMode (mode)
    Set the Configure cache mode. mode must be one of “auto”, “force”, or “cache”.
SCons.SConf.SetProgressDisplay (display)
    Set the progress display to use (called from SCons.Script)
class SCons.SConf.Streamer (orig)
    Bases: object
    ‘Sniffer’ for a file-like writable object. Similar to the unix tool tee.
    flush ()
    getvalue ()
        Return everything written to orig since the Streamer was created.
    write (str)
    writelines (lines)
SCons.SConf._createConfigH (target, source, env)
SCons.SConf._createSource (target, source, env)
SCons.SConf._set_conftest_node (node)
SCons.SConf._stringConfigH (target, source, env)
SCons.SConf._stringSource (target, source, env)
SCons.SConf.createIncludesFromHeaders (headers, leaveLast, include_quotes='')

```

**SCons.SConsign module**

Operations on signature database files (.sconsign).

```
class SCons.SConsign.Base
```

Bases: object

This is the controlling class for the signatures for the collection of entries associated with a specific directory. The actual directory association will be maintained by a subclass that is specific to the underlying storage method. This class provides a common set of methods for fetching and storing the individual bits of information that make up signature entry.

```

do_not_set_entry (filename, obj)
do_not_store_info (filename, node)
get_entry (filename)
    Fetch the specified entry attribute.
merge ()

```

```

    set_entry (filename, obj)
        Set the entry.
    store_info (filename, node)
class SCons.SConsign.DB (dir)
    Bases: Base
    A Base subclass that reads and writes signature information from a global .sconsign.db* file—the actual file suffix is
    determined by the database module.
    do_not_set_entry (filename, obj)
    do_not_store_info (filename, node)
    get_entry (filename)
        Fetch the specified entry attribute.
    merge ()
    set_entry (filename, obj)
        Set the entry.
    store_info (filename, node)
    write (sync=1)
class SCons.SConsign.Dir (fp=None, dir=None)
    Bases: Base
    do_not_set_entry (filename, obj)
    do_not_store_info (filename, node)
    get_entry (filename)
        Fetch the specified entry attribute.
    merge ()
    set_entry (filename, obj)
        Set the entry.
    store_info (filename, node)
class SCons.SConsign.DirFile (dir)
    Bases: Dir
    Encapsulates reading and writing a per-directory .sconsign file.
    do_not_set_entry (filename, obj)
    do_not_store_info (filename, node)
    get_entry (filename)
        Fetch the specified entry attribute.
    merge ()
    set_entry (filename, obj)
        Set the entry.
    store_info (filename, node)
    write (sync=1)
        Write the .sconsign file to disk.
        Try to write to a temporary file first, and rename it if we succeed. If we can't write to the temporary file, it's probably
        because the directory isn't writable (and if so, how did we build anything in this directory, anyway?), so try to write
        directly to the .sconsign file as a backup. If we can't rename, try to copy the temporary contents back to the
        .sconsign file. Either way, always try to remove the temporary file at the end.
SCons.SConsign.File (name, dbm_module=None)
    Arrange for all signatures to be stored in a global .sconsign.db* file.
SCons.SConsign.ForDirectory
    alias of DB
SCons.SConsign.Get_DataBase (dir)
SCons.SConsign.Reset ()
    Reset global state. Used by unit tests that end up using SConsign multiple times to get a clean slate for each test.
class SCons.SConsign.SConsignEntry
    Bases: object
    Wrapper class for the generic entry in a .sconsign file. The Node subclass populates it with attributes as it pleases.
    XXX As coded below, we do expect a 'binfo' attribute to be added, but we'll probably generalize this in the next
    refactorings.
    binfo

```

```

convert_from_sconsign (dir, name)
convert_to_sconsign ()
current_version_id = 2
ninfo
SCons.SConsign.corrupt_dblite_warning (filename)
SCons.SConsign.current_sconsign_filename ()
SCons.SConsign.write ()

```

## SCons.Subst module

SCons string substitution.

```
class SCons.Subst.CmdStringHolder (cmd, literal=None)
```

Bases: UserString

This is a special class used to hold strings generated by `scons_subst()` and `scons_subst_list()`. It defines a special method `escape()`. When passed a function with an escape algorithm for a particular platform, it will return the contained string with the proper escape sequences inserted.

```
_abc_impl = <_abc_data object>
```

```
capitalize ()
```

```
casefold ()
```

```
center (width, *args)
```

```
count (value) → integer -- return number of occurrences of value
```

```
encode (encoding=None, errors=None)
```

```
endswith (suffix, start=0, end=9223372036854775807)
```

```
escape (escape_func, quote_func=<function quote_spaces>)
```

Escape the string with the supplied function. The function is expected to take an arbitrary string, then return it with all special characters escaped and ready for passing to the command interpreter.

After calling this function, the next call to `str()` will return the escaped string.

```
expandtabs (tabsize=8)
```

```
find (sub, start=0, end=9223372036854775807)
```

```
format (*args, **kwargs)
```

```
format_map (mapping)
```

```
index (value[, start[, stop]]) → integer -- return first index of value.
```

Raises `ValueError` if the value is not present.

Supporting start and stop arguments is optional, but recommended.

```
is_literal ()
```

```
isalnum ()
```

```
isalpha ()
```

```
isascii ()
```

```
isdecimal ()
```

```
isdigit ()
```

```
isidentifier ()
```

```
islower ()
```

```
isnumeric ()
```

```
isprintable ()
```

```
isspace ()
```

```
istitle ()
```

```
isupper ()
```

```
join (seq)
```

```
ljust (width, *args)
```

```
lower ()
```

```
lstrip (chars=None)
```

```
maketrans (y=None, z=None, /)
```

Return a translation table usable for `str.translate()`.

If there is only one argument, it must be a dictionary mapping Unicode ordinals (integers) or characters to Unicode ordinals, strings or None. Character keys will be then converted to ordinals. If there are two arguments, they must be strings of equal length, and in the resulting dictionary, each character in `x` will be mapped to the character at the

same position in y. If there is a third argument, it must be a string, whose characters will be mapped to None in the result.

```
partition (sep)
replace (old, new, maxsplit=-1)
rfind (sub, start=0, end=9223372036854775807)
rindex (sub, start=0, end=9223372036854775807)
rjust (width, *args)
rpartition (sep)
rsplit (sep=None, maxsplit=-1)
rstrip (chars=None)
split (sep=None, maxsplit=-1)
splitlines (keepends=False)
startswith (prefix, start=0, end=9223372036854775807)
strip (chars=None)
swapcase ()
title ()
translate (*args)
upper ()
zfill (width)
```

```
class SCons.Subst.ListSubber (env, mode, conv, gvars)
```

Bases: `UserList`

A class to construct the results of a `scons_subst_list()` call.

Like `StringSubber`, this class binds a specific construction environment, mode, target and source with two methods (`substitute()` and `expand()`) that handle the expansion.

In addition, however, this class is used to track the state of the result(s) we're gathering so we can do the appropriate thing whenever we have to append another word to the result—start a new line, start a new word, append to the current word, etc. We do this by setting the “append” attribute to the right method so that our wrapper methods only need ever call `ListSubber.append()`, and the rest of the object takes care of doing the right thing internally.

```
_abc_impl = <_abc_data object>
```

```
add_new_word (x)
```

```
add_to_current_word (x)
```

Append the string `x` to the end of the current last word in the result. If that is not possible, then just add it as a new word. Make sure the entire concatenated string inherits the object attributes of `x` (in particular, the escape function) by wrapping it as `CmdStringHolder`.

```
append (item)
```

`S.append(value)` – append value to the end of the sequence

```
clear () → None -- remove all items from S
```

```
close_strip (x)
```

Handle the “close strip” `$)` token.

```
copy ()
```

```
count (value) → integer -- return number of occurrences of value
```

```
expand (s, lvars, within_list)
```

Expand a single “token” as necessary, appending the expansion to the current result.

This handles expanding different types of things (strings, lists, callables) appropriately. It calls the wrapper `substitute()` method to re-expand things as necessary, so that the results of expansions of side-by-side strings still get re-evaluated separately, not smushed together.

```
expanded (s)
```

Determines if the string `s` requires further expansion.

Due to the implementation of `ListSubber.expand` will call itself 2 additional times for an already expanded string. This method is used to determine if a string is already fully expanded and if so exit the loop early to prevent these recursive calls.

```
extend (other)
```

`S.extend(iterable)` – extend sequence by appending elements from the iterable

```
index (value[, start[, stop]]) → integer -- return first index of value.
```

Raises `ValueError` if the value is not present.

Supporting start and stop arguments is optional, but recommended.

```

insert (i, item)
    S.insert(index, value) – insert value before index
literal (x)
next_line ()
    Arrange for the next word to start a new line. This is like starting a new word, except that we have to append
    another line to the result.
next_word ()
    Arrange for the next word to start a new word.
open_strip (x)
    Handle the “open strip” $( token.
pop ([, index]) → item -- remove and return item at index (default last).
    Raise IndexError if list is empty or index is out of range.
remove (item)
    S.remove(value) – remove first occurrence of value. Raise ValueError if the value is not present.
reverse ()
    S.reverse() – reverse IN PLACE
sort (*args, **kws)
substitute (args, lvars, within_list)
    Substitute expansions in an argument or list of arguments.
    This serves as a wrapper for splitting up a string into separate tokens.
this_word ()
    Arrange for the next word to append to the end of the current last word in the result.
class SCons.Subst.Literal (lstr)
    Bases: object
    A wrapper for a string. If you use this object wrapped around a string, then it will be interpreted as literal. When
    passed to the command interpreter, all special characters will be escaped.
    escape (escape_func)
    for_signature ()
    is_literal ()
class SCons.Subst.NLWrapper (list, func)
    Bases: object
    A wrapper class that delays turning a list of sources or targets into a NodeList until it's needed. The specified function
    supplied when the object is initialized is responsible for turning raw nodes into proxies that implement the special
    attributes like .abspath, .source, etc. This way, we avoid creating those proxies just “in case” someone is going to use
    $TARGET or the like, and only go through the trouble if we really have to.
    In practice, this might be a wash performance-wise, but it's a little cleaner conceptually...
    _create_nodelist ()
    _gen_nodelist ()
    _return_nodelist ()
class SCons.Subst.NullNodeList (*args, **kwargs)
    Bases: NullSeq
    _instance
SCons.Subst.SetAllowableExceptions (*excepts)
class SCons.Subst.SpecialAttrWrapper (lstr, for_signature=None)
    Bases: object
    This is a wrapper for what we call a ‘Node special attribute.’ This is any of the attributes of a Node that we can
    reference from Environment variable substitution, such as $TARGET.abspath or $SOURCES[1].filebase. We
    implement the same methods as Literal so we can handle special characters, plus a for_signature method, such that
    we can return some canonical string during signature calculation to avoid unnecessary rebuilds.
    escape (escape_func)
    for_signature ()
    is_literal ()
class SCons.Subst.StringSubber (env, mode, conv, gvars)
    Bases: object
    A class to construct the results of a scons_subst() call.

```



This binds a specific construction environment, mode, target and source with two methods (substitute() and expand()) that handle the expansion.

expand (s, lvars)

Expand a single “token” as necessary, returning an appropriate string containing the expansion.

This handles expanding different types of things (strings, lists, callables) appropriately. It calls the wrapper substitute() method to re-expand things as necessary, so that the results of expansions of side-by-side strings still get re-evaluated separately, not smushed together.

substitute (args, lvars)

Substitute expansions in an argument or list of arguments.

This serves as a wrapper for splitting up a string into separate tokens.

class SCons.Subst.Target\_or\_Source (nl)

Bases: object

A class that implements \$TARGET or \$SOURCE expansions by in turn wrapping a NLWrapper. This class handles the different methods used to access an individual proxy Node, calling the NLWrapper to create a proxy on demand.

class SCons.Subst.Targets\_or\_Sources (nl)

Bases: UserList

A class that implements \$TARGETS or \$SOURCES expansions by in turn wrapping a NLWrapper. This class handles the different methods used to access the list, calling the NLWrapper to create proxies on demand.

Note that we subclass collections.UserList purely so that the is\_Sequence() function will identify an object of this class as a list during variable expansion. We’re not really using any collections.UserList methods in practice.

\_abc\_impl = <\_abc\_data object>

append (item)

S.append(value) – append value to the end of the sequence

clear () → None -- remove all items from S

copy ()

count (value) → integer -- return number of occurrences of value

extend (other)

S.extend(iterable) – extend sequence by appending elements from the iterable

index (value[, start[, stop]]) → integer -- return first index of value.

Raises ValueError if the value is not present.

Supporting start and stop arguments is optional, but recommended.

insert (i, item)

S.insert(index, value) – insert value before index

pop ([, index]) → item -- remove and return item at index (default last).

Raise IndexError if list is empty or index is out of range.

remove (item)

S.remove(value) – remove first occurrence of value. Raise ValueError if the value is not present.

reverse ()

S.reverse() – reverse *IN PLACE*

sort (\*args, \*\*kws)

SCons.Subst.\_remove\_list (list)

SCons.Subst.\_rm\_list (list)

SCons.Subst.escape\_list (mylist, escape\_func)

Escape a list of arguments by running the specified escape\_func on every object in the list that has an escape() method.

SCons.Subst.quote\_spaces (arg)

Generic function for putting double quotes around any string that has white space in it.

SCons.Subst.raise\_exception (exception, target, s)

SCons.Subst.scons\_subst (strSubst, env, mode=1, target=None, source=None, gvars={}, lvars={}, conv=None)

Expand a string or list containing construction variable substitutions.

This is the work-horse function for substitutions in file names and the like. The companion scons\_subst\_list() function (below) handles separating command lines into lists of arguments, so see that function if that’s what you’re looking for.

SCons.Subst.scons\_subst\_list (strSubst, env, mode=1, target=None, source=None, gvars={}, lvars={}, conv=None)

Substitute construction variables in a string (or list or other object) and separate the arguments into a command list. The companion `scons_subst()` function (above) handles basic substitutions within strings, so see that function instead if that's what you're looking for.

`SCons.Subst.scons_subst_once (strSubst, env, key)`

Perform single (non-recursive) substitution of a single construction variable keyword.

This is used when setting a variable when copying or overriding values in an Environment. We want to capture (expand) the old value before we override it, so people can do things like:

```
env2 = env.Clone(CCFLAGS = '$CCFLAGS -g')
```

We do this with some straightforward, brute-force code here...

`SCons.Subst.subst_dict (target, source)`

Create a dictionary for substitution of special construction variables.

This translates the following special arguments:

**target - the target (object or array of objects),**

used to generate the TARGET and TARGETS construction variables

**source - the source (object or array of objects),**

used to generate the SOURCES and SOURCE construction variables

## SCons.Taskmaster module

Generic Taskmaster module for the SCons build engine.

This module contains the primary interface(s) between a wrapping user interface and the SCons build engine. There are two key classes here:

### Taskmaster

This is the main engine for walking the dependency graph and calling things to decide what does or doesn't need to be built.

### Task

This is the base class for allowing a wrapping interface to decide what does or doesn't actually need to be done. The intention is for a wrapping interface to subclass this as appropriate for different types of behavior it may need.

The canonical example is the SCons native Python interface, which has Task subclasses that handle its specific behavior, like printing "'foo' is up to date" when a top-level target doesn't need to be built, and handling the `-c` option by removing targets as its "build" action. There is also a separate subclass for suppressing this output when the `-q` option is used.

The Taskmaster instantiates a Task object for each (set of) target(s) that it decides need to be evaluated and/or built.

```
class SCons.Taskmaster.AlwaysTask (tm, targets, top, node)
```

Bases: Task

`_abc_impl = <_abc_data object>`

`_exception_raise ()`

Raises a pending exception that was recorded while getting a Task ready for execution.

`_no_exception_to_raise ()`

`display (message)`

Hook to allow the calling interface to display a message.

This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out what Node should be built next, the actual target list may be altered, along with a message describing the alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see those messages.

`exc_clear ()`

Clears any recorded exception.

This also changes the "exception\_raise" attribute to point to the appropriate do-nothing method.

`exc_info ()`

Returns info about a recorded exception.

`exception_set (exception=None)`

Records an exception to be raised at the appropriate time.

This also changes the “exception\_raise” attribute to point to the method that will, in fact

`execute ()`

Called to execute the task.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `prepare()`, `executed()` or `failed()`.

`executed ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node’s callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node’s state before deciding whether it was “built”, in which case we call the appropriate Node method. In any event, we always call “`visited()`”, which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_with_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node’s callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node’s state before deciding whether it was “built”, in which case we call the appropriate Node method. In any event, we always call “`visited()`”, which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_without_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance doesn’t want to call the Node’s callback methods.

`fail_continue ()`

Explicit continue-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fail_stop ()`

Explicit stop-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`failed ()`

Default action when a task fails: stop the build.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what’s necessary.

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the “`scons -c`” option.

`make_ready_current ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what’s necessary.

`needs_execute ()`

Always returns True (indicating this Task should always be executed).

Subclasses that need this behavior (as opposed to the default of only executing Nodes that are out of date w.r.t. their dependencies) can use this as follows:

```
class MyTaskSubclass(SCons.Taskmaster.Task):
```

```
    needs_execute = SCons.Taskmaster.AlwaysTask.needs_execute
```

`postprocess ()`

Post-processes a task after it's been executed.

This examines all the targets just built (or not, we don't care if the build was successful, or even if there was no build because everything was up-to-date) to see if they have any waiting parent Nodes, or Nodes waiting on a common side effect, that can be put back on the candidates list.

`prepare ()`

Called just before the task is executed.

This is mainly intended to give the target Nodes a chance to unlink underlying files and make all necessary directories before the Action is actually called to build the targets.

`trace_message (method, node, description='node')`

`class SCons.Taskmaster.OutOfDateTask (tm, targets, top, node)`

Bases: Task

`_abc_impl = <_abc_data object>`

`_exception_raise ()`

Raises a pending exception that was recorded while getting a Task ready for execution.

`_no_exception_to_raise ()`

`display (message)`

Hook to allow the calling interface to display a message.

This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out what Node should be built next, the actual target list may be altered, along with a message describing the alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see those messages.

`exc_clear ()`

Clears any recorded exception.

This also changes the "exception\_raise" attribute to point to the appropriate do-nothing method.

`exc_info ()`

Returns info about a recorded exception.

`exception_set (exception=None)`

Records an exception to be raised at the appropriate time.

This also changes the "exception\_raise" attribute to point to the method that will, in fact

`execute ()`

Called to execute the task.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `prepare()`, `executed()` or `failed()`.

`executed ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node's state before deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call "visited()", which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_with_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node's state before deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call "visited()", which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_without_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance doesn't want to call the Node's callback methods.

`fail_continue ()`

Explicit continue-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fail_stop ()`

Explicit stop-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`failed ()`

Default action when a task fails: stop the build.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what's necessary.

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the “`scons -c`” option.

`make_ready_current ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what's necessary.

`needs_execute ()`

Returns True (indicating this Task should be executed) if this Task's target state indicates it needs executing, which has already been determined by an earlier up-to-date check.

`postprocess ()`

Post-processes a task after it's been executed.

This examines all the targets just built (or not, we don't care if the build was successful, or even if there was no build because everything was up-to-date) to see if they have any waiting parent Nodes, or Nodes waiting on a common side effect, that can be put back on the candidates list.

`prepare ()`

Called just before the task is executed.

This is mainly intended to give the target Nodes a chance to unlink underlying files and make all necessary directories before the Action is actually called to build the targets.

`trace_message (method, node, description='node')`

`class SCons.Taskmaster.Stats`

Bases: `object`

A simple class for holding statistics about the disposition of a Node by the Taskmaster. If we're collecting statistics, each Node processed by the Taskmaster gets one of these attached, in which case the Taskmaster records its decision each time it processes the Node. (Ideally, that's just once per Node.)

`class SCons.Taskmaster.Task (tm, targets, top, node)`

Bases: `ABC`

SCons build engine abstract task class.

This controls the interaction of the actual building of node and the rest of the engine.

This is expected to handle all of the normally-customizable aspects of controlling a build, so any given application *should* be able to do what it wants by sub-classing this class and overriding methods as appropriate. If an application needs to customize something by sub-classing Taskmaster (or some other build engine class), we should first try to migrate that functionality into this class.

Note that it's generally a good idea for sub-classes to call these methods explicitly to update state, etc., rather than roll their own interaction with Taskmaster from scratch.

`_abc_impl = <_abc_data object>`

`_exception_raise ()`

Raises a pending exception that was recorded while getting a Task ready for execution.

`_no_exception_to_raise ()`

`display (message)`

Hook to allow the calling interface to display a message.

This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out what Node should be built next, the actual target list may be altered, along with a message describing the alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see those messages.

`exc_clear ()`

Clears any recorded exception.

This also changes the “`exception_raise`” attribute to point to the appropriate do-nothing method.

`exc_info ()`

Returns info about a recorded exception.

`exception_set (exception=None)`

Records an exception to be raised at the appropriate time.

This also changes the “`exception_raise`” attribute to point to the method that will, in fact

`execute ()`

Called to execute the task.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `prepare()`, `executed()` or `failed()`.

`executed ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node’s callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node’s state before deciding whether it was “built”, in which case we call the appropriate Node method. In any event, we always call “`visited()`”, which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_with_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node’s callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node’s state before deciding whether it was “built”, in which case we call the appropriate Node method. In any event, we always call “`visited()`”, which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_without_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance doesn’t want to call the Node’s callback methods.

`fail_continue ()`

Explicit continue-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fail_stop ()`

Explicit stop-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`failed ()`

Default action when a task fails: stop the build.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what’s necessary.

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the “`scons -c`” option.





The Taskmaster first evaluates the nodes A, B, and C and starts building some children of node C. Assuming, that the maximum parallel level has not been reached, the Taskmaster will examine Node D. It will find that Node C is a pending child of Node D.

In summary, evaluating a graph with a cycle will always involve a pending child at one point. A pending child might indicate either a cycle or a diamond-shaped DAG. Only a fraction of the nodes ends-up being a “pending child” of another node. This keeps the pending\_children set small in practice.

We can differentiate between the two cases if we wait until the end of the build. At this point, all the pending children nodes due to a diamond-shaped DAG will have been properly built (or will have failed to build). But, the pending children involved in a cycle will still be in the pending state.

The taskmaster removes nodes from the pending\_children set as soon as a pending\_children node moves out of the pending state. This also helps to keep the pending\_children set small.

`cleanup ()`

Check for dependency cycles.

`find_next_candidate ()`

Returns the next candidate Node for (potential) evaluation.

The candidate list (really a stack) initially consists of all of the top-level (command line) targets provided when the Taskmaster was initialized. While we walk the DAG, visiting Nodes, all the children that haven’t finished processing get pushed on to the candidate list. Each child can then be popped and examined in turn for whether *their* children are all up-to-date, in which case a Task will be created for their actual evaluation and potential building.

Here is where we also allow candidate Nodes to alter the list of Nodes that should be examined. This is used, for example, when invoking SCons in a source directory. A source directory Node can return its corresponding build directory Node, essentially saying, “Hey, you really need to build this thing over here instead.”

`next_task ()`

Returns the next task to be executed.

This simply asks for the next Node to be evaluated, and then wraps it in the specific Task subclass with which we were initialized.

`no_next_candidate ()`

Stops Taskmaster processing by not returning a next candidate.

Note that we have to clean-up the Taskmaster candidate list because the cycle detection depends on the fact all nodes have been processed somehow.

`stop ()`

Stops the current build completely.

`trace_message (message)`

`trace_node (node)`

`will_not_build (nodes, node_func=<function Taskmaster.<lambda>>)`

Perform clean-up about nodes that will never be built. Invokes a user defined function on all of these nodes (including all of their parents).

`SCons.Taskmaster.dump_stats ()`

`SCons.Taskmaster.find_cycle (stack, visited)`

## SCons.Util module

Various SCons utility functions.

`SCons.Util.AddMethod (obj, function, name=None)`

Adds a method to an object.

Adds *function* to *obj* if *obj* is a class object. Adds *function* as a bound method if *obj* is an instance object. If *obj* looks like an environment instance, use *MethodWrapper* to add it. If *name* is supplied it is used as the name of *function*.

Although this works for any class object, the intent as a public API is to be used on Environment, to be able to add a method to all construction environments; it is preferred to use `env.AddMethod` to add to an individual environment.

```
>>> class A:
...     ...
```

```
>>> a = A()
```

```
>>> def f(self, x, y):
...     self.z = x + y
```

```
>>> AddMethod(A, f, "add")
>>> a.add(2, 4)
>>> print(a.z)
6
>>> a.data = ['a', 'b', 'c', 'd', 'e', 'f']
>>> AddMethod(a, lambda self, i: self.data[i], "listIndex")
>>> print(a.listIndex(3))
d
```

`SCons.Util.AddPathIfNotExists(env_dict, key, path, sep=':')`

Add a path element to a construction variable.

*key* is looked up in *env\_dict*, and *path* is added to it if it is not already present. *env\_dict[key]* is assumed to be in the format of a PATH variable: a list of paths separated by *sep* tokens. Example:

```
>>> env = {'PATH': '/bin:/usr/bin:/usr/local/bin'}
>>> AddPathIfNotExists(env, 'PATH', '/opt/bin')
>>> print(env['PATH'])
/opt/bin:/bin:/usr/bin:/usr/local/bin
```

`SCons.Util.AppendPath(oldpath, newpath, sep=':', delete_existing=True, canonicalize=None) → Union[list, str]`

Appends *newpath* path elements to *oldpath*.

Will only add any particular path once (leaving the last one it encounters and ignoring the rest, to preserve path order), and will use `os.path.normpath` and `os.path.normcase` on all paths to help assure this. This can also handle the case where *oldpath* is a list instead of a string, in which case a list will be returned instead of a string. For example:

```
>>> p = AppendPath("/foo/bar:/foo", "/biz/boom:/foo")
>>> print(p)
/foo/bar:/biz/boom:/foo
```

If *delete\_existing* is `False`, then adding a path that exists will not move it to the end; it will stay where it is in the list.

```
>>> p = AppendPath("/foo/bar:/foo", "/biz/boom:/foo", delete_existing=False)
>>> print(p)
/foo/bar:/foo:/biz/boom
```

If *canonicalize* is not `None`, it is applied to each element of *newpath* before use.

`class SCons.Util.CLVar (initlist=None)`

Bases: `UserList`

A container for command-line construction variables.

Forces the use of a list of strings intended as command-line arguments. Like `collections.UserList`, but the argument passed to the initializer will be processed by the `Split()` function, which includes special handling for string types: they will be split into a list of words, not coerced directly to a list. The same happens if a string is added to a `CLVar`, which allows doing the right thing with both `Append()/Prepend()` methods, as well as with pure Python addition, regardless of whether adding a list or a string to a construction variable.

Side effect: spaces will be stripped from individual string arguments. If you need spaces preserved, pass strings containing spaces inside a list argument.

```
>>> u = UserList("--some --opts and args")
>>> print(len(u), repr(u))
22 ['-', '-', 's', 'o', 'm', 'e', ' ', '-', '-', 'o', 'p', 't', 's', ' ', 'a', 'n', 'd', ' ', 'a', 'r', 'g', 's']
>>> c = CLVar("--some --opts and args")
>>> print(len(c), repr(c))
4 ['--some', '--opts', 'and', 'args']
>>> c += "      strips spaces      "
>>> print(len(c), repr(c))
6 ['--some', '--opts', 'and', 'args', 'strips', 'spaces']
```

`_abc_impl` = `<_abc_data object>`

`append(item)`

`S.append(value)` – append value to the end of the sequence

`clear()` → None -- remove all items from S

`copy()`

`count(value)` → integer -- return number of occurrences of value

`extend(other)`

`S.extend(iterable)` – extend sequence by appending elements from the iterable

`index(value[, start[, stop]])` → integer -- return first index of value.

Raises `ValueError` if the value is not present.

Supporting start and stop arguments is optional, but recommended.

`insert(i, item)`

`S.insert(index, value)` – insert value before index

`pop([, index])` → item -- remove and return item at index (default last).

Raise `IndexError` if list is empty or index is out of range.

`remove(item)`

`S.remove(value)` – remove first occurrence of value. Raise `ValueError` if the value is not present.

`reverse()`

`S.reverse()` – reverse *IN PLACE*

`sort(*args, **kwargs)`

`class SCons.Util.Delegate(attribute)`

Bases: object

A Python Descriptor class that delegates attribute fetches to an underlying wrapped subject of a Proxy. Typical use:

```
class Foo(Proxy):
    __str__ = Delegate('__str__')
```

`class SCons.Util.DisplayEngine`

Bases: object

A callable class used to display SCons messages.

`print_it` = `True`

`set_mode(mode)`

`SCons.Util.IDX(n)` → bool

Generate in index into strings from the tree legends.

These are always a choice between two, so bool works fine.

`class SCons.Util.LogicalLines(fileobj)`

Bases: object

Wrapper class for the `logical_lines` method.

Allows us to read all “logical” lines at once from a given file object.

`readlines()`

`SCons.Util.MD5collect(signatures)`

Deprecated. Use `hash_collect()` instead.

`SCons.Util.MD5filesignature(fname, chunksize=65536)`

Deprecated. Use `hash_file_signature()` instead.

`SCons.Util.MD5signature(s)`

Deprecated. Use `hash_signature()` instead.

`class SCons.Util.MethodWrapper (obj, method, name=None)`

Bases: `object`

A generic Wrapper class that associates a method with an object.

As part of creating this `MethodWrapper` object an attribute with the specified name (by default, the name of the supplied method) is added to the underlying object. When that new “method” is called, our `__call__()` method adds the object as the first argument, simulating the Python behavior of supplying “self” on method calls.

We hang on to the name by which the method was added to the underlying base class so that we can provide a method to “clone” ourselves onto a new underlying object being copied (without which we wouldn’t need to save that info).

`clone (new_object)`

Returns an object that re-binds the underlying “method” to the specified new object.

`class SCons.Util.NodeList (initlist=None)`

Bases: `UserList`

A list of Nodes with special attribute retrieval.

Unlike an ordinary list, access to a member’s attribute returns a *NodeList* containing the same attribute for each member. Although this can hold any object, it is intended for use when processing Nodes, where fetching an attribute of each member is very common, for example getting the content signature of each node. The term “attribute” here includes the string representation.

Example:

```
>>> someList = NodeList([' foo ', ' bar '])
>>> someList.strip()
['foo', 'bar']
```

`_abc_impl = <_abc_data object>`

`append (item)`

`S.append(value)` – append value to the end of the sequence

`clear ()` → `None` -- remove all items from `S`

`copy ()`

`count (value)` → `integer` -- return number of occurrences of value

`extend (other)`

`S.extend(iterable)` – extend sequence by appending elements from the iterable

`index (value[, start[, stop]])` → `integer` -- return first index of value.

Raises `ValueError` if the value is not present.

Supporting start and stop arguments is optional, but recommended.

`insert (i, item)`

`S.insert(index, value)` – insert value before index

`pop ([, index])` → `item` -- remove and return item at index (default last).

Raise `IndexError` if list is empty or index is out of range.

`remove (item)`

`S.remove(value)` – remove first occurrence of value. Raise `ValueError` if the value is not present.

`reverse ()`

`S.reverse()` – reverse *IN PLACE*

`sort (*args, **kwargs)`

`class SCons.Util.Null (*args, **kwargs)`

Bases: `object`

Null objects always and reliably “do nothing.”

`class SCons.Util.NullSeq (*args, **kwargs)`

Bases: `Null`

A Null object that can also be iterated over.

`SCons.Util.PrependPath (oldpath, newpath, sep=':', delete_existing=True, canonicalize=None)` →

`Union[list, str]`

Prepends *newpath* path elements to *oldpath*.

Will only add any particular path once (leaving the first one it encounters and ignoring the rest, to preserve path order), and will use `os.path.normpath` and `os.path.normcase` on all paths to help assure this. This can also handle the case where *oldpath* is a list instead of a string, in which case a list will be returned instead of a string. For example:

```
>>> p = PrependPath("/foo/bar:/foo", "/biz/boom:/foo")
>>> print(p)
/biz/boom:/foo:/foo/bar
```

If *delete\_existing* is `False`, then adding a path that exists will not move it to the beginning; it will stay where it is in the list.

```
>>> p = PrependPath("/foo/bar:/foo", "/biz/boom:/foo", delete_existing=False)
>>> print(p)
/biz/boom:/foo/bar:/foo
```

If *canonicalize* is not `None`, it is applied to each element of *newpath* before use.

`class SCons.Util.Proxy (subject)`

Bases: `object`

A simple generic Proxy class, forwarding all calls to subject.

This means you can take an object, let's call it *obj\_a*, and wrap it in this Proxy class, with a statement like this:

```
proxy_obj = Proxy(obj_a)
```

Then, if in the future, you do something like this:

```
x = proxy_obj.var1
```

since the Proxy class does not have a `var1` attribute (but presumably *objA* does), the request actually is equivalent to saying:

```
x = obj_a.var1
```

Inherit from this class to create a Proxy.

With Python 3.5+ this does *not* work transparently for Proxy subclasses that use special `__*__()` method names, because those names are now bound to the class, not the individual instances. You now need to know in advance which special method names you want to pass on to the underlying Proxy object, and specifically delegate their calls like this:

```
class Foo(Proxy):
    __str__ = Delegate('__str__')
```

`get ()`

Retrieve the entire wrapped object

`SCons.Util.RegError`

alias of `_NoError`

`SCons.Util.RegGetValue (root, key)`

`SCons.Util.RegOpenKeyEx (root, key)`

`class SCons.Util.Selector`

Bases: `OrderedDict`

A callable ordered dictionary that maps file suffixes to dictionary values. We preserve the order in which items are added so that `get_suffix()` calls always return the first suffix added.

`clear ()` → `None`. Remove all items from `od`.

`copy ()` → a shallow copy of `od`

`fromkeys (value=None)`

Create a new ordered dictionary with keys from iterable and values set to value.

`get (key, default=None, /)`

Return the value for key if key is in the dictionary, else default.

`items ()` → a set-like object providing a view on D's items

`keys ()` → a set-like object providing a view on D's keys

`move_to_end (key, last=True)`

Move an existing element to the end (or beginning if last is false).

Raise `KeyError` if the element does not exist.

`pop (k[, d])` → v, remove specified key and return the corresponding value. If key is not found, d is returned if given, otherwise `KeyError` is raised.

`popitem (last=True)`

Remove and return a (key, value) pair from the dictionary.

Pairs are returned in LIFO order if last is true or FIFO order if false.

`setdefault (key, default=None)`

Insert key with a value of default if key is not in the dictionary.

Return the value for key if key is in the dictionary, else default.

`update ([, E], **F)` → None. Update D from dict/iterable E and F.

If E is present and has a `.keys()` method, then does: for k in E: D[k] = E[k] If E is present and lacks a `.keys()` method, then does: for k, v in E: D[k] = v In either case, this is followed by: for k in F: D[k] = F[k]

`values ()` → an object providing a view on D's values

`SCons.Util.Split (arg)` → list

Returns a list of file names or other objects.

If `arg` is a string, it will be split on strings of white-space characters within the string. If `arg` is already a list, the list will be returned untouched. If `arg` is any other type of object, it will be returned as a list containing just the object.

```
>>> print(Split(" this is a string "))
['this', 'is', 'a', 'string']
>>> print(Split(["stringlist", " preserving ", " spaces "]))
['stringlist', ' preserving ', ' spaces ']
```

`class SCons.Util.Unbuffered (file)`

Bases: object

A proxy that wraps a file object, flushing after every write.

Delegates everything else to the wrapped object.

`write (arg)`

`writelines (arg)`

`class SCons.Util.UniqueList (initlist=None)`

Bases: UserList

A list which maintains uniqueness.

Uniquing is lazy: rather than being assured on list changes, it is fixed up on access by those methods which need to act on a unique list to be correct. That means things like “in” don’t have to eat the uniquing time.

`__make_unique ()`

`_abc_impl = <_abc_data object>`

`append (item)`

`S.append(value)` – append value to the end of the sequence

`clear ()` → None -- remove all items from S

`copy ()`

`count (value)` → integer -- return number of occurrences of value

`extend (other)`

`S.extend(iterable)` – extend sequence by appending elements from the iterable

`index (value[, start[, stop]])` → integer -- return first index of value.

Raises `ValueError` if the value is not present.

Supporting start and stop arguments is optional, but recommended.

`insert (i, item)`

`S.insert(index, value)` – insert value before index

`pop ([, index])` → item -- remove and return item at index (default last).  
 Raise `IndexError` if list is empty or index is out of range.  
`remove (item)`  
 S.remove(value) – remove first occurrence of value. Raise `ValueError` if the value is not present.  
`reverse ()`  
 S.reverse() – reverse *IN PLACE*  
`sort (*args, **kwargs)`  
`SCons.Util.WhereIs (file, path=None, pathext=None, reject=None)` → Optional[str]  
 Return the path to an executable that matches *file*.  
 Searches the given *path* for *file*, respecting any filename extensions *pathext* (on the Windows platform only), and returns the full path to the matching command. If no command is found, return `None`.  
 If *path* is not specified, `os.environ[PATH]` is used. If *pathext* is not specified, `os.environ[PATHEXT]` is used. Will not select any path name or names in the optional *reject* list.  
*exception* `SCons.Util._NoError`  
 Bases: `Exception`  
 args  
`with_traceback ()`  
 Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.  
`SCons.Util._attempt_get_hash_function (hash_name, hashlib_used=<module 'hashlib' from  
'/opt/local/Library/Frameworks/Python.framework/Versions/3.7/lib/python3.7/hashlib.py'>, sys_used=<module 'sys' (built-in)>)`  
 Wrapper used to try to initialize a hash function given.  
 If successful, returns the name of the hash function back to the user.  
 Otherwise returns `None`.  
`SCons.Util._attempt_init_of_python_3_9_hash_object (hash_function_object, sys_used=<module 'sys' (built-in)>)`  
 Python 3.9 and onwards lets us initialize the hash function object with the key “usedforsecurity”=false. This lets us continue to use algorithms that have been deprecated either by FIPS or by Python itself, as the MD5 algorithm SCons prefers is not being used for security purposes as much as a short, 32 char hash that is resistant to accidental collisions.  
 In prior versions of python, hashlib returns a native function wrapper, which errors out when it’s queried for the optional parameter, so this function wraps that call.  
 It can still throw a `ValueError` if the initialization fails due to FIPS compliance issues, but that is assumed to be the responsibility of the caller.  
`SCons.Util._get_hash_object (hash_format, hashlib_used=<module 'hashlib' from  
'/opt/local/Library/Frameworks/Python.framework/Versions/3.7/lib/python3.7/hashlib.py'>, sys_used=<module 'sys' (built-in)>)`  
 Allocates a hash object using the requested hash format.  
**Parameters:** `hash_format` – Hash format to use.  
**Returns:** `hashlib` object.  
`SCons.Util._semi_deepcopy_list (obj)` → list  
`SCons.Util._semi_deepcopy_tuple (obj)` → tuple  
`SCons.Util._set_allowed_viable_default_hashes (hashlib_used, sys_used=<module 'sys' (built-in)>)`  
 Checks if SCons has ability to call the default algorithms normally supported.  
 This util class is sometimes called prior to setting the user-selected hash algorithm, meaning that on FIPS-compliant systems the library would default-initialize MD5 and throw an exception in `set_hash_format`. A common case is using the SConf options, which can run prior to main, and thus ignore the options.hash\_format variable.  
 This function checks the `DEFAULT_HASH_FORMATS` and sets the `ALLOWED_HASH_FORMATS` to only the ones that can be called. In Python >= 3.9 this will always default to MD5 as in Python 3.9 there is an optional attribute “usedforsecurity” set for the method.  
 Throws if no allowed hash formats are detected.  
`SCons.Util._show_md5_warning (function_name)`  
 Shows a deprecation warning for various MD5 functions.  
`SCons.Util.adjustixes (fname, pre, suf, ensure_suffix=False)` → str  
 Adjust filename prefixes and suffixes as needed.



Add *prefix* to *fname* if specified. Add *suffix* to *fname* if specified and if *ensure\_suffix* is `True`

`SCons.Util.case_sensitive_suffixes (s1, s2) → bool`

`SCons.Util.cmp (a, b) → bool`

A `cmp` function because one is no longer available in python3.

`SCons.Util.containsAll (s, pat) → bool`

Check whether string *s* contains ALL of the items in *pat*.

`SCons.Util.containsAny (s, pat) → bool`

Check whether string *s* contains ANY of the items in *pat*.

`SCons.Util.containsOnly (s, pat) → bool`

Check whether string *s* contains ONLY items in *pat*.

`SCons.Util.dictify (keys, values, result=None) → dict`

`SCons.Util.do_flatten (sequence, result, isinstance=<built-in function isinstance>, StringTypes=(<class 'str'>, <class 'collections.UserString'>), SequenceTypes=(<class 'list'>, <class 'tuple'>, <class 'collections.UserList'>, <class 'collections.abc.MappingView'>))`

`SCons.Util.flatten (obj, isinstance=<built-in function isinstance>, StringTypes=(<class 'str'>, <class 'collections.UserString'>), SequenceTypes=(<class 'list'>, <class 'tuple'>, <class 'collections.UserList'>, <class 'collections.abc.MappingView'>), do_flatten=<function do_flatten>) → list`

Flatten a sequence to a non-nested list.

Converts either a single scalar or a nested sequence to a non-nested list. Note that `flatten()` considers strings to be scalars instead of sequences like pure Python would.

`SCons.Util.flatten_sequence (sequence, isinstance=<built-in function isinstance>, StringTypes=(<class 'str'>, <class 'collections.UserString'>), SequenceTypes=(<class 'list'>, <class 'tuple'>, <class 'collections.UserList'>, <class 'collections.abc.MappingView'>), do_flatten=<function do_flatten>) → list`

Flatten a sequence to a non-nested list.

Same as `flatten()`, but it does not handle the single scalar case. This is slightly more efficient when one knows that the sequence to flatten can not be a scalar.

`SCons.Util.get_current_hash_algorithm_used ()`

Returns the current hash algorithm name used.

Where the python version `>= 3.9`, this is expected to return `md5`. If python's version is `<= 3.8`, this returns `md5` on non-FIPS-mode platforms, and `sha1` or `sha256` on FIPS-mode Linux platforms.

This function is primarily useful for testing, where one expects a value to be one of *N* distinct hashes, and therefore the test needs to know which hash to select.

`SCons.Util.get_env_bool (env, name, default=False) → bool`

Convert a construction variable to bool.

If the value of *name* in *env* is `'true'`, `'yes'`, `'y'`, `'on'` (case insensitive) or anything convertible to `int` that yields non-zero then return `True`; if `'false'`, `'no'`, `'n'`, `'off'` (case insensitive) or a number that converts to integer zero return `False`. Otherwise, return *default*.

**Parameters:**

- **env** – construction environment, or any dict-like object
- **name** – name of the variable
- **default** – value to return if *name* not in *env* or cannot be converted (default: `False`)

**Returns:** the “truthiness” of *name*

`SCons.Util.get_environment_var (varstr) → Optional[str]`

Return undecorated construction variable string.

Determine if *varstr* looks like a reference to a single environment variable, like `“$FOO”` or `“${FOO}”`. If so, return that variable with no decorations, like `“FOO”`. If not, return `None`.

`SCons.Util.get_hash_format ()`

Retrieves the hash format or `None` if not overridden.

A return value of `None` does not guarantee that MD5 is being used; instead, it means that the default precedence order documented in `SCons.Util.set_hash_format()` is respected.

`SCons.Util.get_native_path (path) → str`

Transform an absolute path into a native path for the system.

In Cygwin, this converts from a Cygwin path to a Windows path, without regard to whether *path* refers to an existing file system object. For other platforms, *path* is unchanged.

`SCons.Util.get_os_env_bool (name, default=False) → bool`

Convert an environment variable to bool.

Conversion is the same as for `get_env_bool()`.

`SCons.Util.hash_collect (signatures, hash_format=None)`

Collects a list of signatures into an aggregate signature.

**Parameters:**

- **signatures** – a list of signatures
- **hash\_format** – Specify to override default hash format

**Returns:** the aggregate signature

`SCons.Util.hash_file_signature (fname, chunksize=65536, hash_format=None)`

Generate the md5 signature of a file

**Parameters:**

- **fname** – file to hash
- **chunksize** – chunk size to read
- **hash\_format** – Specify to override default hash format

**Returns:** String of Hex digits representing the signature

`SCons.Util.hash_signature (s, hash_format=None)`

Generate hash signature of a string

**Parameters:**

- **s** – either string or bytes. Normally should be bytes
- **hash\_format** – Specify to override default hash format

**Returns:** String of hex digits representing the signature

`SCons.Util.is_Dict (obj, instance=<built-in function isinstance>, DictTypes=(<class 'dict'>, <class 'collections.UserDict'>)) → bool`

`SCons.Util.is_List (obj, instance=<built-in function isinstance>, ListTypes=(<class 'list'>, <class 'collections.UserList'>)) → bool`

`SCons.Util.is_Scalar (obj, instance=<built-in function isinstance>, StringTypes=(<class 'str'>, <class 'collections.UserString'>), SequenceTypes=(<class 'list'>, <class 'tuple'>, <class 'collections.UserList'>, <class 'collections.abc.MappingView'>)) → bool`

`SCons.Util.is_Sequence (obj, instance=<built-in function isinstance>, SequenceTypes=(<class 'list'>, <class 'tuple'>, <class 'collections.UserList'>, <class 'collections.abc.MappingView'>)) → bool`

`SCons.Util.is_String (obj, instance=<built-in function isinstance>, StringTypes=(<class 'str'>, <class 'collections.UserString'>)) → bool`

`SCons.Util.is_Tuple (obj, instance=<built-in function isinstance>, tuple=<class 'tuple'>) → bool`

`SCons.Util.logical_lines (physical_lines, joiner=<built-in method join of str object>)`

`SCons.Util.make_path_relative (path) → str`

Converts an absolute path name to a relative pathname.

`SCons.Util.print_time ()`

Hack to return a value from Main if can't import Main.

`SCons.Util.print_tree (root, child_func, prune=0, showtags=False, margin=[0], visited=None, lastChild=False, singleLineDraw=False)`

Print a tree of nodes.

This is like `func:render_tree`, except it prints lines directly instead of creating a string representation in memory, so that huge trees can be handled.

**Parameters:**

- **root** – the root node of the tree
- **child\_func** – the function called to get the children of a node
- **prune** – don't visit the same node twice
- **showtags** – print status information to the left of each node line
- **margin** – the format of the left margin to use for children of *root*. 1 results in a pipe, and 0 results in no pipe.
- **visited** – a dictionary of visited nodes in the current branch if *prune* is 0, or in the whole tree if *prune* is 1.
- **singleLineDraw** – use line-drawing characters rather than ASCII.

SCons.Util.render\_tree(*root*, *child\_func*, *prune*=0, *margin*=[0], *visited*=None)

Render a tree of nodes into an ASCII tree view.

**Parameters:**

- **root** – the root node of the tree
- **child\_func** – the function called to get the children of a node
- **prune** – don't visit the same node twice
- **margin** – the format of the left margin to use for children of *root*. 1 results in a pipe, and 0 results in no pipe.
- **visited** – a dictionary of visited nodes in the current branch if *prune* is 0, or in the whole tree if *prune* is 1.

SCons.Util.rightmost\_separator(*path*, *sep*)

SCons.Util.semi\_deepcopy(*obj*)

SCons.Util.semi\_deepcopy\_dict(*obj*, *exclude*=None) → dict

SCons.Util.set\_hash\_format(*hash\_format*, *hashlib\_used*=<module 'hashlib' from  
'/opt/local/Library/Frameworks/Python.framework/Versions/3.7/lib/python3.7/hashlib.py'>,  
*sys\_used*=<module 'sys' (built-in)>)

Sets the default hash format used by SCons.

If *hash\_format* is None or an empty string, the default is determined by this function.

Currently the default behavior is to use the first available format of the following options: MD5, SHA1, SHA256.

SCons.Util.silent\_intern(*x*)

Perform sys.intern on the passed argument and return the result. If the input is ineligible for interning the original argument is returned and no exception is thrown.

SCons.Util.splitext(*path*) → tuple

Split *path* into a (root, ext) pair.

Same as os.path.splitext but faster.

SCons.Util.to\_String(*obj*, *isinstance*=<built-in function isinstance>, *str*=<class 'str'>,  
*UserString*=<class 'collections.UserString'>, *BaseStringTypes*=<class 'str'>) → str

Return a string version of *obj*.

SCons.Util.to\_String\_for\_signature(*obj*, *to\_String\_for\_subst*=<function to\_String\_for\_subst>,  
*AttributeError*=<class 'AttributeError'>) → str

Return a string version of *obj* for signature usage.

Like to\_String\_for\_subst() but has special handling for scons objects that have a for\_signature() method, and for dicts.

SCons.Util.to\_String\_for\_subst(*obj*, *isinstance*=<built-in function isinstance>, *str*=<class 'str'>,  
*BaseStringTypes*=<class 'str'>, *SequenceTypes*=(<class 'list'>, <class 'tuple'>, <class  
'collections.UserList'>, <class 'collections.abc.MappingView'>), *UserString*=<class  
'collections.UserString'>) → str

Return a string version of *obj* for subst usage.

SCons.Util.to\_bytes(*s*) → bytes

SCons.Util.to\_str(*s*) → str

SCons.Util.unique(*seq*)

Return a list of the elements in seq without duplicates, ignoring order.

```
>>> mylist = unique([1, 2, 3, 1, 2, 3])
>>> print(sorted(mylist))
[1, 2, 3]
>>> mylist = unique("abcabc")
>>> print(sorted(mylist))
['a', 'b', 'c']
>>> mylist = unique([1, 2], [2, 3], [1, 2])
>>> print(sorted(mylist))
[[1, 2], [2, 3]]
```

For best speed, all sequence elements should be hashable. Then unique() will usually work in linear time.

If not possible, the sequence elements should enjoy a total ordering, and if list(s).sort() doesn't raise TypeError it's assumed that they do enjoy a total ordering. Then unique() will usually work in  $O(N \log_2(N))$  time.

If that's not possible either, the sequence elements must support equality-testing. Then unique() will usually work in quadratic time.

SCons.Util.uniquer (seq, idfun=None)

SCons.Util.uniquer\_hashables (seq)

SCons.Util.updrive (path) → str

Make the drive letter (if any) upper case.

This is useful because Windows is inconsistent on the case of the drive letter, which can cause inconsistencies when calculating command signatures.

SCons.Util.wait\_for\_process\_to\_die (pid)

Wait for specified process to die, or alternatively kill it NOTE: This function operates best with psutil pypi package

TODO: Add timeout which raises exception

## SCons.Warnings module

The SCons warnings framework.

*exception* SCons.Warnings.CacheVersionWarning

Bases: WarningOnByDefault

args

with\_traceback ()

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Warnings.CacheWriteErrorWarning

Bases: SConsWarning

args

with\_traceback ()

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Warnings.CorruptSConsignWarning

Bases: WarningOnByDefault

args

with\_traceback ()

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Warnings.DependencyWarning

Bases: SConsWarning

args

with\_traceback ()

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Warnings.DeprecatedDebugOptionsWarning

Bases: MandatoryDeprecatedWarning

args

with\_traceback ()

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*exception* SCons.Warnings.DeprecatedMissingSConscriptWarning

```

Bases: DeprecatedWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.DeprecatedOptionsWarning
Bases: MandatoryDeprecatedWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.DeprecatedSourceCodeWarning
Bases: FutureDeprecatedWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.DeprecatedWarning
Bases: SConsWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.DevelopmentVersionWarning
Bases: WarningOnByDefault
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.DuplicateEnvironmentWarning
Bases: WarningOnByDefault
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.FortranCxxMixWarning
Bases: LinkWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.FutureDeprecatedWarning
Bases: SConsWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.FutureReservedVariableWarning
Bases: WarningOnByDefault
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.LinkWarning
Bases: WarningOnByDefault
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.MandatoryDeprecatedWarning
Bases: DeprecatedWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.MisleadingKeywordsWarning
Bases: WarningOnByDefault

```

```

args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.MissingSConscriptWarning
Bases: WarningOnByDefault
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.NoObjectCountWarning
Bases: WarningOnByDefault
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.NoParallelSupportWarning
Bases: WarningOnByDefault
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.PythonVersionWarning
Bases: DeprecatedWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.ReservedVariableWarning
Bases: WarningOnByDefault
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.SConsWarning
Bases: UserError
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.StackSizeWarning
Bases: WarningOnByDefault
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.TargetNotBuiltWarning
Bases: SConsWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.TaskmasterNeedsExecuteWarning
Bases: DeprecatedWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.ToolQtDeprecatedWarning
Bases: FutureDeprecatedWarning
args
with_traceback ()
    Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.VisualCMissingWarning
Bases: WarningOnByDefault
args

```

```

    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.VisualStudioMissingWarning
    Bases: SConsWarning
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.VisualStudioVersionMismatch
    Bases: WarningOnByDefault
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
exception SCons.Warnings.WarningOnByDefault
    Bases: SConsWarning
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
SCons.Warnings.enableWarningClass (clazz)
    Enables all warnings of type clazz or derived from clazz.
SCons.Warnings.process_warn_strings (arguments)
    Process requests to enable/disable warnings.
    The requests are strings passed to the –warn option or the SetOption('warn') function.
    An argument to this option should be of the form “warning-class” or “no-warning-class”. The warning class is munged
    and has the suffix “Warning” added in order to get an actual class name from the classes above, which we need to
    pass to the {enable,disable}WarningClass() functions.
    For example, “deprecated” will enable the DeprecatedWarning class. “no-dependency” will disable the
    DependencyWarning class.
    As a special case, –warn=all and –warn=no-all will enable or disable (respectively) the base class of all SCons
    warnings.
SCons.Warnings.suppressWarningClass (clazz)
    Suppresses all warnings of type clazz or derived from clazz.
SCons.Warnings.warn (clazz, *args)
    Issue a warning, accounting for SCons rules.
    Check if warnings for this class are enabled. If warnings are treated as exceptions, raise exception. Use the global
    warning-emitter _warningOut, which allows selecting different ways of presenting a traceback (see Script/Main.py)
SCons.Warnings.warningAsException (flag=True)
    Set global _warningAsException flag.

    Parameters:   flag – value to set warnings-as-exceptions to [default: True]
    Returns:      The previous value.

```

## SCons.cpp module

### SCons C Pre-Processor module

#### SCons.cpp.CPP\_to\_Python (s)

Converts a C pre-processor expression into an equivalent Python expression that can be evaluated.

#### SCons.cpp.CPP\_to\_Python\_Ops\_Sub (m)

#### SCons.cpp.Cleanup\_CPP\_Expressions (ts)

#### class SCons.cpp.DumbPreProcessor (\*args, \*\*kw)

Bases: PreProcessor

A preprocessor that ignores all #if/#elif/#else/#endif directives and just reports back *all* of the #include files (like the classic SCons scanner did).

This is functionally equivalent to using a regular expression to find all of the #include lines, only slower. It exists mainly as an example of how the main PreProcessor class can be sub-classed to tailor its behavior.

#### \_do\_if\_else\_condition (condition)

Common logic for evaluating the conditions on #if, #ifdef and #ifndef lines.



```

_match_tuples (tuples)
_parse_tuples (contents)
_process_tuples (tuples, file=None)
all_include (t)
do_define (t)
    Default handling of a #define line.
do_elif (t)
    Default handling of a #elif line.
do_else (t)
    Default handling of a #else line.
do_endif (t)
    Default handling of a #endif line.
do_if (t)
    Default handling of a #if line.
do_ifdef (t)
    Default handling of a #ifdef line.
do_ifndef (t)
    Default handling of a #ifndef line.
do_import (t)
    Default handling of a #import line.
do_include (t)
    Default handling of a #include line.
do_include_next (t)
    Default handling of a #include line.
do_nothing (t)
    Null method for when we explicitly want the action for a specific preprocessor directive to do nothing.
do_undef (t)
    Default handling of a #undef line.
eval_expression (t)
    Evaluates a C preprocessor expression.
    This is done by converting it to a Python equivalent and eval()ing it in the C preprocessor namespace we use to
    track #define values.
finalize_result (fname)
find_include_file (t)
    Finds the #include file for a given preprocessor tuple.
initialize_result (fname)
process_contents (contents)
    Pre-processes a file contents.
    Is used by tests
process_file (file)
    Pre-processes a file.
    This is the main internal entry point.
read_file (file)
resolve_include (t)
    Resolve a tuple-ized #include line.
    This handles recursive expansion of values without "" or <> surrounding the name until an initial " or < is found, to
    handle #include FILE where FILE is a #define somewhere else.
restore ()
    Pops the previous dispatch table off the stack and makes it the current one.
save ()
    Pushes the current dispatch table on the stack and re-initializes the current dispatch table to the default.
scons_current_file (t)
start_handling_includes (t=None)
    Causes the PreProcessor object to start processing #import, #include and #include_next lines.
    This method will be called when a #if, #ifdef, #ifndef or #elif evaluates True, or when we reach the #else in a #if,
    #ifdef, #ifndef or #elif block where a condition already evaluated False.

```

`stop_handling_includes (t=None)`

Causes the PreProcessor object to stop processing `#import`, `#include` and `#include_next` lines.

This method will be called when a `#if`, `#ifdef`, `#ifndef` or `#elif` evaluates False, or when we reach the `#else` in a `#if`, `#ifdef`, `#ifndef` or `#elif` block where a condition already evaluated True.

`tupleize (contents)`

Turns the contents of a file into a list of easily-processed tuples describing the CPP lines in the file.

The first element of each tuple is the line's preprocessor directive (`#if`, `#include`, `#define`, etc., minus the initial `#`).

The remaining elements are specific to the type of directive, as pulled apart by the regular expression.

`class SCons.cpp.FunctionEvaluator (name, args, expansion)`

Bases: object

Handles delayed evaluation of a `#define` function call.

`class SCons.cpp.PreProcessor (current='.', cpppath=(), dict={}, all=0, depth=-1)`

Bases: object

The main workhorse class for handling C pre-processing.

`_do_if_else_condition (condition)`

Common logic for evaluating the conditions on `#if`, `#ifdef` and `#ifndef` lines.

`_match_tuples (tuples)`

`_parse_tuples (contents)`

`_process_tuples (tuples, file=None)`

`all_include (t)`

`do_define (t)`

Default handling of a `#define` line.

`do_elif (t)`

Default handling of a `#elif` line.

`do_else (t)`

Default handling of a `#else` line.

`do_endif (t)`

Default handling of a `#endif` line.

`do_if (t)`

Default handling of a `#if` line.

`do_ifdef (t)`

Default handling of a `#ifdef` line.

`do_ifndef (t)`

Default handling of a `#ifndef` line.

`do_import (t)`

Default handling of a `#import` line.

`do_include (t)`

Default handling of a `#include` line.

`do_include_next (t)`

Default handling of a `#include` line.

`do_nothing (t)`

Null method for when we explicitly want the action for a specific preprocessor directive to do nothing.

`do_undef (t)`

Default handling of a `#undef` line.

`eval_expression (t)`

Evaluates a C preprocessor expression.

This is done by converting it to a Python equivalent and `eval()`ing it in the C preprocessor namespace we use to track `#define` values.

`finalize_result (fname)`

`find_include_file (t)`

Finds the `#include` file for a given preprocessor tuple.

`initialize_result (fname)`

`process_contents (contents)`

Pre-processes a file contents.

Is used by tests

`process_file (file)`

Pre-processes a file.

This is the main internal entry point.

`read_file (file)`

`resolve_include (t)`

Resolve a tuple-ized `#include` line.

This handles recursive expansion of values without `""` or `<>` surrounding the name until an initial `"` or `<` is found, to handle `#include FILE` where `FILE` is a `#define` somewhere else.

`restore ()`

Pops the previous dispatch table off the stack and makes it the current one.

`save ()`

Pushes the current dispatch table on the stack and re-initializes the current dispatch table to the default.

`scons_current_file (t)`

`start_handling_includes (t=None)`

Causes the PreProcessor object to start processing `#import`, `#include` and `#include_next` lines.

This method will be called when a `#if`, `#ifdef`, `#ifndef` or `#elif` evaluates True, or when we reach the `#else` in a `#if`, `#ifdef`, `#ifndef` or `#elif` block where a condition already evaluated False.

`stop_handling_includes (t=None)`

Causes the PreProcessor object to stop processing `#import`, `#include` and `#include_next` lines.

This method will be called when a `#if`, `#ifdef`, `#ifndef` or `#elif` evaluates False, or when we reach the `#else` in a `#if`, `#ifdef`, `#ifndef` or `#elif` block where a condition already evaluated True.

`tupleize (contents)`

Turns the contents of a file into a list of easily-processed tuples describing the CPP lines in the file.

The first element of each tuple is the line's preprocessor directive (`#if`, `#include`, `#define`, etc., minus the initial `#`).

The remaining elements are specific to the type of directive, as pulled apart by the regular expression.

## SCons.dblite module

`dblite.py` module contributed by Ralf W. Grosse-Kunstleve. Extended for Unicode by Steven Knight.

`SCons.dblite._exercise ()`

`class SCons.dblite.dblite (file_base_name, flag, mode)`

Bases: `object`

Squirrel away references to the functions in various modules that we'll use when our `__del__()` method calls our `sync()` method during shutdown. We might get destroyed when Python is in the midst of tearing down the different modules we import in an essentially arbitrary order, and some of the various modules's global attributes may already be wiped out from under us.

**See the discussion at:**

<http://mail.python.org/pipermail/python-bugs-list/2003-March/016877.html>

`_check_writable ()`

`_open (mode='r', buffering=-1, encoding=None, errors=None, newline=None, closefd=True,`

`opener=None)`

Open file and return a stream. Raise `OSError` upon failure.

`file` is either a text or byte string giving the name (and the path if the file isn't in the current working directory) of the file to be opened or an integer file descriptor of the file to be wrapped. (If a file descriptor is given, it is closed when the returned I/O object is closed, unless `closefd` is set to False.)

`mode` is an optional string that specifies the mode in which the file is opened. It defaults to `'r'` which means open for reading in text mode. Other common values are `'w'` for writing (truncating the file if it already exists), `'x'` for creating and writing to a new file, and `'a'` for appending (which on some Unix systems, means that all writes append to the end of the file regardless of the current seek position). In text mode, if `encoding` is not specified the encoding used is platform dependent: `locale.getpreferredencoding(False)` is called to get the current locale encoding. (For reading and writing raw bytes use binary mode and leave `encoding` unspecified.) The available modes are:

Character	Meaning
<code>'r'</code>	open for reading (default)
<code>'w'</code>	open for writing, truncating the file first

'x'	create a new file and open it for writing
'a'	open for writing, appending to the end of the file if it exists
'b'	binary mode
't'	text mode (default)
'+'	open a disk file for updating (reading and writing)
'U'	universal newline mode (deprecated)

The default mode is 'rt' (open for reading text). For binary random access, the mode 'w+b' opens and truncates the file to 0 bytes, while 'r+b' opens the file without truncation. The 'x' mode implies 'w' and raises an *FileExistsError* if the file already exists.

Python distinguishes between files opened in binary and text modes, even when the underlying operating system doesn't. Files opened in binary mode (appending 'b' to the mode argument) return contents as bytes objects without any decoding. In text mode (the default, or when 't' is appended to the mode argument), the contents of the file are returned as strings, the bytes having been first decoded using a platform-dependent encoding or using the specified encoding if given.

'U' mode is deprecated and will raise an exception in future versions of Python. It has no effect in Python 3. Use `newline` to control universal newlines mode.

buffering is an optional integer used to set the buffering policy. Pass 0 to switch buffering off (only allowed in binary mode), 1 to select line buffering (only usable in text mode), and an integer > 1 to indicate the size of a fixed-size chunk buffer. When no buffering argument is given, the default buffering policy works as follows:

- Binary files are buffered in fixed-size chunks; the size of the buffer is chosen using a heuristic trying to determine the underlying device's "block size" and falling back on `io.DEFAULT_BUFFER_SIZE`. On many systems, the buffer will typically be 4096 or 8192 bytes long.
- "Interactive" text files (files for which `isatty()` returns True) use line buffering. Other text files use the policy described above for binary files.

encoding is the name of the encoding used to decode or encode the file. This should only be used in text mode. The default encoding is platform dependent, but any encoding supported by Python can be passed. See the `codecs` module for the list of supported encodings.

errors is an optional string that specifies how encoding errors are to be handled—this argument should not be used in binary mode. Pass 'strict' to raise a *ValueError* exception if there is an encoding error (the default of None has the same effect), or pass 'ignore' to ignore errors. (Note that ignoring encoding errors can lead to data loss.) See the documentation for `codecs.register` or run `'help(codecs.Codec)'` for a list of the permitted encoding error strings. newline controls how universal newlines works (it only applies to text mode). It can be None, "", 'n', 'r', and 'rn'. It works as follows:

- On input, if newline is None, universal newlines mode is enabled. Lines in the input can end in 'n', 'r', or 'rn', and these are translated into 'n' before being returned to the caller. If it is "", universal newline mode is enabled, but line endings are returned to the caller untranslating. If it has any of the other legal values, input lines are only terminated by the given string, and the line ending is returned to the caller untranslating.
- On output, if newline is None, any 'n' characters written are translated to the system default line separator, `os.linesep`. If newline is "" or 'n', no translation takes place. If newline is any of the other legal values, any 'n' characters written are translated to the given string.

If `closefd` is False, the underlying file descriptor will be kept open when the file is closed. This does not work when a file name is given and must be True in that case.

A custom opener can be used by passing a callable as *opener*. The underlying file descriptor for the file object is then obtained by calling *opener* with (*file*, *flags*). *opener* must return an open file descriptor (passing `os.open` as *opener* results in functionality similar to passing None).

`open()` returns a file object whose type depends on the mode, and through which the standard file operations such as reading and writing are performed. When `open()` is used to open a file in a text mode ('w', 'r', 'wt', 'rt', etc.), it returns a *TextIOWrapper*. When used to open a file in a binary mode, the returned class varies: in read binary mode, it returns a *BufferedReader*; in write binary and append binary modes, it returns a *BufferedWriter*, and in read/write mode, it returns a *BufferedRandom*.

It is also possible to use a string or bytearray as a file for both reading and writing. For strings StringIO can be used like a file opened in a text mode, and for bytes a BytesIO can be used like a file opened in a binary mode.

`_os_chmod(mode, *, dir_fd=None, follow_symlinks=True)`

Change the access permissions of a file.

#### **path**

Path to be modified. May always be specified as a str, bytes, or a path-like object. On some platforms, path may also be specified as an open file descriptor. If this functionality is unavailable, using it raises an exception.

#### **mode**

Operating-system mode bitfield.

#### **dir\_fd**

If not None, it should be a file descriptor open to a directory, and path should be relative; path will then be relative to that directory.

#### **follow\_symlinks**

If False, and the last element of the path is a symbolic link, chmod will modify the symbolic link itself instead of the file the link points to.

**It is an error to use dir\_fd or follow\_symlinks when specifying path as an open file descriptor.**

**dir\_fd and follow\_symlinks may not be implemented on your platform.**

If they are unavailable, using them will raise a NotImplementedError.

`_os_chown(uid, gid, *, dir_fd=None, follow_symlinks=True)`

Change the owner and group id of path to the numeric uid and gid.

#### **path**

Path to be examined; can be string, bytes, a path-like object, or open-file-descriptor int.

#### **dir\_fd**

If not None, it should be a file descriptor open to a directory, and path should be relative; path will then be relative to that directory.

#### **follow\_symlinks**

If False, and the last element of the path is a symbolic link, stat will examine the symbolic link itself instead of the file the link points to.

path may always be specified as a string. On some platforms, path may also be specified as an open file descriptor.

If this functionality is unavailable, using it raises an exception.

**If dir\_fd is not None, it should be a file descriptor open to a directory,**  
and path should be relative; path will then be relative to that directory.

**If follow\_symlinks is False, and the last element of the path is a symbolic**  
link, chown will modify the symbolic link itself instead of the file the link points to.

**It is an error to use dir\_fd or follow\_symlinks when specifying path as**  
an open file descriptor.

**dir\_fd and follow\_symlinks may not be implemented on your platform.**

If they are unavailable, using them will raise a NotImplementedError.

`_os_replace(dst, *, src_dir_fd=None, dst_dir_fd=None)`

Rename a file or directory, overwriting the destination.

**If either src\_dir\_fd or dst\_dir\_fd is not None, it should be a file**

descriptor open to a directory, and the respective path string (src or dst) should be relative; the path will then be relative to that directory.

**src\_dir\_fd and dst\_dir\_fd, may not be implemented on your platform.**

## SCons.compat package

If they are unavailable, using them will raise a `NotImplementedError`.

`static _pickle_dump(obj, file, protocol=None, *, fix_imports=True)`

Write a pickled representation of `obj` to the open file object `file`.

This is equivalent to `Pickler(file, protocol).dump(obj)`, but may be more efficient.

The optional `protocol` argument tells the pickler to use the given protocol supported protocols are 0, 1, 2, 3 and 4.

The default protocol is 3; a backward-incompatible protocol designed for Python 3.

Specifying a negative protocol version selects the highest protocol version supported. The higher the protocol used, the more recent the version of Python needed to read the pickle produced.

The `file` argument must have a `write()` method that accepts a single bytes argument. It can thus be a file object opened for binary writing, an `io.BytesIO` instance, or any other custom object that meets this interface.

If `fix_imports` is `True` and protocol is less than 3, pickle will try to map the new Python 3 names to the old module names used in Python 2, so that the pickle data stream is readable with Python 2.

`_pickle_protocol = 4`

`_shutil_copyfile(dst, *, follow_symlinks=True)`

Copy data from `src` to `dst`.

If `follow_symlinks` is not set and `src` is a symbolic link, a new symlink will be created instead of copying the file it points to.

`_time_time()`

`time()` -> floating point number

Return the current time in seconds since the Epoch. Fractions of a second may be present if the system clock provides them.

`close()`

`keys()`

`sync()`

`SCons.dblite.open(file, flag=None, mode=438)`

## SCons.exitfuncs module

Register functions which are executed when SCons exits for any reason.

`SCons.exitfuncs._run_exitfuncs()`

run any registered exit functions

`_exithandlers` is traversed in reverse order so functions are executed last in, first out.

`SCons.exitfuncs.register(func, *targs, **kargs)`

register a function to be executed upon normal program termination

`func` - function to be called at exit `targs` - optional arguments to pass to `func` `kargs` - optional keyword arguments to pass to `func`

## SCons.compat package

### Module contents

SCons compatibility package for old Python versions

This subpackage holds modules that provide backwards-compatible implementations of various things from newer Python versions that we cannot count on because SCons still supported older Pythons.

Other code will not generally reference things in this package through the `SCons.compat` namespace. The modules included here add things to the builtins namespace or the global module list so that the rest of our code can use the objects and names imported here regardless of Python version. As a result, if this module is used, it should violate the normal convention for imports (standard library imports first, then program-specific imports, each ordered alphabetically) and needs to be listed first.

The rest of the things here will be in individual compatibility modules that are either: 1) suitably modified copies of the future modules that we want to use; or 2) backwards compatible re-implementations of the specific portions of a future module's API that we want to use.

GENERAL WARNINGS: Implementations of functions in the `SCons.compat` modules are *NOT* guaranteed to be fully compliant with these functions in later versions of Python. We are only concerned with adding functionality that we

## SCons.Node package

actually use in SCons, so be wary if you lift this code for other uses. (That said, making these more nearly the same as later, official versions is still a desirable goal, we just don't need to be obsessive about it.)

We name the compatibility modules with an initial `'_scons_'` (for example, `_scons_subprocess.py` is our compatibility module for subprocess) so that we can still try to import the real module name and fall back to our compatibility module if we get an `ImportError`. The `import_as()` function defined below loads the module as the "real" name (without the `'_scons_'`), after which all of the "import {module}" statements in the rest of our code will find our pre-loaded compatibility module.

```
class SCons.compat.NoSlotsPyPy (name, bases, dct)
```

Bases: type

Metaclass for PyPy compatibility.

PyPy does not work well with `__slots__` and `__class__` assignment.

`mro()`

Return a type's method resolution order.

```
SCons.compat.rename_module (new, old)
```

Attempt to import the old module and load it under the new name. Used for purely cosmetic name changes in Python 3.x.

## SCons.Node package

### Submodules

#### SCons.Node.Alias module

Alias nodes.

This creates a hash of global Aliases (dummy targets).

```
class SCons.Node.Alias.Alias (name)
```

Bases: Node

```
class Attrs
```

Bases: object

shared

BuildInfo

alias of AliasBuildInfo

Decider (function)

GetTag (key)

Return a user-defined tag.

NodeInfo

alias of AliasNodeInfo

Tag (key, value)

Add a user-defined tag.

```
_add_child (collection, set, child)
```

Adds 'child' to 'collection', first checking 'set' to see if it's already present.

```
_children_get ()
```

```
_children_reset ()
```

```
_func_exists
```

```
_func_get_contents
```

```
_func_is_derived
```

```
_func_rexists
```

```
_func_target_from_source
```

```
_get_scanner (env, initial_scanner, root_node_scanner, kw)
```

```
_memo
```

```
_specific_sources
```

```
_tags
```

```
add_dependency (depend)
```

Adds dependencies.

```
add_ignore (depend)
```



## SCons.Node package

Adds dependencies to ignore.  
`add_prerequisite (prerequisite)`  
Adds prerequisites  
`add_source (source)`  
Adds sources.  
`add_to_implicit (deps)`  
`add_to_waiting_parents (node)`  
Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)  
`add_to_waiting_s_e (node)`  
`add_wkid (wkid)`  
Add a node to the list of kids waiting to be evaluated  
`all_children (scan=1)`  
Return a list of all the node's direct children.  
`alter_targets ()`  
Return a list of alternate targets for this Node.  
`always_build`  
`attributes`  
`binfo`  
`build ()`  
A "builder" for aliases.  
`builder`  
`builder_set (builder)`  
`built ()`  
Called just after this node is successfully built.  
`cached`  
`changed (node=None, allowcache=False)`  
Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.  
Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an #included .h file) is updated.  
The allowcache option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this changed method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to `changed()`.  
@see: `FS.File.changed()`, `FS.File.release_target_info()`  
`changed_since_last_build`  
`check_attributes (name)`  
Simple API to check if the node.attributes for name has been set  
`children (scan=1)`  
Return a list of the node's direct children, minus those that are ignored by this node.  
`children_are_up_to_date ()`  
Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.  
The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.  
`clear ()`  
Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).  
`clear_memoized_values ()`  
`convert ()`  
`del_binfo ()`  
Delete the build info from this node.  
`depends`  
`depends_set`

## SCons.Node package

`disambiguate (must_exist=None)`

`env`

`env_set (env, safe=0)`

`executor`

`executor_cleanup ()`

Let the executor clean up any cached information.

`exists ()`

Does this node exists?

`explain ()`

`for_signature ()`

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

`get_abspath ()`

Return an absolute path to the Node. This will return simply `str(Node)` by default, but for Node types that have a concept of relative path, this might return something different.

`get_binfo ()`

Fetch a node's build information.

`node` - the node whose sources will be collected  
`cache` - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`

Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`

Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`

Return the set builder, or a specified default value

`get_cachedir_csig ()`

`get_contents ()`

The contents of an alias is the concatenation of the content signatures of all its sources.

`get_csig ()`

Generate a node's content signature, the digested signature of its content.

`node` - the node cache - alternate node to use for the signature cache returns - the content signature

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`

Return the scanned include lines (implicit dependencies) found in this node.

The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`

Return a list of implicit dependencies for this node.

This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_ninfo ()`

`get_source_scanner (node)`

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`

Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if `node.builder: ...`"). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`linked`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

missing ()

multiple\_side\_effect\_has\_builder ()

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

new\_binfo ()

new\_ninfo ()

ninfo

nocache

noclean

postprocess ()

Clean up anything we don't need to hang onto after we've been built.

precious

prepare ()

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

prerequisites

pseudo

push\_to\_cache ()

Try to push a node into a cache

really\_build (\*\*kw)

Actually build the node.

This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the prepare() method has gotten everything, uh, prepared.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in built().

ref\_count

release\_target\_info ()

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: built() and File.release\_target\_info()

remove ()

Remove this Node: no-op by default.

render\_include\_tree ()

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

reset\_executor ()

Remove cached executor; forces recompute when needed.

retrieve\_from\_cache ()

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in built().

Returns true if the node was successfully retrieved.

rexists ()

Does this node exist locally or in a repository?

## SCons.Node package

```
scan ()
    Scan this node's dependents for implicit dependencies.
scanner_key ()
sconsign ()
    An Alias is not recorded in .sconsign files
select_scanner (scanner)
    Selects a scanner for this Node.
    This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that must use
    their own Scanner and don't select one the Scanner.Selector that's configured for the target.
set_always_build (always_build=1)
    Set the Node's always_build value.
set_executor (executor)
    Set the action executor for this node.
set_explicit (is_explicit)
set_nocache (nocache=1)
    Set the Node's nocache value.
set_noclean (noclean=1)
    Set the Node's noclean value.
set_precious (precious=1)
    Set the Node's precious value.
set_pseudo (pseudo=True)
    Set the Node's precious value.
set_specific_source (source)
set_state (state)
side_effect
side_effects
sources
sources_set
state
store_info
str_for_display ()
target_peers
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
wkids
class SCons.Node.Alias.AliasBuildInfo
    Bases: BuildInfoBase
    bact
    bactsig
    bdepends
    bdependssigs
    bimplicit
    bimplicitsigs
    bsources
    bsourcesigs
    current_version_id = 2
    merge (other)
        Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
        data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
class SCons.Node.Alias.AliasNameSpace (**kwargs)
    Bases: UserDict
    Alias (name, **kw)
    _abc_impl = <_abc_data object>
    clear () → None. Remove all items from D.
```

## SCons.Node package

```
copy ()
classmethod fromkeys (iterable, value=None)
get (k[, d]) → D[k] if k in D, else d. d defaults to None.
items () → a set-like object providing a view on D's items
keys () → a set-like object providing a view on D's keys
lookup (name, **kw)
pop (k[, d]) → v, remove specified key and return the corresponding value.
    If key is not found, d is returned if given, otherwise KeyError is raised.
popitem () → (k, v), remove and return some (key, value) pair
    as a 2-tuple; but raise KeyError if D is empty.
setdefault (k[, d]) → D.get(k,d), also set D[k]=d if k not in D
update ([, E], **F) → None. Update D from mapping/iterable E and F.
    If E present and has a .keys() method, does: for k in E: D[k] = E[k] If E present and lacks .keys() method, does: for
    (k, v) in E: D[k] = v In either case, this is followed by: for k, v in F.items(): D[k] = v
values () → an object providing a view on D's values
class SCons.Node.Alias.AliasNodeInfo
Bases: NodeInfoBase
convert (node, val)
csig
current_version_id = 2
field_list = ['csig']
format (field_list=None, names=0)
merge (other)
    Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
    data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
str_to_node (s)
update (node)
```

## SCons.Node.FS module

File system nodes.

These Nodes represent the canonical external objects that people think of when they think of building software: files and directories.

This holds a "default\_fs" variable that should be initialized with an FS that can be used by scripts or modules looking for the canonical default.

```
class SCons.Node.FS.Base (name, directory, fs)
Bases: Node
A generic class for file system entries. This class is for when we don't know yet whether the entry being looked up is
a file or a directory. Instances of this class can morph into either Dir or File objects by a later, more precise lookup.
Note: this class does not define __cmp__ and __hash__ for efficiency reasons. SCons does a lot of comparing of
Node.FS.{Base,Entry,File,Dir} objects, so those operations must be as fast as possible, which means we want to use
Python's built-in object identity comparisons.
class Attrs
    Bases: object
    shared
BuildInfo
    alias of BuildInfoBase
Decider (function)
GetTag (key)
    Return a user-defined tag.
NodeInfo
    alias of NodeInfoBase
RDirs (pathlist)
    Search for a list of directories in the Repository list.
Rfindalldirs (pathlist)
```

## SCons.Node package

Return all of the directories for a given path list, including corresponding “backing” directories in any repositories. The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up the same path for each target in a given directory.

Tag (key, value)

Add a user-defined tag.

\_Rfindalldirs\_key (pathlist)

\_abspath

\_add\_child (collection, set, child)

Adds ‘child’ to ‘collection’, first checking ‘set’ to see if it’s already present.

\_children\_get ()

\_children\_reset ()

\_func\_exists

\_func\_get\_contents

\_func\_is\_derived

\_func\_rexists

\_func\_sconsign

\_func\_target\_from\_source

\_get\_scanner (env, initial\_scanner, root\_node\_scanner, kw)

\_get\_str ()

\_glob1 (pattern, ondisk=True, source=False, strings=False)

\_labspath

\_local

\_memo

\_path

\_path\_elements

\_proxy

\_save\_str ()

\_specific\_sources

\_tags

\_tpath

add\_dependency (depend)

Adds dependencies.

add\_ignore (depend)

Adds dependencies to ignore.

add\_prerequisite (prerequisite)

Adds prerequisites

add\_source (source)

Adds sources.

add\_to\_implicit (deps)

add\_to\_waiting\_parents (node)

Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don’t think you can “clean up” this function by using True and False instead...)

add\_to\_waiting\_s\_e (node)

add\_wkid (wkid)

Add a node to the list of kids waiting to be evaluated

all\_children (scan=1)

Return a list of all the node’s direct children.

alter\_targets ()

Return a list of alternate targets for this Node.

always\_build

attributes

binfo

build (\*\*kw)

Actually build the node.



This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the `prepare()` method has gotten everything, uh, prepared.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

`builder`

`builder_set (builder)`

`built ()`

Called just after this node is successfully built.

`cached`

`changed (node=None, allowcache=False)`

Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.

Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an `#included .h` file) is updated.

The `allowcache` option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this `changed` method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to `changed()`.

@see: `FS.File.changed()`, `FS.File.release_target_info()`

`changed_since_last_build`

`check_attributes (name)`

Simple API to check if the node.attributes for name has been set

`children (scan=1)`

Return a list of the node's direct children, minus those that are ignored by this node.

`children_are_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`clear ()`

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

`clear_memoized_values ()`

`cwd`

`del_binfo ()`

Delete the build info from this node.

`depends`

`depends_set`

`dir`

`disambiguate (must_exist=None)`

`duplicate`

`env`

`env_set (env, safe=0)`

`executor`

`executor_cleanup ()`

Let the executor clean up any cached information.

`exists ()`

Does this node exist?

`explain ()`

`for_signature ()`

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

## SCons.Node package

`fs`  
Reference to parent Node.FS object

`get_abspath ()`  
Get the absolute path of the file.

`get_binfo ()`  
Fetch a node's build information.  
`node` - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature  
This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`  
Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`  
Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`  
Return the set builder, or a specified default value

`get_cachedir_csig ()`

`get_contents ()`  
Fetch the contents of the entry.

`get_csig ()`

`get_dir ()`

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`  
Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`  
Return the scanned include lines (implicit dependencies) found in this node.  
The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`  
Return a list of implicit dependencies for this node.  
This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_internal_path ()`

`get_labspath ()`  
Get the absolute path of the file.

`get_ninfo ()`

`get_path (dir=None)`  
Return path relative to the current working directory of the Node.FS.Base object that owns us.

`get_path_elements ()`

`get_relpath ()`  
Get the path of the file relative to the root SConstruct file's directory.

`get_source_scanner (node)`  
Fetch the source scanner for the specified node  
NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.  
Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.  
This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`  
Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`  
This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_tpath ()`

`getmtime ()`

`getsize ()`

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly (“if `node.builder: ...`”). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

Default check for whether the Node is current: unknown Node subtypes are always out of date, so they will always get built.

`isdir ()`

`isfile ()`

`islink ()`

`linked`

`lstat ()`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly (“if node.builder: ...”). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`must_be_same (klass)`

This node, which already existed, is being looked up as the specified klass. Raise an exception if it isn't.

`name`

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`postprocess ()`

Clean up anything we don't need to hang onto after we've been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

`prerequisites`

`pseudo`

`push_to_cache ()`

Try to push a node into a cache

`ref_count`

`release_target_info ()`

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: `built()` and `File.release_target_info()`

`remove ()`

Remove this Node: no-op by default.

`render_include_tree ()`

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

`reentry ()`

`reset_executor ()`

Remove cached executor; forces recompute when needed.

`retrieve_from_cache ()`

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

Returns true if the node was successfully retrieved.

`rexists ()`

Does this node exist locally or in a repository?

`rfile ()`

`rstr ()`

A Node.FS.Base object's string representation is its path name.

`sbuilder`

## SCons.Node package

```
scan ()
    Scan this node's dependents for implicit dependencies.
scanner_key ()
select_scanner (scanner)
    Selects a scanner for this Node.
    This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that must use
    their own Scanner and don't select one the Scanner.Selector that's configured for the target.
set_always_build (always_build=1)
    Set the Node's always_build value.
set_executor (executor)
    Set the action executor for this node.
set_explicit (is_explicit)
set_local ()
set_nocache (nocache=1)
    Set the Node's nocache value.
set_noclean (noclean=1)
    Set the Node's noclean value.
set_precious (precious=1)
    Set the Node's precious value.
set_pseudo (pseudo=True)
    Set the Node's precious value.
set_specific_source (source)
set_src_builder (builder)
    Set the source code builder for this node.
set_state (state)
side_effect
side_effects
sources
sources_set
src_builder ()
    Fetch the source code builder for this node.
    If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value
    from its parent directory, and so on up to the file system root).
srcnode ()
    If this node is in a build path, return the node corresponding to its source file. Otherwise, return ourself.
stat ()
state
store_info
str_for_display ()
target_from_source (prefix, suffix, splitext=<function splitext>)
    Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.
    Note that this method can be overridden dynamically for generated files that need different behavior. See
    Tool/swig.py for an example.
target_peers
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
wkids
class SCons.Node.FS.Dir (name, directory, fs)
    Bases: Base
    A class for directories in a file system.
    class Attrs
        Bases: object
        shared
    BuildInfo
```

## SCons.Node package

alias of DirBuildInfo

Decider (function)

Dir (name, create=True)

Looks up or creates a directory node named 'name' relative to this directory.

Entry (name)

Looks up or creates an entry node named 'name' relative to this directory.

File (name)

Looks up or creates a file node named 'name' relative to this directory.

GetTag (key)

Return a user-defined tag.

NodeInfo

alias of DirNodeInfo

RDirs (pathlist)

Search for a list of directories in the Repository list.

Rfindalldirs (pathlist)

Return all of the directories for a given path list, including corresponding "backing" directories in any repositories. The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up the same path for each target in a given directory.

Tag (key, value)

Add a user-defined tag.

\_Rfindalldirs\_key (pathlist)

\_clearRepositoryCache (duplicate=None)

Called when we change the repository(ies) for a directory. This clears any cached information that is invalidated by changing the repository.

\_resetDuplicate (node)

\_abspath

\_add\_child (collection, set, child)

Adds 'child' to 'collection', first checking 'set' to see if it's already present.

\_children\_get ()

\_children\_reset ()

\_create ()

Create this directory, silently and without worrying about whether the builder is the default or not.

\_func\_exists

\_func\_get\_contents

\_func\_is\_derived

\_func\_rexists

\_func\_sconsign

\_func\_target\_from\_source

\_get\_scanner (env, initial\_scanner, root\_node\_scanner, kw)

\_get\_str ()

\_glob1 (pattern, ondisk=True, source=False, strings=False)

Globs for and returns a list of entry names matching a single pattern in this directory.

This searches any repositories and source directories for corresponding entries and returns a Node (or string) relative to the current directory if an entry is found anywhere.

TODO: handle pattern with no wildcard

\_labspath

\_local

\_memo

\_morph ()

Turn a file system Node (either a freshly initialized directory object or a separate Entry object) into a proper directory object.

Set up this directory's entries and hook it into the file system tree. Specify that directories (this Node) don't use signatures for calculating whether they're current.

\_path

\_path\_elements

\_proxy

## SCons.Node package

`_rel_path_key (other)`  
`_save_str ()`  
`_sconsign`  
`_specific_sources`  
`_srcdir_find_file_key (filename)`  
`_tags`  
`_tpath`  
`addRepository (dir)`  
`add_dependency (depend)`  
    Adds dependencies.  
`add_ignore (depend)`  
    Adds dependencies to ignore.  
`add_prerequisite (prerequisite)`  
    Adds prerequisites  
`add_source (source)`  
    Adds sources.  
`add_to_implicit (deps)`  
`add_to_waiting_parents (node)`  
    Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)  
`add_to_waiting_s_e (node)`  
`add_wkid (wkid)`  
    Add a node to the list of kids waiting to be evaluated  
`all_children (scan=1)`  
    Return a list of all the node's direct children.  
`alter_targets ()`  
    Return any corresponding targets in a variant directory.  
`always_build`  
`attributes`  
`binfo`  
`build (**kw)`  
    A null "builder" for directories.  
`builder`  
`builder_set (builder)`  
`built ()`  
    Called just after this node is successfully built.  
`cached`  
`cachedir_csig`  
`cachesig`  
`changed (node=None, allowcache=False)`  
    Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.  
    Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an #included .h file) is updated.  
    The allowcache option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this changed method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to changed().  
    @see: FS.File.changed(), FS.File.release\_target\_info()  
`changed_since_last_build`  
`check_attributes (name)`  
    Simple API to check if the node.attributes for name has been set  
`children (scan=1)`  
    Return a list of the node's direct children, minus those that are ignored by this node.



## SCons.Node package

`children_are_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`clear ()`

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

`clear_memoized_values ()`

`contentsig`

`cwd`

`del_binfo ()`

Delete the build info from this node.

`depends`

`depends_set`

`dir`

`dir_on_disk (name)`

`dirname`

`disambiguate (must_exist=None)`

`diskcheck_match ()`

`do_duplicate (src)`

`duplicate`

`entries`

`entry_abspath (name)`

`entry_exists_on_disk (name)`

Searches through the file/dir entries of the current directory, and returns True if a physical entry with the given name could be found.

@see `reentry_exists_on_disk`

`entry_labspath (name)`

`entry_path (name)`

`entry_tpath (name)`

`env`

`env_set (env, safe=0)`

`executor`

`executor_cleanup ()`

Let the executor clean up any cached information.

`exists ()`

Does this node exist?

`explain ()`

`file_on_disk (name)`

`for_signature ()`

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

`fs`

Reference to parent Node.FS object

`getRepositories ()`

Returns a list of repositories for this directory.

`get_abspath ()` → str

Get the absolute path of the file.

`get_all_rdirs ()`

`get_binfo ()`

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`  
Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`  
Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`  
Return the set builder, or a specified default value

`get_cachedir_csig ()`  
`get_contents ()`  
Return content signatures and names of all our children separated by new-lines. Ensure that the nodes are sorted.

`get_csig ()`  
Compute the content signature for Directory nodes. In general, this is not needed and the content signature is not stored in the DirNodeInfo. However, if `get_contents` on a Dir node is called which has a child directory, the child directory should return the hash of its contents.

`get_dir ()`  
`get_env ()`  
`get_env_scanner (env, kw={})`  
`get_executor (create=1)`  
Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`  
Return this directory's implicit dependencies.  
We don't bother caching the results because the scan typically shouldn't be requested more than once (as opposed to scanning .h file contents, which can be requested as many times as the files is #included by other files).

`get_implicit_deps (env, initial_scanner, path_func, kw={})`  
Return a list of implicit dependencies for this node.  
This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_internal_path ()`  
`get_labspath () → str`  
Get the absolute path of the file.

`get_ninfo ()`  
`get_path (dir=None)`  
Return path relative to the current working directory of the Node.FS.Base object that owns us.

`get_path_elements ()`  
`get_relpath ()`  
Get the path of the file relative to the root SConstruct file's directory.

`get_source_scanner (node)`  
Fetch the source scanner for the specified node  
NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.  
Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.  
This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`  
`get_stored_implicit ()`  
Fetch the stored implicit dependencies

`get_stored_info ()`  
`get_string (for_signature)`  
This is a convenience function designed primarily to be used in command generators (i.e., CommandGeneratorActions or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_text_contents ()`

We already emit things in text, so just return the binary version.

`get_timestamp ()` → int

Return the latest timestamp from among our children

`get_tpath ()`

`getmtime ()`

`getsize ()`

`glob (pathname, ondisk=True, source=False, strings=False, exclude=None)`

Returns a list of Nodes (or strings) matching a specified pathname pattern.

Pathname patterns follow UNIX shell semantics: `*` matches any-length strings of any characters, `?` matches any character, and `[]` can enclose lists or ranges of characters. Matches do not span directory separators.

The matches take into account Repositories, returning local Nodes if a corresponding entry exists in a Repository (either an in-memory Node or something on disk).

By default, the `glob()` function matches entries that exist on-disk, in addition to in-memory Nodes. Setting the “`ondisk`” argument to `False` (or some other non-true value) causes the `glob()` function to only match in-memory Nodes. The default behavior is to return both the on-disk and in-memory Nodes.

The “`source`” argument, when true, specifies that corresponding source Nodes must be returned if you’re globbing in a build directory (initialized with `VariantDir()`). The default behavior is to return Nodes local to the `VariantDir()`.

The “`strings`” argument, when true, returns the matches as strings, not Nodes. The strings are path names relative to this directory.

The “`exclude`” argument, if not `None`, must be a pattern or a list of patterns following the same UNIX shell semantics. Elements matching a least one pattern of this list will be excluded from the result.

The underlying algorithm is adapted from the `glob.glob()` function in the Python library (but heavily modified), and uses `fnmatch()` under the covers.

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly (“if `node.builder: ...`”). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when duplicate=0 and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

is\_explicit

is\_literal ()

Always pass the string representation of a Node to the command interpreter literally.

is\_sconscript ()

Returns true if this node is an sconscript

is\_under (dir)

is\_up\_to\_date ()

If any child is not up-to-date, then this directory isn't, either.

isdir ()

isfile ()

islink ()

link (srcdir, duplicate)

Set this directory as the variant directory for the supplied source directory.

linked

lstat ()

make\_ready ()

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

missing ()

multiple\_side\_effect\_has\_builder ()

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

must\_be\_same (klass)

This node, which already existed, is being looked up as the specified klass. Raise an exception if it isn't.

name

new\_binfo ()

new\_ninfo ()

ninfo

nocache

noclean

on\_disk\_entries

postprocess ()

Clean up anything we don't need to hang onto after we've been built.

precious

prepare ()

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

prerequisites

pseudo

push\_to\_cache ()

Try to push a node into a cache

rdir ()

ref\_count

rel\_path (other)

Return a path to “other” relative to this directory.

release\_target\_info ()

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren’t needed any longer after a Node (=File) got built, we don’t have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: built() and File.release\_target\_info()

released\_target\_info

remove ()

Remove this Node: no-op by default.

render\_include\_tree ()

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

rentry ()

rentry\_exists\_on\_disk (name)

Searches through the file/dir entries of the current *and* all its remote directories (repos), and returns True if a physical entry with the given name could be found. The local directory (self) gets searched first, so repositories take a lower precedence regarding the searching order.

@see entry\_exists\_on\_disk

repositories

reset\_executor ()

Remove cached executor; forces recompute when needed.

retrieve\_from\_cache ()

Try to retrieve the node’s content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in built().

Returns true if the node was successfully retrieved.

rexists ()

Does this node exist locally or in a repository?

rfile ()

root

rstr ()

A Node.FS.Base object’s string representation is its path name.

sbuilder

scan ()

Scan this node’s dependents for implicit dependencies.

scanner\_key ()

A directory does not get scanned.

scanner\_paths

sconsign ()

Return the .sconsign file info for this directory.

searched

select\_scanner (scanner)

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that *must* use their own Scanner and don’t select one the Scanner.Selector that’s configured for the target.

set\_always\_build (always\_build=1)

Set the Node’s always\_build value.

set\_executor (executor)

Set the action executor for this node.

set\_explicit (is\_explicit)

set\_local ()

set\_nocache (nocache=1)

Set the Node’s nocache value.

## SCons.Node package

```
set_noclean (noclean=1)
    Set the Node's noclean value.
set_precious (precious=1)
    Set the Node's precious value.
set_pseudo (pseudo=True)
    Set the Node's precious value.
set_specific_source (source)
set_src_builder (builder)
    Set the source code builder for this node.
set_state (state)
side_effect
side_effects
sources
sources_set
src_builder ()
    Fetch the source code builder for this node.
    If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value
    from its parent directory, and so on up to the file system root).
srcdir
srcdir_duplicate (name)
srcdir_find_file (filename)
srcdir_list ()
srcnode ()
    Dir has a special need for srcnode()...if we have a srcdir attribute set, then that is our srcnode.
stat ()
state
store_info
str_for_display ()
target_from_source (prefix, suffix, splitext=<function splitext>)
    Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.
    Note that this method can be overridden dynamically for generated files that need different behavior. See
    Tool/swig.py for an example.
target_peers
up ()
variant_dirs
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
walk (func, arg)
    Walk this directory tree by calling the specified function for each directory in the tree.
    This behaves like the os.path.walk() function, but for in-memory Node.FS.Dir objects. The function takes the same
    arguments as the functions passed to os.path.walk():

        func(arg, dirname, fnames)
    Except that "dirname" will actually be the directory Node, not the string. The '.' and '..' entries are excluded from
    fnames. The fnames list may be modified in-place to filter the subdirectories visited or otherwise impose a specific
    order. The "arg" argument is always passed to func() and may be used in any way (or ignored, passing None is
    common).
wkids
class SCons.Node.FS.DirBuildInfo
    Bases: BuildInfoBase
    bact
    bactsig
    bdepends
    bdependsigs
    bimplicit
```

## SCons.Node package

```
bimplicitsigs
bsources
bsourcesigs
current_version_id = 2
merge (other)
    Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
    data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
class SCons.Node.FS.DirNodeInfo
    Bases: NodeInfoBase
    convert (node, val)
    current_version_id = 2
    format (field_list=None, names=0)
    fs = None
    merge (other)
        Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
        data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
    str_to_node (s)
    update (node)
class SCons.Node.FS.DiskChecker (type, do, ignore)
    Bases: object
    set (list)
class SCons.Node.FS.Entry (name, directory, fs)
    Bases: Base
    This is the class for generic Node.FS entries—that is, things that could be a File or a Dir, but we're just not sure yet.
    Consequently, the methods in this class really exist just to transform their associated object into the right class when
    the time comes, and then call the same-named method in the transformed class.
    class Attrs
        Bases: object
        shared
    BuildInfo
        alias of BuildInfoBase
    Decider (function)
    GetTag (key)
        Return a user-defined tag.
    NodeInfo
        alias of NodeInfoBase
    RDirs (pathlist)
        Search for a list of directories in the Repository list.
    Rfindalldirs (pathlist)
        Return all of the directories for a given path list, including corresponding "backing" directories in any repositories.
        The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up
        the same path for each target in a given directory.
    Tag (key, value)
        Add a user-defined tag.
    _Rfindalldirs_key (pathlist)
    _abspath
    _add_child (collection, set, child)
        Adds 'child' to 'collection', first checking 'set' to see if it's already present.
    _children_get ()
    _children_reset ()
    _func_exists
    _func_get_contents
    _func_is_derived
    _func_rexists
    _func_sconsign
    _func_target_from_source
```



## SCons.Node package

```
_get_scanner (env, initial_scanner, root_node_scanner, kw)
_get_str ()
_glob1 (pattern, ondisk=True, source=False, strings=False)
_labspath
_local
_memo
_path
_path_elements
_proxy
_save_str ()
_sconsign
_specific_sources
_tags
_tpath
add_dependency (depend)
    Adds dependencies.
add_ignore (depend)
    Adds dependencies to ignore.
add_prerequisite (prerequisite)
    Adds prerequisites
add_source (source)
    Adds sources.
add_to_implicit (deps)
add_to_waiting_parents (node)
    Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note
    that the returned values are intended to be used to increment a reference count, so don't think you can "clean up"
    this function by using True and False instead...)
add_to_waiting_s_e (node)
add_wkid (wkid)
    Add a node to the list of kids waiting to be evaluated
all_children (scan=1)
    Return a list of all the node's direct children.
alter_targets ()
    Return a list of alternate targets for this Node.
always_build
attributes
binfo
build (**kw)
    Actually build the node.
    This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the
    prepare() method has gotten everything, uh, prepared.
    This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe
    stuff in built().
builder
builder_set (builder)
built ()
    Called just after this node is successfully built.
cached
cachedir_csig
cachesig
changed (node=None, allowcache=False)
    Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to
    compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in
    a Repository) can be used instead.
```

Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an `#included .h` file) is updated.

The `allowcache` option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this changed method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to `changed()`.

@see: `FS.File.changed()`, `FS.File.release_target_info()`

`changed_since_last_build`

`check_attributes (name)`

Simple API to check if the node.attributes for name has been set

`children (scan=1)`

Return a list of the node's direct children, minus those that are ignored by this node.

`children_are_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`clear ()`

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

`clear_memoized_values ()`

`contentsig`

`cwd`

`del_binfo ()`

Delete the build info from this node.

`depends`

`depends_set`

`dir`

`dirname`

`disambiguate (must_exist=None)`

`diskcheck_match ()`

`duplicate`

`entries`

`env`

`env_set (env, safe=0)`

`executor`

`executor_cleanup ()`

Let the executor clean up any cached information.

`exists ()`

Does this node exist?

`explain ()`

`for_signature ()`

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

`fs`

Reference to parent Node.FS object

`get_abspath ()`

Get the absolute path of the file.

`get_binfo ()`

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`

Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`

Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`

Return the set builder, or a specified default value

`get_cachedir_csig ()`

`get_contents ()`

Fetch the contents of the entry. Returns the exact binary contents of the file.

`get_csig ()`

`get_dir ()`

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`

Return the scanned include lines (implicit dependencies) found in this node.

The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`

Return a list of implicit dependencies for this node.

This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_internal_path ()`

`get_labspath ()`

Get the absolute path of the file.

`get_ninfo ()`

`get_path (dir=None)`

Return path relative to the current working directory of the Node.FS.Base object that owns us.

`get_path_elements ()`

`get_relpath ()`

Get the path of the file relative to the root SConstruct file's directory.

`get_source_scanner (node)`

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`

Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a

tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_text_contents ()`

Fetch the decoded text contents of a Unicode encoded Entry.

Since this should return the text contents from the file system, we check to see into what sort of subclass we should morph this Entry.

`get_tpath ()`

`getmtime ()`

`getsize ()`

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

Default check for whether the Node is current: unknown Node subtypes are always out of date, so they will always get built.

`isdir ()`

`isfile ()`

`islink ()`

`linked`

`lstat ()`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the

`__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`must_be_same (klass)`

Called to make sure a Node is a Dir. Since we're an Entry, we can morph into one.

`name`

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`on_disk_entries`

`postprocess ()`

Clean up anything we don't need to hang onto after we've been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

`prerequisites`

`pseudo`

`push_to_cache ()`

Try to push a node into a cache

`ref_count`

`rel_path (other)`

`release_target_info ()`

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: `built()` and `File.release_target_info()`

`released_target_info`

`remove ()`

Remove this Node: no-op by default.

`render_include_tree ()`

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

`rentry ()`

`repositories`

`reset_executor ()`

Remove cached executor; forces recompute when needed.

`retrieve_from_cache ()`

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

Returns true if the node was successfully retrieved.

`rexists ()`

Does this node exist locally or in a repository?

`rfile ()`

We're a generic Entry, but the caller is actually looking for a File at this point, so morph into one.

`root`

## SCons.Node package

`rstr ()`

A `Node.FS.Base` object's string representation is its path name.

`sbuilder`

`scan ()`

Scan this node's dependents for implicit dependencies.

`scanner_key ()`

`scanner_paths`

`searched`

`select_scanner (scanner)`

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, `Node.FS.Dir`) that *must* use their own `Scanner` and don't select one the `Scanner.Selector` that's configured for the target.

`set_always_build (always_build=1)`

Set the Node's `always_build` value.

`set_executor (executor)`

Set the action executor for this node.

`set_explicit (is_explicit)`

`set_local ()`

`set_nocache (nocache=1)`

Set the Node's `nocache` value.

`set_noclean (noclean=1)`

Set the Node's `noclean` value.

`set_precious (precious=1)`

Set the Node's `precious` value.

`set_pseudo (pseudo=True)`

Set the Node's `precious` value.

`set_specific_source (source)`

`set_src_builder (builder)`

Set the source code builder for this node.

`set_state (state)`

`side_effect`

`side_effects`

`sources`

`sources_set`

`src_builder ()`

Fetch the source code builder for this node.

If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value from its parent directory, and so on up to the file system root).

`srcdir`

`srcnode ()`

If this node is in a build path, return the node corresponding to its source file. Otherwise, return `ourselves`.

`stat ()`

`state`

`store_info`

`str_for_display ()`

`target_from_source (prefix, suffix, splitext=<function splitext>)`

Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.

Note that this method can be overridden dynamically for generated files that need different behavior. See `Tool/swig.py` for an example.

`target_peers`

`variant_dirs`

`visited ()`

Called just after this node has been visited (with or without a build).

`waiting_parents`

`waiting_s_e`

`wkids`

```
class SCons.Node.FS.EntryProxy (subject)
    Bases: Proxy
    __get_abspath ()
    __get_base_path ()
        Return the file's directory and file name, with the suffix stripped.
    __get_dir ()
    __get_file ()
    __get_filebase ()
    __get_posix_path ()
        Return the path with / as the path separator, regardless of platform.
    __get_relpath ()
    __get_rsrcdir ()
        Returns the directory containing the source node linked to this node via VariantDir(), or the directory of this node if not linked.
    __get_rsrcnode ()
    __get_srcdir ()
        Returns the directory containing the source node linked to this node via VariantDir(), or the directory of this node if not linked.
    __get_srcnode ()
    __get_suffix ()
    __get_windows_path ()
        Return the path with as the path separator, regardless of platform.
    dictSpecialAttrs = {'abspath': <function EntryProxy.__get_abspath>, 'base': <function EntryProxy.__get_base_path>, 'dir': <function EntryProxy.__get_dir>, 'file': <function EntryProxy.__get_file>, 'filebase': <function EntryProxy.__get_filebase>, 'posix': <function EntryProxy.__get_posix_path>, 'relpath': <function EntryProxy.__get_relpath>, 'rsrcdir': <function EntryProxy.__get_rsrcdir>, 'srcpath': <function EntryProxy.__get_rsrcnode>, 'srcdir': <function EntryProxy.__get_srcdir>, 'srcnode': <function EntryProxy.__get_srcnode>, 'suffix': <function EntryProxy.__get_suffix>, 'win32': <function EntryProxy.__get_windows_path>, 'windows': <function EntryProxy.__get_windows_path>}
    get ()
        Retrieve the entire wrapped object
exception SCons.Node.FS.EntryProxyAttributeError (entry_proxy, attribute)
    Bases: AttributeError
    An AttributeError subclass for recording and displaying the name of the underlying Entry involved in an AttributeError exception.
    args
    with_traceback ()
        Exception.with_traceback(tb) – set self.__traceback__ to tb and return self.
class SCons.Node.FS (path=None)
    Bases: LocalFS
    Dir (name, directory=None, create=True)
        Look up or create a Dir node with the specified name. If the name is a relative path (begins with ./, ../, or a file name), then it is looked up relative to the supplied directory node, or to the top level directory of the FS (supplied at construction time) if no directory is supplied.
        This method will raise TypeError if a normal file is found at the specified path.
    Entry (name, directory=None, create=1)
        Look up or create a generic Entry node with the specified name. If the name is a relative path (begins with ./, ../, or a file name), then it is looked up relative to the supplied directory node, or to the top level directory of the FS (supplied at construction time) if no directory is supplied.
    File (name, directory=None, create=1)
        Look up or create a File node with the specified name. If the name is a relative path (begins with ./, ../, or a file name), then it is looked up relative to the supplied directory node, or to the top level directory of the FS (supplied at construction time) if no directory is supplied.
        This method will raise TypeError if a directory is found at the specified path.
    Glob (pathname, ondisk=True, source=True, strings=False, exclude=None, cwd=None)
        Globs
```



## SCons.Node package

This is mainly a shim layer

`PyPackageDir (modulename)`

Locate the directory of a given python module name

For example scons might resolve to Windows: C:\Python27\Lib\site-packages\scons-2.5.1 Linux: /usr/lib/scons

This can be useful when we want to determine a toolpath based on a python module name

`Repository (*dirs)`

Specify Repository directories to search.

`VariantDir (variant_dir, src_dir, duplicate=1)`

Link the supplied variant directory to the source directory for purposes of building files.

`_lookup (p, directory, fsclass, create=1)`

The generic entry point for Node lookup with user-supplied data.

This translates arbitrary input into a canonical Node.FS object of the specified fsclass. The general approach for strings is to turn it into a fully normalized absolute path and then call the root directory's `lookup_abs()` method for the heavy lifting.

If the path name begins with '#', it is unconditionally interpreted relative to the top-level directory of this FS. '#' is treated as a synonym for the top-level SConstruct directory, much like '~' is treated as a synonym for the user's home directory in a UNIX shell. So both '#foo' and '#/foo' refer to the 'foo' subdirectory underneath the top-level SConstruct directory.

If the path name is relative, then the path is looked up relative to the specified directory, or the current directory (`self._cwd`, typically the SConstruct directory) if the specified directory is None.

`chdir (dir, change_os_dir=0)`

Change the current working directory for lookups. If `change_os_dir` is true, we will also change the "real" cwd to match.

`chmod (path, mode)`

`copy (src, dst)`

`copy2 (src, dst)`

`exists (path)`

`get_max_drift ()`

`get_root (drive)`

Returns the root directory for the specified drive, creating it if necessary.

`getcwd ()`

`getmtime (path)`

`getsize (path)`

`isdir (path)`

`isfile (path)`

`islink (path)`

`link (src, dst)`

`listdir (path)`

`lstat (path)`

`makedirs (path, mode=511, exist_ok=False)`

`mkdir (path, mode=511)`

`open (path)`

`readlink (file)`

`rename (old, new)`

`scandir (path)`

`set_SConstruct_dir (dir)`

`set_max_drift (max_drift)`

`stat (path)`

`symlink (src, dst)`

`unlink (path)`

`variant_dir_target_climb (orig, dir, tail)`

Create targets in corresponding variant directories

Climb the directory tree, and look up path names relative to any linked variant directories we find.

Even though this loops and walks up the tree, we don't memoize the return value because this is really only used to process the command-line targets.

`class SCons.Node.FS.File (name, directory, fs)`

## SCons.Node package

Bases: Base

A class for files in a file system.

class Attrs

Bases: object

shared

BuildInfo

alias of FileBuildInfo

Decider (function)

Dir (name, create=True)

Create a directory node named 'name' relative to the directory of this file.

Dirs (pathlist)

Create a list of directories relative to the SConscript directory of this file.

Entry (name)

Create an entry node named 'name' relative to the directory of this file.

File (name)

Create a file node named 'name' relative to the directory of this file.

GetTag (key)

Return a user-defined tag.

NodeInfo

alias of FileNodeInfo

RDirs (pathlist)

Search for a list of directories in the Repository list.

Rfindalldirs (pathlist)

Return all of the directories for a given path list, including corresponding "backing" directories in any repositories.

The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up the same path for each target in a given directory.

Tag (key, value)

Add a user-defined tag.

\_Rfindalldirs\_key (pathlist)

\_dmap\_cache = {}

\_dmap\_sig\_cache = {}

\_abspath

\_add\_child (collection, set, child)

Adds 'child' to 'collection', first checking 'set' to see if it's already present.

\_add\_strings\_to\_dependency\_map (dmap)

In the case comparing node objects isn't sufficient, we'll add the strings for the nodes to the dependency map :return:

\_build\_dependency\_map (binfo)

Build mapping from file -> signature

### Parameters:

- **self** (*self* -) –

- **considered** (*binfo - buildinfo from node being*) –

**Returns:** dictionary of file->signature mappings

\_children\_get ()

\_children\_reset ()

\_createDir ()

\_func\_exists

\_func\_get\_contents

\_func\_is\_derived

\_func\_rexists

\_func\_sconsign

\_func\_target\_from\_source

\_get\_found\_includes\_key (env, scanner, path)

\_get\_previous\_signatures (dmap)

Return a list of corresponding csigs from previous build in order of the node/files in children.

**Parameters:**

- **self** (*self* -) –
- **csig** (*dmap* - Dictionary of file ->) –

**Returns:** List of csigs for provided list of children

`_get_scanner (env, initial_scanner, root_node_scanner, kw)`

`_get_str ()`

`_glob1 (pattern, ondisk=True, source=False, strings=False)`

`_labspath`

`_local`

`_memo`

`_morph ()`

Turn a file system node into a File object.

`_path`

`_path_elements`

`_proxy`

`_rmv_existing ()`

`_save_str ()`

`_sconsign`

`_specific_sources`

`_tags`

`_tpath`

`add_dependency (depend)`

Adds dependencies.

`add_ignore (depend)`

Adds dependencies to ignore.

`add_prerequisite (prerequisite)`

Adds prerequisites

`add_source (source)`

Adds sources.

`add_to_implicit (deps)`

`add_to_waiting_parents (node)`

Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)

`add_to_waiting_s_e (node)`

`add_wkid (wkid)`

Add a node to the list of kids waiting to be evaluated

`all_children (scan=1)`

Return a list of all the node's direct children.

`alter_targets ()`

Return any corresponding targets in a variant directory.

`always_build`

`attributes`

`binfo`

`build (**kw)`

Actually build the node.

This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the `prepare()` method has gotten everything, uh, prepared.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

`builder`

`builder_set (builder)`

`built ()`

Called just after this File node is successfully built.

Just like for 'release\_target\_info' we try to release some more target node attributes in order to minimize the overall memory consumption.

@see: `release_target_info`

`cached`

`cachedir_csig`

`cachesig`

`changed (node=None, allowcache=False)`  
 Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built.  
 For File nodes this is basically a wrapper around `Node.changed()`, but we allow the return value to get cached after the reference to the Executor got released in `release_target_info()`.  
 @see: `Node.changed()`

`changed_content (target, prev_ni, repo_node=None)`

`changed_since_last_build`

`changed_state (target, prev_ni, repo_node=None)`

`changed_timestamp_match (target, prev_ni, repo_node=None)`  
 Return True if the timestamps don't match or if there is no previous timestamp :param target: :param prev\_ni:  
 Information about the node from the previous build :return:

`changed_timestamp_newer (target, prev_ni, repo_node=None)`

`changed_timestamp_then_content (target, prev_ni, node=None)`  
 Used when decider for file is Timestamp-MD5

**NOTE: If the timestamp hasn't changed this will skip md5'ing the**  
 file and just copy the prev\_ni provided. If the prev\_ni is wrong. It will propagate it. See:  
<https://github.com/SCons/scons/issues/2980>

**Parameters:**

- **dependency** (*self* -) –
- **target** (*target* -) –
- **.sconsign** (*prev\_ni* - *The NodeInfo object loaded from previous builds*) –
- **existence/timestamp** (*node* - *Node instance. Check this node for file*) – if specified.

**Returns:** Boolean - Indicates if node(File) has changed.

`check_attributes (name)`  
 Simple API to check if the node.attributes for name has been set

`children (scan=1)`  
 Return a list of the node's direct children, minus those that are ignored by this node.

`children_are_up_to_date ()`  
 Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.  
 The SCons.Node.Alias and SCons.Node.Python.Value subclasses rebind their `current()` method to this method.

`clear ()`  
 Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

`clear_memoized_values ()`

`contentsig`

`convert_copy_attrs = ['bsources', 'bimplicit', 'bdepends', 'bact', 'bactsig', 'ninfo']`

`convert_old_entry (old_entry)`

`convert_sig_attrs = ['bsourcesigs', 'bimplicitsigs', 'bdependsigs']`

`cwd`

`del_binfo ()`  
 Delete the build info from this node.

`depends`

`depends_set`

`dir`

`dirname`

`disambiguate (must_exist=None)`

`diskcheck_match ()`

`do_duplicate (src)`

## SCons.Node package

duplicate

entries

env

env\_set (env, safe=0)

executor

executor\_cleanup ()

Let the executor clean up any cached information.

exists ()

Does this node exists?

explain ()

find\_repo\_file ()

For this node, find if there exists a corresponding file in one or more repositories :return: list of corresponding files in repositories

find\_src\_builder ()

for\_signature ()

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

fs

Reference to parent Node.FS object

get\_abspath ()

Get the absolute path of the file.

get\_binfo ()

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

get\_build\_env ()

Fetch the appropriate Environment to build this node.

get\_build\_scanner\_path (scanner)

Fetch the appropriate scanner path for this node.

get\_builder (default\_builder=None)

Return the set builder, or a specified default value

get\_cachedir\_bsig ()

Return the signature for a cached file, including its children.

It adds the path of the cached file to the cache signature, because multiple targets built by the same action will all have the same build signature, and we have to differentiate them somehow.

Signature should normally be string of hex digits.

get\_cachedir\_csig ()

Fetch a Node's content signature for purposes of computing another Node's cachesig.

This is a wrapper around the normal `get_csig()` method that handles the somewhat obscure case of using `CacheDir` with the `-n` option. Any files that don't exist would normally be "built" by fetching them from the cache, but the normal `get_csig()` method will try to open up the local file, which doesn't exist because the `-n` option meant we didn't actually pull the file from `cachedir`. But since the file *does* actually exist in the `cachedir`, we can use its contents for the `csig`.

get\_content\_hash () → str

Compute and return the hash for this file.

get\_contents () → bytes

Return the contents of the file as bytes.

get\_contents\_sig ()

A helper method for `get_cachedir_bsig`.

It computes and returns the signature for this node's contents.

```

get_csig () → str
    Generate a node's content signature.
get_dir ()
get_env ()
get_env_scanner (env, kw={})
get_executor (create=1)
    Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.
get_found_includes (env, scanner, path)
    Return the included implicit dependencies in this file. Cache results so we only scan the file once per path
    regardless of how many times this information is requested.
get_implicit_deps (env, initial_scanner, path_func, kw={})
    Return a list of implicit dependencies for this node.
    This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the
    scanner, if the scanner's recursive flag says that we should.
get_internal_path ()
get_labspath ()
    Get the absolute path of the file.
get_max_drift_csig () → Optional[ str ]
    Returns the content signature currently stored for this node if it's been unmodified longer than the max_drift value,
    or the max_drift value is 0. Returns None otherwise.
get_ninfo ()
get_path (dir=None)
    Return path relative to the current working directory of the Node.FS.Base object that owns us.
get_path_elements ()
get_relpath ()
    Get the path of the file relative to the root SConstruct file's directory.
get_size () → int
get_source_scanner (node)
    Fetch the source scanner for the specified node
    NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.
    Implies self.has_builder() is true; again, expect to only be called from locations where this is already verified.
    This function may be called very often; it attempts to cache the scanner found to improve performance.
get_state ()
get_stored_implicit ()
    Fetch the stored implicit dependencies
get_stored_info ()
get_string (for_signature)
    This is a convenience function designed primarily to be used in command generators (i.e.,
    CommandGeneratorActions or Environment variables that are callable), which are called with a for_signature
    argument that is nonzero if the command generator is being called to generate a signature for the command line,
    which determines if we should rebuild or not.
    Such command generators should use this method in preference to str(Node) when converting a Node to a string,
    passing in the for_signature parameter, such that we will call Node.for_signature() or str(Node) properly,
    depending on whether we are calculating a signature or actually constructing a command line.
get_subst_proxy ()
    This method is expected to return an object that will function exactly like this Node, except that it implements any
    additional special features that we would like to be in effect for Environment variable substitution. The principle use
    is that some Nodes would like to implement a __getattr__() method, but putting that in the Node type itself has a
    tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method
    to return self if no new functionality is needed for Environment substitution.
get_suffix ()
get_target_scanner ()
get_text_contents () → str
    Return the contents of the file in text form.
    This attempts to figure out what the encoding of the text is based upon the BOM bytes, and then decodes the
    contents so that it's a valid python string.

```

## SCons.Node package

`get_timestamp ()` → int

`get_tpath ()`

`getmtime ()`

`getsize ()`

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly (“if node.builder: ...”). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`has_src_builder ()`

Return whether this Node has a source builder or not.

If this Node doesn’t have an explicit source code builder, this is where we figure out, on the fly, if there’s a transparent source code builder for it.

Note that if we found a source builder, we also set the `self.builder` attribute, so that all of the methods that actually *build* this file don’t have to do anything different.

`hash_chunksize` = 65536

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

Check for whether the Node is current In all cases `self` is the target we’re checking to see if it’s up to date

`isdir ()`

`isfile ()`

`islink ()`

`linked`

`lstat ()`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly (“if node.builder: ...”). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the



`__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`must_be_same (klass)`  
 This node, which already existed, is being looked up as the specified klass. Raise an exception if it isn't.

`name`  
`new_binfo ()`  
`new_ninfo ()`  
`ninfo`  
`nocache`  
`noclean`  
`on_disk_entries`  
`postprocess ()`  
 Clean up anything we don't need to hang onto after we've been built.

`precious`  
`prepare ()`  
 Prepare for this file to be created.

`prerequisites`  
`pseudo`  
`push_to_cache ()`  
 Try to push the node into a cache

`ref_count`  
`rel_path (other)`  
`release_target_info ()`  
 Called just after this node has been marked up-to-date or was built completely.  
 This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.  
 We'd like to remove a lot more attributes like `self.sources` and `self.sources_set`, but they might get used in a next build step. For example, during configuration the source files for a built `E{*}.o` file are used to figure out which linker to use for the resulting Program (`gcc` vs. `g++`)! That's why we check for the 'keep\_targetinfo' attribute, config Nodes and the Interactive mode just don't allow an early release of most variables.  
 In the same manner, we can't simply remove the `self.attributes` here. The smart linking relies on the shared flag, and some parts of the java Tool use it to transport information about nodes...  
 @see: `built()` and `Node.release_target_info()`

`released_target_info`  
`remove ()`  
 Remove this file.

`render_include_tree ()`  
 Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

`rentry ()`  
`repositories`  
`reset_executor ()`  
 Remove cached executor; forces recompute when needed.

`retrieve_from_cache ()`  
 Try to retrieve the node's content from a cache  
 This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.  
 Returns true if the node was successfully retrieved.

`rexists ()`  
 Does this node exist locally or in a repository?

`rfile ()`  
`root`  
`rstr ()`  
 A `Node.FS.Base` object's string representation is its path name.

`sbuilder`  
`scan ()`  
 Scan this node's dependents for implicit dependencies.

## SCons.Node package

```
scanner_key ()
scanner_paths
searched
select_scanner (scanner)
    Selects a scanner for this Node.
    This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that must use
    their own Scanner and don't select one the Scanner.Selector that's configured for the target.
set_always_build (always_build=1)
    Set the Node's always_build value.
set_executor (executor)
    Set the action executor for this node.
set_explicit (is_explicit)
set_local ()
set_nocache (nocache=1)
    Set the Node's nocache value.
set_noclean (noclean=1)
    Set the Node's noclean value.
set_precious (precious=1)
    Set the Node's precious value.
set_pseudo (pseudo=True)
    Set the Node's precious value.
set_specific_source (source)
set_src_builder (builder)
    Set the source code builder for this node.
set_state (state)
side_effect
side_effects
sources
sources_set
src_builder ()
    Fetch the source code builder for this node.
    If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value
    from its parent directory, and so on up to the file system root).
srcdir
srcnode ()
    If this node is in a build path, return the node corresponding to its source file. Otherwise, return ourself.
stat ()
state
store_info
str_for_display ()
target_from_source (prefix, suffix, splitext=<function splitext>)
    Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.
    Note that this method can be overridden dynamically for generated files that need different behavior. See
    Tool/swig.py for an example.
target_peers
variant_dirs
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
wkids
class SCons.Node.FS.FileBuildInfo
    Bases: BuildInfoBase
    This is info loaded from sconsign.
Attributes unique to FileBuildInfo:
```

**dependency\_map** : *Caches file->csig mapping*

for all dependencies. Currently this is only used when using MD5-timestamp decider. It's used to ensure that we copy the correct csig from the previous build to be written to .sconsign when current build is done. Previously the matching of csig to file was strictly by order they appeared in bdepends, bsources, or bimplicit, and so a change in order or count of any of these could yield writing wrong csig, and then false positive rebuilds

bact

bactsig

bdepends

bdependssigs

bimplicit

bimplicitssigs

bsources

bsourcesigs

convert\_from\_sconsign (dir, name)

Converts a newly-read FileBuildInfo object for in-SCons use

For normal up-to-date checking, we don't have any conversion to perform—but we're leaving this method here to make that clear.

convert\_to\_sconsign ()

Converts this FileBuildInfo object for writing to a .sconsign file

This replaces each Node in our various dependency lists with its usual string representation: relative to the top-level SConstruct directory, or an absolute path if it's outside.

current\_version\_id = 2

dependency\_map

format (names=0)

merge (other)

Merge the fields of another object into this object. Already existing information is overwritten by the other instance's data. WARNING: If a '\_\_dict\_\_' slot is added, it should be updated instead of replaced.

prepare\_dependencies ()

Prepares a FileBuildInfo object for explaining what changed

The bsources, bdepends and bimplicit lists have all been stored on disk as paths relative to the top-level SConstruct directory. Convert the strings to actual Nodes (for use by the `-debug=explain` code and `-implicit-cache`).

*exception* SCons.Node.FS.FileBuildInfoFileToCsigMappingError

Bases: Exception

args

with\_traceback ()

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

*class* SCons.Node.FS.FileFinder

Bases: object

`_find_file_key` (filename, paths, verbose=None)`filedir_lookup` (p, fd=None)

A helper method for `find_file()` that looks up a directory for a file we're trying to find. This only creates the Dir Node if it exists on-disk, since if the directory doesn't exist we know we won't find any files in it... :-)

It would be more compact to just use this as a nested function with a default keyword argument (see the commented-out version below), but that doesn't work unless you have nested scopes, so we define it here just so this work under Python 1.5.2.

`find_file` (filename, paths, verbose=None)

Find a node corresponding to either a derived file or a file that exists already.

Only the first file found is returned, and none is returned if no file is found.

filename: A filename to find paths: A list of directory path *nodes* to search in. Can be represented as a list, a tuple, or a callable that is called with no arguments and returns the list or tuple.

returns The node created from the found file.

*class* SCons.Node.FS.FileNodeInfo

Bases: NodeInfoBase

`convert` (node, val)

## SCons.Node package

```
csig
current_version_id = 2
field_list = ['csig', 'timestamp', 'size']
format (field_list=None, names=0)
fs = None
merge (other)
    Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
    data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
size
str_to_node (s)
timestamp
update (node)
SCons.Node.FS.LinkFunc (target, source, env)
    Relative paths cause problems with symbolic links, so we use absolute paths, which may be a problem for people
    who want to move their soft-linked src-trees around. Those people should use the 'hard-copy' mode, softlinks cannot
    be used for that; at least I have no idea how ...
class SCons.Node.FS.LocalFS
    Bases: object
    This class implements an abstraction layer for operations involving a local file system. Essentially, this wraps any
    function in the os, os.path or shutil modules that we use to actually go do anything with or to the local file system.
    Note that there's a very good chance we'll refactor this part of the architecture in some way as we really implement
    the interface(s) for remote file system Nodes. For example, the right architecture might be to have this be a subclass
    instead of a base class. Nevertheless, we're using this as a first step in that direction.
    We're not using chdir() yet because the calling subclass method needs to use os.chdir() directly to avoid recursion.
    Will we really need this one?
    chmod (path, mode)
    copy (src, dst)
    copy2 (src, dst)
    exists (path)
    getmtime (path)
    getsize (path)
    isdir (path)
    isfile (path)
    islink (path)
    link (src, dst)
    listdir (path)
    lstat (path)
    makedirs (path, mode=511, exist_ok=False)
    mkdir (path, mode=511)
    open (path)
    readlink (file)
    rename (old, new)
    scandir (path)
    stat (path)
    symlink (src, dst)
    unlink (path)
SCons.Node.FS.LocalString (target, source, env)
SCons.Node.FS.MkdirFunc (target, source, env)
class SCons.Node.FS.RootDir (drive, fs)
    Bases: Dir
    A class for the root directory of a file system.
    This is the same as a Dir class, except that the path separator ('/' or '\') is actually part of the name, so we don't need
    to add a separator when creating the path names of entries within this directory.
    class Attrs
        Bases: object
        shared
```

```

BuildInfo
    alias of DirBuildInfo
Decider (function)
Dir (name, create=True)
    Looks up or creates a directory node named 'name' relative to this directory.
Entry (name)
    Looks up or creates an entry node named 'name' relative to this directory.
File (name)
    Looks up or creates a file node named 'name' relative to this directory.
GetTag (key)
    Return a user-defined tag.
NodeInfo
    alias of DirNodeInfo
RDirs (pathlist)
    Search for a list of directories in the Repository list.
Rfindalldirs (pathlist)
    Return all of the directories for a given path list, including corresponding "backing" directories in any repositories.
    The Node lookups are relative to this Node (typically a directory), so memoizing result saves cycles from looking up
    the same path for each target in a given directory.
Tag (key, value)
    Add a user-defined tag.
_Rfindalldirs_key (pathlist)
_abstractmethod
_add_child (collection, set, child)
    Adds 'child' to 'collection', first checking 'set' to see if it's already present.
_children_get ()
_children_reset ()
_create ()
    Create this directory, silently and without worrying about whether the builder is the default or not.
_func_exists
_func_get_contents
_func_is_derived
_func_rexists
_func_sconsign
_func_target_from_source
_get_scanner (env, initial_scanner, root_node_scanner, kw)
_get_str ()
_glob1 (pattern, ondisk=True, source=False, strings=False)
    Globs for and returns a list of entry names matching a single pattern in this directory.
    This searches any repositories and source directories for corresponding entries and returns a Node (or string)
    relative to the current directory if an entry is found anywhere.
    TODO: handle pattern with no wildcard
_labspath
_local
_lookupDict
_lookup_abs (p, klass, create=1)
    Fast (?) lookup of a normalized absolute path.
    This method is intended for use by internal lookups with already-normalized path data. For general-purpose
    lookups, use the FS.Entry(), FS.Dir() or FS.File() methods.
    The caller is responsible for making sure we're passed a normalized absolute path; we merely let Python's
    dictionary look up and return the One True Node.FS object for the path.
    If a Node for the specified "p" doesn't already exist, and "create" is specified, the Node may be created after
    recursive invocation to find or create the parent directory or directories.
_memo
_morph ()

```

## SCons.Node package

Turn a file system Node (either a freshly initialized directory object or a separate Entry object) into a proper directory object.

Set up this directory's entries and hook it into the file system tree. Specify that directories (this Node) don't use signatures for calculating whether they're current.

`_path`  
`_path_elements`  
`_proxy`  
`_rel_path_key (other)`  
`_save_str ()`  
`_sconsign`  
`_specific_sources`  
`_srcdir_find_file_key (filename)`  
`_tags`  
`_tpath`  
`abspath`  
`addRepository (dir)`  
`add_dependency (depend)`  
    Adds dependencies.  
`add_ignore (depend)`  
    Adds dependencies to ignore.  
`add_prerequisite (prerequisite)`  
    Adds prerequisites  
`add_source (source)`  
    Adds sources.  
`add_to_implicit (deps)`  
`add_to_waiting_parents (node)`  
    Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)  
`add_to_waiting_s_e (node)`  
`add_wkid (wkid)`  
    Add a node to the list of kids waiting to be evaluated  
`all_children (scan=1)`  
    Return a list of all the node's direct children.  
`alter_targets ()`  
    Return any corresponding targets in a variant directory.  
`always_build`  
`attributes`  
`binfo`  
`build (**kw)`  
    A null "builder" for directories.  
`builder`  
`builder_set (builder)`  
`built ()`  
    Called just after this node is successfully built.  
`cached`  
`cachedir_csig`  
`cachesig`  
`changed (node=None, allowcache=False)`  
    Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.  
    Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an #included .h file) is updated.

The allowcache option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this changed method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to changed().

@see: FS.File.changed(), FS.File.release\_target\_info()

changed\_since\_last\_build

check\_attributes (name)

Simple API to check if the node.attributes for name has been set

children (scan=1)

Return a list of the node's direct children, minus those that are ignored by this node.

children\_are\_up\_to\_date ()

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The SCons.Node.Alias and SCons.Node.Python.Value subclasses rebind their current() method to this method.

clear ()

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

clear\_memoized\_values ()

contentsig

cwd

del\_binfo ()

Delete the build info from this node.

depends

depends\_set

dir

dir\_on\_disk (name)

dirname

disambiguate (must\_exist=None)

diskcheck\_match ()

do\_duplicate (src)

duplicate

entries

entry\_abspath (name)

entry\_exists\_on\_disk (name)

Searches through the file/dir entries of the current directory, and returns True if a physical entry with the given name could be found.

@see reentry\_exists\_on\_disk

entry\_labspath (name)

entry\_path (name)

entry\_tpath (name)

env

env\_set (env, safe=0)

executor

executor\_cleanup ()

Let the executor clean up any cached information.

exists ()

Does this node exist?

explain ()

file\_on\_disk (name)

for\_signature ()

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the \_\_str\_\_() method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of str() to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

fs



Reference to parent Node.FS object

`getRepositories ()`  
Returns a list of repositories for this directory.

`get_abspath () → str`  
Get the absolute path of the file.

`get_all_rdirs ()`

`get_binfo ()`  
Fetch a node's build information.  
`node` - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature  
This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`  
Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`  
Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`  
Return the set builder, or a specified default value

`get_cachedir_csig ()`

`get_contents ()`  
Return content signatures and names of all our children separated by new-lines. Ensure that the nodes are sorted.

`get_csig ()`  
Compute the content signature for Directory nodes. In general, this is not needed and the content signature is not stored in the DirNodeInfo. However, if `get_contents` on a Dir node is called which has a child directory, the child directory should return the hash of its contents.

`get_dir ()`

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`  
Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`  
Return this directory's implicit dependencies.  
We don't bother caching the results because the scan typically shouldn't be requested more than once (as opposed to scanning .h file contents, which can be requested as many times as the files is #included by other files).

`get_implicit_deps (env, initial_scanner, path_func, kw={})`  
Return a list of implicit dependencies for this node.  
This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_internal_path ()`

`get_labspath () → str`  
Get the absolute path of the file.

`get_ninfo ()`

`get_path (dir=None)`  
Return path relative to the current working directory of the Node.FS.Base object that owns us.

`get_path_elements ()`

`get_relpath ()`  
Get the path of the file relative to the root SConstruct file's directory.

`get_source_scanner (node)`  
Fetch the source scanner for the specified node  
NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.  
Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.  
This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`  
Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_text_contents ()`

We already emit things in text, so just return the binary version.

`get_timestamp ()` → int

Return the latest timestamp from among our children

`get_tpath ()`

`getmtime ()`

`getsize ()`

`glob (pathname, ondisk=True, source=False, strings=False, exclude=None)`

Returns a list of Nodes (or strings) matching a specified pathname pattern.

Pathname patterns follow UNIX shell semantics: `*` matches any-length strings of any characters, `?` matches any character, and `[]` can enclose lists or ranges of characters. Matches do not span directory separators.

The matches take into account Repositories, returning local Nodes if a corresponding entry exists in a Repository (either an in-memory Node or something on disk).

By default, the `glob()` function matches entries that exist on-disk, in addition to in-memory Nodes. Setting the “`ondisk`” argument to `False` (or some other non-true value) causes the `glob()` function to only match in-memory Nodes. The default behavior is to return both the on-disk and in-memory Nodes.

The “`source`” argument, when true, specifies that corresponding source Nodes must be returned if you’re globbing in a build directory (initialized with `VariantDir()`). The default behavior is to return Nodes local to the `VariantDir()`.

The “`strings`” argument, when true, returns the matches as strings, not Nodes. The strings are path names relative to this directory.

The “`exclude`” argument, if not `None`, must be a pattern or a list of patterns following the same UNIX shell semantics. Elements matching a least one pattern of this list will be excluded from the result.

The underlying algorithm is adapted from the `glob.glob()` function in the Python library (but heavily modified), and uses `fnmatch()` under the covers.

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly (“if `node.builder: ...`”). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when duplicate=0 and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

If any child is not up-to-date, then this directory isn't, either.

`isdir ()`

`isfile ()`

`islink ()`

`link (srcdir, duplicate)`

Set this directory as the variant directory for the supplied source directory.

`linked`

`lstat ()`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`must_be_same (klass)`

This node, which already existed, is being looked up as the specified klass. Raise an exception if it isn't.

`name`

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`on_disk_entries`

`path`

`postprocess ()`

Clean up anything we don't need to hang onto after we've been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

## SCons.Node package

prerequisites

pseudo

push\_to\_cache ()

Try to push a node into a cache

rdir ()

ref\_count

rel\_path (other)

Return a path to “other” relative to this directory.

release\_target\_info ()

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: built() and File.release\_target\_info()

released\_target\_info

remove ()

Remove this Node: no-op by default.

render\_include\_tree ()

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

rentry ()

rentry\_exists\_on\_disk (name)

Searches through the file/dir entries of the current *and* all its remote directories (repos), and returns True if a physical entry with the given name could be found. The local directory (self) gets searched first, so repositories take a lower precedence regarding the searching order.

@see entry\_exists\_on\_disk

repositories

reset\_executor ()

Remove cached executor; forces recompute when needed.

retrieve\_from\_cache ()

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in built().

Returns true if the node was successfully retrieved.

rexists ()

Does this node exist locally or in a repository?

rfile ()

root

rstr ()

A Node.FS.Base object's string representation is its path name.

sbuilder

scan ()

Scan this node's dependents for implicit dependencies.

scanner\_key ()

A directory does not get scanned.

scanner\_paths

sconsign ()

Return the .sconsign file info for this directory.

searched

select\_scanner (scanner)

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that *must* use their own Scanner and don't select one the Scanner.Selector that's configured for the target.

set\_always\_build (always\_build=1)

Set the Node's always\_build value.

set\_executor (executor)

```

    Set the action executor for this node.
set_explicit (is_explicit)
set_local ()
set_nocache (nocache=1)
    Set the Node's nocache value.
set_noclean (noclean=1)
    Set the Node's noclean value.
set_precious (precious=1)
    Set the Node's precious value.
set_pseudo (pseudo=True)
    Set the Node's precious value.
set_specific_source (source)
set_src_builder (builder)
    Set the source code builder for this node.
set_state (state)
side_effect
side_effects
sources
sources_set
src_builder ()
    Fetch the source code builder for this node.
    If there isn't one, we cache the source code builder specified for the directory (which in turn will cache the value
    from its parent directory, and so on up to the file system root).
srcdir
srcdir_duplicate (name)
srcdir_find_file (filename)
srcdir_list ()
srcnode ()
    Dir has a special need for srcnode()...if we have a srcdir attribute set, then that is our srcnode.
stat ()
state
store_info
str_for_display ()
target_from_source (prefix, suffix, splittest=<function splittest>)
    Generates a target entry that corresponds to this entry (usually a source file) with the specified prefix and suffix.
    Note that this method can be overridden dynamically for generated files that need different behavior. See
    Tool/swig.py for an example.
target_peers
up ()
variant_dirs
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
walk (func, arg)
    Walk this directory tree by calling the specified function for each directory in the tree.
    This behaves like the os.path.walk() function, but for in-memory Node.FS.Dir objects. The function takes the same
    arguments as the functions passed to os.path.walk():

        func(arg, dirname, fnames)
    Except that "dirname" will actually be the directory Node, not the string. The '.' and '..' entries are excluded from
    fnames. The fnames list may be modified in-place to filter the subdirectories visited or otherwise impose a specific
    order. The "arg" argument is always passed to func() and may be used in any way (or ignored, passing None is
    common).
wkids
SCons.Node.FS.UnlinkFunc (target, source, env)
class SCons.Node.FS._Null

```

## SCons.Node package

Bases: object

SCons.Node.FS.\_classEntry

alias of Entry

SCons.Node.FS.\_copy\_func (fs, src, dest)

SCons.Node.FS.\_hardlink\_func (fs, src, dst)

SCons.Node.FS.\_my\_normcase (x)

SCons.Node.FS.\_my\_splitdrive (p)

SCons.Node.FS.\_softlink\_func (fs, src, dst)

SCons.Node.FS.diskcheck\_types ()

SCons.Node.FS.do\_diskcheck\_match (node, predicate, errorfmt)

SCons.Node.FS.find\_file (filename, paths, verbose=None)

Find a node corresponding to either a derived file or a file that exists already.

Only the first file found is returned, and none is returned if no file is found.

filename: A filename to find paths: A list of directory path *nodes* to search in. Can be represented as a list, a tuple, or a callable that is called with no arguments and returns the list or tuple.

returns The node created from the found file.

SCons.Node.FS.get\_MkdirBuilder ()

SCons.Node.FS.get\_default\_fs ()

SCons.Node.FS.has\_glob\_magic (s)

SCons.Node.FS.ignore\_diskcheck\_match (node, predicate, errorfmt)

SCons.Node.FS.initialize\_do\_splitdrive ()

SCons.Node.FS.invalidate\_node\_memos (targets)

Invalidate the memoized values of all Nodes (files or directories) that are associated with the given entries. Has been added to clear the cache of nodes affected by a direct execution of an action (e.g. Delete/Copy/Chmod). Existing Node caches become inconsistent if the action is run through Execute(). The argument *targets* can be a single Node object or filename, or a sequence of Nodes/filenames.

SCons.Node.FS.needs\_normpath\_match (string, pos=0, endpos=9223372036854775807)

Matches zero or more characters at the beginning of the string.

SCons.Node.FS.save\_strings (val)

SCons.Node.FS.sconsign\_dir (node)

Return the .sconsign file info for this directory, creating it first if necessary.

SCons.Node.FS.sconsign\_none (node)

SCons.Node.FS.set\_diskcheck (list)

SCons.Node.FS.set\_duplicate (duplicate)

## SCons.Node.Python module

Python nodes.

class SCons.Node.Python.Value (value, built\_value=None, name=None)

Bases: Node

A class for Python variables, typically passed on the command line or generated by a script, but not from a file or some other source.

class Attrs

Bases: object

shared

BuildInfo

alias of ValueBuildInfo

Decider (function)

GetTag (key)

Return a user-defined tag.

NodeInfo

alias of ValueNodeInfo

Tag (key, value)

Add a user-defined tag.

\_add\_child (collection, set, child)

Adds 'child' to 'collection', first checking 'set' to see if it's already present.

## SCons.Node package

`_children_get ()`  
`_children_reset ()`  
`_func_exists`  
`_func_get_contents`  
`_func_is_derived`  
`_func_rexists`  
`_func_target_from_source`  
`_get_scanner (env, initial_scanner, root_node_scanner, kw)`  
`_memo`  
`_specific_sources`  
`_tags`  
`add_dependency (depend)`  
    Adds dependencies.  
`add_ignore (depend)`  
    Adds dependencies to ignore.  
`add_prerequisite (prerequisite)`  
    Adds prerequisites  
`add_source (source)`  
    Adds sources.  
`add_to_implicit (deps)`  
`add_to_waiting_parents (node)`  
    Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note that the returned values are intended to be used to increment a reference count, so don't think you can "clean up" this function by using True and False instead...)  
`add_to_waiting_s_e (node)`  
`add_wkid (wkid)`  
    Add a node to the list of kids waiting to be evaluated  
`all_children (scan=1)`  
    Return a list of all the node's direct children.  
`alter_targets ()`  
    Return a list of alternate targets for this Node.  
`always_build`  
`attributes`  
`binfo`  
`build (**kw)`  
    Actually build the node.  
    This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the `prepare()` method has gotten everything, uh, prepared.  
    This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.  
`builder`  
`builder_set (builder)`  
`built ()`  
    Called just after this node is successfully built.  
`cached`  
`changed (node=None, allowcache=False)`  
    Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.  
    Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an `#included .h` file) is updated.  
    The `allowcache` option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this `changed` method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to `changed()`.  
    @see: `FS.File.changed()`, `FS.File.release_target_info()`



## SCons.Node package

changed\_since\_last\_build

check\_attributes (name)

Simple API to check if the node.attributes for name has been set

children (scan=1)

Return a list of the node's direct children, minus those that are ignored by this node.

children\_are\_up\_to\_date ()

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The SCons.Node.Alias and SCons.Node.Python.Value subclasses rebind their current() method to this method.

clear ()

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

clear\_memoized\_values ()

del\_binfo ()

Delete the build info from this node.

depends

depends\_set

disambiguate (must\_exist=None)

env

env\_set (env, safe=0)

executor

executor\_cleanup ()

Let the executor clean up any cached information.

exists ()

Does this node exist?

explain ()

for\_signature ()

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the \_\_str\_\_() method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of str() to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

get\_abspath ()

Return an absolute path to the Node. This will return simply str(Node) by default, but for Node types that have a concept of relative path, this might return something different.

get\_binfo ()

Fetch a node's build information.

node - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

get\_build\_env ()

Fetch the appropriate Environment to build this node.

get\_build\_scanner\_path (scanner)

Fetch the appropriate scanner path for this node.

get\_builder (default\_builder=None)

Return the set builder, or a specified default value

get\_cachedir\_csig ()

get\_contents () → bytes

Get contents for signature calculations.

get\_csig (calc=None)

Because we're a Python value node and don't have a real timestamp, we get to ignore the calculator and just use the value contents.

Returns string. Ideally string of hex digits. (Not bytes)

get\_env ()

`get_env_scanner (env, kw={})`

`get_executor (create=1)`

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`

Return the scanned include lines (implicit dependencies) found in this node.

The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`

Return a list of implicit dependencies for this node.

This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_ninfo ()`

`get_source_scanner (node)`

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`

Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`get_text_contents ()` → str

By the assumption that the `node.built_value` is a deterministic product of the sources, the contents of a Value are the concatenation of all the contents of its sources. As the value need not be built when `get_contents()` is called, we cannot use the actual `node.built_value`.

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if `node.builder: ...`"). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

## SCons.Node package

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_under (dir)`

`is_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`linked`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`postprocess ()`

Clean up anything we don't need to hang onto after we've been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the `BuildInfo` structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the `BuildInfo` structure.

`prerequisites`

`pseudo`

`push_to_cache ()`

Try to push a node into a cache

`read ()`

Return the value. If necessary, the value is built.

`ref_count`

`release_target_info ()`

Called just after this node has been marked up-to-date or was built completely.

## SCons.Node package

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: `built()` and `File.release_target_info()`

`remove ()`

Remove this Node: no-op by default.

`render_include_tree ()`

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

`reset_executor ()`

Remove cached executor; forces recompute when needed.

`retrieve_from_cache ()`

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

Returns true if the node was successfully retrieved.

`rexists ()`

Does this node exist locally or in a repository?

`scan ()`

Scan this node's dependents for implicit dependencies.

`scanner_key ()`

`select_scanner (scanner)`

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, `Node.FS.Dir`) that *must* use their own `Scanner` and don't select one the `Scanner.Selector` that's configured for the target.

`set_always_build (always_build=1)`

Set the Node's `always_build` value.

`set_executor (executor)`

Set the action executor for this node.

`set_explicit (is_explicit)`

`set_nocache (nocache=1)`

Set the Node's `nocache` value.

`set_noclean (noclean=1)`

Set the Node's `noclean` value.

`set_precious (precious=1)`

Set the Node's `precious` value.

`set_pseudo (pseudo=True)`

Set the Node's `precious` value.

`set_specific_source (source)`

`set_state (state)`

`side_effect`

`side_effects`

`sources`

`sources_set`

`state`

`store_info`

`str_for_display ()`

`target_peers`

`visited ()`

Called just after this node has been visited (with or without a build).

`waiting_parents`

`waiting_s_e`

`wkids`

`write (built_value)`

Set the value of the node.

`class SCons.Node.Python.ValueBuildInfo`

## SCons.Node package

```
Bases: BuildInfoBase
bact
bactsig
bdepends
bdependsigns
bimplicit
bimplicitsigns
bsources
bsourcesigns
current_version_id = 2
merge(other)
    Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
    data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
class SCons.Node.Python.ValueNodeInfo
    Bases: NodeInfoBase
    convert(node, val)
    csig
    current_version_id = 2
    field_list = ['csig']
    format(field_list=None, names=0)
    merge(other)
        Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
        data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
    str_to_node(s)
    update(node)
SCons.Node.Python.ValueWithMemo(value, built_value=None, name=None)
    Memoized Value() node factory.
```

## Module contents

The Node package for the SCons software construction utility.

This is, in many ways, the heart of SCons.

A Node is where we encapsulate all of the dependency information about any thing that SCons can build, or about any thing which SCons can use to build some other thing. The canonical “thing,” of course, is a file, but a Node can also represent something remote (like a web page) or something completely abstract (like an Alias).

Each specific type of “thing” is specifically represented by a subclass of the Node base class: Node.FS.File for files, Node.Alias for aliases, etc. Dependency information is kept here in the base class, and information specific to files/aliases/etc. is in the subclass. The goal, if we’ve done this correctly, is that any type of “thing” should be able to depend on any other type of “thing.”

SCons.Node.Annotate(node)

class SCons.Node.BuildInfoBase

Bases: object

The generic base class for build information for a Node.

This is what gets stored in a .sconsign file for each target file. It contains a NodeInfo instance for this node (signature information that’s specific to the type of Node) and direct attributes for the generic build stuff we have to track: sources, explicit dependencies, implicit dependencies, and action information.

```
bact
bactsig
bdepends
bdependsigns
bimplicit
bimplicitsigns
bsources
bsourcesigns
current_version_id = 2
```

## SCons.Node package

```
merge (other)
    Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
    data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
class SCons.Node.Node
    Bases: object
    The base Node class, for entities that we know how to build, or use to build other Nodes.
    class Attrs
        Bases: object
        shared
    BuildInfo
        alias of BuildInfoBase
    Decider (function)
    GetTag (key)
        Return a user-defined tag.
    NodeInfo
        alias of NodeInfoBase
    Tag (key, value)
        Add a user-defined tag.
    _add_child (collection, set, child)
        Adds 'child' to 'collection', first checking 'set' to see if it's already present.
    _children_get ()
    _children_reset ()
    _func_exists
    _func_get_contents
    _func_is_derived
    _func_rexists
    _func_target_from_source
    _get_scanner (env, initial_scanner, root_node_scanner, kw)
    _memo
    _specific_sources
    _tags
    add_dependency (depend)
        Adds dependencies.
    add_ignore (depend)
        Adds dependencies to ignore.
    add_prerequisite (prerequisite)
        Adds prerequisites
    add_source (source)
        Adds sources.
    add_to_implicit (deps)
    add_to_waiting_parents (node)
        Returns the number of nodes added to our waiting parents list: 1 if we add a unique waiting parent, 0 if not. (Note
        that the returned values are intended to be used to increment a reference count, so don't think you can "clean up"
        this function by using True and False instead...)
    add_to_waiting_s_e (node)
    add_wkid (wkid)
        Add a node to the list of kids waiting to be evaluated
    all_children (scan=1)
        Return a list of all the node's direct children.
    alter_targets ()
        Return a list of alternate targets for this Node.
    always_build
    attributes
    binfo
    build (**kw)
        Actually build the node.
```

This is called by the Taskmaster after it's decided that the Node is out-of-date and must be rebuilt, and after the `prepare()` method has gotten everything, uh, prepared.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `built()`.

`builder`

`builder_set (builder)`

`built ()`

Called just after this node is successfully built.

`cached`

`changed (node=None, allowcache=False)`

Returns if the node is up-to-date with respect to the BuildInfo stored last time it was built. The default behavior is to compare it against our own previously stored BuildInfo, but the stored BuildInfo from another Node (typically one in a Repository) can be used instead.

Note that we now *always* check every dependency. We used to short-circuit the check by returning as soon as we detected any difference, but we now rely on checking every dependency to make sure that any necessary Node information (for example, the content signature of an `#included .h` file) is updated.

The `allowcache` option was added for supporting the early release of the executor/builder structures, right after a File target was built. When set to true, the return value of this `changed` method gets cached for File nodes. Like this, the executor isn't needed any longer for subsequent calls to `changed()`.

@see: `FS.File.changed()`, `FS.File.release_target_info()`

`changed_since_last_build`

`check_attributes (name)`

Simple API to check if the node.attributes for name has been set

`children (scan=1)`

Return a list of the node's direct children, minus those that are ignored by this node.

`children_are_up_to_date ()`

Alternate check for whether the Node is current: If all of our children were up-to-date, then this Node was up-to-date, too.

The `SCons.Node.Alias` and `SCons.Node.Python.Value` subclasses rebind their `current()` method to this method.

`clear ()`

Completely clear a Node of all its cached state (so that it can be re-evaluated by interfaces that do continuous integration builds).

`clear_memoized_values ()`

`del_binfo ()`

Delete the build info from this node.

`depends`

`depends_set`

`disambiguate (must_exist=None)`

`env`

`env_set (env, safe=0)`

`executor`

`executor_cleanup ()`

Let the executor clean up any cached information.

`exists ()`

Does this node exist?

`explain ()`

`for_signature ()`

Return a string representation of the Node that will always be the same for this particular Node, no matter what. This is by contrast to the `__str__()` method, which might, for instance, return a relative path for a file Node. The purpose of this method is to generate a value to be used in signature calculation for the command line used to build a target, and we use this method instead of `str()` to avoid unnecessary rebuilds. This method does not need to return something that would actually work in a command line; it can return any kind of nonsense, so long as it does not change.

`get_abspath ()`

Return an absolute path to the Node. This will return simply `str(Node)` by default, but for Node types that have a concept of relative path, this might return something different.



`get_binfo ()`

Fetch a node's build information.

`node` - the node whose sources will be collected cache - alternate node to use for the signature cache returns - the build signature

This no longer handles the recursive descent of the node's children's signatures. We expect that they're already built and updated by someone else, if that's what's wanted.

`get_build_env ()`

Fetch the appropriate Environment to build this node.

`get_build_scanner_path (scanner)`

Fetch the appropriate scanner path for this node.

`get_builder (default_builder=None)`

Return the set builder, or a specified default value

`get_cachedir_csig ()`

`get_contents ()`

Fetch the contents of the entry.

`get_csig ()`

`get_env ()`

`get_env_scanner (env, kw={})`

`get_executor (create=1)`

Fetch the action executor for this node. Create one if there isn't already one, and requested to do so.

`get_found_includes (env, scanner, path)`

Return the scanned include lines (implicit dependencies) found in this node.

The default is no implicit dependencies. We expect this method to be overridden by any subclass that can be scanned for implicit dependencies.

`get_implicit_deps (env, initial_scanner, path_func, kw={})`

Return a list of implicit dependencies for this node.

This method exists to handle recursive invocation of the scanner on the implicit dependencies returned by the scanner, if the scanner's recursive flag says that we should.

`get_ninfo ()`

`get_source_scanner (node)`

Fetch the source scanner for the specified node

NOTE: "self" is the target being built, "node" is the source file for which we want to fetch the scanner.

Implies `self.has_builder()` is true; again, expect to only be called from locations where this is already verified.

This function may be called very often; it attempts to cache the scanner found to improve performance.

`get_state ()`

`get_stored_implicit ()`

Fetch the stored implicit dependencies

`get_stored_info ()`

`get_string (for_signature)`

This is a convenience function designed primarily to be used in command generators (i.e., `CommandGeneratorActions` or Environment variables that are callable), which are called with a `for_signature` argument that is nonzero if the command generator is being called to generate a signature for the command line, which determines if we should rebuild or not.

Such command generators should use this method in preference to `str(Node)` when converting a Node to a string, passing in the `for_signature` parameter, such that we will call `Node.for_signature()` or `str(Node)` properly, depending on whether we are calculating a signature or actually constructing a command line.

`get_subst_proxy ()`

This method is expected to return an object that will function exactly like this Node, except that it implements any additional special features that we would like to be in effect for Environment variable substitution. The principle use is that some Nodes would like to implement a `__getattr__()` method, but putting that in the Node type itself has a tendency to kill performance. We instead put it in a proxy and return it from this method. It is legal for this method to return self if no new functionality is needed for Environment substitution.

`get_suffix ()`

`get_target_scanner ()`

`has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`has_explicit_builder ()`

Return whether this Node has an explicit builder

This allows an internal Builder created by SCons to be marked non-explicit, so that it can be overridden by an explicit builder that the user supplies (the canonical example being directories).

`ignore`

`ignore_set`

`implicit`

`implicit_set`

`includes`

`is_conftest ()`

Returns true if this node is an conftest node

`is_derived ()`

Returns true if this node is derived (i.e. built).

This should return true only for nodes whose path should be in the variant directory when `duplicate=0` and should contribute their build signatures when they are used as source files to other derived files. For example: source with source builders are not derived in this sense, and hence should not return true.

`is_explicit`

`is_literal ()`

Always pass the string representation of a Node to the command interpreter literally.

`is_sconscript ()`

Returns true if this node is an sconscript

`is_up_to_date ()`

Default check for whether the Node is current: unknown Node subtypes are always out of date, so they will always get built.

`linked`

`make_ready ()`

Get a Node ready for evaluation.

This is called before the Taskmaster decides if the Node is up-to-date or not. Overriding this method allows for a Node subclass to be disambiguated if necessary, or for an implicit source builder to be attached.

`missing ()`

`multiple_side_effect_has_builder ()`

Return whether this Node has a builder or not.

In Boolean tests, this turns out to be a *lot* more efficient than simply examining the builder attribute directly ("if node.builder: ..."). When the builder attribute is examined directly, it ends up calling `__getattr__` for both the `__len__` and `__bool__` attributes on instances of our Builder Proxy class(es), generating a bazillion extra calls and slowing things down immensely.

`new_binfo ()`

`new_ninfo ()`

`ninfo`

`nocache`

`noclean`

`postprocess ()`

Clean up anything we don't need to hang onto after we've been built.

`precious`

`prepare ()`

Prepare for this Node to be built.

This is called after the Taskmaster has decided that the Node is out-of-date and must be rebuilt, but before actually calling the method to build the Node.

This default implementation checks that explicit or implicit dependencies either exist or are derived, and initializes the BuildInfo structure that will hold the information about how this node is, uh, built.

(The existence of source files is checked separately by the Executor, which aggregates checks for all of the targets built by a specific action.)

Overriding this method allows for for a Node subclass to remove the underlying file from the file system. Note that subclass methods should call this base class method to get the child check and the BuildInfo structure.

prerequisites

pseudo

push\_to\_cache ()

Try to push a node into a cache

ref\_count

release\_target\_info ()

Called just after this node has been marked up-to-date or was built completely.

This is where we try to release as many target node infos as possible for clean builds and update runs, in order to minimize the overall memory consumption.

By purging attributes that aren't needed any longer after a Node (=File) got built, we don't have to care that much how many KBytes a Node actually requires...as long as we free the memory shortly afterwards.

@see: built() and File.release\_target\_info()

remove ()

Remove this Node: no-op by default.

render\_include\_tree ()

Return a text representation, suitable for displaying to the user, of the include tree for the sources of this node.

reset\_executor ()

Remove cached executor; forces recompute when needed.

retrieve\_from\_cache ()

Try to retrieve the node's content from a cache

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in built().

Returns true if the node was successfully retrieved.

rexists ()

Does this node exist locally or in a repository?

scan ()

Scan this node's dependents for implicit dependencies.

scanner\_key ()

select\_scanner (scanner)

Selects a scanner for this Node.

This is a separate method so it can be overridden by Node subclasses (specifically, Node.FS.Dir) that *must* use their own Scanner and don't select one the Scanner.Selector that's configured for the target.

set\_always\_build (always\_build=1)

Set the Node's always\_build value.

set\_executor (executor)

Set the action executor for this node.

set\_explicit (is\_explicit)

set\_nocache (nocache=1)

Set the Node's nocache value.

set\_noclean (noclean=1)

Set the Node's noclean value.

set\_precious (precious=1)

Set the Node's precious value.

set\_pseudo (pseudo=True)

Set the Node's precious value.

set\_specific\_source (source)

set\_state (state)

side\_effect

side\_effects

sources

sources\_set

state

store\_info

target\_peers

## SCons.Node package

```
visited ()
    Called just after this node has been visited (with or without a build).
waiting_parents
waiting_s_e
wkids
class SCons.Node.NodeInfoBase
    Bases: object
    The generic base class for signature information for a Node.
    Node subclasses should subclass NodeInfoBase to provide their own logic for dealing with their own Node-specific
    signature information.
    convert (node, val)
    current_version_id = 2
    format (field_list=None, names=0)
    merge (other)
        Merge the fields of another object into this object. Already existing information is overwritten by the other instance's
        data. WARNING: If a '__dict__' slot is added, it should be updated instead of replaced.
    update (node)
class SCons.Node.NodeList (initlist=None)
    Bases: UserList
    _abc_impl = <_abc_data object>
    append (item)
        S.append(value) – append value to the end of the sequence
    clear () → None -- remove all items from S
    copy ()
    count (value) → integer -- return number of occurrences of value
    extend (other)
        S.extend(iterable) – extend sequence by appending elements from the iterable
    index (value[, start[, stop]]) → integer -- return first index of value.
        Raises ValueError if the value is not present.
        Supporting start and stop arguments is optional, but recommended.
    insert (i, item)
        S.insert(index, value) – insert value before index
    pop ([, index]) → item -- remove and return item at index (default last).
        Raise IndexError if list is empty or index is out of range.
    remove (item)
        S.remove(value) – remove first occurrence of value. Raise ValueError if the value is not present.
    reverse ()
        S.reverse() – reverse IN PLACE
    sort (*args, **kwargs)
class SCons.Node.Walker (node, kids_func=<function get_children>, cycle_func=<function
ignore_cycle>, eval_func=<function do_nothing>)
    Bases: object
    An iterator for walking a Node tree.
    This is depth-first, children are visited before the parent. The Walker object can be initialized with any node, and
    returns the next node on the descent with each get_next() call. get the children of a node instead of calling 'children'.
    'cycle_func' is an optional function that will be called when a cycle is detected.
    This class does not get caught in node cycles caused, for example, by C header file include loops.
    get_next ()
        Return the next node for this walk of the tree.
        This function is intentionally iterative, not recursive, to sidestep any issues of stack size limitations.
    is_done ()
SCons.Node.changed_since_last_build_alias (node, target, prev_ni, repo_node=None)
SCons.Node.changed_since_last_build_entry (node, target, prev_ni, repo_node=None)
SCons.Node.changed_since_last_build_node (node, target, prev_ni, repo_node=None)
```

## SCons.Platform package

Must be overridden in a specific subclass to return True if this Node (a dependency) has changed since the last time it was used to build the specified target. `prev_ni` is this Node's state (for example, its file timestamp, length, maybe content signature) as of the last time the target was built.

Note that this method is called through the dependency, not the target, because a dependency Node must be able to use its own logic to decide if it changed. For example, File Nodes need to obey if we're configured to use timestamps, but Python Value Nodes never use timestamps and always use the content. If this method were called through the target, then each Node's implementation of this method would have to have more complicated logic to handle all the different Node types on which it might depend.

`SCons.Node.changed_since_last_build_python (node, target, prev_ni, repo_node=None)`

`SCons.Node.changed_since_last_build_state_changed (node, target, prev_ni, repo_node=None)`

`SCons.Node.classname (obj)`

`SCons.Node.decide_source (node, target, prev_ni, repo_node=None)`

`SCons.Node.decide_target (node, target, prev_ni, repo_node=None)`

`SCons.Node.do_nothing (node, parent)`

`SCons.Node.do_nothing_node (node)`

`SCons.Node.exists_always (node)`

`SCons.Node.exists_base (node)`

`SCons.Node.exists_entry (node)`

Return if the Entry exists. Check the file system to see what we should turn into first. Assume a file if there's no directory.

`SCons.Node.exists_file (node)`

`SCons.Node.exists_none (node)`

`SCons.Node.get_children (node, parent)`

`SCons.Node.get_contents_dir (node)`

Return content signatures and names of all our children separated by new-lines. Ensure that the nodes are sorted.

`SCons.Node.get_contents_entry (node)`

Fetch the contents of the entry. Returns the exact binary contents of the file.

`SCons.Node.get_contents_file (node)`

`SCons.Node.get_contents_none (node)`

`SCons.Node.ignore_cycle (node, stack)`

`SCons.Node.is_derived_node (node)`

Returns true if this node is derived (i.e. built).

`SCons.Node.is_derived_none (node)`

`SCons.Node.reexists_base (node)`

`SCons.Node.reexists_node (node)`

`SCons.Node.reexists_none (node)`

`SCons.Node.store_info_file (node)`

`SCons.Node.store_info_pass (node)`

`SCons.Node.target_from_source_base (node, prefix, suffix, splitext)`

`SCons.Node.target_from_source_none (node, prefix, suffix, splitext)`

## SCons.Platform package

### Submodules

#### SCons.Platform.aix module

Platform-specific initialization for IBM AIX systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic `SCons.Platform.Platform()` selection method.

`SCons.Platform.aix.generate (env)`

`SCons.Platform.aix.get_xlc (env, xlc=None, packages=[])`

## SCons.Platform package

### SCons.Platform.cygwin module

Platform-specific initialization for Cygwin systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.cygwin.generate (env)

### SCons.Platform.darwin module

Platform-specific initialization for Mac OS X systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.darwin.generate (env)

### SCons.Platform.hpux module

Platform-specific initialization for HP-UX systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.hpux.generate (env)

### SCons.Platform.iris module

Platform-specific initialization for SGI IRIX systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.iris.generate (env)

### SCons.Platform.mingw module

Platform-specific initialization for the MinGW system.

### SCons.Platform.os2 module

Platform-specific initialization for OS/2 systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.os2.generate (env)

### SCons.Platform.posix module

Platform-specific initialization for POSIX (Linux, UNIX, etc.) systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.posix.escape (arg)

escape shell special characters

SCons.Platform.posix.exec\_popen3 (l, env, stdout, stderr)

SCons.Platform.posix.exec\_subprocess (l, env)

SCons.Platform.posix.generate (env)

SCons.Platform.posix.piped\_env\_spawn (sh, escape, cmd, args, env, stdout, stderr)

SCons.Platform.posix.subprocess\_spawn (sh, escape, cmd, args, env)

### SCons.Platform.sunos module

Platform-specific initialization for Sun systems.

## SCons.Platform package

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

SCons.Platform.sunos.generate (env)

### SCons.Platform.virtualenv module

'Platform' support for a Python virtualenv.

SCons.Platform.virtualenv.ImportVirtualenv (env)

Copies virtualenv-related environment variables from OS environment to env[ 'ENV' ] and prepends virtualenv's PATH to env[ 'ENV' ][ 'PATH' ].

SCons.Platform.virtualenv.IsInVirtualenv (path)

Returns True, if **path** is under virtualenv's home directory. If not, or if we don't use virtualenv, returns False.

SCons.Platform.virtualenv.Virtualenv ()

Returns path to the virtualenv home if scons is executing within a virtualenv or None, if not.

SCons.Platform.virtualenv.\_enable\_virtualenv\_default ()

SCons.Platform.virtualenv.\_ignore\_virtualenv\_default ()

SCons.Platform.virtualenv.\_inject\_venv\_path (env, path\_list=None)

Modify environment such that SCons will take into account its virtualenv when running external tools.

SCons.Platform.virtualenv.\_inject\_venv\_variables (env)

SCons.Platform.virtualenv.\_is\_path\_in (path, base)

Returns true if **path** is located under the **base** directory.

SCons.Platform.virtualenv.\_running\_in\_virtualenv ()

Returns True if scons is executed within a virtualenv

SCons.Platform.virtualenv.select\_paths\_in\_venv (path\_list)

Returns a list of paths from **path\_list** which are under virtualenv's home directory.

### SCons.Platform.win32 module

Platform-specific initialization for Win32 systems.

There normally shouldn't be any need to import this module directly. It will usually be imported through the generic SCons.Platform.Platform() selection method.

class SCons.Platform.win32.ArchDefinition (arch, synonyms=[])

Bases: object

Determine which windows CPU were running on. A class for defining architecture-specific settings and logic.

SCons.Platform.win32.escape (x)

SCons.Platform.win32.exec\_spawn (l, env)

SCons.Platform.win32.generate (env)

SCons.Platform.win32.get\_architecture (arch=None)

Returns the definition for the specified architecture string.

If no string is specified, the system default is returned (as defined by the PROCESSOR\_ARCHITECTURE or PROCESSOR\_ARCHITEW6432 environment variables).

SCons.Platform.win32.get\_program\_files\_dir ()

Get the location of the program files directory

SCons.Platform.win32.get\_system\_root ()

SCons.Platform.win32.piped\_spawn (sh, escape, cmd, args, env, stdout, stderr)

SCons.Platform.win32.spawn (sh, escape, cmd, args, env)

SCons.Platform.win32.spawnve (mode, file, args, env)

### Module contents

SCons platform selection.

Looks for modules that define a callable object that can modify a construction environment as appropriate for a given platform.

Note that we take a more simplistic view of "platform" than Python does. We're looking for a single string that determines a set of tool-independent variables with which to initialize a construction environment. Consequently, we'll



examine both `sys.platform` and `os.name` (and anything else that might come in to play) in order to return some specification which is unique enough for our purposes.

Note that because this subsystem just *selects* a callable that can modify a construction environment, it's possible for people to define their own "platform specification" in an arbitrary callable function. No one needs to use or tie in to this subsystem in order to roll their own platform definition.

`SCons.Platform.DefaultToolList` (`platform`, `env`)

Select a default tool list for the specified platform.

`SCons.Platform.Platform` (`name='darwin'`)

Select a canned Platform specification.

`class SCons.Platform.PlatformSpec` (`name`, `generate`)

Bases: `object`

`class SCons.Platform.TempFileMunge` (`cmd`, `cmdstr=None`)

Bases: `object`

Convert long command lines to use a temporary file.

You can set an Environment variable (usually `TEMPFILE`) to this, then call it with a string argument, and it will perform temporary file substitution on it. This is used to circumvent limitations on the length of command lines.

Example:

```
env["TEMPFILE"] = TempFileMunge
env["LINKCOM"] = "${TEMPFILE(' $LINK $TARGET $SOURCES', '$LINKCOMSTR')}
```

By default, the name of the temporary file used begins with a prefix of '@'. This may be configured for other tool chains by setting the `TEMPFILEPREFIX` variable. Example:

```
env["TEMPFILEPREFIX"] = '-@'          # diab compiler
env["TEMPFILEPREFIX"] = '-via'        # arm tool chain
env["TEMPFILEPREFIX"] = ''            # (the empty string) PC Lint
```

You can configure the extension of the temporary file through the `TEMPFILESUFFIX` variable, which defaults to '.lnk' (see comments in the code below). Example:

```
env["TEMPFILESUFFIX"] = '.lnk'      # PC Lint
```

Entries in the temporary file are separated by the value of the `TEMPFILEARGJOIN` variable, which defaults to an OS-appropriate value.

A default argument escape function is `SCons.Subst.quote_spaces`. If you need to apply extra operations on a command argument before writing to a temporary file (fix Windows slashes, normalize paths, etc.), please set `TEMPFILEARGESCFUNC` variable to a custom function. Example:

```
import sys
import re
from SCons.Subst import quote_spaces

WINPATHSEP_RE = re.compile(r"\"([^\"]|\\|$(\"\"))")

def tempfile_arg_esc_func(arg):
    arg = quote_spaces(arg)
    if sys.platform != "win32":
        return arg
    # GCC requires double Windows slashes, let's use UNIX separator
    return WINPATHSEP_RE.sub(r"/█", arg)
```

## SCons.Scanner package

```
env["TEMPFILEARGESCFUNC"] = tempfile_arg_esc_func
```

```
_print_cmd_str(target, source, env, cmdstr)
```

SCons.Platform.platform\_default ()

Return the platform string for our execution environment.

The returned value should map to one of the SCons/Platform/\*.py files. Since scons is architecture independent, though, we don't care about the machine architecture.

SCons.Platform.platform\_module (name='darwin')

Return the imported module for the platform.

This looks for a module name that matches the specified argument. If the name is unspecified, we fetch the appropriate default for our execution environment.

## SCons.Scanner package

### Submodules

#### SCons.Scanner.C module

Dependency scanner for C/C++ code.

SCons.Scanner.C.CConditionalScanner ()

Return an advanced conditional Scanner instance for scanning source files

Interprets C/C++ Preprocessor conditional syntax (#ifdef, #if, defined, #else, #elif, etc.).

SCons.Scanner.C.CScanner ()

Return a prototype Scanner instance for scanning source files that use the C pre-processor

class SCons.Scanner.C.SConsCPPConditionalScanner (\*args, \*\*kwargs)

Bases: PreProcessor

SCons-specific subclass of the cpp.py module's processing.

We subclass this so that: 1) we can deal with files represented by Nodes, not strings; 2) we can keep track of the files that are missing.

\_do\_if\_else\_condition (condition)

Common logic for evaluating the conditions on #if, #ifdef and #ifndef lines.

\_match\_tuples (tuples)

\_parse\_tuples (contents)

\_process\_tuples (tuples, file=None)

all\_include (t)

do\_define (t)

Default handling of a #define line.

do\_elif (t)

Default handling of a #elif line.

do\_else (t)

Default handling of a #else line.

do\_endif (t)

Default handling of a #endif line.

do\_if (t)

Default handling of a #if line.

do\_ifdef (t)

Default handling of a #ifdef line.

do\_ifndef (t)

Default handling of a #ifndef line.

do\_import (t)

Default handling of a #import line.

do\_include (t)

Default handling of a #include line.

do\_include\_next (t)

Default handling of a #include line.

`do_nothing (t)`  
 Null method for when we explicitly want the action for a specific preprocessor directive to do nothing.

`do_undef (t)`  
 Default handling of a #undef line.

`eval_expression (t)`  
 Evaluates a C preprocessor expression.  
 This is done by converting it to a Python equivalent and eval()ing it in the C preprocessor namespace we use to track #define values.

`finalize_result (fname)`

`find_include_file (t)`  
 Finds the #include file for a given preprocessor tuple.

`initialize_result (fname)`

`process_contents (contents)`  
 Pre-processes a file contents.  
 Is used by tests

`process_file (file)`  
 Pre-processes a file.  
 This is the main internal entry point.

`read_file (file)`

`resolve_include (t)`  
 Resolve a tuple-sized #include line.  
 This handles recursive expansion of values without "" or <> surrounding the name until an initial " or < is found, to handle #include FILE where FILE is a #define somewhere else.

`restore ()`  
 Pops the previous dispatch table off the stack and makes it the current one.

`save ()`  
 Pushes the current dispatch table on the stack and re-initializes the current dispatch table to the default.

`scons_current_file (t)`

`start_handling_includes (t=None)`  
 Causes the PreProcessor object to start processing #import, #include and #include\_next lines.  
 This method will be called when a #if, #ifdef, #ifndef or #elif evaluates True, or when we reach the #else in a #if, #ifdef, #ifndef or #elif block where a condition already evaluated False.

`stop_handling_includes (t=None)`  
 Causes the PreProcessor object to stop processing #import, #include and #include\_next lines.  
 This method will be called when a #if, #ifdef, #ifndef or #elif evaluates False, or when we reach the #else in a #if, #ifdef, #ifndef or #elif block where a condition already evaluated True.

`tupleize (contents)`  
 Turns the contents of a file into a list of easily-processed tuples describing the CPP lines in the file.  
 The first element of each tuple is the line's preprocessor directive (#if, #include, #define, etc., minus the initial '#').  
 The remaining elements are specific to the type of directive, as pulled apart by the regular expression.

`class SCons.Scanner.C.SConsCPPConditionalScannerWrapper (name, variable)`  
 Bases: object  
 The SCons wrapper around a cpp.py scanner.  
 This is the actual glue between the calling conventions of generic SCons scanners, and the (subclass of) cpp.py class that knows how to look for #include lines with reasonably real C-preprocessor-like evaluation of #if/#ifdef/#else/#elif lines.

`recurse_nodes (nodes)`

`select (node)`

`class SCons.Scanner.C.SConsCPPScanner (*args, **kwargs)`  
 Bases: PreProcessor  
 SCons-specific subclass of the cpp.py module's processing.  
 We subclass this so that: 1) we can deal with files represented by Nodes, not strings; 2) we can keep track of the files that are missing.

`_do_if_else_condition (condition)`  
 Common logic for evaluating the conditions on #if, #ifdef and #ifndef lines.

```

_match_tuples (tuples)
_parse_tuples (contents)
_process_tuples (tuples, file=None)
all_include (t)
do_define (t)
    Default handling of a #define line.
do_elif (t)
    Default handling of a #elif line.
do_else (t)
    Default handling of a #else line.
do_endif (t)
    Default handling of a #endif line.
do_if (t)
    Default handling of a #if line.
do_ifdef (t)
    Default handling of a #ifdef line.
do_ifndef (t)
    Default handling of a #ifndef line.
do_import (t)
    Default handling of a #import line.
do_include (t)
    Default handling of a #include line.
do_include_next (t)
    Default handling of a #include line.
do_nothing (t)
    Null method for when we explicitly want the action for a specific preprocessor directive to do nothing.
do_undef (t)
    Default handling of a #undef line.
eval_expression (t)
    Evaluates a C preprocessor expression.
    This is done by converting it to a Python equivalent and eval()ing it in the C preprocessor namespace we use to
    track #define values.
finalize_result (fname)
find_include_file (t)
    Finds the #include file for a given preprocessor tuple.
initialize_result (fname)
process_contents (contents)
    Pre-processes a file contents.
    Is used by tests
process_file (file)
    Pre-processes a file.
    This is the main internal entry point.
read_file (file)
resolve_include (t)
    Resolve a tuple-ized #include line.
    This handles recursive expansion of values without "" or <> surrounding the name until an initial " or < is found, to
    handle #include FILE where FILE is a #define somewhere else.
restore ()
    Pops the previous dispatch table off the stack and makes it the current one.
save ()
    Pushes the current dispatch table on the stack and re-initializes the current dispatch table to the default.
scons_current_file (t)
start_handling_includes (t=None)
    Causes the PreProcessor object to start processing #import, #include and #include_next lines.
    This method will be called when a #if, #ifdef, #ifndef or #elif evaluates True, or when we reach the #else in a #if,
    #ifdef, #ifndef or #elif block where a condition already evaluated False.

```

## SCons.Scanner package

`stop_handling_includes (t=None)`

Causes the PreProcessor object to stop processing `#import`, `#include` and `#include_next` lines.

This method will be called when a `#if`, `#ifdef`, `#ifndef` or `#elif` evaluates False, or when we reach the `#else` in a `#if`, `#ifdef`, `#ifndef` or `#elif` block where a condition already evaluated True.

`tupleize (contents)`

Turns the contents of a file into a list of easily-processed tuples describing the CPP lines in the file.

The first element of each tuple is the line's preprocessor directive (`#if`, `#include`, `#define`, etc., minus the initial `#`).

The remaining elements are specific to the type of directive, as pulled apart by the regular expression.

`class SCons.Scanner.C.SConsCPPScannerWrapper (name, variable)`

Bases: object

The SCons wrapper around a `cpp.py` scanner.

This is the actual glue between the calling conventions of generic SCons scanners, and the (subclass of) `cpp.py` class that knows how to look for `#include` lines with reasonably real C-preprocessor-like evaluation of `#if/#ifdef/#else/#elif` lines.

`recurse_nodes (nodes)`

`select (node)`

`SCons.Scanner.C.dictify_CPPDEFINES (env) → dict`

Returns CPPDEFINES converted to a dict.

## SCons.Scanner.D module

Scanner for the Digital Mars "D" programming language.

Coded by Andy Friesen, 17 Nov 2003

`class SCons.Scanner.D.D`

Bases: Classic

`static _recurse_all_nodes (nodes)`

`static _recurse_no_nodes (nodes)`

`add_scanner (skey, scanner)`

`add_skey (skey)`

Add a skey to the list of skeys

`find_include (include, source_dir, path)`

`find_include_names (node)`

`get_skeys (env=None)`

`path (env, dir=None, target=None, source=None)`

`scan (node, path=())`

`select (node)`

`static sort_key (include)`

`SCons.Scanner.D.DScanner ()`

Return a prototype Scanner instance for scanning D source files

## SCons.Scanner.Dir module

`SCons.Scanner.Dir.DirEntryScanner (**kwargs)`

Return a prototype Scanner instance for "scanning" directory Nodes for their in-memory entries

`SCons.Scanner.Dir.DirScanner (**kwargs)`

Return a prototype Scanner instance for scanning directories for on-disk files

`SCons.Scanner.Dir.do_not_scan (k)`

`SCons.Scanner.Dir.only_dirs (nodes)`

`SCons.Scanner.Dir.scan_in_memory (node, env, path=())`

"Scans" a Node.FS.Dir for its in-memory entries.

`SCons.Scanner.Dir.scan_on_disk (node, env, path=())`

Scans a directory for on-disk files and directories therein.

Looking up the entries will add these to the in-memory Node tree representation of the file system, so all we have to do is just that and then call the in-memory scanning function.

## SCons.Scanner.Fortran module

Dependency scanner for Fortran code.

```
class SCons.Scanner.Fortran.F90Scanner (name, suffixes, path_variable, use_regex, incl_regex,
def_regex, *args, **kwargs)
```

Bases: Classic

A Classic Scanner subclass for Fortran source files which takes into account both USE and INCLUDE statements. This scanner will work for both F77 and F90 (and beyond) compilers.

Currently, this scanner assumes that the include files do not contain USE statements. To enable the ability to deal with USE statements in include files, add logic right after the module names are found to loop over each include file, search for and locate each USE statement, and append each module name to the list of dependencies. Caching the search results in a common dictionary somewhere so that the same include file is not searched multiple times would be a smart thing to do.

```
static _recurse_all_nodes (nodes)
```

```
static _recurse_no_nodes (nodes)
```

```
add_scanner (skey, scanner)
```

```
add_skey (skey)
```

Add a skey to the list of skeys

```
static find_include (include, source_dir, path)
```

```
find_include_names (node)
```

```
get_skeys (env=None)
```

```
path (env, dir=None, target=None, source=None)
```

```
scan (node, env, path=())
```

```
select (node)
```

```
static sort_key (include)
```

```
SCons.Scanner.Fortran.FortranScan (path_variable='FORTRANPATH')
```

Return a prototype Scanner instance for scanning source files for Fortran USE & INCLUDE statements

## SCons.Scanner.IDL module

Dependency scanner for IDL (Interface Definition Language) files.

```
SCons.Scanner.IDL.IDLScan ()
```

Return a prototype Scanner instance for scanning IDL source files

## SCons.Scanner.LaTeX module

Dependency scanner for LaTeX code.

```
class SCons.Scanner.LaTeX.FindENVPathDirs (variable)
```

Bases: object

A class to bind a specific E{\*}PATH variable name to a function that will return all of the E{\*}path directories.

```
class SCons.Scanner.LaTeX.LaTeX (name, suffixes, graphics_extensions, *args, **kwargs)
```

Bases: ScannerBase

Class for scanning LaTeX files for included files.

Unlike most scanners, which use regular expressions that just return the included file name, this returns a tuple consisting of the keyword for the inclusion (“include”, “includegraphics”, “input”, or “bibliography”), and then the file name itself. Based on a quick look at LaTeX documentation, it seems that we should append .tex suffix for the “include” keywords, append .tex if there is no extension for the “input” keyword, and need to add .bib for the “bibliography” keyword that does not accept extensions by itself.

Finally, if there is no extension for an “includegraphics” keyword latex will append .ps or .eps to find the file, while pdftex may use .pdf, .jpg, .tif, .mps, or .png.

The actual subset and search order may be altered by DeclareGraphicsExtensions command. This complication is ignored. The default order corresponds to experimentation with teTeX:

```
$ latex --version
pdfTeX 3.141592-1.21a-2.2 (Web2C 7.5.4)
kpathsea version 3.5.4
```

### The order is:

['.eps', '.ps'] for latex ['.png', '.pdf', '.jpg', '.tif'].

Another difference is that the search path is determined by the type of the file being searched: env['TEXINPUTS'] for "input" and "include" keywords env['TEXINPUTS'] for "includegraphics" keyword env['TEXINPUTS'] for "lstinputlisting" keyword env['BIBINPUTS'] for "bibliography" keyword env['BSTINPUTS'] for "bibliographystyle" keyword env['INDEXSTYLE'] for "makeindex" keyword, no scanning support needed just allows user to set it if needed.

FIXME: also look for the class or style in document[class|style]{} FIXME: also look for the argument of bibliographystyle{}

\_latex\_names(include\_type, filename)

static \_recurse\_all\_nodes(nodes)

static \_recurse\_no\_nodes(nodes)

add\_scanner(skey, scanner)

add\_skey(skey)

Add a skey to the list of skeys

canonical\_text(text)

Standardize an input TeX-file contents.

### Currently:

- removes comments, unwrapping comment-wrapped lines.

env\_variables = ['TEXINPUTS', 'BIBINPUTS', 'BSTINPUTS', 'INDEXSTYLE']

find\_include(include, source\_dir, path)

get\_keys(env=None)

keyword\_paths = {'addbibresource': 'BIBINPUTS', 'addglobalbib': 'BIBINPUTS', 'addsectionbib': 'BIBINPUTS', 'bibliography': 'BIBINPUTS', 'bibliographystyle': 'BSTINPUTS', 'include': 'TEXINPUTS', 'includegraphics': 'TEXINPUTS', 'input': 'TEXINPUTS', 'lstinputlisting': 'TEXINPUTS', 'makeindex': 'INDEXSTYLE', 'usepackage': 'TEXINPUTS'}

path(env, dir=None, target=None, source=None)

scan(node, subdir='.')

scan\_recurse(node, path=())

do a recursive scan of the top level target file This lets us search for included files based on the directory of the main file just as latex does

select(node)

sort\_key(include)

two\_arg\_commands = ['import', 'subimport', 'includefrom', 'subincludefrom', 'inputfrom', 'subinputfrom']

SCons.Scanner.LaTeX.LaTeXScanner()

Return a prototype Scanner instance for scanning LaTeX source files when built with latex.

SCons.Scanner.LaTeX.PDFLaTeXScanner()

Return a prototype Scanner instance for scanning LaTeX source files when built with pdflatex.

class SCons.Scanner.LaTeX.\_Null

Bases: object

SCons.Scanner.LaTeX.\_null

alias of \_Null

SCons.Scanner.LaTeX.modify\_env\_var(env, var, abspath)

### SCons.Scanner.Prog module

Dependency scanner for program files.

SCons.Scanner.Prog.ProgramScanner(\*\*kwargs)

Return a prototype Scanner instance for scanning executable files for static-lib dependencies

SCons.Scanner.Prog.\_subst\_libs(env, libs)

Substitute environment variables and split into list.

SCons.Scanner.Prog.scan(node, env, libpath=())

Scans program files for static-library dependencies.

It will search the LIBPATH environment variable for libraries specified in the LIBS variable, returning any files it finds as dependencies.



## SCons.Scanner package

### SCons.Scanner.RC module

Dependency scanner for RC (Interface Definition Language) files.

SCons.Scanner.RC.RCScan ()

Return a prototype Scanner instance for scanning RC source files

SCons.Scanner.RC.no\_tlb (nodes)

Filter out .tlb files as they are binary and shouldn't be scanned.

### SCons.Scanner.SWIG module

Dependency scanner for SWIG code.

SCons.Scanner.SWIG.SWIGScanner ()

## Module contents

The Scanner package for the SCons software construction utility.

SCons.Scanner.Base

alias of ScannerBase

class SCons.Scanner.Classic (name, suffixes, path\_variable, regex, \*args, \*\*kwargs)

Bases: Current

A Scanner subclass to contain the common logic for classic CPP-style include scanning, but which can be customized to use different regular expressions to find the includes.

Note that in order for this to work “out of the box” (without overriding the find\_include() and sort\_key1() methods), the regular expression passed to the constructor must return the name of the include file in group 0.

static \_recurse\_all\_nodes (nodes)

static \_recurse\_no\_nodes (nodes)

add\_scanner (skey, scanner)

add\_skey (skey)

Add a skey to the list of skeys

static find\_include (include, source\_dir, path)

find\_include\_names (node)

get\_skeys (env=None)

path (env, dir=None, target=None, source=None)

scan (node, path=())

select (node)

static sort\_key (include)

class SCons.Scanner.ClassicCPP (name, suffixes, path\_variable, regex, \*args, \*\*kwargs)

Bases: Classic

A Classic Scanner subclass which takes into account the type of bracketing used to include the file, and uses classic CPP rules for searching for the files based on the bracketing.

Note that in order for this to work, the regular expression passed to the constructor must return the leading bracket in group 0, and the contained filename in group 1.

static \_recurse\_all\_nodes (nodes)

static \_recurse\_no\_nodes (nodes)

add\_scanner (skey, scanner)

add\_skey (skey)

Add a skey to the list of skeys

find\_include (include, source\_dir, path)

find\_include\_names (node)

get\_skeys (env=None)

path (env, dir=None, target=None, source=None)

scan (node, path=())

select (node)

sort\_key (include)

class SCons.Scanner.Current (\*args, \*\*kwargs)

Bases: ScannerBase

## SCons.Scanner package

A class for scanning files that are source files (have no builder) or are derived files and are current (which implies that they exist, either locally or in a repository).

`static _recurse_all_nodes (nodes)`

`static _recurse_no_nodes (nodes)`

`add_scanner (skey, scanner)`

`add_skey (skey)`

Add a skey to the list of skeys

`get_keys (env=None)`

`path (env, dir=None, target=None, source=None)`

`select (node)`

`class SCons.Scanner.FindPathDirs (variable)`

Bases: object

Class to bind a specific E{\*}PATH variable name to a function that will return all of the E{\*}path directories.

`SCons.Scanner.Scanner (function, *args, **kwargs)`

Factory function to create a Scanner Object.

Creates the appropriate Scanner based on the type of "function".

TODO: Deprecate this some day. We've moved the functionality inside the ScannerBase class and really don't need this factory function any more. It was, however, used by some of our Tool modules, so the call probably ended up in various people's custom modules patterned on SCons code.

`class SCons.Scanner.ScannerBase (function, name='NONE', argument=<class 'SCons.Scanner._Null'>, keys=<class 'SCons.Scanner._Null'>, path_function=None, node_class=<class 'SCons.Node.FS.Base'>, node_factory=None, scan_check=None, recursive=None)`

Bases: object

Base class for dependency scanners.

Implements straightforward, single-pass scanning of a single file.

A Scanner is usually set up with a scanner function (and optionally a path function), but can also be a kind of dispatcher which passes control to other Scanners.

A scanner function takes three arguments: a Node to scan for dependencies, the construction environment to use, and an optional tuple of paths (as generated by the optional path function). It must return a list containing the Nodes for all the direct dependencies of the file.

The optional path function is called to return paths that can be searched for implicit dependency files. It takes five arguments: a construction environment, a Node for the directory containing the SConscript file that defined the primary target, a list of target nodes, a list of source nodes, and the optional argument for this instance.

Examples:

```
s = Scanner(my_scanner_function)
s = Scanner(function=my_scanner_function)
s = Scanner(function=my_scanner_function, argument='foo')
```

**Parameters:**

- **function** – either a scanner function taking two or three arguments and returning a list of File Nodes; or a mapping of keys to other Scanner objects.
- **name** – an optional name for identifying this scanner object (defaults to “NONE”).
- **argument** – an optional argument that will be passed to both *function* and *path\_function*.
- **keys** – an optional list argument that can be used to determine if this scanner can be used for a given Node. In the case of File nodes, for example, the *skeys* would be file suffixes.
- **path\_function** – an optional function which returns a tuple of the directories that can be searched for implicit dependency files. May also return a callable which is called with no args and returns the tuple (supporting Bindable class).
- **node\_class** – optional class of Nodes which this scan will return. If not specified, defaults to SCons.Node.FS.Base. If *node\_class* is `None`, then this scanner will not enforce any Node conversion and will return the raw results from *function*.
- **node\_factory** – optional factory function to be called to translate the raw results returned by *function* into the expected *node\_class* objects.
- **scan\_check** – optional function to be called to first check whether this node really needs to be scanned.
- **recursive** – optional specifier of whether this scanner should be invoked recursively on all of the implicit dependencies it returns (for example *#include* lines in C source files, which may refer to header files which should themselves be scanned). May be a callable, which will be called to filter the list of nodes found to select a subset for recursive scanning (the canonical example being only recursively scanning subdirectories within a directory). The default is to not do recursive scanning.

```

static _recurse_all_nodes (nodes)
static _recurse_no_nodes (nodes)
add_scanner (skey, scanner)
add_key (skey)
    Add a skey to the list of skeys
get_keys (env=None)
path (env, dir=None, target=None, source=None)
select (node)
class SCons.Scanner.Selector (mapping, *args, **kwargs)
    Bases: ScannerBase
    A class for selecting a more specific scanner based on the scanner_key() (suffix) for a specific Node.
    TODO: This functionality has been moved into the inner workings of the ScannerBase class, and this class will be
    deprecated at some point. (It was never exposed directly as part of the public interface, although it is used by the
    Scanner() factory function that was used by various Tool modules and therefore was likely a template for custom
    modules that may be out there.)
    static _recurse_all_nodes (nodes)
    static _recurse_no_nodes (nodes)
    add_scanner (skey, scanner)
    add_key (skey)
        Add a skey to the list of skeys
    get_keys (env=None)
    path (env, dir=None, target=None, source=None)
    select (node)
class SCons.Scanner._Null
    Bases: object
SCons.Scanner._null
    alias of _Null

```

## SCons.Script package

### Submodules

#### SCons.Script.Interactive module

SCons interactive mode.

```
class SCons.Script.Interactive.SConsInteractiveCmd (**kw)
```

Bases: Cmd

build [TARGETS] Build the specified TARGETS and their dependencies. 'b' is a synonym. clean [TARGETS] Clean (remove) the specified TARGETS and their dependencies. 'c' is a synonym. exit Exit SCons interactive mode. help [COMMAND] Prints help for the specified COMMAND. 'h' and '?' are synonyms. shell [COMMANDLINE] Execute COMMANDLINE in a subshell. 'sh' and '!' are synonyms. version Prints SCons version information.

\_do\_one\_help (arg)

\_doc\_to\_help (obj)

\_strip\_initial\_spaces (s)

cmdloop (intro=None)

Repeatedly issue a prompt, accept input, parse an initial prefix off the received input, and dispatch to action methods, passing them the remainder of the line as argument.

columnize (list, displaywidth=80)

Display a list of strings as a compact set of columns.

Each column is only as wide as necessary. Columns are separated by two spaces (one was not legible enough).

complete (text, state)

Return the next possible completion for 'text'.

If a command has not been entered, then complete against command list. Otherwise try to call complete\_<command> to get list of completions.

complete\_help (\*args)

completedefault (\*ignored)

Method called to complete an input line when no command-specific complete\_\*() method is available.

By default, it returns an empty list.

completenames (text, \*ignored)

default (argv)

Called on an input line when the command prefix is not recognized.

If this method is not overridden, it prints an error message and returns.

do\_EOF (argv)

do\_build (argv)

build [TARGETS] Build the specified TARGETS and their dependencies. 'b' is a synonym.

do\_clean (argv)

clean [TARGETS] Clean (remove) the specified TARGETS and their dependencies. 'c' is a synonym.

do\_exit (argv)

exit Exit SCons interactive mode.

do\_help (argv)

help [COMMAND] Prints help for the specified COMMAND. 'h' and '?' are synonyms.

do\_shell (argv)

shell [COMMANDLINE] Execute COMMANDLINE in a subshell. 'sh' and '!' are synonyms.

do\_version (argv)

version Prints SCons version information.

doc\_header = *'Documented commands (type help <topic>):'*

doc\_leader = "

emptyline ()

Called when an empty line is entered in response to the prompt.

If this method is not overridden, it repeats the last nonempty command entered.

get\_names ()

identchars = *'abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789\_'*

intro = None

lastcmd = "

## SCons.Script package

```
misc_header = 'Miscellaneous help topics:'
nohelp = '*** No help on %s'
onecmd (line)
    Interpret the argument as though it had been typed in response to the prompt.
    This may be overridden, but should not normally need to be; see the precmd() and postcmd() methods for useful
    execution hooks. The return value is a flag indicating whether interpretation of commands by the interpreter should
    stop.
parseline (line)
    Parse the line into a command name and a string containing the arguments. Returns a tuple containing (command,
    args, line). 'command' and 'args' may be None if the line couldn't be parsed.
postcmd (stop, line)
    Hook method executed just after a command dispatch is finished.
postloop ()
    Hook method executed once when the cmdloop() method is about to return.
precmd (line)
    Hook method executed just before the command line is interpreted, but after the input prompt is generated and
    issued.
preloop ()
    Hook method executed once when the cmdloop() method is called.
print_topics (header, cmds, cmdlen, maxcol)
prompt = '(Cmd) '
ruler = '='
synonyms = {'b': 'build', 'c': 'clean', 'h': 'help', 'scons': 'build', 'sh': 'shell'}
undoc_header = 'Undocumented commands:'
use_rawinput = 1
SCons.Script.Interactive.interact (fs, parser, options, targets, target_top)
```

## SCons.Script.Main module

The main() function used by the scons script.

Architecturally, this *is* the scons script, and will likely only be called from the external “scons” wrapper. Consequently, anything here should not be, or be considered, part of the build engine. If it's something that we expect other software to want to use, it should go in some other module. If it's specific to the “scons” script invocation, it goes here.

```
SCons.Script.Main.AddOption (*args, **kw)
class SCons.Script.Main.BuildTask (tm, targets, top, node)
    Bases: OutOfDateTask
    An SCons build task.
    _abc_impl = <_abc_data object>
    _exception_raise ()
        Raises a pending exception that was recorded while getting a Task ready for execution.
    _no_exception_to_raise ()
    display (message)
        Hook to allow the calling interface to display a message.
        This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out
        what Node should be built next, the actual target list may be altered, along with a message describing the
        alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see
        those messages.
    do_failed (status=2)
    exc_clear ()
        Clears any recorded exception.
        This also changes the “exception_raise” attribute to point to the appropriate do-nothing method.
    exc_info ()
        Returns info about a recorded exception.
    exception_set (exception=None)
        Records an exception to be raised at the appropriate time.
        This also changes the “exception_raise” attribute to point to the method that will, in fact
```

`execute ()`

Called to execute the task.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in `prepare()`, `executed()` or `failed()`.

`executed ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node's state before deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call "`visited()`", which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_with_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node's state before deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call "`visited()`", which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

`executed_without_callbacks ()`

Called when the task has been successfully executed and the Taskmaster instance doesn't want to call the Node's callback methods.

`fail_continue ()`

Explicit continue-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fail_stop ()`

Explicit stop-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`failed ()`

Default action when a task fails: stop the build.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Make a task ready for execution

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the "`scons -c`" option.

`make_ready_current ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what's necessary.

`needs_execute ()`

Returns True (indicating this Task should be executed) if this Task's target state indicates it needs executing, which has already been determined by an earlier up-to-date check.

`postprocess ()`

Post-processes a task after it's been executed.

This examines all the targets just built (or not, we don't care if the build was successful, or even if there was no build because everything was up-to-date) to see if they have any waiting parent Nodes, or Nodes waiting on a common side effect, that can be put back on the candidates list.

`prepare ()`

Called just before the task is executed.

This is mainly intended to give the target Nodes a chance to unlink underlying files and make all necessary directories before the Action is actually called to build the targets.

```
trace_message (method, node, description='node')
```

```
class SCons.Script.Main.CleanTask (tm, targets, top, node)
```

Bases: AlwaysTask

An SCons clean task.

```
_abc_impl = <_abc_data object>
```

```
_clean_targets (remove=True)
```

```
_exception_raise ()
```

Raises a pending exception that was recorded while getting a Task ready for execution.

```
_get_files_to_clean ()
```

```
_no_exception_to_raise ()
```

```
display (message)
```

Hook to allow the calling interface to display a message.

This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out what Node should be built next, the actual target list may be altered, along with a message describing the alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see those messages.

```
exc_clear ()
```

Clears any recorded exception.

This also changes the "exception\_raise" attribute to point to the appropriate do-nothing method.

```
exc_info ()
```

Returns info about a recorded exception.

```
exception_set (exception=None)
```

Records an exception to be raised at the appropriate time.

This also changes the "exception\_raise" attribute to point to the method that will, in fact

```
execute ()
```

Called to execute the task.

This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe stuff in prepare(), executed() or failed().

```
executed ()
```

Called when the task has been successfully executed and the Taskmaster instance doesn't want to call the Node's callback methods.

```
executed_with_callbacks ()
```

Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's callback methods.

This may have been a do-nothing operation (to preserve build order), so we must check the node's state before deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call "visited()", which will handle any post-visit actions that must take place regardless of whether or not the target was an actual built target or a source Node.

```
executed_without_callbacks ()
```

Called when the task has been successfully executed and the Taskmaster instance doesn't want to call the Node's callback methods.

```
fail_continue ()
```

Explicit continue-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using Configure().

```
fail_stop ()
```

Explicit stop-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using Configure().

```
failed ()
```

Default action when a task fails: stop the build.



Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fs_delete (path, pathstr, remove=True)`

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the “scons -c” option.

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the “scons -c” option.

`make_ready_current ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what’s necessary.

`needs_execute ()`

Always returns True (indicating this Task should always be executed).

Subclasses that need this behavior (as opposed to the default of only executing Nodes that are out of date w.r.t. their dependencies) can use this as follows:

**class MyTaskSubclass(SCons.Taskmaster.Task):**

    needs\_execute = SCons.Taskmaster.AlwaysTask.needs\_execute

`postprocess ()`

Post-processes a task after it’s been executed.

This examines all the targets just built (or not, we don’t care if the build was successful, or even if there was no build because everything was up-to-date) to see if they have any waiting parent Nodes, or Nodes waiting on a common side effect, that can be put back on the candidates list.

`prepare ()`

Called just before the task is executed.

This is mainly intended to give the target Nodes a chance to unlink underlying files and make all necessary directories before the Action is actually called to build the targets.

`remove ()`

`show ()`

`trace_message (method, node, description='node')`

**class SCons.Script.Main.CountStats**

Bases: Stats

`do_append (label)`

`do_nothing (*args, **kw)`

`do_print ()`

`enable (outfp)`

**class SCons.Script.Main.FakeOptionParser**

Bases: object

A do-nothing option parser, used for the initial OptionsParser variable.

During normal SCons operation, the OptionsParser is created right away by the main() function. Certain tests scripts however, can introspect on different Tool modules, the initialization of which can try to add a new, local option to an otherwise uninitialized OptionsParser object. This allows that introspection to happen without blowing up.

**class FakeOptionValues**

Bases: object

`add_local_option (*args, **kw)`

values = <SCons.Script.Main.FakeOptionParser.FakeOptionValues object>

`SCons.Script.Main.GetBuildFailures ()`

`SCons.Script.Main.GetOption (name)`

**class SCons.Script.Main.MemStats**

Bases: Stats

`do_append (label)`

## SCons.Script package

```
do_nothing (*args, **kw)
do_print ()
enable (outfp)
SCons.Script.Main.PrintHelp (file=None)
SCons.Script.Main.Progress (*args, **kw)
class SCons.Script.Main.Progressor (obj, interval=1, file=None, overwrite=False)
    Bases: object
    count = 0
    erase_previous ()
    prev = ""
    replace_string (node)
    spinner (node)
    string (node)
    target_string = '$TARGET'
    write (s)
class SCons.Script.Main.QuestionTask (tm, targets, top, node)
    Bases: AlwaysTask
    An SCons task for the -q (question) option.
    _abc_impl = <_abc_data object>
    _exception_raise ()
        Raises a pending exception that was recorded while getting a Task ready for execution.
    _no_exception_to_raise ()
    display (message)
        Hook to allow the calling interface to display a message.
        This hook gets called as part of preparing a task for execution (that is, a Node to be built). As part of figuring out
        what Node should be built next, the actual target list may be altered, along with a message describing the
        alteration. The calling interface can subclass Task and provide a concrete implementation of this method to see
        those messages.
    exc_clear ()
        Clears any recorded exception.
        This also changes the "exception_raise" attribute to point to the appropriate do-nothing method.
    exc_info ()
        Returns info about a recorded exception.
    exception_set (exception=None)
        Records an exception to be raised at the appropriate time.
        This also changes the "exception_raise" attribute to point to the method that will, in fact
    execute ()
        Called to execute the task.
        This method is called from multiple threads in a parallel build, so only do thread safe stuff here. Do thread unsafe
        stuff in prepare(), executed() or failed().
    executed ()
        Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's
        callback methods.
        This may have been a do-nothing operation (to preserve build order), so we must check the node's state before
        deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call
        "visited()", which will handle any post-visit actions that must take place regardless of whether or not the target was
        an actual built target or a source Node.
    executed_with_callbacks ()
        Called when the task has been successfully executed and the Taskmaster instance wants to call the Node's
        callback methods.
        This may have been a do-nothing operation (to preserve build order), so we must check the node's state before
        deciding whether it was "built", in which case we call the appropriate Node method. In any event, we always call
        "visited()", which will handle any post-visit actions that must take place regardless of whether or not the target was
        an actual built target or a source Node.
    executed_without_callbacks ()
```

Called when the task has been successfully executed and the Taskmaster instance doesn't want to call the Node's callback methods.

`fail_continue ()`

Explicit continue-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`fail_stop ()`

Explicit stop-the-build failure.

This sets failure status on the target nodes and all of their dependent parent nodes.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`failed ()`

Default action when a task fails: stop the build.

Note: Although this function is normally invoked on nodes in the executing state, it might also be invoked on up-to-date nodes when using `Configure()`.

`get_target ()`

Fetch the target being built or updated by this task.

`make_ready ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what's necessary.

`make_ready_all ()`

Marks all targets in a task ready for execution.

This is used when the interface needs every target Node to be visited—the canonical example being the “`scons -c`” option.

`make_ready_current ()`

Marks all targets in a task ready for execution if any target is not current.

This is the default behavior for building only what's necessary.

`needs_execute ()`

Always returns True (indicating this Task should always be executed).

Subclasses that need this behavior (as opposed to the default of only executing Nodes that are out of date w.r.t. their dependencies) can use this as follows:

**class MyTaskSubclass(SCons.Taskmaster.Task):**

    needs\_execute = SCons.Taskmaster.AlwaysTask.needs\_execute

`postprocess ()`

Post-processes a task after it's been executed.

This examines all the targets just built (or not, we don't care if the build was successful, or even if there was no build because everything was up-to-date) to see if they have any waiting parent Nodes, or Nodes waiting on a common side effect, that can be put back on the candidates list.

`prepare ()`

Called just before the task is executed.

This is mainly intended to give the target Nodes a chance to unlink underlying files and make all necessary directories before the Action is actually called to build the targets.

`trace_message (method, node, description='node')`

*exception* SCons.Script.Main.SConsPrintHelpException

Bases: Exception

args

`with_traceback ()`

Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

SCons.Script.Main.SetOption (name, value)

*class* SCons.Script.Main.Stats

Bases: object

`do_nothing (*args, **kw)`

`enable (outfp)`

*class* SCons.Script.Main.TreePrinter (derived=False, prune=False, status=False, sLineDraw=False)

## SCons.Script package

Bases: object  
display ( $\tau$ )  
get\_all\_children ( $node$ )  
get\_derived\_children ( $node$ )  
SCons.Script.Main.\_SConstruct\_exists ( $dirname=""$ ,  $repositories=[]$ ,  $filelist=None$ )  
This function checks that an SConstruct file exists in a directory. If so, it returns the path of the file. By default, it checks the current directory.  
SCons.Script.Main.\_build\_targets ( $fs$ ,  $options$ ,  $targets$ ,  $target_top$ )  
SCons.Script.Main.\_create\_path ( $plist$ )  
SCons.Script.Main.\_exec\_main ( $parser$ ,  $values$ )  
SCons.Script.Main.\_load\_all\_site\_scons\_dirs ( $topdir$ ,  $verbose=False$ )  
Load all of the predefined site\_scons dir. Order is significant; we load them in order from most generic (machine-wide) to most specific ( $topdir$ ). The verbose argument is only for testing.  
SCons.Script.Main.\_load\_site\_scons\_dir ( $topdir$ ,  $site_dir_name=None$ )  
Load the site directory under  $topdir$ .  
If a site dir name is supplied use it, else use default "site\_scons" Prepend site dir to  $sys.path$ . If a "site\_tools" subdir exists, prepend to  $toolpath$ . Import "site\_init.py" from site dir if it exists.  
SCons.Script.Main.\_main ( $parser$ )  
SCons.Script.Main.\_scons\_internal\_error ()  
Handle all errors but user errors. Print out a message telling the user what to do in this case and print a normal trace.  
SCons.Script.Main.\_scons\_internal\_warning ( $e$ )  
Slightly different from  $\_scons\_user\_warning$  in that we use the *current call stack* rather than  $sys.exc\_info()$  to get our stack trace. This is used by the warnings framework to print warnings.  
SCons.Script.Main.\_scons\_syntax\_error ( $e$ )  
Handle syntax errors. Print out a message and show where the error occurred.  
SCons.Script.Main.\_scons\_user\_error ( $e$ )  
Handle user errors. Print out a message and a description of the error, along with the line number and routine where it occurred. The file and line number will be the deepest stack frame that is not part of SCons itself.  
SCons.Script.Main.\_scons\_user\_warning ( $e$ )  
Handle user warnings. Print out a message and a description of the warning, along with the line number and routine where it occurred. The file and line number will be the deepest stack frame that is not part of SCons itself.  
SCons.Script.Main.\_set\_debug\_values ( $options$ )  
SCons.Script.Main.find\_deepest\_user\_frame ( $tb$ )  
Find the deepest stack frame that is not part of SCons.  
Input is a "pre-processed" stack trace in the form returned by  $traceback.extract\_tb()$  or  $traceback.extract\_stack()$   
SCons.Script.Main.main ()  
SCons.Script.Main.path\_string ( $label$ ,  $module$ )  
SCons.Script.Main.python\_version\_deprecated ( $version=sys.version\_info(major=3, minor=7, micro=13, releaselevel='final', serial=0)$ )  
SCons.Script.Main.python\_version\_string ()  
SCons.Script.Main.python\_version\_unsupported ( $version=sys.version\_info(major=3, minor=7, micro=13, releaselevel='final', serial=0)$ )  
SCons.Script.Main.revert\_io ()  
SCons.Script.Main.test\_load\_all\_site\_scons\_dirs ( $d$ )  
SCons.Script.Main.version\_string ( $label$ ,  $module$ )

## SCons.Script.SConsOptions module

SCons.Script.SConsOptions.Parser ( $version$ )  
Returns a parser object initialized with the standard SCons options.  
Add options in the order we want them to show up in the  $-H$  help text, basically alphabetical. Each  $op.add\_option()$  call should have a consistent format:

```
op.add_option("-L", "--long-option-name",
              nargs=1, type="string",
              dest="long_option_name", default='foo',
```

```

        action="callback", callback=opt_long_option,
        help="help text goes here",
        metavar="VAR" )

```

Even though the `optparse` module constructs reasonable default destination names from the long option names, we're going to be explicit about each one for easier readability and so this code will at least show up when grepping the source for option attribute names, or otherwise browsing the source code.

```

class SCons.Script.SConsOptions.SConsIndentedHelpFormatter(indent_increment=2,
max_help_position=24, width=None, short_first=1)

```

Bases: `IndentedHelpFormatter`

`NO_DEFAULT_VALUE = 'none'`

`_format_text(text)`

Format a paragraph of free-form text for inclusion in the help output at the current indentation level.

`dedent()`

`expand_default(option)`

`format_description(description)`

`format_epilog(epilog)`

`format_heading(heading)`

Translates heading to "SCons Options"

Heading of "Options" changed to "SCons Options." Unfortunately, we have to do this here, because those titles are hard-coded in the `optparse` calls.

`format_option(option)`

Customized option formatter.

A copy of the normal `optparse.IndentedHelpFormatter.format_option()` method. This has been snarfed so we can modify text wrapping to our liking:

- add our own regular expression that doesn't break on hyphens (so things like `--no-print-directory` don't get broken).
- wrap the list of options themselves when it's too long (the `wrapper.fill(opts)` call below).
- set the `subsequent_indent` when wrapping the `help_text`.

The help for each option consists of two parts:

- the opt strings and metavariables e.g. ("`-x`", or "`-fFILENAME, --file=FILENAME`")
- the user-supplied help string e.g. ("`turn on expert mode`", "`read data from FILENAME`")

If possible, we write both of these on the same line:

```

-x          turn on expert mode

```

But if the opt string list is too long, we put the help string on a second line, indented to the same column it would start in if it fit on the first line:

```

-fFILENAME, --file=FILENAME
    read data from FILENAME

```

`format_option_strings(option)`

Return a comma-separated list of option strings & metavariables.

`format_usage(usage)`

Formats the usage message.

`indent()`

`set_long_opt_delimiter(delim)`

`set_parser(parser)`

`set_short_opt_delimiter(delim)`

`store_option_strings(parser)`

```

class SCons.Script.SConsOptions.SConsOption(*opts, **attrs)

```

```

Bases: Option
ACTIONS = ('store', 'store_const', 'store_true', 'store_false', 'append', 'append_const', 'count', 'callback', 'help',
'version')
ALWAYS_TYPED_ACTIONS = ('store', 'append')
ATTRS = ['action', 'type', 'dest', 'default', 'nargs', 'const', 'choices', 'callback', 'callback_args', 'callback_kwargs',
'help', 'metavar']
CHECK_METHODS = [<function Option._check_action>, <function Option._check_type>, <function
Option._check_choice>, <function Option._check_dest>, <function Option._check_const>, <function
Option._check_nargs>, <function Option._check_callback>, <function SConsOption._check_nargs_optional>]
CONST_ACTIONS = ('store_const', 'append_const', 'store', 'append', 'callback')
STORE_ACTIONS = ('store', 'store_const', 'store_true', 'store_false', 'append', 'append_const', 'count')
TYPED_ACTIONS = ('store', 'append', 'callback')
TYPES = ('string', 'int', 'long', 'float', 'complex', 'choice')
TYPE_CHECKER = {'choice': <function check_choice>, 'complex': <function check_builtint>, 'float': <function
check_builtint>, 'int': <function check_builtint>, 'long': <function check_builtint>}
_check_action ()
_check_callback ()
_check_choice ()
_check_const ()
_check_dest ()
_check_nargs ()
_check_nargs_optional ()
_check_opt_strings (opts)
_check_type ()
_set_attrs (attrs)
_set_opt_strings (opts)
check_value (opt, value)
convert_value (opt, value)
get_opt_string ()
process (opt, value, values, parser)
take_action (action, dest, opt, value, values, parser)
takes_value ()
class SCons.Script.SConsOptions.SConsOptionGroup (parser, title, description=None)
Bases: OptionGroup
A subclass for SCons-specific option groups.
The only difference between this and the base class is that we print the group's help text flush left, underneath their
own title but lined up with the normal "SCons Options".
_check_conflict (option)
_create_option_list ()
_create_option_mappings ()
_share_option_mappings (parser)
add_option (Option)
add_option (opt_str, ..., kwarg=val, ...) → None
add_options (option_list)
destroy ()
    see OptionParser.destroy().
format_description (formatter)
format_help (formatter)
    Format an option group's help text.
    The title is dedented so it's flush with the "SCons Options" title we print at the top.
format_option_help (formatter)
get_description ()
get_option (opt_str)
has_option (opt_str)
remove_option (opt_str)
set_conflict_handler (handler)

```

```

    set_description (description)
    set_title (title)
class SCons.Script.SConsOptions.SConsOptionParser (usage=None, option_list=None,
option_class=<class 'optparse.Option'>, version=None, conflict_handler='error',
description=None, formatter=None, add_help_option=True, prog=None, epilog=None)
    Bases: OptionParser
    _add_help_option ()
    _add_version_option ()
    _check_conflict (option)
    _create_option_list ()
    _create_option_mappings ()
    _get_all_options ()
    _get_args (args)
    _init_parsing_state ()
    _match_long_opt (opt: string) → string
        Determine which long option string 'opt' matches, ie. which one it is an unambiguous abbreviation for. Raises
        BadOptionError if 'opt' doesn't unambiguously match any long option string.
    _populate_option_list (option_list, add_help=True)
    _process_args (largs, rargs, values)
        _process_args(largs : [string],
            rargs : [string], values : Values)
        Process command-line arguments and populate 'values', consuming options and arguments from 'rargs'. If
        'allow_interspersed_args' is false, stop at the first non-option argument. If true, accumulate any interspersed
        non-option arguments in 'largs'.
    _process_long_opt (rargs, values)
        SCons-specific processing of long options.
        This is copied directly from the normal optparse._process_long_opt() method, except that, if configured to
        do so, we catch the exception thrown when an unknown option is encountered and just stick it back on the
        "leftover" arguments for later (re-)processing. This is because we may see the option definition later, while
        processing SConscript files.
    _process_short_opts (rargs, values)
    _share_option_mappings (parser)
    add_local_option (*args, **kw)
        Adds a local option to the parser.
        This is initiated by an AddOption() call to add a user-defined command-line option. We add the option to a separate
        option group for the local options, creating the group if necessary.
    add_option (Option)
    add_option (opt_str, ..., kwarg=val, ...) → None
    add_option_group (*args, **kwargs)
    add_options (option_list)
    check_values (values: Values, args: [string])
        -> (values : Values, args : [string])
        Check that the supplied option values and leftover arguments are valid. Returns the option values and leftover
        arguments (possibly adjusted, possibly completely new – whatever you like). Default implementation just returns
        the passed-in values; subclasses may override as desired.
    destroy ()
        Declare that you are done with this OptionParser. This cleans up reference cycles so the OptionParser (and all
        objects referenced by it) can be garbage-collected promptly. After calling destroy(), the OptionParser is unusable.
    disable_interspersed_args ()
        Set parsing to stop on the first non-option. Use this if you have a command processor which runs another
        command that has options of its own and you want to make sure these options don't get confused.
    enable_interspersed_args ()
        Set parsing to not stop on the first non-option, allowing interspersing switches with command arguments. This is
        the default behavior. See also disable_interspersed_args() and the class documentation description of the attribute
        allow_interspersed_args.

```



`error (msg: string)`

Print a usage message incorporating 'msg' to stderr and exit. If you override this in a subclass, it should not return – it should either exit or raise an exception.

`exit (status=0, msg=None)`

`expand_prog_name (s)`

`format_description (formatter)`

`format_epilog (formatter)`

`format_help (formatter=None)`

`format_option_help (formatter=None)`

`get_default_values ()`

`get_description ()`

`get_option (opt_str)`

`get_option_group (opt_str)`

`get_prog_name ()`

`get_usage ()`

`get_version ()`

`has_option (opt_str)`

`parse_args (args=None, values=None)`

**`parse_args(args : [string] = sys.argv[1:],`**

**`values : Values = None)`**

**`-> (values : Values, args : [string])`**

Parse the command-line options found in 'args' (default: sys.argv[1:]). Any errors result in a call to 'error()', which by default prints the usage message to stderr and calls sys.exit() with an error message. On success returns a pair (values, args) where 'values' is a Values instance (with all your option values) and 'args' is the list of arguments left over after parsing options.

`preserve_unknown_options = False`

`print_help (file: file = stdout)`

Print an extended help message, listing all options and any help text provided with them, to 'file' (default stdout).

`print_usage (file: file = stdout)`

Print the usage message for the current program (self.usage) to 'file' (default stdout). Any occurrence of the string "%prog" in self.usage is replaced with the name of the current program (basename of sys.argv[0]). Does nothing if self.usage is empty or not defined.

`print_version (file: file = stdout)`

Print the version message for this program (self.version) to 'file' (default stdout). As with print\_usage(), any occurrence of "%prog" in self.version is replaced by the current program's name. Does nothing if self.version is empty or undefined.

`remove_option (opt_str)`

`reparse_local_options ()`

Re-parse the leftover command-line options.

Parse options stored in *self.largs*, so that any value overridden on the command line is immediately available if the user turns around and does a GetOption() right away.

We mimic the processing of the single args in the original OptionParser `_process_args()`, but here we allow exact matches for long-opts only (no partial argument names!). Otherwise there could be problems in `add_local_option()` below. When called from there, we try to reparse the command-line arguments that

1. haven't been processed so far (*self.largs*), but

2. are possibly not added to the list of options yet.

So, when we only have a value for "--myargument" so far, a command-line argument of "--myarg=test" would set it, per the behaviour of `_match_long_opt()`, which allows for partial matches of the option name, as long as the common prefix appears to be unique. This would lead to further confusion, because we might want to add another option "--myarg" later on (see issue #2929).

`set_conflict_handler (handler)`

`set_default (dest, value)`

`set_defaults (**kwargs)`

`set_description (description)`

## SCons.Script package

```
set_process_default_values (process)
set_usage (usage)
standard_option_list = []
class SCons.Script.SConsOptions.SConsValues (defaults)
    Bases: Values
    Holder class for uniform access to SCons options, regardless of whether or not they can be set on the command line
    or in the SConscript files (using the SetOption() function).
    A SCons option value can originate three different ways:
```

1. set on the command line;
2. set in an SConscript file;
3. the default setting (from the the op.add\_option() calls in the Parser() function, below).

The command line always overrides a value set in a SConscript file, which in turn always overrides default settings. Because we want to support user-specified options in the SConscript file itself, though, we may not know about all of the options when the command line is first parsed, so we can't make all the necessary precedence decisions at the time the option is configured.

The solution implemented in this class is to keep these different sets of settings separate (command line, SConscript file, and default) and to override the `__getattr__()` method to check them in turn. This should allow the rest of the code to just fetch values as attributes of an instance of this class, without having to worry about where they came from.

Note that not all command line options are settable from SConscript files, and the ones that are must be explicitly added to the “settable” list in this class, and optionally validated and coerced in the `set_option()` method.

```
_update (dict, mode)
_update_careful (dict)
    Update the option values from an arbitrary dictionary, but only use keys from dict that already have a
    corresponding attribute in self. Any keys in dict without a corresponding attribute are silently ignored.
_update_loose (dict)
    Update the option values from an arbitrary dictionary, using all keys from the dictionary regardless of whether they
    have a corresponding attribute in self or not.
ensure_value (attr, value)
read_file (filename, mode='careful')
read_module (modname, mode='careful')
set_option (name, value)
    Sets an option from an SConscript file.
```

**Raises:** **UserError** – invalid or malformed option (“error in your script”)

```
settable = ['clean', 'diskcheck', 'duplicate', 'experimental', 'hash_chunksize', 'hash_format', 'help', 'implicit_cache',
'implicit_deps_changed', 'implicit_deps_unchanged', 'max_drift', 'md5_chunksize', 'no_exec', 'no_progress',
'num_jobs', 'random', 'silent', 'stack_size', 'warn', 'disable_execute_ninja', 'disable_ninja', 'skip_ninja_regen']
```

```
SCons.Script.SConsOptions.diskcheck_convert (value)
```

## SCons.Script.SConscript module

This module defines the Python API provided to SConscript files.

```
SCons.Script.SConscript.BuildDefaultGlobals ()
```

Create a dictionary containing all the default globals for SConstruct and SConscript files.

```
SCons.Script.SConscript.Configure (*args, **kw)
```

```
class SCons.Script.SConscript.DefaultEnvironmentCall (method_name, subst=0)
```

Bases: object

A class that implements “global function” calls of Environment methods by fetching the specified method from the DefaultEnvironment’s class. Note that this uses an intermediate proxy class instead of calling the DefaultEnvironment method directly so that the proxy can override the `subst()` method and thereby prevent expansion of construction variables (since from the user’s point of view this was called as a global function, with no associated construction environment).

```
class SCons.Script.SConscript.Frame (fs, exports, sconsript)
```

Bases: object

A frame on the SConstruct/SConscript call stack

`SCons.Script.SConscript.Return (*vars, **kw)`

`class SCons.Script.SConscript.SConsEnvironment (platform=None, tools=None, toolpath=None, variables=None, parse_flags=None, **kw)`

Bases: Base

An Environment subclass that contains all of the methods that are particular to the wrapper SCons interface and which aren't (or shouldn't be) part of the build engine itself.

Note that not all of the methods of this class have corresponding global functions, there are some private methods.

Action (\*args, \*\*kw)

AddMethod (function, name=None)

Adds the specified function as a method of this construction environment with the specified name. If the name is omitted, the default name is the name of the function itself.

AddPostAction (files, action)

AddPreAction (files, action)

Alias (target, source=[], action=None, \*\*kw)

AlwaysBuild (\*targets)

Append (\*\*kw)

Append values to construction variables in an Environment.

The variable is created if it is not already present.

AppendENVPath (name, newpath, envname='ENV', sep=':', delete\_existing=False)

Append path elements to the path *name* in the *envname* dictionary for this environment. Will only add any particular path once, and will normpath and normcase all paths to help assure this. This can also handle the case where the env variable is a list instead of a string.

If *delete\_existing* is False, a *newpath* element already in the path will not be moved to the end (it will be left where it is).

AppendUnique (delete\_existing=False, \*\*kw)

Append values to existing construction variables in an Environment, if they're not already there. If *delete\_existing* is True, removes existing values first, so values move to end.

Builder (\*\*kw)

CacheDir (path, custom\_class=None)

Clean (targets, files)

Clone (tools=[], toolpath=None, parse\_flags=None, \*\*kw)

Return a copy of a construction Environment.

The copy is like a Python "deep copy"—that is, independent copies are made recursively of each objects—except that a reference is copied when an object is not deep-copyable (like a function). There are no references to any mutable objects in the original Environment.

Command (target, source, action, \*\*kw)

Builds the supplied target files from the supplied source files using the supplied action. Action may be any type that the Builder constructor will accept for an action.

Configure (\*args, \*\*kw)

Decider (function)

Default (\*targets)

Depends (target, dependency)

Explicitly specify that 'target's depend on 'dependency'.

Detect (progs)

Return the first available program from one or more possibilities.

**Parameters:** **progs** (*str or list*) – one or more command names to check for

Dictionary (\*args)

Return construction variables from an environment.

**Parameters:** **\*args** (*optional*) – variable names to look up

**Returns:** If *args* omitted, the dictionary of all construction variables. If one arg, the corresponding value is returned. If more than one arg, a list of values is returned.

**Raises:** **KeyError** – if any of *args* is not in the construction environment.

Dir (name, \*args, \*\*kw)

Dump (key=None, format='pretty')

Return construction variables serialized to a string.

**Parameters:**

- **key** (*optional*) – if None, format the whole dict of variables. Else format the value of *key* (Default value = None)
- **format** (*str, optional*) – specify the format to serialize to. “pretty” generates a pretty-printed string, “json” a JSON-formatted string. (Default value = “pretty”)

EnsurePythonVersion (major, minor)

Exit abnormally if the Python version is not late enough.

EnsureSConsVersion (major, minor, revision=0)

Exit abnormally if the SCons version is not late enough.

Entry (name, \*args, \*\*kw)

Environment (\*\*kw)

Execute (action, \*args, \*\*kw)

Directly execute an action through an Environment

Exit (value=0)

Export (\*vars, \*\*kw)

File (name, \*args, \*\*kw)

FindFile (file, dirs)

FindInstalledFiles ()

returns the list of all targets of the Install and InstallAs Builder.

FindIdxes (paths, prefix, suffix)

Search a list of paths for something that matches the prefix and suffix.

**Parameters:**

- **paths** – the list of paths or nodes.
- **prefix** – construction variable for the prefix.
- **suffix** – construction variable for the suffix.

Returns: the matched path or None

FindSourceFiles (node='.')

returns a list of all source files.

Flatten (sequence)

GetBuildPath (files)

GetLaunchDir ()

GetOption (name)

Glob (pattern, ondisk=True, source=False, strings=False, exclude=None)

Help (text, append=False)

Ignore (target, dependency)

Ignore a dependency.

Import (\*vars)

Literal (string)

Local (\*targets)

MergeFlags (args, unique=True) → None

Merge flags into construction variables.

Merges the flags from *args* into this construction environment. If *args* is not a dict, it is first converted to one with flags distributed into appropriate construction variables. See ParseFlags().

**Parameters:**

- **args** – flags to merge
- **unique** – merge flags rather than appending (default: True). When merging, path variables are retained from the front, other construction variables from the end.

NoCache (\*targets)

Tags a target so that it will not be cached

NoClean (\*targets)

Tags a target so that it will not be cleaned by -c

**Override (overrides)**

Produce a modified environment whose variables are overridden by the overrides dictionaries. “overrides” is a dictionary that will override the variables of this environment.

This function is much more efficient than Clone() or creating a new Environment because it doesn’t copy the construction environment dictionary, it just wraps the underlying construction environment, and doesn’t even create a wrapper object if there are no overrides.

**ParseConfig (command, function=None, unique=True)**

Parse the result of running a command to update construction vars.

Use `function` to parse the output of running `command` in order to modify the current environment.

**Parameters:**

- **command** – a string or a list of strings representing a command and its arguments.
- **function** – called to process the result of `command`, which will be passed as `args`. If `function` is omitted or `None`, `MergeFlags()` is used. Takes 3 args (`env`, `args`, `unique`)
- **unique** – whether no duplicate values are allowed (default true)

**ParseDepends (filename, must\_exist=None, only\_one=False)**

Parse a mkdep-style file for explicit dependencies. This is completely abusable, and should be unnecessary in the “normal” case of proper SCons configuration, but it may help make the transition from a Make hierarchy easier for some people to swallow. It can also be genuinely useful when using a tool that can write a .d file, but for which writing a scanner would be too complicated.

**ParseFlags (\*flags) → dict**

Return a dict of parsed flags.

Parse `flags` and return a dict with the flags distributed into the appropriate construction variable names. The flags are treated as a typical set of command-line flags for a GNU-style toolchain, such as might have been generated by one of the {foo}-config scripts, and used to populate the entries based on knowledge embedded in this method - the choices are not expected to be portable to other toolchains.

If one of the `flags` strings begins with a bang (exclamation mark), it is assumed to be a command and the rest of the string is executed; the result of that evaluation is then added to the dict.

**Platform (platform)****Precious (\*targets)****Prepend (\*\*kw)**

Prepend values to construction variables in an Environment.

The variable is created if it is not already present.

**PrependENVPath (name, newpath, envname='ENV', sep=':', delete\_existing=True)**

Prepend path elements to the path `name` in the `envname` dictionary for this environment. Will only add any particular path once, and will normpath and normcase all paths to help assure this. This can also handle the case where the env variable is a list instead of a string.

If `delete_existing` is False, a `newpath` component already in the path will not be moved to the front (it will be left where it is).

**PrependUnique (delete\_existing=False, \*\*kw)**

Prepend values to existing construction variables in an Environment, if they’re not already there. If `delete_existing` is True, removes existing values first, so values move to front.

**Pseudo (\*targets)****PyPackageDir (modulename)****RemoveMethod (function)**

Removes the specified function’s MethodWrapper from the `added_methods` list, so we don’t re-bind it when making a clone.

**Replace (\*\*kw)**

Replace existing construction variables in an Environment with new construction variables and/or values.

**Replacexes (path, old\_prefix, old\_suffix, new\_prefix, new\_suffix)**

Replace `old_prefix` with `new_prefix` and `old_suffix` with `new_suffix`.

`env` - Environment used to interpolate variables. `path` - the path that will be modified. `old_prefix` - construction variable for the old prefix. `old_suffix` - construction variable for the old suffix. `new_prefix` - construction variable for the new prefix. `new_suffix` - construction variable for the new suffix.

**Repository (\*dirs, \*\*kw)**

Requires (`target`, `prerequisite`)

Specify that 'prerequisite' must be built before 'target', (but 'target' does not actually depend on 'prerequisite' and need not be rebuilt if it changes).

SConscript (`*ls`, `**kw`)

Execute SCons configuration files.

**Parameters:** `*ls` (*str or list*) – configuration file(s) to execute.

**Keyword**

**Arguments:**

- **dirs** (*list*) – execute SConscript in each listed directory.
- **name** (*str*) – execute script 'name' (used only with 'dirs').
- **exports** (*list or dict*) – locally export variables the called script(s) can import.
- **variant\_dir** (*str*) – mirror sources needed for the build in a variant directory to allow building in it.
- **duplicate** (*bool*) – physically duplicate sources instead of just adjusting paths of derived files (used only with 'variant\_dir') (default is True).
- **must\_exist** (*bool*) – fail if a requested script is missing (default is False, default is deprecated).

**Returns:** list of variables returned by the called script

**Raises:** `UserError` – a script is not found and such exceptions are enabled.

SConscriptChdir (`flag`)

SConsignFile (`name`='.sconsign', `dbm_module`=None)

Scanner (`*args`, `**kw`)

SetDefault (`**kw`)

SetOption (`name`, `value`)

SideEffect (`side_effect`, `target`)

Tell scons that side\_effects are built as side effects of building targets.

Split (`arg`)

This function converts a string or list into a list of strings or Nodes. This makes things easier for users by allowing files to be specified as a white-space separated list to be split.

**The input rules are:**

- A single string containing names separated by spaces. These will be split apart at the spaces.
- A single Node instance
- A list containing either strings or Node instances. Any strings in the list are not split at spaces.

In all cases, the function returns a list of Nodes and strings.

Tool (`tool`, `toolpath`=None, `**kwargs`) → `Tool`

Value (`value`, `built_value`=None, `name`=None)

VariantDir (`variant_dir`, `src_dir`, `duplicate`=1)

WhereIs (`prog`, `path`=None, `pathext`=None, `reject`=None)

Find prog in the path.

\_canonicalize (`path`)

Allow Dirs and strings beginning with # for top-relative.

Note this uses the current env's fs (in self).

\_changed\_build (`dependency`, `target`, `prev_ni`, `repo_node`=None)

\_changed\_content (`dependency`, `target`, `prev_ni`, `repo_node`=None)

\_changed\_source (`dependency`, `target`, `prev_ni`, `repo_node`=None)

\_changed\_timestamp\_match (`dependency`, `target`, `prev_ni`, `repo_node`=None)

\_changed\_timestamp\_newer (`dependency`, `target`, `prev_ni`, `repo_node`=None)

\_changed\_timestamp\_then\_content (`dependency`, `target`, `prev_ni`, `repo_node`=None)

\_exceeds\_version (`major`, `minor`, `v_major`, `v_minor`)

Return 1 if 'major' and 'minor' are greater than the version in 'v\_major' and 'v\_minor', and 0 otherwise.

\_find\_toolpath\_dir (`tp`)



`_get_SConscript_filenames (ls, kw)`  
 Convert the parameters passed to `SConscript()` calls into a list of files and export variables. If the parameters are invalid, throws `SCons.Errors.UserError`. Returns a tuple (`l`, `e`) where `l` is a list of SConscript filenames and `e` is a list of exports.

`_get_major_minor_revision (version_string)`  
 Split a version string into major, minor and (optionally) revision parts.  
 This is complicated by the fact that a version string can be something like 3.2b1.

`_gsm ()`

`_init_special ()`  
 Initial the dispatch tables for special handling of special construction variables.

`_update (other)`  
 Private method to update an environment's consvar dict directly.  
 Bypasses the normal checks that occur when users try to set items.

`_update_onlynew (other)`  
 Private method to add new items to an environment's consvar dict.  
 Only adds items from *other* whose keys do not already appear in the existing dict; values from *other* are not used for replacement. Bypasses the normal checks that occur when users try to set items.

`arg2nodes (args, node_factory=<class 'SCons.Environment._Null'>, lookup_list=<class 'SCons.Environment._Null'>, **kw)`

`backtick (command) → str`  
 Emulate command substitution.  
 Provides behavior conceptually like POSIX Shell notation for running a command in backquotes (backticks) by running `command` and returning the resulting output string.  
 This is not really a public API any longer, it is provided for the use of `ParseFlags()` (which supports it using a syntax of `!command`) and `ParseConfig()`.

**Raises:** **OSError** – if the external command returned non-zero exit status.

`get (key, default=None)`  
 Emulates the `get()` method of dictionaries.

`get_CacheDir ()`

`get_builder (name)`  
 Fetch the builder with the specified name from the environment.

`get_factory (factory, default='File')`  
 Return a factory function for creating Nodes for this construction environment.

`get_scanner (skey)`  
 Find the appropriate scanner given a key (usually a file suffix).

`get_src_sig_type ()`

`get_tgt_sig_type ()`

`gvars ()`

`items ()`  
 Emulates the `items()` method of dictionaries.

`keys ()`  
 Emulates the `keys()` method of dictionaries.

`lvars ()`

`scanner_map_delete (kw=None)`  
 Delete the cached scanner map (if we need to).

`setdefault (key, default=None)`  
 Emulates the `setdefault()` method of dictionaries.

`subst (string, raw=0, target=None, source=None, conv=None, executor=None)`  
 Recursively interpolates construction variables from the Environment into the specified string, returning the expanded result. Construction variables are specified by a `$` prefix in the string and begin with an initial underscore or alphabetic character followed by any number of underscores or alphanumeric characters. The construction variable names may be surrounded by curly braces to separate the name from trailing characters.

`subst_kw (kw, raw=0, target=None, source=None)`

`subst_list (string, raw=0, target=None, source=None, conv=None, executor=None)`  
 Calls through to `SCons.Subst.scons_subst_list()`. See the documentation for that function.



## SCons.Script package

`subst_path (path, target=None, source=None)`  
Substitute a path list, turning EntryProxies into Nodes and leaving Nodes (and other objects) as-is.

`subst_target_source (string, raw=0, target=None, source=None, conv=None, executor=None)`  
Recursively interpolates construction variables from the Environment into the specified string, returning the expanded result. Construction variables are specified by a \$ prefix in the string and begin with an initial underscore or alphabetic character followed by any number of underscores or alphanumeric characters. The construction variable names may be surrounded by curly braces to separate the name from trailing characters.

`validate_CacheDir_class (custom_class=None)`  
Validate the passed custom CacheDir class, or if no args are passed, validate the custom CacheDir class from the environment.

`values ()`  
Emulates the values() method of dictionaries.

*exception* `SCons.Script.SConscript.SConscriptReturn`  
Bases: Exception  
args  
`with_traceback ()`  
Exception.with\_traceback(tb) – set self.\_\_traceback\_\_ to tb and return self.

`SCons.Script.SConscript.SConscript_exception (file=<_io.TextIOWrapper name='<stderr>' mode='w' encoding='utf-8'>)`  
Print an exception stack trace just for the SConscript file(s). This will show users who have Python errors where the problem is, without cluttering the output with all of the internal calls leading up to where we exec the SConscript.

`SCons.Script.SConscript._SConscript (fs, *files, **kw)`  
`SCons.Script.SConscript.annotate (node)`  
Annotate a node with the stack frame describing the SConscript file and line number that created it.

`SCons.Script.SConscript.compute_exports (exports)`  
Compute a dictionary of exports given one of the parameters to the Export() function or the exports argument to SConscript().

`SCons.Script.SConscript.get_DefaultEnvironmentProxy ()`  
`SCons.Script.SConscript.get_calling_namespaces ()`  
Return the locals and globals for the function that called into this module in the current call stack.

`SCons.Script.SConscript.handle_missing_SConscript (f, must_exist=None)`  
Take appropriate action on missing file in SConscript() call.  
Print a warning or raise an exception on missing file, unless missing is explicitly allowed by the *must\_exist* value. On first warning, print a deprecation message.

### Parameters:

- **f (str)** – path of missing configuration file
- **must\_exist (bool)** – if true, fail. If false, but not `None`, allow the file to be missing. The default is `None`, which means issue the warning. The default is deprecated.

**Raises:** `UserError` – if *must\_exist* is true or if global `SCons.Script._no_missing_sconscript` is true.

## Module contents

The `main()` function used by the `scons` script.

Architecturally, this *is* the `scons` script, and will likely only be called from the external “scons” wrapper. Consequently, anything here should not be, or be considered, part of the build engine. If it’s something that we expect other software to want to use, it should go in some other module. If it’s specific to the “scons” script invocation, it goes here.

`SCons.Script.HelpFunction (text, append=False)`  
`class SCons.Script.TargetList (initlist=None)`  
Bases: `UserList`  
`_abc_impl = <_abc_data object>`  
`_add_Default (list)`  
`_clear ()`  
`_do_nothing (*args, **kw)`  
`append (item)`  
`S.append(value)` – append value to the end of the sequence

## SCons.Tool package

```
clear () → None -- remove all items from S
copy ()
count (value) → integer -- return number of occurrences of value
extend (other)
    S.extend(iterable) – extend sequence by appending elements from the iterable
index (value[, start[, stop]]) → integer -- return first index of value.
    Raises ValueError if the value is not present.
    Supporting start and stop arguments is optional, but recommended.
insert (i, item)
    S.insert(index, value) – insert value before index
pop ([, index]) → item -- remove and return item at index (default last).
    Raise IndexError if list is empty or index is out of range.
remove (item)
    S.remove(value) – remove first occurrence of value. Raise ValueError if the value is not present.
reverse ()
    S.reverse() – reverse IN PLACE
sort (*args, **kws)
SCons.Script.Variables (files=None, args={})
SCons.Script._Add_Arguments (alist)
SCons.Script._Add_Targets (tlist)
SCons.Script._Get_Default_Targets (d, fs)
SCons.Script._Set_Default_Targets (env, tlist)
SCons.Script._Set_Default_Targets_Has_Been_Called (d, fs)
SCons.Script._Set_Default_Targets_Has_Not_Been_Called (d, fs)
SCons.Script.set_missing_sconscript_error (flag=1)
    Set behavior on missing file in SConscript() call.

Returns:    previous value
```

## SCons.Tool package

### Module contents

SCons tool selection.

Looks for modules that define a callable object that can modify a construction environment as appropriate for a given tool (or tool chain).

Note that because this subsystem just *selects* a callable that can modify a construction environment, it's possible for people to define their own "tool specification" in an arbitrary callable function. No one needs to use or tie in to this subsystem in order to roll their own tool specifications.

SCons.Tool.CreateJarBuilder (env)

The Jar builder expects a list of class files which it can package into a jar file.

The jar tool provides an interface for passing other types of java files such as .java, directories or swig interfaces and will build them to class files in which it can package into the jar.

SCons.Tool.CreateJavaClassDirBuilder (env)

SCons.Tool.CreateJavaClassFileBuilder (env)

SCons.Tool.CreateJavaFileBuilder (env)

SCons.Tool.CreateJavaHBuilder (env)

SCons.Tool.FindAllTools (tools, env)

SCons.Tool.FindTool (tools, env)

SCons.Tool.Initializers (env)

class SCons.Tool.Tool (name, toolpath=None, \*\*kwargs)

Bases: object

\_tool\_module ()

Try to load a tool module.

This will hunt in the toolpath for both a Python file (toolname.py) and a Python module (toolname directory), then try the regular import machinery, then fallback to try a zipfile.

`class SCons.Tool.ToolInitializer (env, tools, names)`

Bases: object

A class for delayed initialization of Tools modules.

Instances of this class associate a list of Tool modules with a list of Builder method names that will be added by those Tool modules. As part of instantiating this object for a particular construction environment, we also add the appropriate ToolInitializerMethod objects for the various Builder methods that we want to use to delay Tool searches until necessary.

`apply_tools (env)`

Searches the list of associated Tool modules for one that exists, and applies that to the construction environment.

`remove_methods (env)`

Removes the methods that were added by the tool initialization so we no longer copy and re-bind them when the construction environment gets cloned.

`class SCons.Tool.ToolInitializerMethod (name, initializer)`

Bases: object

This is added to a construction environment in place of a method(s) normally called for a Builder (env.Object, env.StaticObject, etc.). When called, it has its associated ToolInitializer object search the specified list of tools and apply the first one that exists to the construction environment. It then calls whatever builder was (presumably) added to the construction environment in place of this particular instance.

`get_builder (env)`

Returns the appropriate real Builder for this method name after having the associated ToolInitializer object apply the appropriate Tool module.

`SCons.Tool.createCFileBuilders (env)`

This is a utility function that creates the CFile/CXXFile Builders in an Environment if they are not there already.

If they are there already, we return the existing ones.

This is a separate function because soooo many Tools use this functionality.

The return is a 2-tuple of (CFile, CXXFile)

`SCons.Tool.createLoadableModuleBuilder (env, loadable_module_suffix='$_LDMODULESUFFIX')`

This is a utility function that creates the LoadableModule Builder in an Environment if it is not there already.

If it is already there, we return the existing one.

**Parameters:** `loadable_module_suffix` – The suffix specified for the loadable module builder

`SCons.Tool.createObjBuilders (env)`

This is a utility function that creates the StaticObject and SharedObject Builders in an Environment if they are not there already.

If they are there already, we return the existing ones.

This is a separate function because soooo many Tools use this functionality.

The return is a 2-tuple of (StaticObject, SharedObject)

`SCons.Tool.createProgBuilder (env)`

This is a utility function that creates the Program Builder in an Environment if it is not there already.

If it is already there, we return the existing one.

`SCons.Tool.createSharedLibBuilder (env, shlib_suffix='$_SHLIBSUFFIX')`

This is a utility function that creates the SharedLibrary Builder in an Environment if it is not there already.

If it is already there, we return the existing one.

**Parameters:** `shlib_suffix` – The suffix specified for the shared library builder

`SCons.Tool.createStaticLibBuilder (env)`

This is a utility function that creates the StaticLibrary Builder in an Environment if it is not there already.

If it is already there, we return the existing one.

`SCons.Tool.find_program_path (env, key_program, default_paths=None, add_path=False) → Optional[str]`

Find the location of a tool using various means.

Mainly for windows where tools aren't all installed in /usr/bin, etc.

## SCons.Variables package

### Parameters:

- **env** – Current Construction Environment.
- **key\_program** – Tool to locate.
- **default\_paths** – List of additional paths this tool might be found in.
- **add\_path** – If true, add path found if it was from *default\_paths*.

SCons.Tool.tool\_list (platform, env)

## SCons.Variables package

### Submodules

#### SCons.Variables.BoolVariable module

Variable type for true/false Variables.

Usage example:

```
opts = Variables()
opts.Add(BoolVariable('embedded', 'build for an embedded system', 0))
...
if env['embedded'] == 1:
    ...
```

SCons.Variables.BoolVariable.BoolVariable (key, help, default) → Tuple[str, str, str, Callable, Callable]

Return a tuple describing a boolean SCons Variable.

The input parameters describe a boolean option. Returns a tuple including the correct converter and validator. The *help* text will have (yes|no) automatically appended to show the valid values. The result is usable as input to Add().

SCons.Variables.BoolVariable.\_text2bool (val) → bool

Converts strings to True/False.

If *val* looks like it expresses a bool-like value, based on the TRUE\_STRINGS and FALSE\_STRINGS tuples, return the appropriate value.

This is usable as a converter function for SCons Variables.

**Raises:** **ValueError** – if the string cannot be converted.

SCons.Variables.BoolVariable.\_validator (key, val, env) → None

Validates the given value to be either true or false.

This is usable as a validator function for SCons Variables.

### Raises:

- **KeyError** – if key is not set in env
- **UserError** – if key does not validate.

#### SCons.Variables.EnumVariable module

Variable type for enumeration Variables.

Enumeration variables allow selection of one from a specified set of values.

Usage example:

```
opts = Variables()
opts.Add(
    EnumVariable(
        'debug',
        help='debug output and symbols',
```

```

        default='no',
        allowed_values=('yes', 'no', 'full'),
        map={},
        ignorecase=2,
    )
)
...
if env['debug'] == 'full':
    ...

```

`SCons.Variables.EnumVariable.EnumVariable(key, help, default, allowed_values, map={}, ignorecase=0) → Tuple[str, str, str, Callable, Callable]`

Return a tuple describing an enumeration SCons Variable.

The input parameters describe an option with only certain values allowed. Returns A tuple including an appropriate converter and validator. The result is usable as input to `Add()`.

*key* and *default* are passed directly on to `Add()`.

*help* is the descriptive part of the help text, and will have the allowed values automatically appended.

*allowed\_values* is a list of strings, which are the allowed values for this option.

The *map*-dictionary may be used for converting the input value into canonical values (e.g. for aliases).

The value of *ignorecase* defines the behaviour of the validator:

- 0: the validator/converter are case-sensitive.
- 1: the validator/converter are case-insensitive.
- 2: the validator/converter is case-insensitive and the converted value will always be lower-case.

The *validator* tests whether the value is in the list of allowed values. The *converter* converts input values according to the given *map*-dictionary (unmapped input values are returned unchanged).

## SCons.Variables.ListVariable module

Variable type for list Variables.

A 'list' option may either be 'all', 'none' or a list of names separated by comma. After the option has been processed, the option value holds either the named list elements, all list elements or no list elements at all.

Usage example:

```

list_of_libs = Split('x11 gl qt ical')

opts = Variables()
opts.Add(
    ListVariable(
        'shared',
        help='libraries to build as shared libraries',
        default='all',
        elems=list_of_libs,
    )
)
...
for lib in list_of_libs:
    if lib in env['shared']:
        env.SharedObject(...)
    else:
        env.Object(...)

```

## SCons.Variables package

`SCons.Variables.ListVariable.ListVariable (key, help, default, names, map={}) → Tuple[str, str, str, None, Callable]`

Return a tuple describing a list SCons Variable.

The input parameters describe a 'list' option. Returns a tuple including the correct converter and validator. The result is usable for input to `Add()`.

*help* will have text appended indicating the legal values (not including any extra names from *map*).

*map* can be used to map alternative names to the ones in *names* - that is, a form of alias.

A 'list' option may either be 'all', 'none' or a list of names (separated by commas).

`SCons.Variables.ListVariable._converter (val, allowedElems, mapdict) → _ListVariable`

## SCons.Variables.PackageVariable module

Variable type for package Variables.

To be used whenever a 'package' may be enabled/disabled and the package path may be specified.

Given these options

```
x11=no    (disables X11 support)
x11=yes   (will search for the package installation dir)
x11=/usr/local/X11 (will check this path for existence)
```

Can be used as a replacement for `autoconf`'s `--with-xxx=yyy`

```
opts = Variables()
opts.Add(
    PackageVariable(
        key='x11',
        help='use X11 installed here (yes = search some places)',
        default='yes'
    )
)
...
if env['x11'] == True:
    dir = ... # search X11 in some standard places ...
    env['x11'] = dir
if env['x11']:
    ... # build with x11 ...
```

`SCons.Variables.PackageVariable.PackageVariable (key, help, default, searchfunc=None) → Tuple[str, str, str, Callable, Callable]`

Return a tuple describing a package list SCons Variable.

The input parameters describe a 'package list' option. Returns a tuple including the correct converter and validator appended. The result is usable as input to `Add()`.

A 'package list' option may either be 'all', 'none' or a pathname string. This information is appended to *help*.

`SCons.Variables.PackageVariable._converter (val)`

`SCons.Variables.PackageVariable._validator (key, val, env, searchfunc) → None`

## SCons.Variables.PathVariable module

Variable type for path Variables.

To be used whenever a user-specified path override setting should be allowed.

**Arguments to PathVariable are:**

- *key* - name of this option on the command line (e.g. "prefix")
- *help* - help string for option

- *default* - default value for this option
- *validator* - [optional] validator for option value. Predefined are:
  - *PathAccept* - accepts any path setting; no validation
  - *PathIsDir* - path must be an existing directory
  - *PathIsDirCreate* - path must be a dir; will create
  - *PathIsFile* - path must be a file
  - *PathExists* - path must exist (any type) [default]

The *validator* is a function that is called and which should return True or False to indicate if the path is valid. The arguments to the validator function are: (*key*, *val*, *env*). *key* is the name of the option, *val* is the path specified for the option, and *env* is the environment to which the Options have been added.

Usage example:

```
opts = Variables()
opts.Add(
    PathVariable(
        'qtdir',
        help='where the root of Qt is installed',
        default=qtdir,
        validator=PathIsDir,
    )
)
opts.Add(
    PathVariable(
        'qt_includes',
        help='where the Qt includes are installed',
        default='${qtdir}/includes',
        validator=PathIsDirCreate,
    )
)
opts.Add(
    PathVariable(
        'qt_libraries',
        help='where the Qt library is installed',
        default='${qtdir}/lib',
    )
)
```

## Module contents

Adds user-friendly customizable variables to an SCons build.

`class SCons.Variables.Variables (files=None, args=None, is_global=True)`

Bases: object

Holds all the options, updates the environment with the variables, and renders the help text.

If *is\_global* is true, this is a singleton, create only once.

### Parameters:

- **files** (*optional*) – List of option configuration files to load (backward compatibility). If a single string is passed it is automatically placed in a file list (Default value = None)
- **args** (*optional*) – dictionary to override values set from *files*. (Default value = None)
- **is\_global** (*optional*) – global instance? (Default value = True)

Add (*key*, *\*args*, *\*\*kwargs*) → None



Adds an option.

**Parameters:**

- **key** – the name of the variable, or a 5-tuple (or list). If a tuple, and there are no additional arguments, the tuple is unpacked into the four named kwargs from below. If a tuple and there are additional arguments, the first word of the tuple is taken as the key, and the remainder as aliases.
- **\*args** – optional positional arguments, corresponding to the four named kwargs below.

**Keyword Arguments:**

- **help** – help text for the options (Default value = "")
- **default** – default value for option (Default value = None)
- **validator** – function called to validate the option's value (Default value = None)
- **converter** – function to be called to convert the option's value before putting it in the environment. (Default value = None)
- **\*\*kwargs** – arbitrary keyword arguments used by the variable itself.

AddVariables (\*optlist) → None

Adds a list of options.

Each list element is a tuple/list of arguments to be passed on to the underlying method for adding options.

Example:

```
opt.AddVariables(
    ('debug', '', 0),
    ('CC', 'The C compiler'),
    ('VALIDATE', 'An option for testing validation', 'notset', validator, None),
)
```

FormatVariableHelpText (env, key, help, default, actual, aliases=None) → str

GenerateHelpText (env, sort=None) → str

Generates the help text for the options.

**Parameters:**

- **env** – an environment that is used to get the current values of the options.
- **sort** – Either a comparison function used for sorting (must take two arguments and return -1, 0 or 1) or a boolean to indicate if it should be sorted.

Save (filename, env) → None

Save the options to a file.

Saves all the options which have non-default settings to the given file as Python expressions. This file can then be used to load the options for a subsequent run. This can be used to create an option cache file.

**Parameters:**

- **filename** – Name of the file to save into
- **env** – the environment get the option values from

UnknownVariables () → dict

Returns unknown variables.

Identifies options that were not known, declared options in this object.

Update (env, args=None) → None

Updates an environment with the option variables.

**Parameters:**

- **env** – the environment to update.
- **args** (optional) – a dictionary of keys and values to update in *env*. If omitted, uses the variables from the commandline.

\_do\_add (key, help="", default=None, validator=None, converter=None, \*\*kwargs) → None

aliasfmt = '\n%s: %s\n default: %s\n actual: %s\n aliases: %s\n'

fmt = '\n%s: %s\n default: %s\n actual: %s\n'

## Indices and Tables

instance = *None*

keys () → list

Returns the keywords for the options.

## Indices and Tables

- genindex
- modindex
- search

# Index

—

`__clearRepositoryCache()` (SCons.Node.FS.Dir method)

`__dmap_cache` (SCons.Node.FS.File attribute)

`__dmap_sig_cache` (SCons.Node.FS.File attribute)

`__get_abspath()` (SCons.Node.FS.EntryProxy method)

`__get_base_path()` (SCons.Node.FS.EntryProxy method)

`__get_dir()` (SCons.Node.FS.EntryProxy method)

`__get_file()` (SCons.Node.FS.EntryProxy method)

`__get_filebase()` (SCons.Node.FS.EntryProxy method)

`__get_posix_path()` (SCons.Node.FS.EntryProxy method)

`__get_relpath()` (SCons.Node.FS.EntryProxy method)

`__get_rsrcdir()` (SCons.Node.FS.EntryProxy method)

`__get_rsrcnode()` (SCons.Node.FS.EntryProxy method)

`__get_srcdir()` (SCons.Node.FS.EntryProxy method)

`__get_srcnode()` (SCons.Node.FS.EntryProxy method)

`__get_suffix()` (SCons.Node.FS.EntryProxy method)

`__get_windows_path()` (SCons.Node.FS.EntryProxy method)

`__lib_either_version_flag()` (in module SCons.Defaults)

`__libversionflags()` (in module SCons.Defaults)

`__make_unique()` (SCons.Util.UniqueList method)

`__resetDuplicate()` (SCons.Node.FS.Dir method)

`_abc_impl` (SCons.Builder.ListEmitter attribute)

    (SCons.Builder.OverrideWarner attribute)

    (SCons.Environment.BuilderDict attribute)

    (SCons.Executor.TSList attribute)

    (SCons.Node.Alias.AliasNameSpace attribute)

    (SCons.Node.NodeList attribute)

    (SCons.SConf.SConfBuildTask attribute)

    (SCons.Script.Main.BuildTask attribute)

    (SCons.Script.Main.CleanTask attribute)

    (SCons.Script.Main.QuestionTask attribute)

    (SCons.Script.TargetList attribute)

    (SCons.Subst.CmdStringHolder attribute)

    (SCons.Subst.ListSubber attribute)

    (SCons.Subst.Targets\_or\_Sources attribute)

    (SCons.Taskmaster.AlwaysTask attribute)

    (SCons.Taskmaster.OutOfDateTask attribute)

    (SCons.Taskmaster.Task attribute)

    (SCons.Util.CLVar attribute)

    (SCons.Util.NodeList attribute)

    (SCons.Util.UniqueList attribute)

`_abspath` (SCons.Node.FS.Base attribute)

    (SCons.Node.FS.Dir attribute)

    (SCons.Node.FS.Entry attribute)

    (SCons.Node.FS.File attribute)

    (SCons.Node.FS.RootDir attribute)

`_ActionAction` (class in SCons.Action)

`_actionAppend()` (in module SCons.Action)

`_Add_Arguments()` (in module SCons.Script)

`_add_child()` (SCons.Node.Alias.Alias method)

    (SCons.Node.FS.Base method)

    (SCons.Node.FS.Dir method)

    (SCons.Node.FS.Entry method)

    (SCons.Node.FS.File method)

    (SCons.Node.FS.RootDir method)

    (SCons.Node.Node method)

    (SCons.Node.Python.Value method)

`_add_Default()` (SCons.Script.TargetList method)

`_add_help_option()`  
(SCons.Script.SConsOptions.SConsOptionParser method)

`_add_strings_to_dependency_map()`  
(SCons.Node.FS.File method)

`_Add_Targets()` (in module SCons.Script)

`_add_version_option()`  
(SCons.Script.SConsOptions.SConsOptionParser method)

`_adjustixes()` (SCons.Builder.BuilderBase method)

`_attempt_get_hash_function()` (in module SCons.Util)

`_attempt_init_of_python_3_9_hash_object()` (in module SCons.Util)

`_bootstrap()` (SCons.Job.Worker method)

`_bootstrap_inner()` (SCons.Job.Worker method)

`_build_dependency_map()` (SCons.Node.FS.File method)

`_build_targets()` (in module SCons.Script.Main)

[\\_CacheDir](#) (SCons.Executor.NullEnvironment attribute)  
[\\_CacheDir\\_path](#) (SCons.Executor.NullEnvironment attribute)  
[\\_callable\\_contents\(\)](#) (in module SCons.Action)  
[\\_canonicalize\(\)](#) (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment method)  
[\\_changed\\_build\(\)](#) (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment method)  
[\\_changed\\_content\(\)](#) (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment method)  
[\\_changed\\_source\(\)](#) (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment method)  
[\\_changed\\_sources\\_list](#) (SCons.Executor.Executor attribute)  
     (SCons.Executor.Null attribute)  
[\\_changed\\_targets\\_list](#) (SCons.Executor.Executor attribute)  
     (SCons.Executor.Null attribute)  
[\\_changed\\_timestamp\\_match\(\)](#) (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment method)  
[\\_changed\\_timestamp\\_newer\(\)](#) (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment method)  
[\\_changed\\_timestamp\\_then\\_content\(\)](#) (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment method)  
[\\_check\\_action\(\)](#) (SCons.Script.SConsOptions.SConsOption method)  
[\\_check\\_callback\(\)](#) (SCons.Script.SConsOptions.SConsOption method)  
[\\_check\\_choice\(\)](#) (SCons.Script.SConsOptions.SConsOption method)  
[\\_check\\_conflict\(\)](#) (SCons.Script.SConsOptions.SConsOptionGroup method)  
     (SCons.Script.SConsOptions.SConsOptionParser method)  
[\\_check\\_const\(\)](#) (SCons.Script.SConsOptions.SConsOption method)  
[\\_check\\_dest\(\)](#) (SCons.Script.SConsOptions.SConsOption method)  
[\\_check\\_empty\\_program\(\)](#) (in module SCons.Conftest)  
[\\_check\\_nargs\(\)](#) (SCons.Script.SConsOptions.SConsOption method)  
[\\_check\\_nargs\\_optional\(\)](#) (SCons.Script.SConsOptions.SConsOption method)  
[\\_check\\_opt\\_strings\(\)](#) (SCons.Script.SConsOptions.SConsOption method)  
[\\_check\\_type\(\)](#) (SCons.Script.SConsOptions.SConsOption method)  
[\\_check\\_writable\(\)](#) (SCons.dblite.dblite method)  
[\\_children\\_get\(\)](#) (SCons.Node.Alias.Alias method)  
     (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
     (SCons.Node.Node method)  
     (SCons.Node.Python.Value method)  
[\\_children\\_reset\(\)](#) (SCons.Node.Alias.Alias method)  
     (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
     (SCons.Node.Node method)  
     (SCons.Node.Python.Value method)  
[\\_classEntry](#) (in module SCons.Node.FS)  
[\\_clean\\_targets\(\)](#) (SCons.Script.Main.CleanTask method)  
[\\_clear\(\)](#) (SCons.Script.TargetList method)  
[\\_code\\_contents\(\)](#) (in module SCons.Action)

[\\_concat\(\)](#) (in module [SCons.Defaults](#))  
[\\_concat\\_ixes\(\)](#) (in module [SCons.Defaults](#))  
[\\_converter\(\)](#) (in module [SCons.Variables.ListVariable](#))  
(in module [SCons.Variables.PackageVariable](#))  
[\\_copy\\_func\(\)](#) (in module [SCons.Node.FS](#))  
[\\_create\(\)](#) ([SCons.Node.FS.Dir](#) method)  
([SCons.Node.FS.RootDir](#) method)  
[\\_create\\_nodelist\(\)](#) ([SCons.Subst.NLWrapper](#) method)  
[\\_create\\_nodes\(\)](#) ([SCons.Builder.BuilderBase](#) method)  
[\\_create\\_option\\_list\(\)](#)  
([SCons.Script.SConsOptions.SConsOptionGroup](#)  
method)  
([SCons.Script.SConsOptions.SConsOptionParser](#)  
method)  
[\\_create\\_option\\_mappings\(\)](#)  
([SCons.Script.SConsOptions.SConsOptionGroup](#)  
method)  
([SCons.Script.SConsOptions.SConsOptionParser](#)  
method)  
[\\_create\\_path\(\)](#) (in module [SCons.Script.Main](#))  
[\\_createConfigH\(\)](#) (in module [SCons.SConf](#))  
[\\_createDir\(\)](#) ([SCons.Node.FS.File](#) method)  
([SCons.SConf.SConfBase](#) method)  
[\\_createSource\(\)](#) (in module [SCons.SConf](#))  
[\\_defines\(\)](#) (in module [SCons.Defaults](#))  
[\\_del\\_SCANNERS\(\)](#) (in module [SCons.Environment](#))  
[\\_delete\(\)](#) ([SCons.Job.Worker](#) method)  
[\\_delete\\_duplicates\(\)](#) (in module [SCons.Environment](#))  
[\\_do\\_add\(\)](#) ([SCons.Variables.Variables](#) method)  
[\\_do\\_create\\_action\(\)](#) (in module [SCons.Action](#))  
[\\_do\\_create\\_keywords\(\)](#) (in module [SCons.Action](#))  
[\\_do\\_create\\_list\\_action\(\)](#) (in module [SCons.Action](#))  
[\\_do\\_execute](#) ([SCons.Executor.Executor](#) attribute)  
([SCons.Executor.Null](#) attribute)  
[\\_do\\_if\\_else\\_condition\(\)](#) ([SCons.cpp.DumbPreProcessor](#)  
method)  
([SCons.cpp.PreProcessor](#) method)  
([SCons.Scanner.C.SConsCPPConditionalScanner](#)  
method)  
([SCons.Scanner.C.SConsCPPScanner](#) method)  
[\\_do\\_nothing\(\)](#) ([SCons.Script.TargetList](#) method)

[\\_do\\_one\\_help\(\)](#)  
([SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[\\_doc\\_to\\_help\(\)](#)  
([SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[\\_dump\\_one\\_caller\(\)](#) (in module [SCons.Debug](#))  
[\\_enable\\_virtualenv\\_default\(\)](#) (in module  
[SCons.Platform.virtualenv](#))  
[\\_exc\\_info\(\)](#) ([SCons.Job.Worker](#) method)  
[\\_exceeds\\_version\(\)](#)  
([SCons.Script.SConscript.SConsEnvironment](#) method)  
[\\_exception\\_raise\(\)](#) ([SCons.SConf.SConfBuildTask](#)  
method)  
([SCons.Script.Main.BuildTask](#) method)  
([SCons.Script.Main.CleanTask](#) method)  
([SCons.Script.Main.QuestionTask](#) method)  
([SCons.Taskmaster.AlwaysTask](#) method)  
([SCons.Taskmaster.OutOfDateTask](#) method)  
([SCons.Taskmaster.Task](#) method)  
[\\_exec\\_main\(\)](#) (in module [SCons.Script.Main](#))  
[\\_execute\(\)](#) ([SCons.Builder.BuilderBase](#) method)  
[\\_execute\\_str](#) ([SCons.Executor.Executor](#) attribute)  
([SCons.Executor.Null](#) attribute)  
[\\_exercise\(\)](#) (in module [SCons.dblite](#))  
[\\_fetch\\_DefaultEnvironment\(\)](#) (in module  
[SCons.Defaults](#))  
[\\_find\\_file\\_key\(\)](#) ([SCons.Node.FS.FileFinder](#) method)  
[\\_find\\_next\\_ready\\_node\(\)](#)  
([SCons.Taskmaster.Taskmaster](#) method)  
[\\_find\\_toolpath\\_dir\(\)](#) ([SCons.Environment.Base](#) method)  
([SCons.Environment.OverrideEnvironment](#) method)  
([SCons.Script.SConscript.SConsEnvironment](#)  
method)  
[\\_format\\_text\(\)](#) ([SCons.Script.SConsOptions.SConsInden](#)  
[tedHelpFormatter](#) method)  
[\\_func\\_exists](#) ([SCons.Node.Alias.Alias](#) attribute)  
([SCons.Node.FS.Base](#) attribute)  
([SCons.Node.FS.Dir](#) attribute)  
([SCons.Node.FS.Entry](#) attribute)  
([SCons.Node.FS.File](#) attribute)  
([SCons.Node.FS.RootDir](#) attribute)  
([SCons.Node.Node](#) attribute)  
([SCons.Node.Python.Value](#) attribute)

`_func_get_contents` (SCons.Node.Alias.Alias attribute)

(SCons.Node.FS.Base attribute)

(SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)

(SCons.Node.FS.File attribute)

(SCons.Node.FS.RootDir attribute)

(SCons.Node.Node attribute)

(SCons.Node.Python.Value attribute)

`_func_is_derived` (SCons.Node.Alias.Alias attribute)

(SCons.Node.FS.Base attribute)

(SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)

(SCons.Node.FS.File attribute)

(SCons.Node.FS.RootDir attribute)

(SCons.Node.Node attribute)

(SCons.Node.Python.Value attribute)

`_func_rexists` (SCons.Node.Alias.Alias attribute)

(SCons.Node.FS.Base attribute)

(SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)

(SCons.Node.FS.File attribute)

(SCons.Node.FS.RootDir attribute)

(SCons.Node.Node attribute)

(SCons.Node.Python.Value attribute)

`_func_sconsign` (SCons.Node.FS.Base attribute)

(SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)

(SCons.Node.FS.File attribute)

(SCons.Node.FS.RootDir attribute)

`_func_target_from_source` (SCons.Node.Alias.Alias attribute)

(SCons.Node.FS.Base attribute)

(SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)

(SCons.Node.FS.File attribute)

(SCons.Node.FS.RootDir attribute)

(SCons.Node.Node attribute)

(SCons.Node.Python.Value attribute)

`_function_contents`() (in module SCons.Action)

`_gen_nodelist`() (SCons.Subst.NLWrapper method)

`_generate`() (SCons.Action.CommandGeneratorAction method)

(SCons.Action.LazyAction method)

`_generate_cache`() (SCons.Action.LazyAction method)

`_get_all_options`()

(SCons.Script.SConsOptions.SConsOptionParser method)

`_get_args`()

(SCons.Script.SConsOptions.SConsOptionParser method)

`_get_changed_sources`() (SCons.Executor.Executor method)

`_get_changed_targets`() (SCons.Executor.Executor method)

`_get_changes`() (SCons.Executor.Executor method)

`_Get_Default_Targets`() (in module SCons.Script)

`_get_files_to_clean`() (SCons.Script.Main.CleanTask method)

`_get_found_includes_key`() (SCons.Node.FS.File method)

`_get_hash_object`() (in module SCons.Util)

`_get_implicit_deps_heavyweight`()

(SCons.Action.CommandAction method)

(SCons.Action.LazyAction method)

`_get_implicit_deps_lightweight`()

(SCons.Action.CommandAction method)

(SCons.Action.LazyAction method)

`_get_major_minor_revision`()

(SCons.Script.SConscript.SConsEnvironment method)

`_get_previous_signatures`() (SCons.Node.FS.File method)

`_get_scanner`() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

`_get_SConscript_filenames`()

(SCons.Script.SConscript.SConsEnvironment method)

`_get_sdict`() (SCons.Builder.BuilderBase method)

`_get_source`() (SCons.Executor.Executor method)



<code>_get_sources()</code> (SCons.Executor.Executor method)	<code>_instance</code> (SCons.Subst.NullNodeList attribute)
<code>_get_src_builders_key()</code> (SCons.Builder.BuilderBase method)	<code>_is_path_in()</code> (in module SCons.Platform.virtualenv)
<code>_get_str()</code> (SCons.Node.FS.Base method)	<code>_labspath</code> (SCons.Node.FS.Base attribute)
(SCons.Node.FS.Dir method)	(SCons.Node.FS.Dir attribute)
(SCons.Node.FS.Entry method)	(SCons.Node.FS.Entry attribute)
(SCons.Node.FS.File method)	(SCons.Node.FS.File attribute)
(SCons.Node.FS.RootDir method)	(SCons.Node.FS.RootDir attribute)
<code>_get_target()</code> (SCons.Executor.Executor method)	<code>_lang2suffix()</code> (in module SCons.ConfTest)
<code>_get_targets()</code> (SCons.Executor.Executor method)	<code>_latex_names()</code> (SCons.Scanner.LaTeX.LaTeX method)
<code>_get_unchanged_sources()</code> (SCons.Executor.Executor method)	<code>_load_all_site_scons_dirs()</code> (in module SCons.Script.Main)
<code>_get_unchanged_targets()</code> (SCons.Executor.Executor method)	<code>_load_site_scons_dir()</code> (in module SCons.Script.Main)
<code>_get_unignored_sources_key()</code> (SCons.Executor.Executor method)	<code>_local</code> (SCons.Node.FS.Base attribute)
<code>_glob1()</code> (SCons.Node.FS.Base method)	(SCons.Node.FS.Dir attribute)
(SCons.Node.FS.Dir method)	(SCons.Node.FS.Entry attribute)
(SCons.Node.FS.Entry method)	(SCons.Node.FS.File attribute)
(SCons.Node.FS.File method)	(SCons.Node.FS.RootDir attribute)
(SCons.Node.FS.RootDir method)	<code>_LogFailed()</code> (in module SCons.ConfTest)
<code>_gsm()</code> (SCons.Environment.Base method)	<code>_lookup()</code> (SCons.Node.FS.FS method)
(SCons.Environment.OverrideEnvironment method)	<code>_lookup_abs()</code> (SCons.Node.FS.RootDir method)
(SCons.Script.SConscript.SConsEnvironment method)	<code>_lookupDict</code> (SCons.Node.FS.RootDir attribute)
<code>_hardlink_func()</code> (in module SCons.Node.FS)	<code>_main()</code> (in module SCons.Script.Main)
<code>_Have()</code> (in module SCons.ConfTest)	<code>_match_long_opt()</code> (SCons.Script.SConsOptions.SConsOptionParser method)
<code>_ignore_virtualenv_default()</code> (in module SCons.Platform.virtualenv)	<code>_match_tuples()</code> (SCons.cpp.DumbPreProcessor method)
<code>_init_parsing_state()</code> (SCons.Script.SConsOptions.SConsOptionParser method)	(SCons.cpp.PreProcessor method)
<code>_init_special()</code> (SCons.Environment.Base method)	(SCons.Scanner.C.SConsCPPConditionalScanner method)
(SCons.Environment.OverrideEnvironment method)	(SCons.Scanner.C.SConsCPPScanner method)
(SCons.Environment.SubstitutionEnvironment method)	<code>_memo</code> (SCons.Executor.Executor attribute)
(SCons.Script.SConscript.SConsEnvironment method)	(SCons.Executor.Null attribute)
<code>_initialized</code> (SCons.Job.Worker attribute)	(SCons.Node.Alias.Alias attribute)
<code>_inject_venv_path()</code> (in module SCons.Platform.virtualenv)	(SCons.Node.FS.Base attribute)
<code>_inject_venv_variables()</code> (in module SCons.Platform.virtualenv)	(SCons.Node.FS.Dir attribute)
	(SCons.Node.FS.Entry attribute)
	(SCons.Node.FS.File attribute)
	(SCons.Node.FS.RootDir attribute)
	(SCons.Node.Node attribute)
	(SCons.Node.Python.Value attribute)



[\\_morph\(\)](#) (SCons.Executor.Null method)  
[\(SCons.Node.FS.Dir method\)](#)  
[\(SCons.Node.FS.File method\)](#)  
[\(SCons.Node.FS.RootDir method\)](#)  
[\\_my\\_normcase\(\)](#) (in module SCons.Node.FS)  
[\\_my\\_splitdrive\(\)](#) (in module SCons.Node.FS)  
[\\_no\\_exception\\_to\\_raise\(\)](#)  
[\(SCons.SConf.SConfBuildTask method\)](#)  
[\(SCons.Script.Main.BuildTask method\)](#)  
[\(SCons.Script.Main.CleanTask method\)](#)  
[\(SCons.Script.Main.QuestionTask method\)](#)  
[\(SCons.Taskmaster.AlwaysTask method\)](#)  
[\(SCons.Taskmaster.OutOfDateTask method\)](#)  
[\(SCons.Taskmaster.Task method\)](#)  
[\\_node\\_errors\(\)](#) (in module SCons.Builder)  
[\\_NoError](#)  
[\\_null](#) (class in SCons.Action)  
[\\_Null](#) (class in SCons.Builder)  
[\(class in SCons.Environment\)](#)  
[\(class in SCons.Node.FS\)](#)  
[\(class in SCons.Scanner\)](#)  
[\(class in SCons.Scanner.LaTeX\)](#)  
[\\_null](#) (in module SCons.Builder)  
[\(in module SCons.Environment\)](#)  
[\(in module SCons.Scanner\)](#)  
[\(in module SCons.Scanner.LaTeX\)](#)  
[\\_object\\_contents\(\)](#) (in module SCons.Action)  
[\\_object\\_instance\\_content\(\)](#) (in module SCons.Action)  
[\\_open\(\)](#) (SCons.dblite.dblite method)  
[\\_os\\_chmod\(\)](#) (SCons.dblite.dblite method)  
[\\_os\\_chown\(\)](#) (SCons.dblite.dblite method)  
[\\_os\\_replace\(\)](#) (SCons.dblite.dblite method)  
[\\_parse\\_tuples\(\)](#) (SCons.cpp.DumbPreProcessor method)  
[\(SCons.cpp.PreProcessor method\)](#)  
[\(SCons.Scanner.C.SConsCPPConditionalScanner method\)](#)  
[\(SCons.Scanner.C.SConsCPPScanner method\)](#)  
[\\_path](#) (SCons.Node.FS.Base attribute)  
[\(SCons.Node.FS.Dir attribute\)](#)  
[\(SCons.Node.FS.Entry attribute\)](#)  
[\(SCons.Node.FS.File attribute\)](#)  
[\(SCons.Node.FS.RootDir attribute\)](#)  
[\\_path\\_elements](#) (SCons.Node.FS.Base attribute)  
[\(SCons.Node.FS.Dir attribute\)](#)  
[\(SCons.Node.FS.Entry attribute\)](#)  
[\(SCons.Node.FS.File attribute\)](#)  
[\(SCons.Node.FS.RootDir attribute\)](#)  
[\\_PathList](#) (class in SCons.PathList)  
[\\_pickle\\_dump\(\)](#) (SCons.dblite.dblite static method)  
[\\_pickle\\_protocol](#) (SCons.dblite.dblite attribute)  
[\\_populate\\_option\\_list\(\)](#)  
[\(SCons.Script.SConsOptions.SConsOptionParser method\)](#)  
[\\_print\\_cmd\\_str\(\)](#) (SCons.Platform.TempFileMunge method)  
[\\_process\\_args\(\)](#)  
[\(SCons.Script.SConsOptions.SConsOptionParser method\)](#)  
[\\_process\\_long\\_opt\(\)](#)  
[\(SCons.Script.SConsOptions.SConsOptionParser method\)](#)  
[\\_process\\_short\\_opts\(\)](#)  
[\(SCons.Script.SConsOptions.SConsOptionParser method\)](#)  
[\\_process\\_tuples\(\)](#) (SCons.cpp.DumbPreProcessor method)  
[\(SCons.cpp.PreProcessor method\)](#)  
[\(SCons.Scanner.C.SConsCPPConditionalScanner method\)](#)  
[\(SCons.Scanner.C.SConsCPPScanner method\)](#)  
[\\_proxy](#) (SCons.Node.FS.Base attribute)  
[\(SCons.Node.FS.Dir attribute\)](#)  
[\(SCons.Node.FS.Entry attribute\)](#)  
[\(SCons.Node.FS.File attribute\)](#)  
[\(SCons.Node.FS.RootDir attribute\)](#)  
[\\_readconfig\(\)](#) (SCons.CacheDir.CacheDir method)  
[\\_recurse\\_all\\_nodes\(\)](#) (SCons.Scanner.Classic static method)  
[\(SCons.Scanner.ClassicCPP static method\)](#)  
[\(SCons.Scanner.Current static method\)](#)  
[\(SCons.Scanner.D.D static method\)](#)

(SCons.Scanner.Fortran.F90Scanner static method)	_scons_user_warning() (in module SCons.Script.Main)
(SCons.Scanner.LaTeX.LaTeX static method)	_SConscript() (in module SCons.Script.SConscript)
(SCons.Scanner.ScannerBase static method)	_sconsign (SCons.Node.FS.Dir attribute)
(SCons.Scanner.Selector static method)	(SCons.Node.FS.Entry attribute)
_recurse_no_nodes() (SCons.Scanner.Classic static method)	(SCons.Node.FS.File attribute)
(SCons.Scanner.ClassicCPP static method)	(SCons.Node.FS.RootDir attribute)
(SCons.Scanner.Current static method)	_SConstruct_exists() (in module SCons.Script.Main)
(SCons.Scanner.D.D static method)	_semi_deepcopy_list() (in module SCons.Util)
(SCons.Scanner.Fortran.F90Scanner static method)	_semi_deepcopy_tuple() (in module SCons.Util)
(SCons.Scanner.LaTeX.LaTeX static method)	_set_allowed_viable_default_hashes() (in module SCons.Util)
(SCons.Scanner.ScannerBase static method)	_set_attrs() (SCons.Script.SConsOptions.SConsOption method)
(SCons.Scanner.Selector static method)	_set_BUILDERS() (in module SCons.Environment)
_rel_path_key() (SCons.Node.FS.Dir method)	_set_conftest_node() (in module SCons.SConf)
(SCons.Node.FS.RootDir method)	_set_debug_values() (in module SCons.Script.Main)
_remove_list() (in module SCons.Subst)	_Set_Default_Targets() (in module SCons.Script)
_reset_internal_locks() (SCons.Job.Worker method)	_Set_Default_Targets_Has_Been_Called() (in module SCons.Script)
_reset_sig_handler() (SCons.Job.Jobs method)	_Set_Default_Targets_Has_Not_Been_Called() (in module SCons.Script)
_resolve_shell_env() (in module SCons.Action)	_set_future_reserved() (in module SCons.Environment)
_return_nodelist() (SCons.Subst.NLWrapper method)	_set_ident() (SCons.Job.Worker method)
_Rfindalldirs_key() (SCons.Node.FS.Base method)	_set_opt_strings() (SCons.Script.SConsOptions.SConsOption method)
(SCons.Node.FS.Dir method)	_set_reserved() (in module SCons.Environment)
(SCons.Node.FS.Entry method)	_set_SCANNERS() (in module SCons.Environment)
(SCons.Node.FS.File method)	_set_tstate_lock() (SCons.Job.Worker method)
(SCons.Node.FS.RootDir method)	_setup_sig_handler() (SCons.Job.Jobs method)
_rm_list() (in module SCons.Subst)	_share_option_mappings() (SCons.Script.SConsOptions.SConsOptionGroup method)
_rmv_existing() (SCons.Node.FS.File method)	(SCons.Script.SConsOptions.SConsOptionParser method)
_run_exitfuncs() (in module SCons.exitfuncs)	_show_md5_warning() (in module SCons.Util)
_running_in_virtualenv() (in module SCons.Platform.virtualenv)	_shutdown() (SCons.SConf.SConfBase method)
_save_str() (SCons.Node.FS.Base method)	_shutil_copyfile() (SCons.dblite.dblite method)
(SCons.Node.FS.Dir method)	_softlink_func() (in module SCons.Node.FS)
(SCons.Node.FS.Entry method)	_specific_sources (SCons.Node.Alias.Alias attribute)
(SCons.Node.FS.File method)	(SCons.Node.FS.Base attribute)
(SCons.Node.FS.RootDir method)	(SCons.Node.FS.Dir attribute)
_scons_internal_error() (in module SCons.Script.Main)	(SCons.Node.FS.Entry attribute)
_scons_internal_warning() (in module SCons.Script.Main)	
_scons_syntax_error() (in module SCons.Script.Main)	
_scons_user_error() (in module SCons.Script.Main)	

(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)  
\_srcdir\_find\_file\_key() (SCons.Node.FS.Dir method)  
(SCons.Node.FS.RootDir method)  
\_startup() (SCons.SConf.SConfBase method)  
\_stop() (SCons.Job.Worker method)  
\_string\_from\_cmd\_list() (in module SCons.Action)  
\_stringConfigH() (in module SCons.SConf)  
\_stringSource() (in module SCons.SConf)  
\_strip\_initial\_spaces()  
(SCons.Script.Interactive.SConsInteractiveCmd method)  
\_stripixes() (in module SCons.Defaults)  
\_subproc() (in module SCons.Action)  
\_subst\_libs() (in module SCons.Scanner.Prog)  
\_subst\_src\_suffixes\_key() (SCons.Builder.BuilderBase method)  
\_tags (SCons.Node.Alias.Alias attribute)  
(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)  
\_text2bool() (in module SCons.Variables.BoolVariable)  
\_time\_time() (SCons.dblite.dblite method)  
\_tool\_module() (SCons.Tool.Tool method)  
\_tpath (SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
\_unchanged\_sources\_list (SCons.Executor.Executor attribute)  
(SCons.Executor.Null attribute)  
\_unchanged\_targets\_list (SCons.Executor.Executor attribute)  
(SCons.Executor.Null attribute)

\_update() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
(SCons.Script.SConsOptions.SConsValues method)  
\_update\_careful()  
(SCons.Script.SConsOptions.SConsValues method)  
\_update\_loose()  
(SCons.Script.SConsOptions.SConsValues method)  
\_update\_onlynew() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
\_validate\_pending\_children()  
(SCons.Taskmaster.Taskmaster method)  
\_validator() (in module SCons.Variables.BoolVariable)  
(in module SCons.Variables.PackageVariable)  
\_wait\_for\_tstate\_lock() (SCons.Job.Worker method)  
\_YesNoResult() (in module SCons.Conftest)

## A

abspath (SCons.Node.FS.RootDir attribute)  
action (SCons.Errors.BuildError attribute)  
Action() (in module SCons.Action)  
(SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
action\_list (SCons.Executor.Executor attribute)  
(SCons.Executor.Null attribute)  
ActionBase (class in SCons.Action)  
ActionCaller (class in SCons.Action)  
ActionFactory (class in SCons.Action)  
ACTIONS (SCons.Script.SConsOptions.SConsOption attribute)  
Add() (SCons.Variables.Variables method)  
add\_action() (SCons.Builder.CompositeBuilder method)  
(SCons.Builder.DictCmdGenerator method)  
add\_batch() (SCons.Executor.Executor method)  
add\_dependency() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
add\_emitter() (SCons.Builder.BuilderBase method)  
add\_ignore() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
add\_local\_option()  
(SCons.Script.Main.FakeOptionParser method)  
(SCons.Script.SConsOptions.SConsOptionParser method)  
add\_new\_word() (SCons.Subst.ListSubber method)  
add\_option()  
(SCons.Script.SConsOptions.SConsOptionGroup method)  
(SCons.Script.SConsOptions.SConsOptionParser method)  
add\_option\_group()  
(SCons.Script.SConsOptions.SConsOptionParser method)  
add\_options()  
(SCons.Script.SConsOptions.SConsOptionGroup method)  
(SCons.Script.SConsOptions.SConsOptionParser method)  
add\_post\_action() (SCons.Executor.Executor method)  
(SCons.Executor.Null method)  
add\_pre\_action() (SCons.Executor.Executor method)  
(SCons.Executor.Null method)  
add\_prerequisite() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
add\_scanner() (SCons.Scanner.Classic method)  
(SCons.Scanner.ClassicCPP method)  
(SCons.Scanner.Current method)  
(SCons.Scanner.D.D method)  
(SCons.Scanner.Fortran.F90Scanner method)  
(SCons.Scanner.LaTeX.LaTeX method)  
(SCons.Scanner.ScannerBase method)  
(SCons.Scanner.Selector method)  
add\_key() (SCons.Scanner.Classic method)  
(SCons.Scanner.ClassicCPP method)  
(SCons.Scanner.Current method)  
(SCons.Scanner.D.D method)  
(SCons.Scanner.Fortran.F90Scanner method)  
(SCons.Scanner.LaTeX.LaTeX method)  
(SCons.Scanner.ScannerBase method)  
(SCons.Scanner.Selector method)  
add\_source() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
add\_sources() (SCons.Executor.Executor method)  
add\_src\_builder() (SCons.Builder.BuilderBase method)  
add\_to\_current\_word() (SCons.Subst.ListSubber method)  
add\_to\_implicit() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
add\_to\_waiting\_parents() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 (SCons.Node.Node method)  
 (SCons.Node.Python.Value method)  
 add\_to\_waiting\_s\_e() (SCons.Node.Alias.Alias method)  
 (SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 (SCons.Node.Node method)  
 (SCons.Node.Python.Value method)  
 add\_wkid() (SCons.Node.Alias.Alias method)  
 (SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 (SCons.Node.Node method)  
 (SCons.Node.Python.Value method)  
 AddBatchExecutor() (in module SCons.Executor)  
 AddMethod() (in module SCons.Util)  
 (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Environment.SubstitutionEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 AddOption() (in module SCons.Script.Main)  
 AddPathIfNotExists() (in module SCons.Util)  
 AddPostAction() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 AddPreAction() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 addRepository() (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.RootDir method)  
 AddTest() (SCons.SConf.SConfBase method)  
 AddTests() (SCons.SConf.SConfBase method)  
 AddVariables() (SCons.Variables.Variables method)  
 adjust\_suffix() (SCons.Builder.BuilderBase method)  
 adjustixes() (in module SCons.Util)  
 Alias (class in SCons.Node.Alias)  
 Alias() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Node.Alias.AliasNameSpace method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 Alias.Attrs (class in SCons.Node.Alias)  
 alias\_builder() (in module SCons.Environment)  
 AliasBuildInfo (class in SCons.Node.Alias)  
 aliasfmt (SCons.Variables.Variables attribute)  
 AliasNameSpace (class in SCons.Node.Alias)  
 AliasNodeInfo (class in SCons.Node.Alias)  
 all\_children() (SCons.Node.Alias.Alias method)  
 (SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 (SCons.Node.Node method)  
 (SCons.Node.Python.Value method)  
 all\_include() (SCons.cpp.DumbPreProcessor method)  
 (SCons.cpp.PreProcessor method)  
 (SCons.Scanner.C.SConsCPPConditionalScanner method)  
 (SCons.Scanner.C.SConsCPPScanner method)  
 alter\_targets() (SCons.Node.Alias.Alias method)  
 (SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 (SCons.Node.Node method)  
 (SCons.Node.Python.Value method)



[always\\_build](#) ([SCons.Node.Alias.Alias](#) attribute)  
     ([SCons.Node.FS.Base](#) attribute)  
     ([SCons.Node.FS.Dir](#) attribute)  
     ([SCons.Node.FS.Entry](#) attribute)  
     ([SCons.Node.FS.File](#) attribute)  
     ([SCons.Node.FS.RootDir](#) attribute)  
     ([SCons.Node.Node](#) attribute)  
     ([SCons.Node.Python.Value](#) attribute)  
[ALWAYS\\_TYPED\\_ACTIONS](#)  
 ([SCons.Script.SConsOptions.SConsOption](#) attribute)  
[AlwaysBuild\(\)](#) ([SCons.Environment.Base](#) method)  
     ([SCons.Environment.OverrideEnvironment](#) method)  
     ([SCons.Script.SConscript.SConsEnvironment](#) method)  
[AlwaysTask](#) (class in [SCons.Taskmaster](#))  
[Annotate\(\)](#) (in module [SCons.Node](#))  
[annotate\(\)](#) (in module [SCons.Script.SConscript](#))  
[append\(\)](#) ([SCons.Builder.ListEmitter](#) method)  
[Append\(\)](#) ([SCons.Environment.Base](#) method)  
     ([SCons.Environment.OverrideEnvironment](#) method)  
[append\(\)](#) ([SCons.Executor.TSList](#) method)  
     ([SCons.Node.NodeList](#) method)  
[Append\(\)](#) ([SCons.Script.SConscript.SConsEnvironment](#) method)  
[append\(\)](#) ([SCons.Script.TargetList](#) method)  
     ([SCons.Subst.ListSubber](#) method)  
     ([SCons.Subst.Targets\\_or\\_Sources](#) method)  
     ([SCons.Util.CLVar](#) method)  
     ([SCons.Util.NodeList](#) method)  
     ([SCons.Util.UniqueList](#) method)  
[AppendENVPPath\(\)](#) ([SCons.Environment.Base](#) method)  
     ([SCons.Environment.OverrideEnvironment](#) method)  
     ([SCons.Script.SConscript.SConsEnvironment](#) method)  
[AppendLIBS\(\)](#) ([SCons.SConf.CheckContext](#) method)  
[AppendPath\(\)](#) (in module [SCons.Util](#))  
[AppendUnique\(\)](#) ([SCons.Environment.Base](#) method)  
     ([SCons.Environment.OverrideEnvironment](#) method)  
     ([SCons.Script.SConscript.SConsEnvironment](#) method)  
[apply\\_tools\(\)](#) (in module [SCons.Environment](#))

([SCons.Tool.ToolInitializer](#) method)  
[ArchDefinition](#) (class in [SCons.Platform.win32](#))  
[arg2nodes\(\)](#) ([SCons.Environment.Base](#) method)  
     ([SCons.Environment.OverrideEnvironment](#) method)  
     ([SCons.Environment.SubstitutionEnvironment](#) method)  
     ([SCons.Script.SConscript.SConsEnvironment](#) method)  
[args](#) ([SCons.Errors.BuildError](#) attribute)  
     ([SCons.Errors.ExplicitExit](#) attribute)  
     ([SCons.Errors.InternalError](#) attribute)  
     ([SCons.Errors.MSVCErrors](#) attribute)  
     ([SCons.Errors.SConsEnvironmentError](#) attribute)  
     ([SCons.Errors.StopError](#) attribute)  
     ([SCons.Errors.UserError](#) attribute)  
     ([SCons.Node.FS.EntryProxyAttributeError](#) attribute)  
     ([SCons.Node.FS.FileBuildInfoFileToCsigMappingError](#) attribute)  
     ([SCons.SConf.ConfigureCacheError](#) attribute)  
     ([SCons.SConf.ConfigureDryRunError](#) attribute)  
     ([SCons.SConf.SConfError](#) attribute)  
     ([SCons.SConf.SConfWarning](#) attribute)  
     ([SCons.Script.Main.SConsPrintHelpException](#) attribute)  
     ([SCons.Script.SConscript.SConscriptReturn](#) attribute)  
     ([SCons.Util.\\_NoError](#) attribute)  
     ([SCons.Warnings.CacheVersionWarning](#) attribute)  
     ([SCons.Warnings.CacheWriteErrorWarning](#) attribute)  
     ([SCons.Warnings.CorruptSConsignWarning](#) attribute)  
     ([SCons.Warnings.DependencyWarning](#) attribute)  
     ([SCons.Warnings.DeprecatedDebugOptionsWarning](#) attribute)  
     ([SCons.Warnings.DeprecatedMissingSConscriptWarning](#) attribute)  
     ([SCons.Warnings.DeprecatedOptionsWarning](#) attribute)  
     ([SCons.Warnings.DeprecatedSourceCodeWarning](#) attribute)  
     ([SCons.Warnings.DeprecatedWarning](#) attribute)  
     ([SCons.Warnings.DevelopmentVersionWarning](#) attribute)  
     ([SCons.Warnings.DuplicateEnvironmentWarning](#) attribute)  
     ([SCons.Warnings.FortranCxxMixWarning](#) attribute)

(SCons.Warnings.FutureDeprecatedWarning attribute)  
 (SCons.Warnings.FutureReservedVariableWarning attribute)  
 (SCons.Warnings.LinkWarning attribute)  
 (SCons.Warnings.MandatoryDeprecatedWarning attribute)  
 (SCons.Warnings.MisleadingKeywordsWarning attribute)  
 (SCons.Warnings.MissingSConscriptWarning attribute)  
 (SCons.Warnings.NoObjectCountWarning attribute)  
 (SCons.Warnings.NoParallelSupportWarning attribute)  
 (SCons.Warnings.PythonVersionWarning attribute)  
 (SCons.Warnings.ReservedVariableWarning attribute)  
 (SCons.Warnings.SConsWarning attribute)  
 (SCons.Warnings.StackSizeWarning attribute)  
 (SCons.Warnings.TargetNotBuiltWarning attribute)  
 (SCons.Warnings.TaskmasterNeedsExecuteWarning attribute)  
 (SCons.Warnings.ToolQtDeprecatedWarning attribute)  
 (SCons.Warnings.VisualCMissingWarning attribute)  
 (SCons.Warnings.VisualStudioMissingWarning attribute)  
 (SCons.Warnings.VisualVersionMismatch attribute)  
 (SCons.Warnings.WarningOnByDefault attribute)  
 attributes (SCons.Node.Alias.Alias attribute)  
     (SCons.Node.FS.Base attribute)  
     (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
     (SCons.Node.Node attribute)  
     (SCons.Node.Python.Value attribute)  
 ATTRS (SCons.Script.SConsOptions.SConsOption attribute)  
 B  
 backtick() (SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)  
 (SCons.Environment.SubstitutionEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 bact (SCons.Node.Alias.AliasBuildInfo attribute)  
     (SCons.Node.BuildInfoBase attribute)  
     (SCons.Node.FS.DirBuildInfo attribute)  
     (SCons.Node.FS.FileBuildInfo attribute)  
     (SCons.Node.Python.ValueBuildInfo attribute)  
     (SCons.SConf.SConfBuildInfo attribute)  
 bactsig (SCons.Node.Alias.AliasBuildInfo attribute)  
     (SCons.Node.BuildInfoBase attribute)  
     (SCons.Node.FS.DirBuildInfo attribute)  
     (SCons.Node.FS.FileBuildInfo attribute)  
     (SCons.Node.Python.ValueBuildInfo attribute)  
     (SCons.SConf.SConfBuildInfo attribute)  
 Base (class in SCons.Environment)  
     (class in SCons.Node.FS)  
     (class in SCons.SConsign)  
     (in module SCons.Scanner)  
 Base.Attrs (class in SCons.Node.FS)  
 Batch (class in SCons.Executor)  
 batch\_key() (SCons.Action.\_ActionAction method)  
     (SCons.Action.ActionBase method)  
     (SCons.Action.CommandAction method)  
     (SCons.Action.CommandGeneratorAction method)  
     (SCons.Action.FunctionAction method)  
     (SCons.Action.LazyAction method)  
     (SCons.Action.ListAction method)  
 batches (SCons.Executor.Executor attribute)  
     (SCons.Executor.Null attribute)  
 bdepends (SCons.Node.Alias.AliasBuildInfo attribute)  
     (SCons.Node.BuildInfoBase attribute)  
     (SCons.Node.FS.DirBuildInfo attribute)  
     (SCons.Node.FS.FileBuildInfo attribute)  
     (SCons.Node.Python.ValueBuildInfo attribute)  
     (SCons.SConf.SConfBuildInfo attribute)  
 bdependsigs (SCons.Node.Alias.AliasBuildInfo attribute)



(SCons.Node.BuildInfoBase attribute)	build() (SCons.Node.Alias.Alias method)	
(SCons.Node.FS.DirBuildInfo attribute)	(SCons.Node.FS.Base method)	
(SCons.Node.FS.FileBuildInfo attribute)	(SCons.Node.FS.Dir method)	
(SCons.Node.Python.ValueBuildInfo attribute)	(SCons.Node.FS.Entry method)	
(SCons.SConf.SConfBuildInfo attribute)	(SCons.Node.FS.File method)	
bimplicit (SCons.Node.Alias.AliasBuildInfo attribute)	(SCons.Node.FS.RootDir method)	
(SCons.Node.BuildInfoBase attribute)	(SCons.Node.Node method)	
(SCons.Node.FS.DirBuildInfo attribute)	(SCons.Node.Python.Value method)	
(SCons.Node.FS.FileBuildInfo attribute)	BuildDefaultGlobals() (in module	SCons.Script.SConscript)
(SCons.Node.Python.ValueBuildInfo attribute)	builder (SCons.Node.Alias.Alias attribute)	
(SCons.SConf.SConfBuildInfo attribute)	(SCons.Node.FS.Base attribute)	
bimplicitargs (SCons.Node.Alias.AliasBuildInfo attribute)	(SCons.Node.FS.Dir attribute)	
(SCons.Node.BuildInfoBase attribute)	(SCons.Node.FS.Entry attribute)	
(SCons.Node.FS.DirBuildInfo attribute)	(SCons.Node.FS.File attribute)	
(SCons.Node.FS.FileBuildInfo attribute)	(SCons.Node.FS.RootDir attribute)	
(SCons.Node.Python.ValueBuildInfo attribute)	(SCons.Node.Node attribute)	
(SCons.SConf.SConfBuildInfo attribute)	(SCons.Node.Python.Value attribute)	
binfo (SCons.Node.Alias.Alias attribute)	Builder() (in module SCons.Builder)	
(SCons.Node.FS.Base attribute)	(SCons.Environment.Base method)	
(SCons.Node.FS.Dir attribute)	(SCons.Environment.OverrideEnvironment method)	
(SCons.Node.FS.Entry attribute)	(SCons.Script.SConscript.SConsEnvironment	method)
(SCons.Node.FS.File attribute)	builder_kw (SCons.Executor.Executor attribute)	
(SCons.Node.FS.RootDir attribute)	(SCons.Executor.Null attribute)	
(SCons.Node.Node attribute)	builder_set() (SCons.Node.Alias.Alias method)	
(SCons.Node.Python.Value attribute)	(SCons.Node.FS.Base method)	
(SCons.SConsign.SConsignEntry attribute)	(SCons.Node.FS.Dir method)	
BoolVariable() (in module	(SCons.Node.FS.Entry method)	SCons.Variables.BoolVariable)
bsources (SCons.Node.Alias.AliasBuildInfo attribute)	(SCons.Node.FS.File method)	
(SCons.Node.BuildInfoBase attribute)	(SCons.Node.FS.RootDir method)	
(SCons.Node.FS.DirBuildInfo attribute)	(SCons.Node.Node method)	
(SCons.Node.FS.FileBuildInfo attribute)	(SCons.Node.Python.Value method)	
(SCons.Node.Python.ValueBuildInfo attribute)	BuilderBase (class in SCons.Builder)	
(SCons.SConf.SConfBuildInfo attribute)	BuilderDict (class in SCons.Environment)	
bsourcesigs (SCons.Node.Alias.AliasBuildInfo attribute)	BuildError	
(SCons.Node.BuildInfoBase attribute)	BuilderWrapper (class in SCons.Environment)	
(SCons.Node.FS.DirBuildInfo attribute)	BuildInfo (SCons.Node.Alias.Alias attribute)	
(SCons.Node.FS.FileBuildInfo attribute)	(SCons.Node.FS.Base attribute)	
(SCons.Node.Python.ValueBuildInfo attribute)	(SCons.Node.FS.Dir attribute)	
(SCons.SConf.SConfBuildInfo attribute)		

(SCons.Node.FS.Entry attribute)  
 (SCons.Node.FS.File attribute)  
 (SCons.Node.FS.RootDir attribute)  
 (SCons.Node.Node attribute)  
 (SCons.Node.Python.Value attribute)  
 BuildInfoBase (class in SCons.Node)  
 BuildNodes() (SCons.SConf.SConfBase method)  
 BuildProg() (SCons.SConf.CheckContext method)  
 BuildTask (class in SCons.Script.Main)  
 built() (SCons.Node.Alias.Alias method)  
     (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
     (SCons.Node.Node method)  
     (SCons.Node.Python.Value method)

## C

cached (SCons.Node.Alias.Alias attribute)  
     (SCons.Node.FS.Base attribute)  
     (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
     (SCons.Node.Node attribute)  
     (SCons.Node.Python.Value attribute)  
 CacheDebug() (SCons.CacheDir.CacheDir method)  
 CacheDir (class in SCons.CacheDir)  
 CacheDir() (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment method)  
 cachedir\_csig (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
 cachepath() (SCons.CacheDir.CacheDir method)  
 CachePushFunc() (in module SCons.CacheDir)  
 CacheRetrieveFunc() (in module SCons.CacheDir)

CacheRetrieveString() (in module SCons.CacheDir)  
 cachesig (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
 CacheVersionWarning  
 CacheWriteErrorWarning  
 CallableSelector (class in SCons.Builder)  
 caller\_stack() (in module SCons.Debug)  
 caller\_trace() (in module SCons.Debug)  
 canonical\_text() (SCons.Scanner.LaTeX.LaTeX method)  
 capitalize() (SCons.Subst.CmdStringHolder method)  
 case\_sensitive\_suffixes() (in module SCons.Util)  
 casefold() (SCons.Subst.CmdStringHolder method)  
 CConditionalScanner() (in module SCons.Scanner.C)  
 center() (SCons.Subst.CmdStringHolder method)  
 changed() (SCons.Node.Alias.Alias method)  
     (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
     (SCons.Node.Node method)  
     (SCons.Node.Python.Value method)  
 changed\_content() (SCons.Node.FS.File method)  
 changed\_since\_last\_build (SCons.Node.Alias.Alias attribute)  
     (SCons.Node.FS.Base attribute)  
     (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
     (SCons.Node.Node attribute)  
     (SCons.Node.Python.Value attribute)  
 changed\_since\_last\_build\_alias() (in module SCons.Node)  
 changed\_since\_last\_build\_entry() (in module SCons.Node)  
 changed\_since\_last\_build\_node() (in module SCons.Node)

[changed\\_since\\_last\\_build\\_python\(\)](#) (in module [SCons.Node](#))  
[changed\\_since\\_last\\_build\\_state\\_changed\(\)](#) (in module [SCons.Node](#))  
[changed\\_state\(\)](#) ([SCons.Node.FS.File](#) method)  
[changed\\_timestamp\\_match\(\)](#) ([SCons.Node.FS.File](#) method)  
[changed\\_timestamp\\_newer\(\)](#) ([SCons.Node.FS.File](#) method)  
[changed\\_timestamp\\_then\\_content\(\)](#) ([SCons.Node.FS.File](#) method)  
[characters\\_written](#) ([SCons.Errors.MSVCErrors](#) attribute)  
[chdir\(\)](#) ([SCons.Node.FS.FS](#) method)  
[check\\_attributes\(\)](#) ([SCons.Node.Alias.Alias](#) method)  
     ([SCons.Node.FS.Base](#) method)  
     ([SCons.Node.FS.Dir](#) method)  
     ([SCons.Node.FS.Entry](#) method)  
     ([SCons.Node.FS.File](#) method)  
     ([SCons.Node.FS.RootDir](#) method)  
     ([SCons.Node.Node](#) method)  
     ([SCons.Node.Python.Value](#) method)  
[CHECK\\_METHODS](#)  
 ([SCons.Script.SConsOptions.SConsOption](#) attribute)  
[check\\_value\(\)](#)  
 ([SCons.Script.SConsOptions.SConsOption](#) method)  
[check\\_values\(\)](#)  
 ([SCons.Script.SConsOptions.SConsOptionParser](#) method)  
[CheckBuilder\(\)](#) (in module [SCons.ConfTest](#))  
[CheckCC\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckCHdr\(\)](#) (in module [SCons.SConf](#))  
[CheckContext](#) (class in [SCons.SConf](#))  
[CheckCXX\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckCXXHeader\(\)](#) (in module [SCons.SConf](#))  
[CheckDeclaration\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckFunc\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckHeader\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckLib\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckLibWithHeader\(\)](#) (in module [SCons.SConf](#))  
[CheckMember\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckProg\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckSHCC\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckSHCXX\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckType\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[CheckTypeSize\(\)](#) (in module [SCons.ConfTest](#))  
     (in module [SCons.SConf](#))  
[children\(\)](#) ([SCons.Node.Alias.Alias](#) method)  
     ([SCons.Node.FS.Base](#) method)  
     ([SCons.Node.FS.Dir](#) method)  
     ([SCons.Node.FS.Entry](#) method)  
     ([SCons.Node.FS.File](#) method)  
     ([SCons.Node.FS.RootDir](#) method)  
     ([SCons.Node.Node](#) method)  
     ([SCons.Node.Python.Value](#) method)  
[children\\_are\\_up\\_to\\_date\(\)](#) ([SCons.Node.Alias.Alias](#) method)  
     ([SCons.Node.FS.Base](#) method)  
     ([SCons.Node.FS.Dir](#) method)  
     ([SCons.Node.FS.Entry](#) method)  
     ([SCons.Node.FS.File](#) method)  
     ([SCons.Node.FS.RootDir](#) method)  
     ([SCons.Node.Node](#) method)  
     ([SCons.Node.Python.Value](#) method)  
[chmod\(\)](#) ([SCons.Node.FS.FS](#) method)  
     ([SCons.Node.FS.LocalFS](#) method)  
[chmod\\_func\(\)](#) (in module [SCons.Defaults](#))  
[chmod\\_strfunc\(\)](#) (in module [SCons.Defaults](#))  
[Classic](#) (class in [SCons.Scanner](#))  
[ClassicCPP](#) (class in [SCons.Scanner](#))  
[classname\(\)](#) (in module [SCons.Node](#))

[Clean\(\)](#) ([SCons.Environment.Base](#) method)  
     ([SCons.Environment.OverrideEnvironment](#) method)  
     ([SCons.Script.SConscript.SConsEnvironment](#) method)  
[CleanTask](#) (class in [SCons.Script.Main](#))  
[cleanup\(\)](#) ([SCons.Executor.Executor](#) method)  
     ([SCons.Executor.Null](#) method)  
     ([SCons.Job.ThreadPool](#) method)  
     ([SCons.Taskmaster.Taskmaster](#) method)  
[Cleanup\\_CPP\\_Expressions\(\)](#) (in module [SCons.cpp](#))  
[clear\(\)](#) ([SCons.Builder.CallableSelector](#) method)  
     ([SCons.Builder.DictCmdGenerator](#) method)  
     ([SCons.Builder.DictEmitter](#) method)  
     ([SCons.Builder.ListEmitter](#) method)  
     ([SCons.Builder.OverrideWarner](#) method)  
     ([SCons.Environment.BuilderDict](#) method)  
     ([SCons.Executor.TSList](#) method)  
     ([SCons.Node.Alias.Alias](#) method)  
     ([SCons.Node.Alias.AliasNameSpace](#) method)  
     ([SCons.Node.FS.Base](#) method)  
     ([SCons.Node.FS.Dir](#) method)  
     ([SCons.Node.FS.Entry](#) method)  
     ([SCons.Node.FS.File](#) method)  
     ([SCons.Node.FS.RootDir](#) method)  
     ([SCons.Node.Node](#) method)  
     ([SCons.Node.NodeList](#) method)  
     ([SCons.Node.Python.Value](#) method)  
     ([SCons.Script.TargetList](#) method)  
     ([SCons.Subst.ListSubber](#) method)  
     ([SCons.Subst.Targets\\_or\\_Sources](#) method)  
     ([SCons.Util.CLVar](#) method)  
     ([SCons.Util.NodeList](#) method)  
     ([SCons.Util.Selector](#) method)  
     ([SCons.Util.UniqueList](#) method)  
[clear\\_memoized\\_values\(\)](#) ([SCons.Node.Alias.Alias](#) method)  
     ([SCons.Node.FS.Base](#) method)  
     ([SCons.Node.FS.Dir](#) method)  
     ([SCons.Node.FS.Entry](#) method)  
     ([SCons.Node.FS.File](#) method)

    ([SCons.Node.FS.RootDir](#) method)  
     ([SCons.Node.Node](#) method)  
     ([SCons.Node.Python.Value](#) method)  
[Clone\(\)](#) ([SCons.Environment.Base](#) method)  
[clone\(\)](#) ([SCons.Environment.BuilderWrapper](#) method)  
[Clone\(\)](#) ([SCons.Environment.OverrideEnvironment](#) method)  
     ([SCons.Script.SConscript.SConsEnvironment](#) method)  
[clone\(\)](#) ([SCons.Util.MethodWrapper](#) method)  
[close\(\)](#) ([SCons.dblite.dblite](#) method)  
[close\\_strip\(\)](#) ([SCons.Subst.ListSubber](#) method)  
[CLVar](#) (class in [SCons.Util](#))  
[cmdloop\(\)](#)  
     ([SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[CmdStringHolder](#) (class in [SCons.Subst](#))  
[cmp\(\)](#) (in module [SCons.Util](#))  
[collect\\_node\\_states\(\)](#) ([SCons.SConf.SConfBuildTask](#) method)  
[columnize\(\)](#)  
     ([SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[command](#) ([SCons.Errors.BuildError](#) attribute)  
[Command\(\)](#) ([SCons.Environment.Base](#) method)  
     ([SCons.Environment.OverrideEnvironment](#) method)  
     ([SCons.Script.SConscript.SConsEnvironment](#) method)  
[CommandAction](#) (class in [SCons.Action](#))  
[CommandGeneratorAction](#) (class in [SCons.Action](#))  
[CompileProg\(\)](#) ([SCons.SConf.CheckContext](#) method)  
[CompileSharedObject\(\)](#) ([SCons.SConf.CheckContext](#) method)  
[complete\(\)](#)  
     ([SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[complete\\_help\(\)](#)  
     ([SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[completedefault\(\)](#)  
     ([SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[completenames\(\)](#)  
     ([SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[CompositeBuilder](#) (class in [SCons.Builder](#))  
[compute\\_exports\(\)](#) (in module [SCons.Script.SConscript](#))  
[Configure\(\)](#) (in module [SCons.Script.SConscript](#))

(SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
ConfigureCacheError  
ConfigureDryRunError  
CONST\_ACTIONS  
(SCons.Script.SConsOptions.SConsOption attribute)  
containsAll() (in module SCons.Util)  
containsAny() (in module SCons.Util)  
containsOnly() (in module SCons.Util)  
contentsig (SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
convert() (SCons.Node.Alias.Alias method)  
(SCons.Node.Alias.AliasNodeInfo method)  
(SCons.Node.FS.DirNodeInfo method)  
(SCons.Node.FS.FileNodeInfo method)  
(SCons.Node.NodeInfoBase method)  
(SCons.Node.Python.ValueNodeInfo method)  
convert\_copy\_attrs (SCons.Node.FS.File attribute)  
convert\_from\_sconsign() (SCons.Node.FS.FileBuildInfo method)  
(SCons.SConf.SConfBuildInfo method)  
(SCons.SConsign.SConsignEntry method)  
convert\_old\_entry() (SCons.Node.FS.File method)  
convert\_sig\_attrs (SCons.Node.FS.File attribute)  
convert\_to\_BuildError() (in module SCons.Errors)  
convert\_to\_sconsign() (SCons.Node.FS.FileBuildInfo method)  
(SCons.SConf.SConfBuildInfo method)  
(SCons.SConsign.SConsignEntry method)  
convert\_value()  
(SCons.Script.SConsOptions.SConsOption method)  
copy() (SCons.Builder.CallableSelector method)  
(SCons.Builder.DictCmdGenerator method)  
(SCons.Builder.DictEmitter method)  
(SCons.Builder.ListEmitter method)  
(SCons.Builder.OverrideWarner method)  
(SCons.Environment.BuilderDict method)

(SCons.Executor.TSList method)  
(SCons.Node.Alias.AliasNameSpace method)  
(SCons.Node.FS.FS method)  
(SCons.Node.FS.LocalFS method)  
(SCons.Node.NodeList method)  
(SCons.Script.TargetList method)  
(SCons.Subst.ListSubber method)  
(SCons.Subst.Targets\_or\_Sources method)  
(SCons.Util.CLVar method)  
(SCons.Util.NodeList method)  
(SCons.Util.Selector method)  
(SCons.Util.UniqueList method)  
copy2() (SCons.Node.FS.FS method)  
(SCons.Node.FS.LocalFS method)  
copy\_from\_cache() (SCons.CacheDir.CacheDir class method)  
copy\_func() (in module SCons.Defaults)  
copy\_non\_reserved\_keywords() (in module SCons.Environment)  
copy\_to\_cache() (SCons.CacheDir.CacheDir class method)  
corrupt\_dblite\_warning() (in module SCons.SConsign)  
CorruptSConsignWarning  
count (SCons.Script.Main.Progressor attribute)  
count() (SCons.Builder.ListEmitter method)  
(SCons.Executor.TSList method)  
(SCons.Memoize.CountDict method)  
(SCons.Memoize.CountValue method)  
(SCons.Node.NodeList method)  
(SCons.Script.TargetList method)  
(SCons.Subst.CmdStringHolder method)  
(SCons.Subst.ListSubber method)  
(SCons.Subst.Targets\_or\_Sources method)  
(SCons.Util.CLVar method)  
(SCons.Util.NodeList method)  
(SCons.Util.UniqueList method)  
CountDict (class in SCons.Memoize)  
CountDictCall() (in module SCons.Memoize)  
Counter (class in SCons.Memoize)  
countLoggedInstances() (in module SCons.Debug)



CountMethodCall() (in module SCons.Memoize)	(SCons.Node.FS.Dir attribute)
CountStats (class in SCons.Script.Main)	(SCons.Node.FS.Entry attribute)
CountValue (class in SCons.Memoize)	(SCons.Node.FS.File attribute)
CPP_to_Python() (in module SCons.cpp)	(SCons.Node.FS.RootDir attribute)
CPP_to_Python_Ops_Sub() (in module SCons.cpp)	
createCFileBuilders() (in module SCons.Tool)	D
CreateConfigHBuilder() (in module SCons.SConf)	D (class in SCons.Scanner.D)
createIncludesFromHeaders() (in module SCons.SConf)	daemon (SCons.Job.Worker property)
CreateJarBuilder() (in module SCons.Tool)	DB (class in SCons.SConsign)
CreateJavaClassDirBuilder() (in module SCons.Tool)	dblite (class in SCons.dblite)
CreateJavaClassFileBuilder() (in module SCons.Tool)	decide_source() (in module SCons.Node)
CreateJavaFileBuilder() (in module SCons.Tool)	decide_target() (in module SCons.Node)
CreateJavaHBuilder() (in module SCons.Tool)	Decider() (SCons.Environment.Base method)
createLoadableModuleBuilder() (in module SCons.Tool)	(SCons.Environment.OverrideEnvironment method)
createObjBuilders() (in module SCons.Tool)	(SCons.Node.Alias.Alias method)
createProgBuilder() (in module SCons.Tool)	(SCons.Node.FS.Base method)
createSharedLibBuilder() (in module SCons.Tool)	(SCons.Node.FS.Dir method)
createStaticLibBuilder() (in module SCons.Tool)	(SCons.Node.FS.Entry method)
CScanner() (in module SCons.Scanner.C)	(SCons.Node.FS.File method)
csig (SCons.Node.Alias.AliasNodeInfo attribute)	(SCons.Node.FS.RootDir method)
(SCons.Node.FS.FileNodeInfo attribute)	(SCons.Node.Node method)
(SCons.Node.Python.ValueNodeInfo attribute)	(SCons.Node.Python.Value method)
Current (class in SCons.Scanner)	(SCons.Script.SConscript.SConsEnvironment method)
current_sconsign_filename() (in module SCons.SConsign)	dedent() (SCons.Script.SConsOptions.SConsIndentedH elpFormatter method)
current_version_id (SCons.Node.Alias.AliasBuildInfo attribute)	default() (SCons.Script.Interactive.SConsInteractiveCmd method)
(SCons.Node.Alias.AliasNodeInfo attribute)	Default() (SCons.Script.SConscript.SConsEnvironment method)
(SCons.Node.BuildInfoBase attribute)	default_copy_from_cache() (in module SCons.Environment)
(SCons.Node.FS.DirBuildInfo attribute)	default_copy_to_cache() (in module SCons.Environment)
(SCons.Node.FS.DirNodeInfo attribute)	default_decide_source() (in module SCons.Environment)
(SCons.Node.FS.FileBuildInfo attribute)	default_decide_target() (in module SCons.Environment)
(SCons.Node.FS.FileNodeInfo attribute)	default_exitstatfunc() (in module SCons.Action)
(SCons.Node.NodeInfoBase attribute)	DefaultEnvironment() (in module SCons.Defaults)
(SCons.Node.Python.ValueBuildInfo attribute)	DefaultEnvironmentCall (class in SCons.Script.SConscript)
(SCons.Node.Python.ValueNodeInfo attribute)	DefaultToolList() (in module SCons.Platform)
(SCons.SConf.SConfBuildInfo attribute)	Define() (SCons.SConf.SConfBase method)
(SCons.SConsign.SConsignEntry attribute)	
cwd (SCons.Node.FS.Base attribute)	

`del_binfo()` (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)

`Delegate` (class in SCons.Util)

`delete_func()` (in module SCons.Defaults)

`delete_strfunc()` (in module SCons.Defaults)

`dependency_map` (SCons.Node.FS.FileBuildInfo attribute)  
(SCons.SConf.SConfBuildInfo attribute)

`DependencyWarning`

`depends` (SCons.Node.Alias.Alias attribute)  
(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)

`Depends()` (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)

`depends_set` (SCons.Node.Alias.Alias attribute)  
(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)

`DeprecatedDebugOptionsWarning`

`DeprecatedMissingSConscriptWarning`

`DeprecatedOptionsWarning`

`DeprecatedSourceCodeWarning`

`DeprecatedWarning`

`destroy()`  
(SCons.Script.SConsOptions.SConsOptionGroup method)  
(SCons.Script.SConsOptions.SConsOptionParser method)

`Detect()` (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)

`DevelopmentVersionWarning`

`DictCmdGenerator` (class in SCons.Builder)

`DictEmitter` (class in SCons.Builder)

`dictify()` (in module SCons.Util)

`dictify_CPPDEFINES()` (in module SCons.Scanner.C)

`Dictionary()` (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)

`dictSpecialAttrs` (SCons.Node.FS.EntryProxy attribute)

`Dir` (class in SCons.Node.FS)  
(class in SCons.SConsign)

`dir` (SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)

`Dir()` (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.FS method)  
(SCons.Node.FS.RootDir method)  
(SCons.Script.SConscript.SConsEnvironment method)

`Dir.Attrs` (class in SCons.Node.FS)

`dir_on_disk()` (SCons.Node.FS.Dir method)  
(SCons.Node.FS.RootDir method)

`DirBuildInfo` (class in SCons.Node.FS)

`DirEntryScanner()` (in module SCons.Scanner.Dir)

`DirFile` (class in SCons.SConsign)

`dirname` (SCons.Node.FS.Dir attribute)



(SCons.Node.FS.Entry attribute)	do_append() (SCons.Script.Main.CountStats method)
(SCons.Node.FS.File attribute)	(SCons.Script.Main.MemStats method)
(SCons.Node.FS.RootDir attribute)	do_build()
DirNodeInfo (class in SCons.Node.FS)	(SCons.Script.Interactive.SConsInteractiveCmd method)
Dirs() (SCons.Node.FS.File method)	do_clean()
DirScanner() (in module SCons.Scanner.Dir)	(SCons.Script.Interactive.SConsInteractiveCmd method)
disable_interspersed_args()	do_define() (SCons.cpp.DumbPreProcessor method)
(SCons.Script.SConsOptions.SConsOptionParser method)	(SCons.cpp.PreProcessor method)
disambiguate() (SCons.Node.Alias.Alias method)	(SCons.Scanner.C.SConsCPPConditionalScanner method)
(SCons.Node.FS.Base method)	(SCons.Scanner.C.SConsCPPScanner method)
(SCons.Node.FS.Dir method)	do_diskcheck_match() (in module SCons.Node.FS)
(SCons.Node.FS.Entry method)	do_duplicate() (SCons.Node.FS.Dir method)
(SCons.Node.FS.File method)	(SCons.Node.FS.File method)
(SCons.Node.FS.RootDir method)	(SCons.Node.FS.RootDir method)
(SCons.Node.Node method)	do_elif() (SCons.cpp.DumbPreProcessor method)
(SCons.Node.Python.Value method)	(SCons.cpp.PreProcessor method)
diskcheck_convert() (in module SCons.Script.SConsOptions)	(SCons.Scanner.C.SConsCPPConditionalScanner method)
diskcheck_match() (SCons.Node.FS.Dir method)	(SCons.Scanner.C.SConsCPPScanner method)
(SCons.Node.FS.Entry method)	do_else() (SCons.cpp.DumbPreProcessor method)
(SCons.Node.FS.File method)	(SCons.cpp.PreProcessor method)
(SCons.Node.FS.RootDir method)	(SCons.Scanner.C.SConsCPPConditionalScanner method)
diskcheck_types() (in module SCons.Node.FS)	(SCons.Scanner.C.SConsCPPScanner method)
DiskChecker (class in SCons.Node.FS)	do_endif() (SCons.cpp.DumbPreProcessor method)
display() (SCons.Memoize.CountDict method)	(SCons.cpp.PreProcessor method)
(SCons.Memoize.Counter method)	(SCons.Scanner.C.SConsCPPConditionalScanner method)
(SCons.Memoize.CountValue method)	(SCons.Scanner.C.SConsCPPScanner method)
Display() (SCons.SConf.CheckContext method)	do_eof()
display() (SCons.SConf.SConfBuildTask method)	(SCons.Script.Interactive.SConsInteractiveCmd method)
(SCons.Script.Main.BuildTask method)	do_exit()
(SCons.Script.Main.CleanTask method)	(SCons.Script.Interactive.SConsInteractiveCmd method)
(SCons.Script.Main.QuestionTask method)	do_failed() (SCons.Script.Main.BuildTask method)
(SCons.Script.Main.TreePrinter method)	do_flatten() (in module SCons.Util)
(SCons.Taskmaster.AlwaysTask method)	do_help()
(SCons.Taskmaster.OutOfDateTask method)	(SCons.Script.Interactive.SConsInteractiveCmd method)
(SCons.Taskmaster.Task method)	do_if() (SCons.cpp.DumbPreProcessor method)
display_cached_string() (SCons.SConf.SConfBuildTask method)	(SCons.cpp.PreProcessor method)
DisplayEngine (class in SCons.Util)	(SCons.Scanner.C.SConsCPPConditionalScanner method)
	(SCons.Scanner.C.SConsCPPScanner method)

[do\\_ifdef\(\)](#) ([SCons.cpp.DumbPreProcessor](#) method)  
[\(SCons.cpp.PreProcessor](#) method)  
[\(SCons.Scanner.C.SConsCPPConditionalScanner](#) method)  
[\(SCons.Scanner.C.SConsCPPScanner](#) method)  
[do\\_ifndef\(\)](#) ([SCons.cpp.DumbPreProcessor](#) method)  
[\(SCons.cpp.PreProcessor](#) method)  
[\(SCons.Scanner.C.SConsCPPConditionalScanner](#) method)  
[\(SCons.Scanner.C.SConsCPPScanner](#) method)  
[do\\_import\(\)](#) ([SCons.cpp.DumbPreProcessor](#) method)  
[\(SCons.cpp.PreProcessor](#) method)  
[\(SCons.Scanner.C.SConsCPPConditionalScanner](#) method)  
[\(SCons.Scanner.C.SConsCPPScanner](#) method)  
[do\\_include\(\)](#) ([SCons.cpp.DumbPreProcessor](#) method)  
[\(SCons.cpp.PreProcessor](#) method)  
[\(SCons.Scanner.C.SConsCPPConditionalScanner](#) method)  
[\(SCons.Scanner.C.SConsCPPScanner](#) method)  
[do\\_include\\_next\(\)](#) ([SCons.cpp.DumbPreProcessor](#) method)  
[\(SCons.cpp.PreProcessor](#) method)  
[\(SCons.Scanner.C.SConsCPPConditionalScanner](#) method)  
[\(SCons.Scanner.C.SConsCPPScanner](#) method)  
[do\\_not\\_scan\(\)](#) (in module [SCons.Scanner.Dir](#))  
[do\\_not\\_set\\_entry\(\)](#) ([SCons.SConsign.Base](#) method)  
[\(SCons.SConsign.DB](#) method)  
[\(SCons.SConsign.Dir](#) method)  
[\(SCons.SConsign.DirFile](#) method)  
[do\\_not\\_store\\_info\(\)](#) ([SCons.SConsign.Base](#) method)  
[\(SCons.SConsign.DB](#) method)  
[\(SCons.SConsign.Dir](#) method)  
[\(SCons.SConsign.DirFile](#) method)  
[do\\_nothing\(\)](#) (in module [SCons.Node](#))  
[\(SCons.cpp.DumbPreProcessor](#) method)  
[\(SCons.cpp.PreProcessor](#) method)  
[\(SCons.Scanner.C.SConsCPPConditionalScanner](#) method)  
[\(SCons.Scanner.C.SConsCPPScanner](#) method)  
[\(SCons.Script.Main.CountStats](#) method)  
[\(SCons.Script.Main.MemStats](#) method)  
[\(SCons.Script.Main.Stats](#) method)  
[do\\_nothing\\_node\(\)](#) (in module [SCons.Node](#))  
[do\\_print\(\)](#) ([SCons.Script.Main.CountStats](#) method)  
[\(SCons.Script.Main.MemStats](#) method)  
[do\\_shell\(\)](#)  
[\(SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[do\\_undef\(\)](#) ([SCons.cpp.DumbPreProcessor](#) method)  
[\(SCons.cpp.PreProcessor](#) method)  
[\(SCons.Scanner.C.SConsCPPConditionalScanner](#) method)  
[\(SCons.Scanner.C.SConsCPPScanner](#) method)  
[do\\_version\(\)](#)  
[\(SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[doc\\_header](#)  
[\(SCons.Script.Interactive.SConsInteractiveCmd](#) attribute)  
[doc\\_leader](#)  
[\(SCons.Script.Interactive.SConsInteractiveCmd](#) attribute)  
[DScanner\(\)](#) (in module [SCons.Scanner.D](#))  
[DumbPreProcessor](#) (class in [SCons.cpp](#))  
[Dump\(\)](#) (in module [SCons.Memoize](#))  
[\(SCons.Environment.Base](#) method)  
[\(SCons.Environment.OverrideEnvironment](#) method)  
[\(SCons.Script.SConsScript.SConsEnvironment](#) method)  
[dump\\_caller\\_counts\(\)](#) (in module [SCons.Debug](#))  
[dump\\_stats\(\)](#) (in module [SCons.Taskmaster](#))  
[dumpLoggedInstances\(\)](#) (in module [SCons.Debug](#))  
[duplicate](#) ([SCons.Node.FS.Base](#) attribute)  
[\(SCons.Node.FS.Dir](#) attribute)  
[\(SCons.Node.FS.Entry](#) attribute)  
[\(SCons.Node.FS.File](#) attribute)  
[\(SCons.Node.FS.RootDir](#) attribute)  
[DuplicateEnvironmentWarning](#)  
**E**  
[EmitterProxy](#) (class in [SCons.Builder](#))  
[emptyline\(\)](#)  
[\(SCons.Script.Interactive.SConsInteractiveCmd](#) method)  
[enable\(\)](#) ([SCons.Script.Main.CountStats](#) method)

(SCons.Script.Main.MemStats method)	EnumVariable()	(in	module
(SCons.Script.Main.Stats method)	SCons.Variables.EnumVariable)		
enable_interspersed_args()	env	(SCons.Executor.Executor attribute)	
(SCons.Script.SConsOptions.SConsOptionParser method)		(SCons.Executor.Null attribute)	
EnableMemoization() (in module SCons.Memoize)		(SCons.Node.Alias.Alias attribute)	
enableWarningClass() (in module SCons.Warnings)		(SCons.Node.FS.Base attribute)	
encode() (SCons.Subst.CmdStringHolder method)		(SCons.Node.FS.Dir attribute)	
endswith() (SCons.Subst.CmdStringHolder method)		(SCons.Node.FS.Entry attribute)	
ensure_value()		(SCons.Node.FS.File attribute)	
(SCons.Script.SConsOptions.SConsValues method)		(SCons.Node.FS.RootDir attribute)	
EnsurePythonVersion()		(SCons.Node.Node attribute)	
(SCons.Script.SConscript.SConsEnvironment method)		(SCons.Node.Python.Value attribute)	
EnsureSConsVersion()	env_set()	(SCons.Node.Alias.Alias method)	
(SCons.Script.SConscript.SConsEnvironment method)		(SCons.Node.FS.Base method)	
entries (SCons.Node.FS.Dir attribute)		(SCons.Node.FS.Dir method)	
		(SCons.Node.FS.Entry method)	
		(SCons.Node.FS.File method)	
		(SCons.Node.FS.RootDir method)	
Entry (class in SCons.Node.FS)		(SCons.Node.Node method)	
Entry() (SCons.Environment.Base method)		(SCons.Node.Python.Value method)	
	env_variables	(SCons.Scanner.LaTeX.LaTeX attribute)	
	Environment()	(SCons.Environment.Base method)	
		(SCons.Environment.OverrideEnvironment method)	
		(SCons.Script.SConscript.SConsEnvironment method)	
	erase_previous()	(SCons.Script.Main.Progressor method)	
Entry.Attrs (class in SCons.Node.FS)	errno	(SCons.Errors.MSVCErr attribute)	
entry_abspath() (SCons.Node.FS.Dir method)	error()	(SCons.Script.SConsOptions.SConsOptionParser method)	
	errstr	(SCons.Errors.BuildError attribute)	
entry_exists_on_disk() (SCons.Node.FS.Dir method)	escape()	(in module SCons.Platform.posix)	
		(in module SCons.Platform.win32)	
entry_labspath() (SCons.Node.FS.Dir method)		(SCons.Subst.CmdStringHolder method)	
		(SCons.Subst.Literal method)	
entry_path() (SCons.Node.FS.Dir method)		(SCons.Subst.SpecialAttrWrapper method)	
	escape_list()	(in module SCons.Subst)	
entry_tpath() (SCons.Node.FS.Dir method)	eval_expression()	(SCons.cpp.DumbPreProcessor method)	
		(SCons.cpp.PreProcessor method)	
EntryProxy (class in SCons.Node.FS)			
EntryProxyAttributeError			

(SCons.Scanner.C.SConsCPPConditionalScanner method)  
 (SCons.Scanner.C.SConsCPPScanner method)  
 exc\_clear() (SCons.SConf.SConfBuildTask method)  
 (SCons.Script.Main.BuildTask method)  
 (SCons.Script.Main.CleanTask method)  
 (SCons.Script.Main.QuestionTask method)  
 (SCons.Taskmaster.AlwaysTask method)  
 (SCons.Taskmaster.OutOfDateTask method)  
 (SCons.Taskmaster.Task method)  
 exc\_info (SCons.Errors.BuildError attribute)  
 exc\_info() (SCons.SConf.SConfBuildTask method)  
 (SCons.Script.Main.BuildTask method)  
 (SCons.Script.Main.CleanTask method)  
 (SCons.Script.Main.QuestionTask method)  
 (SCons.Taskmaster.AlwaysTask method)  
 (SCons.Taskmaster.OutOfDateTask method)  
 (SCons.Taskmaster.Task method)  
 exception\_set() (SCons.SConf.SConfBuildTask method)  
 (SCons.Script.Main.BuildTask method)  
 (SCons.Script.Main.CleanTask method)  
 (SCons.Script.Main.QuestionTask method)  
 (SCons.Taskmaster.AlwaysTask method)  
 (SCons.Taskmaster.OutOfDateTask method)  
 (SCons.Taskmaster.Task method)  
 exec\_popen3() (in module SCons.Platform.posix)  
 exec\_spawn() (in module SCons.Platform.win32)  
 exec\_subprocess() (in module SCons.Platform.posix)  
 execute() (SCons.Action.CommandAction method)  
 (SCons.Action.FunctionAction method)  
 (SCons.Action.LazyAction method)  
 Execute() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 execute() (SCons.SConf.SConfBuildTask method)  
 (SCons.Script.Main.BuildTask method)  
 (SCons.Script.Main.CleanTask method)  
 (SCons.Script.Main.QuestionTask method)  
 Execute() (SCons.Script.SConscript.SConsEnvironment method)  
 execute() (SCons.Taskmaster.AlwaysTask method)  
 (SCons.Taskmaster.OutOfDateTask method)  
 (SCons.Taskmaster.Task method)  
 execute\_action\_list() (in module SCons.Executor)  
 execute\_actions\_str() (in module SCons.Executor)  
 execute\_nothing() (in module SCons.Executor)  
 execute\_null\_str() (in module SCons.Executor)  
 executed() (SCons.SConf.SConfBuildTask method)  
 (SCons.Script.Main.BuildTask method)  
 (SCons.Script.Main.CleanTask method)  
 (SCons.Script.Main.QuestionTask method)  
 (SCons.Taskmaster.AlwaysTask method)  
 (SCons.Taskmaster.OutOfDateTask method)  
 (SCons.Taskmaster.Task method)  
 executed\_with\_callbacks()  
 (SCons.SConf.SConfBuildTask method)  
 (SCons.Script.Main.BuildTask method)  
 (SCons.Script.Main.CleanTask method)  
 (SCons.Script.Main.QuestionTask method)  
 (SCons.Taskmaster.AlwaysTask method)  
 (SCons.Taskmaster.OutOfDateTask method)  
 (SCons.Taskmaster.Task method)  
 executed\_without\_callbacks()  
 (SCons.SConf.SConfBuildTask method)  
 (SCons.Script.Main.BuildTask method)  
 (SCons.Script.Main.CleanTask method)  
 (SCons.Script.Main.QuestionTask method)  
 (SCons.Taskmaster.AlwaysTask method)  
 (SCons.Taskmaster.OutOfDateTask method)  
 (SCons.Taskmaster.Task method)  
 Executor (class in SCons.Executor)  
 executor (SCons.Errors.BuildError attribute)  
 (SCons.Node.Alias.Alias attribute)  
 (SCons.Node.FS.Base attribute)  
 (SCons.Node.FS.Dir attribute)  
 (SCons.Node.FS.Entry attribute)  
 (SCons.Node.FS.File attribute)  
 (SCons.Node.FS.RootDir attribute)  
 (SCons.Node.Node attribute)  
 (SCons.Node.Python.Value attribute)  
 executor\_cleanup() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
exists() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.FS method)  
(SCons.Node.FS.LocalFS method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
exists\_always() (in module SCons.Node)  
exists\_base() (in module SCons.Node)  
exists\_entry() (in module SCons.Node)  
exists\_file() (in module SCons.Node)  
exists\_none() (in module SCons.Node)  
Exit() (SCons.Script.SConscript.SConsEnvironment  
method)  
exit() (SCons.Script.SConsOptions.SConsOptionParser  
method)  
exitstatus (SCons.Errors.BuildError attribute)  
expand() (SCons.Subst.ListSubber method)  
(SCons.Subst.StringSubber method)  
expand\_default() (SCons.Script.SConsOptions.SConsIn  
dentedHelpFormatter method)  
expand\_prog\_name()  
(SCons.Script.SConsOptions.SConsOptionParser  
method)  
expanded() (SCons.Subst.ListSubber method)  
expandtabs() (SCons.Subst.CmdStringHolder method)  
explain() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
ExplicitExit  
Export() (SCons.Script.SConscript.SConsEnvironment  
method)  
extend() (SCons.Builder.ListEmitter method)  
(SCons.Executor.TSList method)  
(SCons.Node.NodeList method)  
(SCons.Script.TargetList method)  
(SCons.Subst.ListSubber method)  
(SCons.Subst.Targets\_or\_Sources method)  
(SCons.Util.CLVar method)  
(SCons.Util.NodeList method)  
(SCons.Util.UniqueList method)  
  
F  
F90Scanner (class in SCons.Scanner.Fortran)  
fail\_continue() (SCons.SConf.SConfBuildTask method)  
(SCons.Script.Main.BuildTask method)  
(SCons.Script.Main.CleanTask method)  
(SCons.Script.Main.QuestionTask method)  
(SCons.Taskmaster.AlwaysTask method)  
(SCons.Taskmaster.OutOfDateTask method)  
(SCons.Taskmaster.Task method)  
fail\_stop() (SCons.SConf.SConfBuildTask method)  
(SCons.Script.Main.BuildTask method)  
(SCons.Script.Main.CleanTask method)  
(SCons.Script.Main.QuestionTask method)  
(SCons.Taskmaster.AlwaysTask method)  
(SCons.Taskmaster.OutOfDateTask method)  
(SCons.Taskmaster.Task method)  
failed() (SCons.SConf.SConfBuildTask method)  
(SCons.Script.Main.BuildTask method)  
(SCons.Script.Main.CleanTask method)  
(SCons.Script.Main.QuestionTask method)  
(SCons.Taskmaster.AlwaysTask method)  
(SCons.Taskmaster.OutOfDateTask method)  
(SCons.Taskmaster.Task method)  
FakeOptionParser (class in SCons.Script.Main)



FakeOptionParser.FakeOptionValues (class in SCons.Script.Main)	(SCons.Scanner.ClassicCPP method)
fetchLoggedInstances() (in module SCons.Debug)	(SCons.Scanner.D.D method)
field_list (SCons.Node.Alias.AliasNodeInfo attribute)	(SCons.Scanner.Fortran.F90Scanner static method)
(SCons.Node.FS.FileNodeInfo attribute)	(SCons.Scanner.LaTeX.LaTeX method)
(SCons.Node.Python.ValueNodeInfo attribute)	find_include_file() (SCons.cpp.DumbPreProcessor method)
File (class in SCons.Node.FS)	(SCons.cpp.PreProcessor method)
File() (in module SCons.SConsign)	(SCons.Scanner.C.SConsCPPConditionalScanner method)
(SCons.Environment.Base method)	(SCons.Scanner.C.SConsCPPScanner method)
(SCons.Environment.OverrideEnvironment method)	find_include_names() (SCons.Scanner.Classic method)
(SCons.Node.FS.Dir method)	(SCons.Scanner.ClassicCPP method)
(SCons.Node.FS.File method)	(SCons.Scanner.D.D method)
(SCons.Node.FS.FS method)	(SCons.Scanner.Fortran.F90Scanner method)
(SCons.Node.FS.RootDir method)	find_next_candidate() (SCons.Taskmaster.Taskmaster method)
(SCons.Script.SConscript.SConsEnvironment method)	find_program_path() (in module SCons.Tool)
File.Attrs (class in SCons.Node.FS)	find_repo_file() (SCons.Node.FS.File method)
file_on_disk() (SCons.Node.FS.Dir method)	find_src_builder() (SCons.Node.FS.File method)
(SCons.Node.FS.RootDir method)	FindAllTools() (in module SCons.Tool)
FileBuildInfo (class in SCons.Node.FS)	FindENVPathDirs (class in SCons.Scanner.LaTeX)
FileBuildInfoFileToCsigMappingError	FindFile() (SCons.Environment.Base method)
filedir_lookup() (SCons.Node.FS.FileFinder method)	(SCons.Environment.OverrideEnvironment method)
FileFinder (class in SCons.Node.FS)	(SCons.Script.SConscript.SConsEnvironment method)
filename (SCons.Errors.BuildError attribute)	FindInstalledFiles() (SCons.Environment.Base method)
(SCons.Errors.MSVCErrors attribute)	(SCons.Environment.OverrideEnvironment method)
filename2 (SCons.Errors.MSVCErrors attribute)	(SCons.Script.SConscript.SConsEnvironment method)
FileNodeInfo (class in SCons.Node.FS)	FindIdxes() (SCons.Environment.Base method)
finalize_result() (SCons.cpp.DumbPreProcessor method)	(SCons.Environment.OverrideEnvironment method)
(SCons.cpp.PreProcessor method)	(SCons.Script.SConscript.SConsEnvironment method)
(SCons.Scanner.C.SConsCPPConditionalScanner method)	FindPathDirs (class in SCons.Scanner)
(SCons.Scanner.C.SConsCPPScanner method)	FindSourceFiles() (SCons.Environment.Base method)
find() (SCons.Subst.CmdStringHolder method)	(SCons.Environment.OverrideEnvironment method)
find_cycle() (in module SCons.Taskmaster)	(SCons.Script.SConscript.SConsEnvironment method)
find_deepest_user_frame() (in module SCons.Script.Main)	FindTool() (in module SCons.Tool)
find_file() (in module SCons.Node.FS)	Finish() (SCons.SConf.SConfBase method)
(SCons.Node.FS.FileFinder method)	flatten() (in module SCons.Util)
find_include() (SCons.Scanner.Classic static method)	

[Flatten\(\)](#) ([SCons.Environment.Base](#) method)  
[\(SCons.Environment.OverrideEnvironment](#) method)  
[\(SCons.Script.SConscript.SConsEnvironment](#) method)  
[flatten\\_sequence\(\)](#) (in module [SCons.Util](#))  
[flush\(\)](#) ([SCons.SConf.Streamer](#) method)  
[fmt](#) ([SCons.Variables.Variables](#) attribute)  
[for\\_signature\(\)](#) ([SCons.Node.Alias.Alias](#) method)  
[\(SCons.Node.FS.Base](#) method)  
[\(SCons.Node.FS.Dir](#) method)  
[\(SCons.Node.FS.Entry](#) method)  
[\(SCons.Node.FS.File](#) method)  
[\(SCons.Node.FS.RootDir](#) method)  
[\(SCons.Node.Node](#) method)  
[\(SCons.Node.Python.Value](#) method)  
[\(SCons.Subst.Literal](#) method)  
[\(SCons.Subst.SpecialAttrWrapper](#) method)  
[ForDirectory](#) (in module [SCons.SConsign](#))  
[format\(\)](#) ([SCons.Node.Alias.AliasNodeInfo](#) method)  
[\(SCons.Node.FS.DirNodeInfo](#) method)  
[\(SCons.Node.FS.FileBuildInfo](#) method)  
[\(SCons.Node.FS.FileNodeInfo](#) method)  
[\(SCons.Node.NodeInfoBase](#) method)  
[\(SCons.Node.Python.ValueNodeInfo](#) method)  
[\(SCons.SConf.SConfBuildInfo](#) method)  
[\(SCons.Subst.CmdStringHolder](#) method)  
[format\\_description\(\)](#) ([SCons.Script.SConsOptions.SConsIndentedHelpFormatter](#) method)  
[\(SCons.Script.SConsOptions.SConsOptionGroup](#) method)  
[\(SCons.Script.SConsOptions.SConsOptionParser](#) method)  
[format\\_epilog\(\)](#) ([SCons.Script.SConsOptions.SConsIndentedHelpFormatter](#) method)  
[\(SCons.Script.SConsOptions.SConsOptionParser](#) method)  
[format\\_heading\(\)](#) ([SCons.Script.SConsOptions.SConsIndentedHelpFormatter](#) method)  
[format\\_help\(\)](#)  
[\(SCons.Script.SConsOptions.SConsOptionGroup](#) method)  
[\(SCons.Script.SConsOptions.SConsOptionParser](#) method)  
[format\\_map\(\)](#) ([SCons.Subst.CmdStringHolder](#) method)  
[format\\_option\(\)](#) ([SCons.Script.SConsOptions.SConsIndentedHelpFormatter](#) method)  
[format\\_option\\_help\(\)](#)  
[\(SCons.Script.SConsOptions.SConsOptionGroup](#) method)  
[\(SCons.Script.SConsOptions.SConsOptionParser](#) method)  
[format\\_option\\_strings\(\)](#) ([SCons.Script.SConsOptions.SConsIndentedHelpFormatter](#) method)  
[format\\_usage\(\)](#) ([SCons.Script.SConsOptions.SConsIndentedHelpFormatter](#) method)  
[FormatVariableHelpText\(\)](#) ([SCons.Variables.Variables](#) method)  
[FortranCxxMixWarning](#)  
[FortranScan\(\)](#) (in module [SCons.Scanner.Fortran](#))  
[Frame](#) (class in [SCons.Script.SConscript](#))  
[fromkeys\(\)](#) ([SCons.Builder.CallableSelector](#) method)  
[\(SCons.Builder.DictCmdGenerator](#) method)  
[\(SCons.Builder.DictEmitter](#) method)  
[\(SCons.Builder.OverrideWarner](#) class method)  
[\(SCons.Environment.BuilderDict](#) class method)  
[\(SCons.Node.Alias.AliasNameSpace](#) class method)  
[\(SCons.Util.Selector](#) method)  
[FS](#) (class in [SCons.Node.FS](#))  
[fs](#) ([SCons.Node.FS.Base](#) attribute)  
[\(SCons.Node.FS.Dir](#) attribute)  
[\(SCons.Node.FS.DirNodeInfo](#) attribute)  
[\(SCons.Node.FS.Entry](#) attribute)  
[\(SCons.Node.FS.File](#) attribute)  
[\(SCons.Node.FS.FileNodeInfo](#) attribute)  
[\(SCons.Node.FS.RootDir](#) attribute)  
[fs\\_delete\(\)](#) ([SCons.Script.Main.CleanTask](#) method)  
[func\\_shorten\(\)](#) (in module [SCons.Debug](#))  
[function\\_name\(\)](#) ([SCons.Action.FunctionAction](#) method)  
[FunctionAction](#) (class in [SCons.Action](#))  
[FunctionEvaluator](#) (class in [SCons.cpp](#))  
[FutureDeprecatedWarning](#)  
[FutureReservedVariableWarning](#)



## G

`generate()` (in module `SCons.Platform.aix`)

(in module `SCons.Platform.cygwin`)

(in module `SCons.Platform.darwin`)

(in module `SCons.Platform.hpux`)

(in module `SCons.Platform.irix`)

(in module `SCons.Platform.os2`)

(in module `SCons.Platform.posix`)

(in module `SCons.Platform.sunos`)

(in module `SCons.Platform.win32`)

`GenerateHelpText()` (`SCons.Variables.Variables` method)

`genstring()` (`SCons.Action._ActionAction` method)

(`SCons.Action.ActionBase` method)

(`SCons.Action.CommandAction` method)

(`SCons.Action.CommandGeneratorAction` method)

(`SCons.Action.FunctionAction` method)

(`SCons.Action.LazyAction` method)

(`SCons.Action.ListAction` method)

`get()` (`SCons.Builder.CallableSelector` method)

(`SCons.Builder.CompositeBuilder` method)

(`SCons.Builder.DictCmdGenerator` method)

(`SCons.Builder.DictEmitter` method)

(`SCons.Builder.OverrideWarner` method)

(`SCons.Environment.Base` method)

(`SCons.Environment.BuilderDict` method)

(`SCons.Environment.OverrideEnvironment` method)

(`SCons.Environment.SubstitutionEnvironment` method)

(`SCons.Job.ThreadPool` method)

(`SCons.Node.Alias.AliasNameSpace` method)

(`SCons.Node.FS.EntryProxy` method)

(`SCons.Script.SConscript.SConsEnvironment` method)

(`SCons.Util.Proxy` method)

(`SCons.Util.Selector` method)

`get_abspath()` (`SCons.Node.Alias.Alias` method)

(`SCons.Node.FS.Base` method)

(`SCons.Node.FS.Dir` method)

(`SCons.Node.FS.Entry` method)

(`SCons.Node.FS.File` method)

(`SCons.Node.FS.RootDir` method)

(`SCons.Node.Node` method)

(`SCons.Node.Python.Value` method)

`get_action_list()` (`SCons.Executor.Executor` method)

(`SCons.Executor.Null` method)

`get_action_side_effects()` (`SCons.Executor.Executor` method)

(`SCons.Executor.Null` method)

`get_action_targets()` (`SCons.Executor.Executor` method)

(`SCons.Executor.Null` method)

`get_all_children()` (`SCons.Executor.Executor` method)

(`SCons.Executor.Null` method)

(`SCons.Script.Main.TreePrinter` method)

`get_all_prerequisites()` (`SCons.Executor.Executor` method)

(`SCons.Executor.Null` method)

`get_all_rdirs()` (`SCons.Node.FS.Dir` method)

(`SCons.Node.FS.RootDir` method)

`get_all_sources()` (`SCons.Executor.Executor` method)

(`SCons.Executor.Null` method)

`get_all_targets()` (`SCons.Executor.Executor` method)

(`SCons.Executor.Null` method)

`get_architecture()` (in module `SCons.Platform.win32`)

`get_bininfo()` (`SCons.Node.Alias.Alias` method)

(`SCons.Node.FS.Base` method)

(`SCons.Node.FS.Dir` method)

(`SCons.Node.FS.Entry` method)

(`SCons.Node.FS.File` method)

(`SCons.Node.FS.RootDir` method)

(`SCons.Node.Node` method)

(`SCons.Node.Python.Value` method)

`get_build_env()` (`SCons.Executor.Executor` method)

(`SCons.Executor.Null` method)

(`SCons.Node.Alias.Alias` method)

(`SCons.Node.FS.Base` method)

(`SCons.Node.FS.Dir` method)

(`SCons.Node.FS.Entry` method)

(`SCons.Node.FS.File` method)

(`SCons.Node.FS.RootDir` method)

(SCons.Node.Node method)	(SCons.Node.Python.Value method)
(SCons.Node.Python.Value method)	get_calling_namespaces() (in module SCons.Script.SConscript)
get_build_scanner_path() (SCons.Executor.Executor method)	get_children() (in module SCons.Node)
(SCons.Executor.Null method)	get_content_hash() (SCons.Node.FS.File method)
(SCons.Node.Alias.Alias method)	get_contents() (SCons.Action._ActionAction method)
(SCons.Node.FS.Base method)	(SCons.Action.ActionBase method)
(SCons.Node.FS.Dir method)	(SCons.Action.ActionCaller method)
(SCons.Node.FS.Entry method)	(SCons.Action.CommandAction method)
(SCons.Node.FS.File method)	(SCons.Action.CommandGeneratorAction method)
(SCons.Node.FS.RootDir method)	(SCons.Action.FunctionAction method)
(SCons.Node.Node method)	(SCons.Action.LazyAction method)
(SCons.Node.Python.Value method)	(SCons.Action.ListAction method)
get_builder() (SCons.Environment.Base method)	(SCons.Executor.Executor method)
(SCons.Environment.OverrideEnvironment method)	(SCons.Executor.Null method)
(SCons.Node.Alias.Alias method)	(SCons.Node.Alias.Alias method)
(SCons.Node.FS.Base method)	(SCons.Node.FS.Base method)
(SCons.Node.FS.Dir method)	(SCons.Node.FS.Dir method)
(SCons.Node.FS.Entry method)	(SCons.Node.FS.Entry method)
(SCons.Node.FS.File method)	(SCons.Node.FS.File method)
(SCons.Node.FS.RootDir method)	(SCons.Node.FS.RootDir method)
(SCons.Node.Node method)	(SCons.Node.Node method)
(SCons.Node.Python.Value method)	(SCons.Node.Python.Value method)
(SCons.Script.SConscript.SConsEnvironment method)	get_contents_dir() (in module SCons.Node)
(SCons.Tool.ToolInitializerMethod method)	get_contents_entry() (in module SCons.Node)
get_CacheDir() (SCons.Environment.Base method)	get_contents_file() (in module SCons.Node)
(SCons.Environment.OverrideEnvironment method)	get_contents_none() (in module SCons.Node)
(SCons.Executor.NullEnvironment method)	get_contents_sig() (SCons.Node.FS.File method)
(SCons.Script.SConscript.SConsEnvironment method)	get_csig() (SCons.Node.Alias.Alias method)
get_cachedir_bsig() (SCons.Node.FS.File method)	(SCons.Node.FS.Base method)
get_cachedir_csig() (SCons.CacheDir.CacheDir method)	(SCons.Node.FS.Dir method)
(SCons.Node.Alias.Alias method)	(SCons.Node.FS.Entry method)
(SCons.Node.FS.Base method)	(SCons.Node.FS.File method)
(SCons.Node.FS.Dir method)	(SCons.Node.FS.RootDir method)
(SCons.Node.FS.Entry method)	(SCons.Node.Node method)
(SCons.Node.FS.File method)	(SCons.Node.Python.Value method)
(SCons.Node.FS.RootDir method)	get_current_hash_algorithm_used() (in module SCons.Util)
(SCons.Node.Node method)	Get_DataBase() (in module SCons.SConsign)
	get_default_ENV() (in module SCons.Action)

get_default_fs() (in module SCons.Node.FS)	(SCons.Node.FS.Base method)
get_default_values() (SCons.Script.SConsOptions.SConsOptionParser method)	(SCons.Node.FS.Dir method)
get_DefaultEnvironmentProxy() (in module SCons.Script.SConscript)	(SCons.Node.FS.Entry method)
get_derived_children() (SCons.Script.Main.TreePrinter method)	(SCons.Node.FS.File method)
get_description() (SCons.Script.SConsOptions.SConsOptionGroup method)	(SCons.Node.FS.RootDir method)
(SCons.Script.SConsOptions.SConsOptionParser method)	(SCons.Node.Node method)
get_dir() (SCons.Node.FS.Base method)	(SCons.Node.Python.Value method)
(SCons.Node.FS.Dir method)	get_factory() (SCons.Environment.Base method)
(SCons.Node.FS.Entry method)	(SCons.Environment.OverrideEnvironment method)
(SCons.Node.FS.File method)	(SCons.Script.SConscript.SConsEnvironment method)
(SCons.Node.FS.RootDir method)	get_found_includes() (SCons.Node.Alias.Alias method)
get_entry() (SCons.SConsign.Base method)	(SCons.Node.FS.Base method)
(SCons.SConsign.DB method)	(SCons.Node.FS.Dir method)
(SCons.SConsign.Dir method)	(SCons.Node.FS.Entry method)
(SCons.SConsign.DirFile method)	(SCons.Node.FS.File method)
get_env() (SCons.Node.Alias.Alias method)	(SCons.Node.FS.RootDir method)
(SCons.Node.FS.Base method)	(SCons.Node.Node method)
(SCons.Node.FS.Dir method)	(SCons.Node.Python.Value method)
(SCons.Node.FS.Entry method)	get_hash_format() (in module SCons.Util)
(SCons.Node.FS.File method)	get_implicit_deps() (SCons.Action.CommandAction method)
(SCons.Node.FS.RootDir method)	(SCons.Action.CommandGeneratorAction method)
(SCons.Node.Node method)	(SCons.Action.FunctionAction method)
(SCons.Node.Python.Value method)	(SCons.Action.LazyAction method)
get_env_bool() (in module SCons.Util)	(SCons.Action.ListAction method)
get_env_scanner() (SCons.Node.Alias.Alias method)	(SCons.Executor.Executor method)
(SCons.Node.FS.Base method)	(SCons.Node.Alias.Alias method)
(SCons.Node.FS.Dir method)	(SCons.Node.FS.Base method)
(SCons.Node.FS.Entry method)	(SCons.Node.FS.Dir method)
(SCons.Node.FS.File method)	(SCons.Node.FS.Entry method)
(SCons.Node.FS.RootDir method)	(SCons.Node.FS.File method)
(SCons.Node.Node method)	(SCons.Node.FS.RootDir method)
(SCons.Node.Python.Value method)	(SCons.Node.Node method)
get_environment_var() (in module SCons.Util)	(SCons.Node.Python.Value method)
get_executor() (SCons.Node.Alias.Alias method)	get_internal_path() (SCons.Node.FS.Base method)
	(SCons.Node.FS.Dir method)
	(SCons.Node.FS.Entry method)
	(SCons.Node.FS.File method)
	(SCons.Node.FS.RootDir method)

[get\\_kw\(\)](#) (SCons.Executor.Executor method)  
[get\\_labspath\(\)](#) (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
[get\\_lvars\(\)](#) (SCons.Executor.Executor method)  
[get\\_max\\_drift\(\)](#) (SCons.Node.FS.FS method)  
[get\\_max\\_drift\\_csig\(\)](#) (SCons.Node.FS.File method)  
[get\\_MkdirBuilder\(\)](#) (in module SCons.Node.FS)  
[get\\_name\(\)](#) (SCons.Builder.BuilderBase method)  
[get\\_names\(\)](#)  
 (SCons.Script.Interactive.SConsInteractiveCmd method)  
[get\\_native\\_path\(\)](#) (in module SCons.Util)  
[get\\_next\(\)](#) (SCons.Node.Walker method)  
[get\\_ninfo\(\)](#) (SCons.Node.Alias.Alias method)  
     (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
     (SCons.Node.Node method)  
     (SCons.Node.Python.Value method)  
[get\\_NullEnvironment\(\)](#) (in module SCons.Executor)  
[get\\_opt\\_string\(\)](#)  
 (SCons.Script.SConsOptions.SConsOption method)  
[get\\_option\(\)](#)  
 (SCons.Script.SConsOptions.SConsOptionGroup method)  
     (SCons.Script.SConsOptions.SConsOptionParser method)  
[get\\_option\\_group\(\)](#)  
 (SCons.Script.SConsOptions.SConsOptionParser method)  
[get\\_os\\_env\\_bool\(\)](#) (in module SCons.Util)  
[get\\_parent\\_class\(\)](#) (SCons.Action.LazyAction method)  
[get\\_path\(\)](#) (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
[get\\_path\\_elements\(\)](#) (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
[get\\_paths\\_str\(\)](#) (in module SCons.Defaults)  
[get\\_prefix\(\)](#) (SCons.Builder.BuilderBase method)  
[get\\_presig\(\)](#) (SCons.Action.CommandAction method)  
     (SCons.Action.CommandGeneratorAction method)  
     (SCons.Action.FunctionAction method)  
     (SCons.Action.LazyAction method)  
     (SCons.Action.ListAction method)  
[get\\_prog\\_name\(\)](#)  
 (SCons.Script.SConsOptions.SConsOptionParser method)  
[get\\_program\\_files\\_dir\(\)](#) (in module SCons.Platform.win32)  
[get\\_relpath\(\)](#) (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
[get\\_root\(\)](#) (SCons.Node.FS.FS method)  
[get\\_scanner\(\)](#) (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment method)  
[get\\_size\(\)](#) (SCons.Node.FS.File method)  
[get\\_keys\(\)](#) (SCons.Scanner.Classic method)  
     (SCons.Scanner.ClassicCPP method)  
     (SCons.Scanner.Current method)  
     (SCons.Scanner.D.D method)  
     (SCons.Scanner.Fortran.F90Scanner method)  
     (SCons.Scanner.LaTeX.LaTeX method)  
     (SCons.Scanner.ScannerBase method)  
     (SCons.Scanner.Selector method)  
[get\\_source\\_scanner\(\)](#) (SCons.Node.Alias.Alias method)  
     (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
get\_sources() (SCons.Executor.Executor method)  
get\_src\_builders() (SCons.Builder.BuilderBase method)  
get\_src\_sig\_type() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
get\_src\_suffix() (SCons.Builder.BuilderBase method)  
get\_state() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
get\_stored\_implicit() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
get\_stored\_info() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
get\_string() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
get\_subst\_proxy() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
get\_suffix() (SCons.Builder.BuilderBase method)  
(SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
get\_system\_root() (in module SCons.Platform.win32)  
get\_target() (SCons.SConf.SConfBuildTask method)  
(SCons.Script.Main.BuildTask method)  
(SCons.Script.Main.CleanTask method)  
(SCons.Script.Main.QuestionTask method)  
(SCons.Taskmaster.AlwaysTask method)  
(SCons.Taskmaster.OutOfDateTask method)  
(SCons.Taskmaster.Task method)  
get\_target\_scanner() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
get\_targets() (SCons.Action.\_ActionAction method)  
(SCons.Action.ActionBase method)



(SCons.Action.CommandAction method)	GetBuildFailures() (in module SCons.Script.Main)
(SCons.Action.CommandGeneratorAction method)	GetBuildPath() (SCons.Environment.Base method)
(SCons.Action.FunctionAction method)	(SCons.Environment.OverrideEnvironment method)
(SCons.Action.LazyAction method)	(SCons.Script.SConscript.SConsEnvironment method)
(SCons.Action.ListAction method)	getcwd() (SCons.Node.FS.FS method)
get_text_contents() (SCons.Node.FS.Dir method)	GetLaunchDir()
(SCons.Node.FS.Entry method)	(SCons.Script.SConscript.SConsEnvironment method)
(SCons.Node.FS.File method)	getmtime() (SCons.Node.FS.Base method)
(SCons.Node.FS.RootDir method)	(SCons.Node.FS.Dir method)
(SCons.Node.Python.Value method)	(SCons.Node.FS.Entry method)
get_tgt_sig_type() (SCons.Environment.Base method)	(SCons.Node.FS.File method)
(SCons.Environment.OverrideEnvironment method)	(SCons.Node.FS.FS method)
(SCons.Script.SConscript.SConsEnvironment method)	(SCons.Node.FS.LocalFS method)
get_timestamp() (SCons.Executor.Executor method)	(SCons.Node.FS.RootDir method)
(SCons.Node.FS.Dir method)	getName() (SCons.Job.Worker method)
(SCons.Node.FS.File method)	GetOption() (in module SCons.Script.Main)
(SCons.Node.FS.RootDir method)	(SCons.Script.SConscript.SConsEnvironment method)
get_tpath() (SCons.Node.FS.Base method)	getRepositories() (SCons.Node.FS.Dir method)
(SCons.Node.FS.Dir method)	(SCons.Node.FS.RootDir method)
(SCons.Node.FS.Entry method)	getsize() (SCons.Node.FS.Base method)
(SCons.Node.FS.File method)	(SCons.Node.FS.Dir method)
(SCons.Node.FS.RootDir method)	(SCons.Node.FS.Entry method)
get_unignored_sources() (SCons.Executor.Executor method)	(SCons.Node.FS.File method)
(SCons.Executor.Null method)	(SCons.Node.FS.FS method)
get_usage()	(SCons.Node.FS.LocalFS method)
(SCons.Script.SConsOptions.SConsOptionParser method)	(SCons.Node.FS.RootDir method)
get_varlist() (SCons.Action._ActionAction method)	GetTag() (SCons.Node.Alias.Alias method)
(SCons.Action.ActionBase method)	(SCons.Node.FS.Base method)
(SCons.Action.CommandAction method)	(SCons.Node.FS.Dir method)
(SCons.Action.CommandGeneratorAction method)	(SCons.Node.FS.Entry method)
(SCons.Action.FunctionAction method)	(SCons.Node.FS.File method)
(SCons.Action.LazyAction method)	(SCons.Node.FS.RootDir method)
(SCons.Action.ListAction method)	(SCons.Node.Node method)
get_version()	(SCons.Node.Python.Value method)
(SCons.Script.SConsOptions.SConsOptionParser method)	getvalue() (SCons.SConf.Streamer method)
get_xlc() (in module SCons.Platform.aix)	Glob() (SCons.Environment.Base method)
GetBatchExecutor() (in module SCons.Executor)	(SCons.Environment.OverrideEnvironment method)
	glob() (SCons.Node.FS.Dir method)

Glob() (SCons.Node.FS.FS method)  
glob() (SCons.Node.FS.RootDir method)  
Glob() (SCons.Script.SConscript.SConsEnvironment method)  
gvars() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Environment.SubstitutionEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)

## H

handle\_missing\_SConscript() (in module SCons.Script.SConscript)  
has\_builder() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
has\_explicit\_builder() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
has\_glob\_magic() (in module SCons.Node.FS)  
has\_option()  
(SCons.Script.SConsOptions.SConsOptionGroup method)  
(SCons.Script.SConsOptions.SConsOptionParser method)  
has\_src\_builder() (SCons.Node.FS.File method)  
hash\_chunksize (SCons.Node.FS.File attribute)  
hash\_collect() (in module SCons.Util)  
hash\_file\_signature() (in module SCons.Util)  
hash\_signature() (in module SCons.Util)

Help() (SCons.Script.SConscript.SConsEnvironment method)  
HelpFunction() (in module SCons.Script)  
hit\_ratio (SCons.CacheDir.CacheDir property)

## I

ident (SCons.Job.Worker property)  
identchars  
(SCons.Script.Interactive.SConsInteractiveCmd attribute)  
IDLScan() (in module SCons.Scanner.IDL)  
IDX() (in module SCons.Util)  
ignore (SCons.Node.Alias.Alias attribute)  
(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)  
Ignore() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
ignore\_cycle() (in module SCons.Node)  
ignore\_diskcheck\_match() (in module SCons.Node.FS)  
ignore\_set (SCons.Node.Alias.Alias attribute)  
(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)  
implicit (SCons.Node.Alias.Alias attribute)  
(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)



(SCons.Node.Python.Value attribute)  
implicit\_set (SCons.Node.Alias.Alias attribute)  
(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)  
Import() (SCons.Script.SConscript.SConsEnvironment  
method)  
ImportVirtualenv() (in module SCons.Platform.virtualenv)  
includes (SCons.Node.Alias.Alias attribute)  
(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)  
indent() (SCons.Script.SConsOptions.SConsIndentedHe  
lpFormatter method)  
index() (SCons.Builder.ListEmitter method)  
(SCons.Executor.TSList method)  
(SCons.Node.NodeList method)  
(SCons.Script.TargetList method)  
(SCons.Subst.CmdStringHolder method)  
(SCons.Subst.ListSubber method)  
(SCons.Subst.Targets\_or\_Sources method)  
(SCons.Util.CLVar method)  
(SCons.Util.NodeList method)  
(SCons.Util.UniqueList method)  
initialize\_do\_splitdrive() (in module SCons.Node.FS)  
initialize\_result() (SCons.cpp.DumbPreProcessor  
method)  
(SCons.cpp.PreProcessor method)  
(SCons.Scanner.C.SConsCPPConditionalScanner  
method)  
(SCons.Scanner.C.SConsCPPScanner method)  
Initializers() (in module SCons.Tool)

insert() (SCons.Builder.ListEmitter method)  
(SCons.Executor.TSList method)  
(SCons.Node.NodeList method)  
(SCons.Script.TargetList method)  
(SCons.Subst.ListSubber method)  
(SCons.Subst.Targets\_or\_Sources method)  
(SCons.Util.CLVar method)  
(SCons.Util.NodeList method)  
(SCons.Util.UniqueList method)  
instance (SCons.Variables.Variables attribute)  
interact() (in module SCons.Script.Interactive)  
InternalError  
InterruptState (class in SCons.Job)  
intro (SCons.Script.Interactive.SConsInteractiveCmd  
attribute)  
invalidate\_node\_memos() (in module SCons.Node.FS)  
is\_a\_Builder() (in module SCons.Builder)  
is\_alive() (SCons.Job.Worker method)  
is\_conftest() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
is\_derived() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
is\_derived\_node() (in module SCons.Node)  
is\_derived\_none() (in module SCons.Node)  
is\_Dict() (in module SCons.Util)  
is\_done() (SCons.Node.Walker method)  
is\_enabled() (SCons.CacheDir.CacheDir method)

is_explicit(SCons.Node.Alias.Alias attribute)	(SCons.Node.Python.Value method)
(SCons.Node.FS.Base attribute)	is_up_to_date() (SCons.Node.Alias.Alias method)
(SCons.Node.FS.Dir attribute)	(SCons.Node.FS.Base method)
(SCons.Node.FS.Entry attribute)	(SCons.Node.FS.Dir method)
(SCons.Node.FS.File attribute)	(SCons.Node.FS.Entry method)
(SCons.Node.FS.RootDir attribute)	(SCons.Node.FS.File method)
(SCons.Node.Node attribute)	(SCons.Node.FS.RootDir method)
(SCons.Node.Python.Value attribute)	(SCons.Node.Node method)
is_List() (in module SCons.Util)	(SCons.Node.Python.Value method)
is_literal() (SCons.Node.Alias.Alias method)	is_valid_construction_var() (in module SCons.Environment)
(SCons.Node.FS.Base method)	isAlive() (SCons.Job.Worker method)
(SCons.Node.FS.Dir method)	isalnum() (SCons.Subst.CmdStringHolder method)
(SCons.Node.FS.Entry method)	isalpha() (SCons.Subst.CmdStringHolder method)
(SCons.Node.FS.File method)	isascii() (SCons.Subst.CmdStringHolder method)
(SCons.Node.FS.RootDir method)	isDaemon() (SCons.Job.Worker method)
(SCons.Node.Node method)	isdecimal() (SCons.Subst.CmdStringHolder method)
(SCons.Node.Python.Value method)	isdigit() (SCons.Subst.CmdStringHolder method)
(SCons.Subst.CmdStringHolder method)	isdir() (SCons.Node.FS.Base method)
(SCons.Subst.Literal method)	(SCons.Node.FS.Dir method)
(SCons.Subst.SpecialAttrWrapper method)	(SCons.Node.FS.Entry method)
is_readonly() (SCons.CacheDir.CacheDir method)	(SCons.Node.FS.File method)
is_Scalar() (in module SCons.Util)	(SCons.Node.FS.FS method)
is_sconscript() (SCons.Node.Alias.Alias method)	(SCons.Node.FS.LocalFS method)
(SCons.Node.FS.Base method)	(SCons.Node.FS.RootDir method)
(SCons.Node.FS.Dir method)	isfile() (SCons.Node.FS.Base method)
(SCons.Node.FS.Entry method)	(SCons.Node.FS.Dir method)
(SCons.Node.FS.File method)	(SCons.Node.FS.Entry method)
(SCons.Node.FS.RootDir method)	(SCons.Node.FS.File method)
(SCons.Node.Node method)	(SCons.Node.FS.FS method)
(SCons.Node.Python.Value method)	(SCons.Node.FS.LocalFS method)
is_Sequence() (in module SCons.Util)	(SCons.Node.FS.RootDir method)
is_String() (in module SCons.Util)	isidentifier() (SCons.Subst.CmdStringHolder method)
is_Tuple() (in module SCons.Util)	IsInVirtualenv() (in module SCons.Platform.virtualenv)
is_under() (SCons.Node.Alias.Alias method)	islink() (SCons.Node.FS.Base method)
(SCons.Node.FS.Base method)	(SCons.Node.FS.Dir method)
(SCons.Node.FS.Dir method)	(SCons.Node.FS.Entry method)
(SCons.Node.FS.Entry method)	(SCons.Node.FS.File method)
(SCons.Node.FS.File method)	(SCons.Node.FS.FS method)
(SCons.Node.FS.RootDir method)	

(SCons.Node.FS.LocalFS method)  
(SCons.Node.FS.RootDir method)  
islower() (SCons.Subst.CmdStringHolder method)  
isnumeric() (SCons.Subst.CmdStringHolder method)  
isprintable() (SCons.Subst.CmdStringHolder method)  
isspace() (SCons.Subst.CmdStringHolder method)  
istitle() (SCons.Subst.CmdStringHolder method)  
isupper() (SCons.Subst.CmdStringHolder method)  
items() (SCons.Builder.CallableSelector method)  
(SCons.Builder.DictCmdGenerator method)  
(SCons.Builder.DictEmitter method)  
(SCons.Builder.OverrideWarner method)  
(SCons.Environment.Base method)  
(SCons.Environment.BuilderDict method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Environment.SubstitutionEnvironment method)  
(SCons.Node.Alias.AliasNameSpace method)  
(SCons.Script.SConscript.SConsEnvironment method)  
(SCons.Util.Selector method)

## J

Jobs (class in SCons.Job)  
join() (SCons.Job.Worker method)  
(SCons.Subst.CmdStringHolder method)

## K

key() (SCons.Memoize.CountDict method)  
(SCons.Memoize.Counter method)  
(SCons.Memoize.CountValue method)  
keys() (SCons.Builder.CallableSelector method)  
(SCons.Builder.DictCmdGenerator method)  
(SCons.Builder.DictEmitter method)  
(SCons.Builder.OverrideWarner method)  
(SCons.dblite.dblite method)  
(SCons.Environment.Base method)  
(SCons.Environment.BuilderDict method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Environment.SubstitutionEnvironment method)

(SCons.Node.Alias.AliasNameSpace method)  
(SCons.Script.SConscript.SConsEnvironment method)  
(SCons.Util.Selector method)  
(SCons.Variables.Variables method)

keyword\_paths (SCons.Scanner.LaTeX.LaTeX attribute)

## L

lastcmd (SCons.Script.Interactive.SConsInteractiveCmd attribute)  
LaTeX (class in SCons.Scanner.LaTeX)  
LaTeXScanner() (in module SCons.Scanner.LaTeX)  
LazyAction (class in SCons.Action)  
link() (SCons.Node.FS.Dir method)  
(SCons.Node.FS.FS method)  
(SCons.Node.FS.LocalFS method)  
(SCons.Node.FS.RootDir method)  
linked (SCons.Node.Alias.Alias attribute)  
(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)  
LinkFunc() (in module SCons.Node.FS)  
LinkWarning  
ListAction (class in SCons.Action)  
listdir() (SCons.Node.FS.FS method)  
(SCons.Node.FS.LocalFS method)  
ListEmitter (class in SCons.Builder)  
listLoggedInstances() (in module SCons.Debug)  
ListSubber (class in SCons.Subst)  
ListVariable() (in module SCons.Variables.ListVariable)  
Literal (class in SCons.Subst)  
Literal() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
literal() (SCons.Subst.ListSubber method)  
ljust() (SCons.Subst.CmdStringHolder method)

Local() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
LocalFS (class in SCons.Node.FS)  
LocalString() (in module SCons.Node.FS)  
Log() (SCons.SConf.CheckContext method)  
logical\_lines() (in module SCons.Util)  
LogicalLines (class in SCons.Util)  
logInstanceCreation() (in module SCons.Debug)  
lookup() (SCons.Node.Alias.AliasNameSpace method)  
lower() (SCons.Subst.CmdStringHolder method)  
Istat() (SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.FS method)  
(SCons.Node.FS.LocalFS method)  
(SCons.Node.FS.RootDir method)  
Istrip() (SCons.Subst.CmdStringHolder method)  
Ivars (SCons.Executor.Executor attribute)  
(SCons.Executor.Null attribute)  
Ivars() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Environment.SubstitutionEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)

## M

main() (in module SCons.Script.Main)  
make\_path\_relative() (in module SCons.Util)  
make\_ready() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
(SCons.SConf.SConfBuildTask method)

(SCons.Script.Main.BuildTask method)  
(SCons.Script.Main.CleanTask method)  
(SCons.Script.Main.QuestionTask method)  
(SCons.Taskmaster.AlwaysTask method)  
(SCons.Taskmaster.OutOfDateTask method)  
(SCons.Taskmaster.Task method)  
make\_ready\_all() (SCons.SConf.SConfBuildTask method)  
(SCons.Script.Main.BuildTask method)  
(SCons.Script.Main.CleanTask method)  
(SCons.Script.Main.QuestionTask method)  
(SCons.Taskmaster.AlwaysTask method)  
(SCons.Taskmaster.OutOfDateTask method)  
(SCons.Taskmaster.Task method)  
make\_ready\_current() (SCons.SConf.SConfBuildTask method)  
(SCons.Script.Main.BuildTask method)  
(SCons.Script.Main.CleanTask method)  
(SCons.Script.Main.QuestionTask method)  
(SCons.Taskmaster.AlwaysTask method)  
(SCons.Taskmaster.OutOfDateTask method)  
(SCons.Taskmaster.Task method)  
makedirs() (SCons.Node.FS.FS method)  
(SCons.Node.FS.LocalFS method)  
maketrans() (SCons.Subst.CmdStringHolder method)  
MandatoryDeprecatedWarning  
match\_splitext() (in module SCons.Builder)  
MD5collect() (in module SCons.Util)  
MD5filesignature() (in module SCons.Util)  
MD5signature() (in module SCons.Util)  
memory() (in module SCons.Debug)  
MemStats (class in SCons.Script.Main)  
merge() (SCons.Node.Alias.AliasBuildInfo method)  
(SCons.Node.Alias.AliasNodeInfo method)  
(SCons.Node.BuildInfoBase method)  
(SCons.Node.FS.DirBuildInfo method)  
(SCons.Node.FS.DirNodeInfo method)  
(SCons.Node.FS.FileBuildInfo method)  
(SCons.Node.FS.FileNodeInfo method)  
(SCons.Node.NodeInfoBase method)

(SCons.Node.Python.ValueBuildInfo method)	SCons.Conftest
(SCons.Node.Python.ValueNodeInfo method)	SCons.cpp
(SCons.SConf.SConfBuildInfo method)	SCons.dblite
(SCons.SConsign.Base method)	SCons.Debug
(SCons.SConsign.DB method)	SCons.Defaults
(SCons.SConsign.Dir method)	SCons.Environment
(SCons.SConsign.DirFile method)	SCons.Errors
MergeFlags() (SCons.Environment.Base method)	SCons.Executor
(SCons.Environment.OverrideEnvironment method)	SCons.exitfuncs
(SCons.Environment.SubstitutionEnvironment method)	SCons.Job
(SCons.Script.SConscript.SConsEnvironment method)	SCons.Memoize
Message() (SCons.SConf.CheckContext method)	SCons.Node
MethodWrapper (class in SCons.Util)	SCons.Node.Alias
misc_header	SCons.Node.FS
(SCons.Script.Interactive.SConsInteractiveCmd attribute)	SCons.Node.Python
MisleadingKeywordsWarning	SCons.PathList
misses (SCons.CacheDir.CacheDir property)	SCons.Platform
missing() (SCons.Node.Alias.Alias method)	SCons.Platform.aix
(SCons.Node.FS.Base method)	SCons.Platform.cygwin
(SCons.Node.FS.Dir method)	SCons.Platform.darwin
(SCons.Node.FS.Entry method)	SCons.Platform.hpux
(SCons.Node.FS.File method)	SCons.Platform.irix
(SCons.Node.FS.RootDir method)	SCons.Platform.mingw
(SCons.Node.Node method)	SCons.Platform.os2
(SCons.Node.Python.Value method)	SCons.Platform.posix
MissingSConscriptWarning	SCons.Platform.sunos
mkdir() (SCons.Node.FS.FS method)	SCons.Platform.virtualenv
(SCons.Node.FS.LocalFS method)	SCons.Platform.win32
mkdir_func() (in module SCons.Defaults)	SCons.Scanner
MkdirFunc() (in module SCons.Node.FS)	SCons.Scanner.C
modify_env_var() (in module SCons.Scanner.LaTeX)	SCons.Scanner.D
<b>module</b>	SCons.Scanner.Dir
SCons	SCons.Scanner.Fortran
SCons.Action	SCons.Scanner.IDL
SCons.Builder	SCons.Scanner.LaTeX
SCons.CacheDir	SCons.Scanner.Prog
SCons.compat	SCons.Scanner.RC
	SCons.Scanner.SWIG
	SCons.SConf

[SCons.SConsign](#)  
[SCons.Script](#)  
[SCons.Script.Interactive](#)  
[SCons.Script.Main](#)  
[SCons.Script.SConscript](#)  
[SCons.Script.SConsOptions](#)  
[SCons.Subst](#)  
[SCons.Taskmaster](#)  
[SCons.Tool](#)  
[SCons.Util](#)  
[SCons.Variables](#)  
[SCons.Variables.BoolVariable](#)  
[SCons.Variables.EnumVariable](#)  
[SCons.Variables.ListVariable](#)  
[SCons.Variables.PackageVariable](#)  
[SCons.Variables.PathVariable](#)  
[SCons.Warnings](#)  
[move\\_func\(\)](#) (in module [SCons.Defaults](#))  
[move\\_to\\_end\(\)](#) ([SCons.Builder.CallableSelector](#) method)  
     ([SCons.Builder.DictCmdGenerator](#) method)  
     ([SCons.Builder.DictEmitter](#) method)  
     ([SCons.Util.Selector](#) method)  
[mro\(\)](#) ([SCons.compat.NoSlotsPyPy](#) method)  
[MSVCErrors](#)  
[multiple\\_side\\_effect\\_has\\_builder\(\)](#)  
     ([SCons.Node.Alias.Alias](#) method)  
         ([SCons.Node.FS.Base](#) method)  
         ([SCons.Node.FS.Dir](#) method)  
         ([SCons.Node.FS.Entry](#) method)  
         ([SCons.Node.FS.File](#) method)  
         ([SCons.Node.FS.RootDir](#) method)  
         ([SCons.Node.Node](#) method)  
         ([SCons.Node.Python.Value](#) method)  
[must\\_be\\_same\(\)](#) ([SCons.Node.FS.Base](#) method)  
     ([SCons.Node.FS.Dir](#) method)  
     ([SCons.Node.FS.Entry](#) method)  
     ([SCons.Node.FS.File](#) method)  
     ([SCons.Node.FS.RootDir](#) method)

## N

[name](#) ([SCons.Job.Worker](#) property)  
     ([SCons.Node.FS.Base](#) attribute)  
     ([SCons.Node.FS.Dir](#) attribute)  
     ([SCons.Node.FS.Entry](#) attribute)  
     ([SCons.Node.FS.File](#) attribute)  
     ([SCons.Node.FS.RootDir](#) attribute)  
[NeedConfigHBuilder\(\)](#) (in module [SCons.SConf](#))  
[needs\\_execute\(\)](#) ([SCons.SConf.SConfBuildTask](#) method)  
     ([SCons.Script.Main.BuildTask](#) method)  
     ([SCons.Script.Main.CleanTask](#) method)  
     ([SCons.Script.Main.QuestionTask](#) method)  
     ([SCons.Taskmaster.AlwaysTask](#) method)  
     ([SCons.Taskmaster.OutOfDateTask](#) method)  
     ([SCons.Taskmaster.Task](#) method)  
[needs\\_normpath\\_match\(\)](#) (in module [SCons.Node.FS](#))  
[new\\_binfo\(\)](#) ([SCons.Node.Alias.Alias](#) method)  
     ([SCons.Node.FS.Base](#) method)  
     ([SCons.Node.FS.Dir](#) method)  
     ([SCons.Node.FS.Entry](#) method)  
     ([SCons.Node.FS.File](#) method)  
     ([SCons.Node.FS.RootDir](#) method)  
     ([SCons.Node.Node](#) method)  
     ([SCons.Node.Python.Value](#) method)  
[new\\_ninfo\(\)](#) ([SCons.Node.Alias.Alias](#) method)  
     ([SCons.Node.FS.Base](#) method)  
     ([SCons.Node.FS.Dir](#) method)  
     ([SCons.Node.FS.Entry](#) method)  
     ([SCons.Node.FS.File](#) method)  
     ([SCons.Node.FS.RootDir](#) method)  
     ([SCons.Node.Node](#) method)  
     ([SCons.Node.Python.Value](#) method)  
[next\\_line\(\)](#) ([SCons.Subst.ListSubber](#) method)  
[next\\_task\(\)](#) ([SCons.Taskmaster.Taskmaster](#) method)  
[next\\_word\(\)](#) ([SCons.Subst.ListSubber](#) method)  
[ninfo](#) ([SCons.Node.Alias.Alias](#) attribute)  
     ([SCons.Node.FS.Base](#) attribute)  
     ([SCons.Node.FS.Dir](#) attribute)



(SCons.Node.FS.Entry attribute)  
 (SCons.Node.FS.File attribute)  
 (SCons.Node.FS.RootDir attribute)  
 (SCons.Node.Node attribute)  
 (SCons.Node.Python.Value attribute)  
 (SCons.SConsign.SConsignEntry attribute)  
 NLWrapper (class in SCons.Subst)  
 no\_batch\_key() (SCons.Action.\_ActionAction method)  
     (SCons.Action.ActionBase method)  
     (SCons.Action.CommandAction method)  
     (SCons.Action.CommandGeneratorAction method)  
     (SCons.Action.FunctionAction method)  
     (SCons.Action.LazyAction method)  
     (SCons.Action.ListAction method)  
 NO\_DEFAULT\_VALUE (SCons.Script.SConsOptions.S  
 ConsIndentedHelpFormatter attribute)  
 no\_next\_candidate() (SCons.Taskmaster.Taskmaster  
 method)  
 no\_tlb() (in module SCons.Scanner.RC)  
 nocache (SCons.Node.Alias.Alias attribute)  
     (SCons.Node.FS.Base attribute)  
     (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
     (SCons.Node.Node attribute)  
     (SCons.Node.Python.Value attribute)  
 NoCache() (SCons.Environment.Base method)  
     (SCons.Environment.OverrideEnvironment method)  
     (SCons.Script.SConscript.SConsEnvironment  
 method)  
 noclean (SCons.Node.Alias.Alias attribute)  
     (SCons.Node.FS.Base attribute)  
     (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
     (SCons.Node.Node attribute)  
     (SCons.Node.Python.Value attribute)  
 NoClean() (SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment  
 method)  
 Node (class in SCons.Node)  
 node (SCons.Errors.BuildError attribute)  
 Node.Attrs (class in SCons.Node)  
 node\_conv() (in module SCons.PathList)  
 NodeInfo (SCons.Node.Alias.Alias attribute)  
     (SCons.Node.FS.Base attribute)  
     (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
     (SCons.Node.Node attribute)  
     (SCons.Node.Python.Value attribute)  
 NodeInfoBase (class in SCons.Node)  
 NodeList (class in SCons.Node)  
     (class in SCons.Util)  
 nohelp (SCons.Script.Interactive.SConsInteractiveCmd  
 attribute)  
 NoObjectCountWarning  
 NoParallelSupportWarning  
 NoSlotsPyPy (class in SCons.compat)  
 NoSubstitutionProxy() (in module SCons.Environment)  
 Null (class in SCons.Executor)  
     (class in SCons.Util)  
 NullCmdGenerator (class in SCons.Defaults)  
 NullEnvironment (class in SCons.Executor)  
 nullify() (SCons.Executor.Executor method)  
 NullNodeList (class in SCons.Subst)  
 NullSeq (class in SCons.Util)

**O**  
 on\_disk\_entries (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
 onecmd()  
 (SCons.Script.Interactive.SConsInteractiveCmd method)  
 only\_dirs() (in module SCons.Scanner.Dir)  
 open() (in module SCons.dblite)



(SCons.Node.FS.FS method)  
(SCons.Node.FS.LocalFS method)  
open\_strip() (SCons.Subst.ListSubber method)  
OutOfDateTask (class in SCons.Taskmaster)  
Override() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Environment.SubstitutionEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
OverrideEnvironment (class in SCons.Environment)  
overridelist (SCons.Executor.Executor attribute)  
(SCons.Executor.Null attribute)  
OverrideWarner (class in SCons.Builder)  
  
P  
PackageVariable() (in module SCons.Variables.PackageVariable)  
Parallel (class in SCons.Job)  
parse\_args()  
(SCons.Script.SConsOptions.SConsOptionParser method)  
ParseConfig() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
ParseDepends() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
ParseFlags() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Environment.SubstitutionEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
parseline()  
(SCons.Script.Interactive.SConsInteractiveCmd method)  
Parser() (in module SCons.Script.SConsOptions)  
partition() (SCons.Subst.CmdStringHolder method)  
path (SCons.Node.FS.RootDir attribute)  
path() (SCons.Scanner.Classic method)  
(SCons.Scanner.ClassicCPP method)

(SCons.Scanner.Current method)  
(SCons.Scanner.D.D method)  
(SCons.Scanner.Fortran.F90Scanner method)  
(SCons.Scanner.LaTeX.LaTeX method)  
(SCons.Scanner.ScannerBase method)  
(SCons.Scanner.Selector method)  
path\_string() (in module SCons.Script.Main)  
PathList() (in module SCons.PathList)  
PDFLaTeXScanner() (in module SCons.Scanner.LaTeX)  
piped\_env\_spawn() (in module SCons.Platform.posix)  
piped\_spawn() (in module SCons.Platform.win32)  
Platform() (in module SCons.Platform)  
(SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment method)  
platform\_default() (in module SCons.Platform)  
platform\_module() (in module SCons.Platform)  
PlatformSpec (class in SCons.Platform)  
pop() (SCons.Builder.CallableSelector method)  
(SCons.Builder.DictCmdGenerator method)  
(SCons.Builder.DictEmitter method)  
(SCons.Builder.ListEmitter method)  
(SCons.Builder.OverrideWarner method)  
(SCons.Environment.BuilderDict method)  
(SCons.Executor.TSList method)  
(SCons.Node.Alias.AliasNameSpace method)  
(SCons.Node.NodeList method)  
(SCons.Script.TargetList method)  
(SCons.Subst.ListSubber method)  
(SCons.Subst.Targets\_or\_Sources method)  
(SCons.Util.CLVar method)  
(SCons.Util.NodeList method)  
(SCons.Util.Selector method)  
(SCons.Util.UniqueList method)  
popitem() (SCons.Builder.CallableSelector method)  
(SCons.Builder.DictCmdGenerator method)  
(SCons.Builder.DictEmitter method)  
(SCons.Builder.OverrideWarner method)

(SCons.Environment.BuilderDict method)  
 (SCons.Node.Alias.AliasNameSpace method)  
 (SCons.Util.Selector method)  
 post\_actions (SCons.Executor.Executor attribute)  
 (SCons.Executor.Null attribute)  
 postcmd()  
 (SCons.Script.Interactive.SConsInteractiveCmd method)  
 postloop()  
 (SCons.Script.Interactive.SConsInteractiveCmd method)  
 postprocess() (SCons.Node.Alias.Alias method)  
 (SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 (SCons.Node.Node method)  
 (SCons.Node.Python.Value method)  
 (SCons.SConf.SConfBuildTask method)  
 (SCons.Script.Main.BuildTask method)  
 (SCons.Script.Main.CleanTask method)  
 (SCons.Script.Main.QuestionTask method)  
 (SCons.Taskmaster.AlwaysTask method)  
 (SCons.Taskmaster.OutOfDateTask method)  
 (SCons.Taskmaster.Task method)  
 pre\_actions (SCons.Executor.Executor attribute)  
 (SCons.Executor.Null attribute)  
 precious (SCons.Node.Alias.Alias attribute)  
 (SCons.Node.FS.Base attribute)  
 (SCons.Node.FS.Dir attribute)  
 (SCons.Node.FS.Entry attribute)  
 (SCons.Node.FS.File attribute)  
 (SCons.Node.FS.RootDir attribute)  
 (SCons.Node.Node attribute)  
 (SCons.Node.Python.Value attribute)  
 Precious() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 precmd()  
 (SCons.Script.Interactive.SConsInteractiveCmd method)

preloop()  
 (SCons.Script.Interactive.SConsInteractiveCmd method)  
 preparation\_failed() (SCons.Job.ThreadPool method)  
 prepare() (SCons.Executor.Executor method)  
 (SCons.Executor.Null method)  
 (SCons.Node.Alias.Alias method)  
 (SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 (SCons.Node.Node method)  
 (SCons.Node.Python.Value method)  
 (SCons.SConf.SConfBuildTask method)  
 (SCons.Script.Main.BuildTask method)  
 (SCons.Script.Main.CleanTask method)  
 (SCons.Script.Main.QuestionTask method)  
 (SCons.Taskmaster.AlwaysTask method)  
 (SCons.Taskmaster.OutOfDateTask method)  
 (SCons.Taskmaster.Task method)  
 prepare\_dependencies() (SCons.Node.FS.FileBuildInfo method)  
 (SCons.SConf.SConfBuildInfo method)  
 Prepend() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 PrependENVPath() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 PrependLIBS() (SCons.SConf.CheckContext method)  
 PrependPath() (in module SCons.Util)  
 PrependUnique() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 PreProcessor (class in SCons.cpp)  
 prerequisites (SCons.Node.Alias.Alias attribute)  
 (SCons.Node.FS.Base attribute)  
 (SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)	(SCons.Scanner.C.SConsCPPScanner method)
(SCons.Node.FS.File attribute)	process_file() (SCons.cpp.DumbPreProcessor method)
(SCons.Node.FS.RootDir attribute)	(SCons.cpp.PreProcessor method)
(SCons.Node.Node attribute)	(SCons.Scanner.C.SConsCPPConditionalScanner method)
(SCons.Node.Python.Value attribute)	(SCons.Scanner.C.SConsCPPScanner method)
preserve_unknown_options (SCons.Script.SConsOptions.SConsOptionParser attribute)	process_warn_strings() (in module SCons.Warnings)
presub_lines() (SCons.Action._ActionAction method)	processDefines() (in module SCons.Defaults)
(SCons.Action.ActionBase method)	ProgramScanner() (in module SCons.Scanner.Prog)
(SCons.Action.CommandAction method)	Progress() (in module SCons.Script.Main)
(SCons.Action.CommandGeneratorAction method)	Progressor (class in SCons.Script.Main)
(SCons.Action.FunctionAction method)	prompt (SCons.Script.Interactive.SConsInteractiveCmd attribute)
(SCons.Action.LazyAction method)	Proxy (class in SCons.Util)
(SCons.Action.ListAction method)	pseudo (SCons.Node.Alias.Alias attribute)
prev (SCons.Script.Main.Progressor attribute)	(SCons.Node.FS.Base attribute)
print_cmd_line() (SCons.Action._ActionAction method)	(SCons.Node.FS.Dir attribute)
(SCons.Action.CommandAction method)	(SCons.Node.FS.Entry attribute)
(SCons.Action.FunctionAction method)	(SCons.Node.FS.File attribute)
(SCons.Action.LazyAction method)	(SCons.Node.FS.RootDir attribute)
print_help() (SCons.Script.SConsOptions.SConsOptionParser method)	(SCons.Node.Node attribute)
print_it (SCons.Util.DisplayEngine attribute)	(SCons.Node.Python.Value attribute)
print_time() (in module SCons.Util)	Pseudo() (SCons.Environment.Base method)
print_topics() (SCons.Script.Interactive.SConsInteractiveCmd method)	(SCons.Environment.OverrideEnvironment method)
print_tree() (in module SCons.Util)	(SCons.Script.SConsScript.SConsEnvironment method)
print_usage() (SCons.Script.SConsOptions.SConsOptionParser method)	pspawn_wrapper() (SCons.SConf.SConfBase method)
print_version() (SCons.Script.SConsOptions.SConsOptionParser method)	push() (SCons.CacheDir.CacheDir method)
PrintHelp() (in module SCons.Script.Main)	push_if_forced() (SCons.CacheDir.CacheDir method)
process() (SCons.Action.CommandAction method)	push_to_cache() (SCons.Node.Alias.Alias method)
(SCons.Action.LazyAction method)	(SCons.Node.FS.Base method)
(SCons.Script.SConsOptions.SConsOption method)	(SCons.Node.FS.Dir method)
process_contents() (SCons.cpp.DumbPreProcessor method)	(SCons.Node.FS.Entry method)
(SCons.cpp.PreProcessor method)	(SCons.Node.FS.File method)
(SCons.Scanner.C.SConsCPPConditionalScanner method)	(SCons.Node.FS.RootDir method)
	(SCons.Node.Node method)
	(SCons.Node.Python.Value method)
	put() (SCons.Job.ThreadPool method)
	PyPackageDir() (SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)  
(SCons.Node.FS.FS method)  
(SCons.Script.SConscript.SConsEnvironment method)  
python\_version\_deprecated() (in module SCons.Script.Main)  
python\_version\_string() (in module SCons.Script.Main)  
python\_version\_unsupported() (in module SCons.Script.Main)  
PythonVersionWarning

## Q

QuestionTask (class in SCons.Script.Main)  
quote\_spaces() (in module SCons.Subst)

## R

raise\_exception() (in module SCons.Subst)  
RCScan() (in module SCons.Scanner.RC)  
rdir() (SCons.Node.FS.Dir method)  
(SCons.Node.FS.RootDir method)  
RDirs() (SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
read() (SCons.Node.Python.Value method)  
read\_file() (SCons.cpp.DumbPreProcessor method)  
(SCons.cpp.PreProcessor method)  
(SCons.Scanner.C.SConsCPPConditionalScanner method)  
(SCons.Scanner.C.SConsCPPScanner method)  
(SCons.Script.SConsOptions.SConsValues method)  
read\_module()  
(SCons.Script.SConsOptions.SConsValues method)  
readlines() (SCons.Util.LogicalLines method)  
readlink() (SCons.Node.FS.FS method)  
(SCons.Node.FS.LocalFS method)  
really\_build() (SCons.Node.Alias.Alias method)  
recurse\_nodes() (SCons.Scanner.C.SConsCPPConditionalScannerWrapper method)  
(SCons.Scanner.C.SConsCPPScannerWrapper method)  
ref\_count (SCons.Node.Alias.Alias attribute)

(SCons.Node.FS.Base attribute)  
(SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
(SCons.Node.Node attribute)  
(SCons.Node.Python.Value attribute)  
RegError (in module SCons.Util)  
RegGetValue() (in module SCons.Util)  
register() (in module SCons.exitfuncs)  
RegOpenKeyEx() (in module SCons.Util)  
rel\_path() (SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
release\_target\_info() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
released\_target\_info (SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
remove() (SCons.Builder.ListEmitter method)  
(SCons.Executor.TSList method)  
(SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.NodeList method)  
(SCons.Node.Python.Value method)  
(SCons.Script.Main.CleanTask method)

(SCons.Script.TargetList method)  
 (SCons.Subst.ListSubber method)  
 (SCons.Subst.Targets\_or\_Sources method)  
 (SCons.Util.CLVar method)  
 (SCons.Util.NodeList method)  
 (SCons.Util.UniqueList method)  
 remove\_methods() (SCons.Tool.ToolInitializer method)  
 remove\_option()  
 (SCons.Script.SConsOptions.SConsOptionGroup method)  
 (SCons.Script.SConsOptions.SConsOptionParser method)  
 RemoveMethod() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Environment.SubstitutionEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 rename() (SCons.Node.FS.FS method)  
 (SCons.Node.FS.LocalFS method)  
 rename\_module() (in module SCons.compat)  
 render\_include\_tree() (SCons.Node.Alias.Alias method)  
 (SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 (SCons.Node.Node method)  
 (SCons.Node.Python.Value method)  
 render\_tree() (in module SCons.Util)  
 reentry() (SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 reentry\_exists\_on\_disk() (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.RootDir method)  
 reparse\_local\_options()  
 (SCons.Script.SConsOptions.SConsOptionParser method)  
 Replace() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 replace() (SCons.Subst.CmdStringHolder method)  
 replace\_string() (SCons.Script.Main.Progressor method)  
 ReplaceIxes() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 repositories (SCons.Node.FS.Dir attribute)  
 (SCons.Node.FS.Entry attribute)  
 (SCons.Node.FS.File attribute)  
 (SCons.Node.FS.RootDir attribute)  
 Repository() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Node.FS.FS method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 Requires() (SCons.Environment.Base method)  
 (SCons.Environment.OverrideEnvironment method)  
 (SCons.Script.SConscript.SConsEnvironment method)  
 ReservedVariableWarning  
 Reset() (in module SCons.SConsign)  
 reset\_executor() (SCons.Node.Alias.Alias method)  
 (SCons.Node.FS.Base method)  
 (SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 (SCons.Node.Node method)  
 (SCons.Node.Python.Value method)  
 resolve\_include() (SCons.cpp.DumbPreProcessor method)  
 (SCons.cpp.PreProcessor method)  
 (SCons.Scanner.C.SConsCPPConditionalScanner method)  
 (SCons.Scanner.C.SConsCPPScanner method)  
 restore() (SCons.cpp.DumbPreProcessor method)  
 (SCons.cpp.PreProcessor method)



(SCons.Scanner.C.SConsCPPConditionalScanner method)  
 (SCons.Scanner.C.SConsCPPScanner method)  
 result (SCons.SConf.SConfBuildInfo attribute)  
 Result() (SCons.SConf.CheckContext method)  
 retrieve() (SCons.CacheDir.CacheDir method)  
 retrieve\_from\_cache() (SCons.Node.Alias.Alias method)  
     (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
     (SCons.Node.Node method)  
     (SCons.Node.Python.Value method)  
 Return() (in module SCons.Script.SConsScript)  
 reverse() (SCons.Builder.ListEmitter method)  
     (SCons.Executor.TSList method)  
     (SCons.Node.NodeList method)  
     (SCons.Script.TargetList method)  
     (SCons.Subst.ListSubber method)  
     (SCons.Subst.Targets\_or\_Sources method)  
     (SCons.Util.CLVar method)  
     (SCons.Util.NodeList method)  
     (SCons.Util.UniqueList method)  
 revert\_io() (in module SCons.Script.Main)  
 rexists() (SCons.Node.Alias.Alias method)  
     (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
     (SCons.Node.Node method)  
     (SCons.Node.Python.Value method)  
 rexists\_base() (in module SCons.Node)  
 rexists\_node() (in module SCons.Node)  
 rexists\_none() (in module SCons.Node)  
 rfile() (in module SCons.Action)  
     (in module SCons.Executor)  
     (SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)  
 (SCons.Node.FS.Entry method)  
 (SCons.Node.FS.File method)  
 (SCons.Node.FS.RootDir method)  
 rfind() (SCons.Subst.CmdStringHolder method)  
 Rfindalldirs() (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
 rightmost\_separator() (in module SCons.Util)  
 rindex() (SCons.Subst.CmdStringHolder method)  
 rjust() (SCons.Subst.CmdStringHolder method)  
 root (SCons.Node.FS.Dir attribute)  
     (SCons.Node.FS.Entry attribute)  
     (SCons.Node.FS.File attribute)  
     (SCons.Node.FS.RootDir attribute)  
 RootDir (class in SCons.Node.FS)  
 RootDir.Attrs (class in SCons.Node.FS)  
 rpartition() (SCons.Subst.CmdStringHolder method)  
 rsplit() (SCons.Subst.CmdStringHolder method)  
 rstr() (SCons.Node.FS.Base method)  
     (SCons.Node.FS.Dir method)  
     (SCons.Node.FS.Entry method)  
     (SCons.Node.FS.File method)  
     (SCons.Node.FS.RootDir method)  
 rstrip() (SCons.Subst.CmdStringHolder method)  
 ruler (SCons.Script.Interactive.SConsInteractiveCmd attribute)  
 run() (SCons.Job.Jobs method)  
     (SCons.Job.Worker method)  
 RunProg() (SCons.SConf.CheckContext method)

## S

save() (SCons.cpp.DumbPreProcessor method)  
     (SCons.cpp.PreProcessor method)  
     (SCons.Scanner.C.SConsCPPConditionalScanner method)  
     (SCons.Scanner.C.SConsCPPScanner method)  
 Save() (SCons.Variables.Variables method)

`save_strings()` (in module `SCons.Node.FS`)  
`sbuilder` (`SCons.Node.FS.Base` attribute)  
    (`SCons.Node.FS.Dir` attribute)  
    (`SCons.Node.FS.Entry` attribute)  
    (`SCons.Node.FS.File` attribute)  
    (`SCons.Node.FS.RootDir` attribute)  
`scan()` (in module `SCons.Scanner.Prog`)  
    (`SCons.Executor.Executor` method)  
    (`SCons.Node.Alias.Alias` method)  
    (`SCons.Node.FS.Base` method)  
    (`SCons.Node.FS.Dir` method)  
    (`SCons.Node.FS.Entry` method)  
    (`SCons.Node.FS.File` method)  
    (`SCons.Node.FS.RootDir` method)  
    (`SCons.Node.Node` method)  
    (`SCons.Node.Python.Value` method)  
    (`SCons.Scanner.Classic` method)  
    (`SCons.Scanner.ClassicCPP` method)  
    (`SCons.Scanner.D.D` method)  
    (`SCons.Scanner.Fortran.F90Scanner` method)  
    (`SCons.Scanner.LaTeX.LaTeX` method)  
`scan_in_memory()` (in module `SCons.Scanner.Dir`)  
`scan_on_disk()` (in module `SCons.Scanner.Dir`)  
`scan_recurse()` (`SCons.Scanner.LaTeX.LaTeX` method)  
`scan_sources()` (`SCons.Executor.Executor` method)  
`scan_targets()` (`SCons.Executor.Executor` method)  
`scandir()` (`SCons.Node.FS.FS` method)  
    (`SCons.Node.FS.LocalFS` method)  
`Scanner()` (in module `SCons.Scanner`)  
    (`SCons.Environment.Base` method)  
    (`SCons.Environment.OverrideEnvironment` method)  
    (`SCons.Script.SConscript.SConsEnvironment` method)  
`scanner_key()` (`SCons.Node.Alias.Alias` method)  
    (`SCons.Node.FS.Base` method)  
    (`SCons.Node.FS.Dir` method)  
    (`SCons.Node.FS.Entry` method)  
    (`SCons.Node.FS.File` method)  
    (`SCons.Node.FS.RootDir` method)  
    (`SCons.Node.Node` method)  
    (`SCons.Node.Python.Value` method)  
`scanner_map_delete()` (`SCons.Environment.Base` method)  
    (`SCons.Environment.OverrideEnvironment` method)  
    (`SCons.Script.SConscript.SConsEnvironment` method)  
`scanner_paths` (`SCons.Node.FS.Dir` attribute)  
    (`SCons.Node.FS.Entry` attribute)  
    (`SCons.Node.FS.File` attribute)  
    (`SCons.Node.FS.RootDir` attribute)  
`ScannerBase` (class in `SCons.Scanner`)  
`SConf()` (in module `SCons.SConf`)  
`SConfBase` (class in `SCons.SConf`)  
`SConfBase.TestWrapper` (class in `SCons.SConf`)  
`SConfBuildInfo` (class in `SCons.SConf`)  
`SConfBuildTask` (class in `SCons.SConf`)  
`SConfError`  
`SConfWarning`  
**SCons**  
    module  
`SCons` (`SCons.Executor.NullEnvironment` attribute)  
**SCons.Action**  
    module  
**SCons.Builder**  
    module  
**SCons.CacheDir**  
    module  
**SCons.compat**  
    module  
**SCons.Conftest**  
    module  
**SCons.cpp**  
    module  
**SCons.dblite**  
    module  
**SCons.Debug**  
    module  
**SCons.Defaults**  
    module  
**SCons.Environment**  
    module  
**SCons.Errors**



[module](#)  
**SCons.Executor**  
[module](#)  
**SCons.exitfuncs**  
[module](#)  
**SCons.Job**  
[module](#)  
**SCons.Memoize**  
[module](#)  
**SCons.Node**  
[module](#)  
**SCons.Node.Alias**  
[module](#)  
**SCons.Node.FS**  
[module](#)  
**SCons.Node.Python**  
[module](#)  
**SCons.PathList**  
[module](#)  
**SCons.Platform**  
[module](#)  
**SCons.Platform.aix**  
[module](#)  
**SCons.Platform.cygwin**  
[module](#)  
**SCons.Platform.darwin**  
[module](#)  
**SCons.Platform.hpux**  
[module](#)  
**SCons.Platform.irix**  
[module](#)  
**SCons.Platform.mingw**  
[module](#)  
**SCons.Platform.os2**  
[module](#)  
**SCons.Platform.posix**  
[module](#)  
**SCons.Platform.sunos**  
[module](#)  
**SCons.Platform.virtualenv**  
[module](#)  
**SCons.Platform.win32**  
[module](#)  
**SCons.Scanner**  
[module](#)

**SCons.Scanner.C**  
[module](#)  
**SCons.Scanner.D**  
[module](#)  
**SCons.Scanner.Dir**  
[module](#)  
**SCons.Scanner.Fortran**  
[module](#)  
**SCons.Scanner.IDL**  
[module](#)  
**SCons.Scanner.LaTeX**  
[module](#)  
**SCons.Scanner.Prog**  
[module](#)  
**SCons.Scanner.RC**  
[module](#)  
**SCons.Scanner.SWIG**  
[module](#)  
**SCons.SConf**  
[module](#)  
**SCons.SConsign**  
[module](#)  
**SCons.Script**  
[module](#)  
**SCons.Script.Interactive**  
[module](#)  
**SCons.Script.Main**  
[module](#)  
**SCons.Script.SConscript**  
[module](#)  
**SCons.Script.SConsOptions**  
[module](#)  
**SCons.Subst**  
[module](#)  
**SCons.Taskmaster**  
[module](#)  
**SCons.Tool**  
[module](#)  
**SCons.Util**  
[module](#)  
**SCons.Variables**  
[module](#)  
**SCons.Variables.BoolVariable**  
[module](#)  
**SCons.Variables.EnumVariable**

module  
**SCons.Variables.ListVariable**  
module  
**SCons.Variables.PackageVariable**  
module  
**SCons.Variables.PathVariable**  
module  
**SCons.Warnings**  
module  
  
scons\_current\_file() (SCons.cpp.DumbPreProcessor  
method)  
  
(SCons.cpp.PreProcessor method)  
  
(SCons.Scanner.C.SConsCPPConditionalScanner  
method)  
  
(SCons.Scanner.C.SConsCPPScanner method)  
  
scons\_subst() (in module SCons.Subst)  
scons\_subst\_list() (in module SCons.Subst)  
scons\_subst\_once() (in module SCons.Subst)  
SConsCPPConditionalScanner (class in  
SCons.Scanner.C)  
SConsCPPConditionalScannerWrapper (class in  
SCons.Scanner.C)  
SConsCPPScanner (class in SCons.Scanner.C)  
SConsCPPScannerWrapper (class in SCons.Scanner.C)  
SConscript()  
(SCons.Script.SConscript.SConsEnvironment method)  
SConscript\_exception() (in module  
SCons.Script.SConscript)  
SConscriptChdir()  
(SCons.Script.SConscript.SConsEnvironment method)  
SConscriptReturn  
SConsEnvironment (class in SCons.Script.SConscript)  
SConsEnvironmentError  
sconsign() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.RootDir method)  
sconsign\_dir() (in module SCons.Node.FS)  
sconsign\_none() (in module SCons.Node.FS)  
SConsignEntry (class in SCons.SConsign)  
SConsignFile() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Script.SConscript.SConsEnvironment  
method)

SConsIndentedHelpFormatter (class in  
SCons.Script.SConsOptions)  
SConsInteractiveCmd (class in SCons.Script.Interactive)  
SConsOption (class in SCons.Script.SConsOptions)  
SConsOptionGroup (class in  
SCons.Script.SConsOptions)  
SConsOptionParser (class in  
SCons.Script.SConsOptions)  
SConsPrintHelpException  
SConsValues (class in SCons.Script.SConsOptions)  
SConsWarning  
searched (SCons.Node.FS.Dir attribute)  
(SCons.Node.FS.Entry attribute)  
(SCons.Node.FS.File attribute)  
(SCons.Node.FS.RootDir attribute)  
select() (SCons.Scanner.C.SConsCPPConditionalScann  
erWrapper method)  
(SCons.Scanner.C.SConsCPPScannerWrapper  
method)  
(SCons.Scanner.Classic method)  
(SCons.Scanner.ClassicCPP method)  
(SCons.Scanner.Current method)  
(SCons.Scanner.D.D method)  
(SCons.Scanner.Fortran.F90Scanner method)  
(SCons.Scanner.LaTeX.LaTeX method)  
(SCons.Scanner.ScannerBase method)  
(SCons.Scanner.Selector method)  
select\_paths\_in\_venv() (in module  
SCons.Platform.virtualenv)  
select\_scanner() (SCons.Node.Alias.Alias method)  
(SCons.Node.FS.Base method)  
(SCons.Node.FS.Dir method)  
(SCons.Node.FS.Entry method)  
(SCons.Node.FS.File method)  
(SCons.Node.FS.RootDir method)  
(SCons.Node.Node method)  
(SCons.Node.Python.Value method)  
Selector (class in SCons.Scanner)  
(class in SCons.Util)  
semi\_deepcopy() (in module SCons.Util)  
semi\_deepcopy\_dict() (in module SCons.Util)

Serial (class in SCons.Job)

set() (SCons.Job.InterruptState method)

(SCons.Node.FS.DiskChecker method)

set\_action\_list() (SCons.Executor.Executor method)

(SCons.Executor.Null method)

set\_always\_build() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

set\_build\_result() (SCons.SConf.SConfBuildInfo method)

set\_conflict\_handler() (SCons.Script.SConsOptions.SConsOptionGroup method)

(SCons.Script.SConsOptions.SConsOptionParser method)

set\_default() (SCons.Script.SConsOptions.SConsOptionParser method)

set\_defaults() (SCons.Script.SConsOptions.SConsOptionParser method)

set\_description() (SCons.Script.SConsOptions.SConsOptionGroup method)

(SCons.Script.SConsOptions.SConsOptionParser method)

set\_diskcheck() (in module SCons.Node.FS)

set\_duplicate() (in module SCons.Node.FS)

set\_entry() (SCons.SConsign.Base method)

(SCons.SConsign.DB method)

(SCons.SConsign.Dir method)

(SCons.SConsign.DirFile method)

set\_executor() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

set\_explicit() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

set\_hash\_format() (in module SCons.Util)

set\_local() (SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

set\_long\_opt\_delimiter() (SCons.Script.SConsOptions.SConsIndentedHelpFormatter method)

set\_max\_drift() (SCons.Node.FS.FS method)

set\_missing\_sconscript\_error() (in module SCons.Script)

set\_mode() (SCons.Util.DisplayEngine method)

set\_nocache() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

set\_noclean() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

set\_option() (SCons.Script.SConsOptions.SConsValues method)

set\_parser() (SCons.Script.SConsOptions.SConsIndentedHelpFormatter method)

set\_precious() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

set\_process\_default\_values()

(SCons.Script.SConsOptions.SConsOptionParser method)

set\_pseudo() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

set\_SConstruct\_dir() (SCons.Node.FS.FS method)

set\_short\_opt\_delimiter() (SCons.Script.SConsOptions.SConsIndentedHelpFormatter method)

set\_specific\_source() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

set\_src\_builder() (SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

set\_src\_suffix() (SCons.Builder.BuilderBase method)

set\_state() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

set\_suffix() (SCons.Builder.BuilderBase method)

set\_title()

(SCons.Script.SConsOptions.SConsOptionGroup method)

set\_usage()

(SCons.Script.SConsOptions.SConsOptionParser method)

SetAllowableExceptions() (in module SCons.Subst)

SetBuildType() (in module SCons.SConf)

SetCacheMode() (in module SCons.SConf)

setDaemon() (SCons.Job.Worker method)

setdefault() (SCons.Builder.CallableSelector method)

(SCons.Builder.DictCmdGenerator method)

(SCons.Builder.DictEmitter method)

(SCons.Builder.OverrideWarner method)

SetDefault() (SCons.Environment.Base method)

setdefault() (SCons.Environment.Base method)

(SCons.Environment.BuilderDict method)

SetDefault() (SCons.Environment.OverrideEnvironment method)

setdefault() (SCons.Environment.OverrideEnvironment method)

(SCons.Environment.SubstitutionEnvironment method)

(SCons.Node.Alias.AliasNameSpace method)

SetDefault()

(SCons.Script.SConsScript.SConsEnvironment method)

setdefault()

(SCons.Script.SConsScript.SConsEnvironment method)

(SCons.Util.Selector method)

SetLIBS() (SCons.SConf.CheckContext method)

setName() (SCons.Job.Worker method)

SetOption() (in module SCons.Script.Main)

(SCons.Script.SConsScript.SConsEnvironment method)

SetProgressDisplay() (in module SCons.SConf)

settable attribute)	(SCons.Script.SConsOptions.SConsValues method)
shared (SCons.Node.Alias.Alias.Attrs attribute)	(SCons.Util.CLVar method)
(SCons.Node.FS.Base.Attrs attribute)	(SCons.Util.NodeList method)
(SCons.Node.FS.Dir.Attrs attribute)	(SCons.Util.UniqueList method)
(SCons.Node.FS.Entry.Attrs attribute)	sort_key() (SCons.Scanner.Classic static method)
(SCons.Node.FS.File.Attrs attribute)	(SCons.Scanner.ClassicCPP method)
(SCons.Node.FS.RootDir.Attrs attribute)	(SCons.Scanner.D.D static method)
(SCons.Node.Node.Attrs attribute)	(SCons.Scanner.Fortran.F90Scanner static method)
(SCons.Node.Python.Value.Attrs attribute)	(SCons.Scanner.LaTeX.LaTeX method)
SharedFlagChecker() (in module SCons.Defaults)	sources (SCons.Executor.Batch attribute)
SharedObjectEmitter() (in module SCons.Defaults)	(SCons.Node.Alias.Alias attribute)
show() (SCons.Script.Main.CleanTask method)	(SCons.Node.FS.Base attribute)
side_effect (SCons.Node.Alias.Alias attribute)	(SCons.Node.FS.Dir attribute)
(SCons.Node.FS.Base attribute)	(SCons.Node.FS.Entry attribute)
(SCons.Node.FS.Dir attribute)	(SCons.Node.FS.File attribute)
(SCons.Node.FS.Entry attribute)	(SCons.Node.FS.RootDir attribute)
(SCons.Node.FS.File attribute)	(SCons.Node.Node attribute)
(SCons.Node.FS.RootDir attribute)	(SCons.Node.Python.Value attribute)
(SCons.Node.Node attribute)	sources_set (SCons.Node.Alias.Alias attribute)
(SCons.Node.Python.Value attribute)	(SCons.Node.FS.Base attribute)
side_effects (SCons.Node.Alias.Alias attribute)	(SCons.Node.FS.Dir attribute)
(SCons.Node.FS.Base attribute)	(SCons.Node.FS.Entry attribute)
(SCons.Node.FS.Dir attribute)	(SCons.Node.FS.File attribute)
(SCons.Node.FS.Entry attribute)	(SCons.Node.FS.RootDir attribute)
(SCons.Node.FS.File attribute)	(SCons.Node.Node attribute)
(SCons.Node.FS.RootDir attribute)	(SCons.Node.Python.Value attribute)
(SCons.Node.Node attribute)	spawn() (in module SCons.Platform.win32)
(SCons.Node.Python.Value attribute)	spawnve() (in module SCons.Platform.win32)
SideEffect() (SCons.Environment.Base method)	SpecialAttrWrapper (class in SCons.Subst)
(SCons.Environment.OverrideEnvironment method)	spinner() (SCons.Script.Main.Progressor method)
(SCons.Script.SConsScript.SConsEnvironment method)	Split() (in module SCons.Util)
silent_intern() (in module SCons.Util)	(SCons.Environment.Base method)
size (SCons.Node.FS.FileNodeInfo attribute)	(SCons.Environment.OverrideEnvironment method)
sort() (SCons.Builder.ListEmitter method)	(SCons.Script.SConsScript.SConsEnvironment method)
(SCons.Executor.TSList method)	split() (SCons.Subst.CmdStringHolder method)
(SCons.Node.NodeList method)	splitext() (in module SCons.Util)
(SCons.Script.TargetList method)	(SCons.Builder.BuilderBase method)
(SCons.Subst.ListSubber method)	splitlines() (SCons.Subst.CmdStringHolder method)

src_builder() (SCons.Node.FS.Base method)	(SCons.Node.FS.File method)
(SCons.Node.FS.Dir method)	(SCons.Node.FS.FS method)
(SCons.Node.FS.Entry method)	(SCons.Node.FS.LocalFS method)
(SCons.Node.FS.File method)	(SCons.Node.FS.RootDir method)
(SCons.Node.FS.RootDir method)	state (SCons.Node.Alias.Alias attribute)
src_builder_sources() (SCons.Builder.BuilderBase method)	(SCons.Node.FS.Base attribute)
	(SCons.Node.FS.Dir attribute)
src_suffices() (SCons.Builder.BuilderBase method)	(SCons.Node.FS.Entry attribute)
(SCons.Builder.DictCmdGenerator method)	(SCons.Node.FS.File attribute)
srcdir (SCons.Node.FS.Dir attribute)	(SCons.Node.FS.RootDir attribute)
(SCons.Node.FS.Entry attribute)	(SCons.Node.Node attribute)
(SCons.Node.FS.File attribute)	(SCons.Node.Python.Value attribute)
(SCons.Node.FS.RootDir attribute)	StaticObjectEmitter() (in module SCons.Defaults)
srcdir_duplicate() (SCons.Node.FS.Dir method)	Stats (class in SCons.Script.Main)
(SCons.Node.FS.RootDir method)	(class in SCons.Taskmaster)
srcdir_find_file() (SCons.Node.FS.Dir method)	status (SCons.Errors.BuildError attribute)
(SCons.Node.FS.RootDir method)	stop() (SCons.Taskmaster.Taskmaster method)
srcdir_list() (SCons.Node.FS.Dir method)	stop_handling_includes()
(SCons.Node.FS.RootDir method)	(SCons.cpp.DumbPreProcessor method)
srcnode() (SCons.Node.FS.Base method)	(SCons.cpp.PreProcessor method)
(SCons.Node.FS.Dir method)	(SCons.Scanner.C.SConsCPPConditionalScanner method)
(SCons.Node.FS.Entry method)	(SCons.Scanner.C.SConsCPPScanner method)
(SCons.Node.FS.File method)	StopError
(SCons.Node.FS.RootDir method)	STORE_ACTIONS
StackSizeWarning	(SCons.Script.SConsOptions.SConsOption attribute)
standard_option_list	store_info (SCons.Node.Alias.Alias attribute)
(SCons.Script.SConsOptions.SConsOptionParser attribute)	(SCons.Node.FS.Base attribute)
start() (SCons.Job.Parallel method)	(SCons.Node.FS.Dir attribute)
(SCons.Job.Serial method)	(SCons.Node.FS.Entry attribute)
(SCons.Job.Worker method)	(SCons.Node.FS.File attribute)
start_handling_includes()	(SCons.Node.FS.RootDir attribute)
(SCons.cpp.DumbPreProcessor method)	(SCons.Node.Node attribute)
(SCons.cpp.PreProcessor method)	(SCons.Node.Python.Value attribute)
(SCons.Scanner.C.SConsCPPConditionalScanner method)	store_info() (SCons.SConsign.Base method)
(SCons.Scanner.C.SConsCPPScanner method)	(SCons.SConsign.DB method)
startswith() (SCons.Subst.CmdStringHolder method)	(SCons.SConsign.Dir method)
stat() (SCons.Node.FS.Base method)	(SCons.SConsign.DirFile method)
(SCons.Node.FS.Dir method)	store_info_file() (in module SCons.Node)
(SCons.Node.FS.Entry method)	store_info_pass() (in module SCons.Node)



store\_option\_strings() (SCons.Script.SConsOptions.SConsIndentedHelpFormatter method)

str\_for\_display() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Python.Value method)

str\_to\_node() (SCons.Node.Alias.AliasNodeInfo method)

(SCons.Node.FS.DirNodeInfo method)

(SCons.Node.FS.FileNodeInfo method)

(SCons.Node.Python.ValueNodeInfo method)

Streamer (class in SCons.SConf)

strerror (SCons.Errors.MSVCErrors attribute)

strfunction() (SCons.Action.ActionCaller method)

(SCons.Action.CommandAction method)

(SCons.Action.FunctionAction method)

(SCons.Action.LazyAction method)

string (SCons.SConf.SConfBuildInfo attribute)

string() (SCons.Script.Main.Progressor method)

string\_to\_classes() (in module SCons.Debug)

StringSubber (class in SCons.Subst)

strip() (SCons.Subst.CmdStringHolder method)

subprocess\_spawn() (in module SCons.Platform.posix)

subst() (SCons.Action.ActionCaller method)

(SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)

(SCons.Environment.SubstitutionEnvironment method)

(SCons.Script.SConsScript.SConsEnvironment method)

subst\_args() (SCons.Action.ActionCaller method)

subst\_dict() (in module SCons.Subst)

subst\_kw() (SCons.Action.ActionCaller method)

(SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)

(SCons.Environment.SubstitutionEnvironment method)

(SCons.Script.SConsScript.SConsEnvironment method)

subst\_list() (SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)

(SCons.Environment.SubstitutionEnvironment method)

(SCons.Script.SConsScript.SConsEnvironment method)

subst\_path() (SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)

(SCons.Environment.SubstitutionEnvironment method)

(SCons.PathList.\_PathList method)

(SCons.Script.SConsScript.SConsEnvironment method)

subst\_src\_suffixes() (SCons.Builder.BuilderBase method)

subst\_target\_source() (SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)

(SCons.Environment.SubstitutionEnvironment method)

(SCons.Script.SConsScript.SConsEnvironment method)

substitute() (SCons.Subst.ListSubber method)

(SCons.Subst.StringSubber method)

SubstitutionEnvironment (class in SCons.Environment)

suppressWarningClass() (in module SCons.Warnings)

swapcase() (SCons.Subst.CmdStringHolder method)

SWIGScanner() (in module SCons.Scanner.SWIG)

symlink() (SCons.Node.FS.FS method)

(SCons.Node.FS.LocalFS method)

sync() (SCons.dblite.dblite method)

synonyms (SCons.Script.Interactive.SConsInteractiveCmd attribute)

## T

Tag() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)



[\(SCons.Node.Python.Value method\)](#)  
[take\\_action\(\) \(SCons.Script.SConsOptions.SConsOption method\)](#)  
[takes\\_value\(\) \(SCons.Script.SConsOptions.SConsOption method\)](#)  
[target\\_from\\_source\(\) \(SCons.Node.FS.Base method\)](#)  
     [\(SCons.Node.FS.Dir method\)](#)  
     [\(SCons.Node.FS.Entry method\)](#)  
     [\(SCons.Node.FS.File method\)](#)  
     [\(SCons.Node.FS.RootDir method\)](#)  
[target\\_from\\_source\\_base\(\) \(in module SCons.Node\)](#)  
[target\\_from\\_source\\_none\(\) \(in module SCons.Node\)](#)  
[Target\\_or\\_Source \(class in SCons.Subst\)](#)  
[target\\_peers \(SCons.Node.Alias.Alias attribute\)](#)  
     [\(SCons.Node.FS.Base attribute\)](#)  
     [\(SCons.Node.FS.Dir attribute\)](#)  
     [\(SCons.Node.FS.Entry attribute\)](#)  
     [\(SCons.Node.FS.File attribute\)](#)  
     [\(SCons.Node.FS.RootDir attribute\)](#)  
     [\(SCons.Node.Node attribute\)](#)  
     [\(SCons.Node.Python.Value attribute\)](#)  
[target\\_string \(SCons.Script.Main.Progressor attribute\)](#)  
[TargetList \(class in SCons.Script\)](#)  
[TargetNotBuiltWarning](#)  
[targets \(SCons.Executor.Batch attribute\)](#)  
[Targets\\_or\\_Sources \(class in SCons.Subst\)](#)  
[Task \(class in SCons.Taskmaster\)](#)  
[Taskmaster \(class in SCons.Taskmaster\)](#)  
[TaskmasterNeedsExecuteWarning](#)  
[TempFileMunge \(class in SCons.Platform\)](#)  
[test\\_load\\_all\\_site\\_scons\\_dirs\(\) \(in module SCons.Script.Main\)](#)  
[this\\_word\(\) \(SCons.Subst.ListSubber method\)](#)  
[ThreadPool \(class in SCons.Job\)](#)  
[timestamp \(SCons.Node.FS.FileNodeInfo attribute\)](#)  
[title\(\) \(SCons.Subst.CmdStringHolder method\)](#)  
[to\\_bytes\(\) \(in module SCons.Util\)](#)  
[to\\_str\(\) \(in module SCons.Util\)](#)  
[to\\_String\(\) \(in module SCons.Util\)](#)  
[to\\_String\\_for\\_signature\(\) \(in module SCons.Util\)](#)

[to\\_String\\_for\\_subst\(\) \(in module SCons.Util\)](#)  
[Tool \(class in SCons.Tool\)](#)  
[Tool\(\) \(SCons.Environment.Base method\)](#)  
     [\(SCons.Environment.OverrideEnvironment method\)](#)  
     [\(SCons.Script.SConscript.SConsEnvironment method\)](#)  
[tool\\_list\(\) \(in module SCons.Tool\)](#)  
[ToolInitializer \(class in SCons.Tool\)](#)  
[ToolInitializerMethod \(class in SCons.Tool\)](#)  
[ToolQtDeprecatedWarning](#)  
[touch\\_func\(\) \(in module SCons.Defaults\)](#)  
[Trace\(\) \(in module SCons.Debug\)](#)  
[trace\\_message\(\) \(SCons.SConf.SConfBuildTask method\)](#)  
     [\(SCons.Script.Main.BuildTask method\)](#)  
     [\(SCons.Script.Main.CleanTask method\)](#)  
     [\(SCons.Script.Main.QuestionTask method\)](#)  
     [\(SCons.Taskmaster.AlwaysTask method\)](#)  
     [\(SCons.Taskmaster.OutOfDateTask method\)](#)  
     [\(SCons.Taskmaster.Task method\)](#)  
     [\(SCons.Taskmaster.Taskmaster method\)](#)  
[trace\\_node\(\) \(SCons.Taskmaster.Taskmaster method\)](#)  
[translate\(\) \(SCons.Subst.CmdStringHolder method\)](#)  
[TreePrinter \(class in SCons.Script.Main\)](#)  
[TryAction\(\) \(SCons.SConf.CheckContext method\)](#)  
     [\(SCons.SConf.SConfBase method\)](#)  
[TryBuild\(\) \(SCons.SConf.CheckContext method\)](#)  
     [\(SCons.SConf.SConfBase method\)](#)  
[TryCompile\(\) \(SCons.SConf.CheckContext method\)](#)  
     [\(SCons.SConf.SConfBase method\)](#)  
[TryLink\(\) \(SCons.SConf.CheckContext method\)](#)  
     [\(SCons.SConf.SConfBase method\)](#)  
[TryRun\(\) \(SCons.SConf.CheckContext method\)](#)  
     [\(SCons.SConf.SConfBase method\)](#)  
[TSList \(class in SCons.Executor\)](#)  
[TSObject \(class in SCons.Executor\)](#)  
[tupleize\(\) \(SCons.cpp.DumbPreProcessor method\)](#)  
     [\(SCons.cpp.PreProcessor method\)](#)  
     [\(SCons.Scanner.C.SConsCPPConditionalScanner method\)](#)

(SCons.Scanner.C.SConsCPPScanner method)  
two\_arg\_commands (SCons.Scanner.LaTeX.LaTeX attribute)

TYPE\_CHECKER  
(SCons.Script.SConsOptions.SConsOption attribute)

TYPED\_ACTIONS  
(SCons.Script.SConsOptions.SConsOption attribute)

TYPES (SCons.Script.SConsOptions.SConsOption attribute)

## U

Unbuffered (class in SCons.Util)

undoc\_header  
(SCons.Script.Interactive.SConsInteractiveCmd attribute)

unique() (in module SCons.Util)

UniqueList (class in SCons.Util)

uniquer() (in module SCons.Util)

uniquer\_hashables() (in module SCons.Util)

UnknownVariables() (SCons.Variables.Variables method)

unlink() (SCons.Node.FS.FS method)

(SCons.Node.FS.LocalFS method)

UnlinkFunc() (in module SCons.Node.FS)

up() (SCons.Node.FS.Dir method)

(SCons.Node.FS.RootDir method)

update() (SCons.Builder.CallableSelector method)

(SCons.Builder.DictCmdGenerator method)

(SCons.Builder.DictEmitter method)

(SCons.Builder.OverrideWarner method)

(SCons.Environment.BuilderDict method)

(SCons.Node.Alias.AliasNameSpace method)

(SCons.Node.Alias.AliasNodeInfo method)

(SCons.Node.FS.DirNodeInfo method)

(SCons.Node.FS.FileNodeInfo method)

(SCons.Node.NodeInfoBase method)

(SCons.Node.Python.ValueNodeInfo method)

(SCons.Util.Selector method)

Update() (SCons.Variables.Variables method)

updrive() (in module SCons.Util)

upper() (SCons.Subst.CmdStringHolder method)

use\_rawinput  
(SCons.Script.Interactive.SConsInteractiveCmd attribute)

UserError

## V

validate\_CacheDir\_class() (SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)

(SCons.Script.SConsScript.SConsEnvironment method)

Value (class in SCons.Node.Python)

Value() (SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)

(SCons.Script.SConsScript.SConsEnvironment method)

Value.Attrs (class in SCons.Node.Python)

ValueBuildInfo (class in SCons.Node.Python)

ValueNodeInfo (class in SCons.Node.Python)

values (SCons.Script.Main.FakeOptionParser attribute)

values() (SCons.Builder.CallableSelector method)

(SCons.Builder.DictCmdGenerator method)

(SCons.Builder.DictEmitter method)

(SCons.Builder.OverrideWarner method)

(SCons.Environment.Base method)

(SCons.Environment.BuilderDict method)

(SCons.Environment.OverrideEnvironment method)

(SCons.Environment.SubstitutionEnvironment method)

(SCons.Node.Alias.AliasNameSpace method)

(SCons.Script.SConsScript.SConsEnvironment method)

(SCons.Util.Selector method)

ValueWithMemo() (in module SCons.Node.Python)

Variable\_Method\_Caller (class in SCons.Defaults)

Variables (class in SCons.Variables)

Variables() (in module SCons.Script)

variant\_dir\_target\_climb() (SCons.Node.FS.FS method)

variant\_dirs (SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)

(SCons.Node.FS.File attribute)

(SCons.Node.FS.RootDir attribute)

VariantDir() (SCons.Environment.Base method)  
(SCons.Environment.OverrideEnvironment method)  
(SCons.Node.FS.FS method)  
(SCons.Script.SConscript.SConsEnvironment method)

version\_string() (in module SCons.Script.Main)

Virtualenv() (in module SCons.Platform.virtualenv)

visited() (SCons.Node.Alias.Alias method)

(SCons.Node.FS.Base method)

(SCons.Node.FS.Dir method)

(SCons.Node.FS.Entry method)

(SCons.Node.FS.File method)

(SCons.Node.FS.RootDir method)

(SCons.Node.Node method)

(SCons.Node.Python.Value method)

VisualCMissingWarning

VisualStudioMissingWarning

VisualVersionMismatch

## W

wait\_for\_process\_to\_die() (in module SCons.Util)

waiting\_parents (SCons.Node.Alias.Alias attribute)

(SCons.Node.FS.Base attribute)

(SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)

(SCons.Node.FS.File attribute)

(SCons.Node.FS.RootDir attribute)

(SCons.Node.Node attribute)

(SCons.Node.Python.Value attribute)

waiting\_s\_e (SCons.Node.Alias.Alias attribute)

(SCons.Node.FS.Base attribute)

(SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)

(SCons.Node.FS.File attribute)

(SCons.Node.FS.RootDir attribute)

(SCons.Node.Node attribute)

(SCons.Node.Python.Value attribute)

walk() (SCons.Node.FS.Dir method)

(SCons.Node.FS.RootDir method)

Walker (class in SCons.Node)

warn() (in module SCons.Warnings)

(SCons.Builder.OverrideWarner method)

warningAsException() (in module SCons.Warnings)

WarningOnByDefault

were\_interrupted() (SCons.Job.Jobs method)

WhereIs() (in module SCons.Util)

(SCons.Environment.Base method)

(SCons.Environment.OverrideEnvironment method)

(SCons.Script.SConscript.SConsEnvironment method)

will\_not\_build() (SCons.Taskmaster.Taskmaster method)

with\_traceback() (SCons.Errors.BuildError method)

(SCons.Errors.ExplicitExit method)

(SCons.Errors.InternalError method)

(SCons.Errors.MSVCErrors method)

(SCons.Errors.SConsEnvironmentError method)

(SCons.Errors.StopError method)

(SCons.Errors.UserError method)

(SCons.Node.FS.EntryProxyAttributeError method)

(SCons.Node.FS.FileBuildInfoFileToCsigMappingError method)

(SCons.SConf.ConfigureCacheError method)

(SCons.SConf.ConfigureDryRunError method)

(SCons.SConf.SConfError method)

(SCons.SConf.SConfWarning method)

(SCons.Script.Main.SConsPrintHelpException method)

(SCons.Script.SConscript.SConscriptReturn method)

(SCons.Util.\_NoError method)

(SCons.Warnings.CacheVersionWarning method)

(SCons.Warnings.CacheWriteErrorWarning method)

(SCons.Warnings.CorruptSConsignWarning method)

(SCons.Warnings.DependencyWarning method)

(SCons.Warnings.DeprecatedDebugOptionsWarning method)

(SCons.Warnings.DeprecatedMissingSConscriptWarning method)

(SCons.Warnings.DeprecatedOptionsWarning method)

(SCons.Warnings.DeprecatedSourceCodeWarning method)

(SCons.Warnings.DeprecatedWarning method)

(SCons.Warnings.DevelopmentVersionWarning method)  
(SCons.Warnings.DuplicateEnvironmentWarning method)  
(SCons.Warnings.FortranCxxMixWarning method)  
(SCons.Warnings.FutureDeprecatedWarning method)  
(SCons.Warnings.FutureReservedVariableWarning method)  
(SCons.Warnings.LinkWarning method)  
(SCons.Warnings.MandatoryDeprecatedWarning method)  
(SCons.Warnings.MisleadingKeywordsWarning method)  
(SCons.Warnings.MissingSConscriptWarning method)  
(SCons.Warnings.NoObjectCountWarning method)  
(SCons.Warnings.NoParallelSupportWarning method)  
(SCons.Warnings.PythonVersionWarning method)  
(SCons.Warnings.ReservedVariableWarning method)  
(SCons.Warnings.SConsWarning method)  
(SCons.Warnings.StackSizeWarning method)  
(SCons.Warnings.TargetNotBuiltWarning method)  
(SCons.Warnings.TaskmasterNeedsExecuteWarning method)  
(SCons.Warnings.ToolQtDeprecatedWarning method)  
(SCons.Warnings.VisualCMissingWarning method)  
(SCons.Warnings.VisualStudioMissingWarning method)  
(SCons.Warnings.VisualStudioVersionMismatch method)  
(SCons.Warnings.WarningOnByDefault method)

wkids (SCons.Node.Alias.Alias attribute)

(SCons.Node.FS.Base attribute)

(SCons.Node.FS.Dir attribute)

(SCons.Node.FS.Entry attribute)

(SCons.Node.FS.File attribute)

(SCons.Node.FS.RootDir attribute)

(SCons.Node.Node attribute)

(SCons.Node.Python.Value attribute)

Worker (class in SCons.Job)

write() (in module SCons.SConsign)

(SCons.Node.Python.Value method)

(SCons.SConf.Streamer method)

(SCons.SConsign.DB method)

(SCons.SConsign.DirFile method)

(SCons.Script.Main.Progressor method)

(SCons.Util.Unbuffered method)

writelines() (SCons.SConf.Streamer method)

(SCons.Util.Unbuffered method)

## Z

zfill() (SCons.Subst.CmdStringHolder method)

# Python Module Index

s

[SCons](#)

[SCons.Action](#)

[SCons.Builder](#)

[SCons.CacheDir](#)

[SCons.compat](#)

[SCons.Conftest](#)

[SCons.cpp](#)

[SCons.dblite](#)

[SCons.Debug](#)

[SCons.Defaults](#)

[SCons.Environment](#)

[SCons.Errors](#)

[SCons.Executor](#)

[SCons.exitfuncs](#)

[SCons.Job](#)

[SCons.Memoize](#)

[SCons.Node](#)

[SCons.Node.Alias](#)

[SCons.Node.FS](#)

[SCons.Node.Python](#)

[SCons.PathList](#)

[SCons.Platform](#)

[SCons.Platform.aix](#)

[SCons.Platform.cygwin](#)

[SCons.Platform.darwin](#)

[SCons.Platform.hpux](#)

[SCons.Platform.irix](#)

[SCons.Platform.mingw](#)

[SCons.Platform.os2](#)

[SCons.Platform.posix](#)

[SCons.Platform.sunos](#)

[SCons.Platform.virtualenv](#)

[SCons.Platform.win32](#)

[SCons.Scanner](#)

[SCons.Scanner.C](#)

[SCons.Scanner.D](#)

[SCons.Scanner.Dir](#)

[SCons.Scanner.Fortran](#)

[SCons.Scanner.IDL](#)

[SCons.Scanner.LaTeX](#)

[SCons.Scanner.Prog](#)

[SCons.Scanner.RC](#)

[SCons.Scanner.SWIG](#)

[SCons.SConf](#)

[SCons.SConsign](#)

[SCons.Script](#)

[SCons.Script.Interactive](#)

[SCons.Script.Main](#)

[SCons.Script.SConscript](#)

[SCons.Script.SConsOptions](#)

[SCons.Subst](#)

[SCons.Taskmaster](#)

[SCons.Tool](#)

[SCons.Util](#)

[SCons.Variables](#)

[SCons.Variables.BoolVariable](#)

[SCons.Variables.EnumVariable](#)

[SCons.Variables.ListVariable](#)

[SCons.Variables.PackageVariable](#)

[SCons.Variables.PathVariable](#)

[SCons.Warnings](#)