



Linux Ubuntu 26.04 Manual Pages on command 'python3.12.1'

\$ man python3.12.1

PYTHON(1) General Commands Manual PYTHON(1)

NAME

python - an interpreted, interactive, object-oriented programming language

SYNOPSIS

```
python [ -B ] [ -b ] [ -d ] [ -E ] [ -h ] [ -i ] [ -l ]
      [ -m module-name ] [ -q ] [ -O ] [ -OO ] [ -P ] [ -s ] [ -S ] [ -u ]
      [ -v ] [ -V ] [ -W argument ] [ -x ] [ -X option ] [ -? ]
      [ --check-hash-based-pycs default | always | never ]
      [ --help ] [ --help-env ] [ --help-xoptions ] [ --help-all ]
      [ -c command | script | - ] [ arguments ]
```

DESCRIPTION

Python is an interpreted, interactive, object-oriented programming language that combines remarkable power with very clear syntax. For an introduction to programming in Python, see the Python Tutorial. The Python Library Reference documents built-in and standard types, constants, functions and modules. Finally, the Python Reference Manual describes the syntax and semantics of the core language in (perhaps too) much detail. (These documents may be located via the INTERNET RESOURCES below; they may be installed on your system as well.) Python's basic power can be extended with your own modules written in C or C++. On most systems such modules may be dynamically loaded. Python is also adaptable as an extension language for existing applications. See the internal documentation for hints.

Documentation for installed Python modules and packages can be viewed by running the pydoc program.

COMMAND LINE OPTIONS

- B Don't write .pyc files on import. See also PYTHONDONTWRITEBYTECODE.
- b Issue warnings about str(bytes_instance), str(bytearray_instance) and comparing bytes/bytearray with str. (-bb: issue errors)
- c command
Specify the command to execute (see next section). This terminates the option list (following options are passed as arguments to the command).
- check-hash-based-pycs mode
Configure how Python evaluates the up-to-dateness of hash-based .pyc files.
- d Turn on parser debugging output (for expert only, depending on compilation options).
- E Ignore environment variables like PYTHONPATH and PYTHONHOME that modify the behavior of the interpreter.
- h , -? , --help
Prints the usage for the interpreter executable and exits.
- help-env
Prints help about Python-specific environment variables and exits.
- help-xoptions
Prints help about implementation-specific -X options and exits.
- help-all
Prints complete usage information and exits.
- i When a script is passed as first argument or the -c option is used, enter interactive mode after executing the script or the command. It does not read the \$PYTHONSTARTUP file. This can be useful to inspect global variables or a stack trace when a script raises an exception.
- I Run Python in isolated mode. This also implies -E, -P and -s. In isolated mode sys.path contains neither the script's directory nor the user's site-packages directory. All PYTHON* environment variables are ignored, too. Further restrictions may be imposed to prevent the user from injecting malicious code.
- m module-name
Searches sys.path for the named module and runs the corresponding .py file as a script. This terminates the option list (following options are passed as arguments to the module).
- O Remove assert statements and any code conditional on the value of __debug__; augment the filename for compiled (bytecode) files by adding .opt-1 before the .pyc extension?

sion.

- OO Do -O and also discard docstrings; change the filename for compiled (bytecode) files by adding .opt-2 before the .pyc extension.
- P Don't automatically prepend a potentially unsafe path to sys.path such as the current directory, the script's directory or an empty string. See also the PYTHONSAFEPATH environment variable.
- q Do not print the version and copyright messages. These messages are also suppressed in non-interactive mode.
- s Don't add user site directory to sys.path.
- S Disable the import of the module site and the site-dependent manipulations of sys.path that it entails. Also disable these manipulations if site is explicitly imported later.
- u Force the stdout and stderr streams to be unbuffered. This option has no effect on the stdin stream.
- v Print a message each time a module is initialized, showing the place (filename or built-in module) from which it is loaded. When given twice, print a message for each file that is checked for when searching for a module. Also provides information on module cleanup at exit.
- V, --version
Prints the Python version number of the executable and exits. When given twice, print more information about the build.
- W argument
Warning control. Python's warning machinery by default prints warning messages to sys.stderr.
The simplest settings apply a particular action unconditionally to all warnings emitted by a process (even those that are otherwise ignored by default):
 - Wdefault # Warn once per call location
 - Werror # Convert to exceptions
 - Walways # Warn every time
 - Wall # Same as -Walways
 - Wmodule # Warn once per calling module
 - Wonce # Warn once per Python process
 - Wignore # Never warn

The action names can be abbreviated as desired and the interpreter will resolve them to the appropriate action name. For example, -Wi is the same as -Wignore .

The full form of argument is: action:message:category:module:lineno

Empty fields match all values; trailing empty fields may be omitted. For example -W ignore::DeprecationWarning ignores all DeprecationWarning warnings.

The action field is as explained above but only applies to warnings that match the remaining fields.

The message field must match the whole printed warning message; this match is case-insensitive.

The category field matches the warning category (ex: "DeprecationWarning"). This must be a class name; the match test whether the actual warning category of the message is a subclass of the specified warning category.

The module field matches the (fully-qualified) module name; this match is case-sensitive.

The lineno field matches the line number, where zero matches all line numbers and is thus equivalent to an omitted line number.

Multiple -W options can be given; when a warning matches more than one option, the action for the last matching option is performed. Invalid -W options are ignored (though, a warning message is printed about invalid options when the first warning is issued).

Warnings can also be controlled using the PYTHONWARNINGS environment variable and from within a Python program using the warnings module. For example, the warnings.filterwarnings() function can be used to use a regular expression on the warning message.

-X option

Set implementation-specific option. The following options are available:

- X faulthandler: enable faulthandler
- X showrefcount: output the total reference count and number of used memory blocks when the program finishes or after each statement in the interactive interpreter. This only works on debug builds
- X tracemalloc: start tracing Python memory allocations using the tracemalloc module. By default, only the most recent frame is stored in a traceback of a trace. Use -X tracemalloc=NFRAME to start tracing with a

traceback limit of NFRAME frames

-X importtime: show how long each import takes. It shows module name, cumulative time (including nested imports) and self time (excluding nested imports). Note that its output may be broken in multi-threaded application. Typical usage is `python3 -X importtime -c 'import asyncio'`

-X dev: enable CPython's "development mode", introducing additional runtime checks which are too expensive to be enabled by default. It will not be more verbose than the default if the code is correct: new warnings are only emitted when an issue is detected. Effect of the developer mode:

- * Add default warning filter, as -W default

- * Install debug hooks on memory allocators: see the `PyMem_SetupDe?`

`bugHooks()`

C function

- * Enable the fault handler module to dump the Python traceback on a crash

- * Enable asyncio debug mode

- * Set the `dev_mode` attribute of `sys.flags` to `True`

- * `io.IOBase` destructor logs `close()` exceptions

-X utf8: enable UTF-8 mode for operating system interfaces, overriding the de?

fault

locale-aware mode. -X utf8=0 explicitly disables UTF-8 mode (even when it would

otherwise activate automatically). See PYTHONUTF8 for more details

-X pycache_prefix=PATH: enable writing .pyc files to a parallel tree rooted at the

given directory instead of to the code tree.

-X warn_default_encoding: enable opt-in `EncodingWarning` for 'encoding=None'

-X no_debug_ranges: disable the inclusion of the tables mapping extra location information (end line, start column offset and end column offset) to every instruction in code objects. This is useful when smaller code objects and pyc files are desired as well as suppressing the extra visual location indicators when the interpreter displays tracebacks.

-X frozen_modules=[on|off]: whether or not frozen modules should be used.

The default is "on" (or "off" if you are running a local build).

-X int_max_str_digits=number: limit the size of int<->str conversions.

This helps avoid denial of service attacks when parsing untrusted data.

The default is sys.int_info.default_max_str_digits. 0 disables.

-x Skip the first line of the source. This is intended for a DOS specific hack only.

Warning: the line numbers in error messages will be off by one!

INTERPRETER INTERFACE

The interpreter interface resembles that of the UNIX shell: when called with standard input connected to a tty device, it prompts for commands and executes them until an EOF is read; when called with a file name argument or with a file as standard input, it reads and executes a script from that file; when called with -c command, it executes the Python statement(s) given as command. Here command may contain multiple statements separated by new lines. Leading whitespace is significant in Python statements! In non-interactive mode, the entire input is parsed before it is executed.

If available, the script name and additional arguments thereafter are passed to the script in the Python variable sys.argv, which is a list of strings (you must first import sys to be able to access it). If no script name is given, sys.argv[0] is an empty string; if -c is used, sys.argv[0] contains the string '-c'. Note that options interpreted by the Python interpreter itself are not placed in sys.argv.

In interactive mode, the primary prompt is '>>>'; the second prompt (which appears when a command is not complete) is '...'. The prompts can be changed by assignment to sys.ps1 or sys.ps2. The interpreter quits when it reads an EOF at a prompt. When an unhandled exception occurs, a stack trace is printed and control returns to the primary prompt; in non-interactive mode, the interpreter exits after printing the stack trace. The interrupt signal raises the KeyboardInterrupt exception; other UNIX signals are not caught (except that SIGPIPE is sometimes ignored, in favor of the IOError exception). Error messages are written to stderr.

FILES AND DIRECTORIES

These are subject to difference depending on local installation conventions; \${prefix} and \${exec_prefix} are installation-dependent and should be interpreted as for GNU software; they may be the same. On Debian GNU/{Hurd, Linux} the default for both is /usr.

\${exec_prefix}/bin/python

Recommended location of the interpreter.

\${prefix}/lib/python<version>

`${exec_prefix}/lib/python<version>`

Recommended locations of the directories containing the standard modules.

`${prefix}/include/python<version>`

`${exec_prefix}/include/python<version>`

Recommended locations of the directories containing the include files needed for developing Python extensions and embedding the interpreter.

ENVIRONMENT VARIABLES

PYTHONSAFEPATH

If this is set to a non-empty string, don't automatically prepend a potentially unsafe path to `sys.path` such as the current directory, the script's directory or an empty string. See also the `-P` option.

PYTHONHOME

Change the location of the standard Python libraries. By default, the libraries are searched in `${prefix}/lib/python<version>` and `${exec_prefix}/lib/python<version>`, where `${prefix}` and `${exec_prefix}` are installation-dependent directories, both defaulting to `/usr/local`. When `$PYTHONHOME` is set to a single directory, its value replaces both `${prefix}` and `${exec_prefix}`. To specify different values for these, set `$PYTHONHOME` to `${prefix}:${exec_prefix}`.

PYTHONPATH

Augments the default search path for module files. The format is the same as the shell's `$PATH`: one or more directory pathnames separated by colons. Non-existent directories are silently ignored. The default search path is installation dependent, but generally begins with `${prefix}/lib/python<version>` (see `PYTHONHOME` above). The default search path is always appended to `$PYTHONPATH`. If a script argument is given, the directory containing the script is inserted in the path in front of `$PYTHONPATH`. The search path can be manipulated from within a Python program as the variable `sys.path`.

PYTHONPLATLIBDIR

Override `sys.platlibdir`.

PYTHONSTARTUP

If this is the name of a readable file, the Python commands in that file are executed before the first prompt is displayed in interactive mode. The file is executed in the same name space where interactive commands are executed so that objects defined

or imported in it can be used without qualification in the interactive session. You can also change the prompts `sys.ps1` and `sys.ps2` in this file.

PYTHONOPTIMIZE

If this is set to a non-empty string it is equivalent to specifying the `-O` option. If set to an integer, it is equivalent to specifying `-O` multiple times.

PYTHONDEBUG

If this is set to a non-empty string it is equivalent to specifying the `-d` option. If set to an integer, it is equivalent to specifying `-d` multiple times.

PYTHONDONTWRITEBYTECODE

If this is set to a non-empty string it is equivalent to specifying the `-B` option (don't try to write `.pyc` files).

PYTHONINSPECT

If this is set to a non-empty string it is equivalent to specifying the `-i` option.

PYTHONIOENCODING

If this is set before running the interpreter, it overrides the encoding used for `stdin/stdout/stderr`, in the syntax `encodingname:errorhandler`. The `errorhandler` part is optional and has the same meaning as in `str.encode`. For `stderr`, the `errorhandler` part is ignored; the handler will always be `'backslashreplace'`.

PYTHONNOUSERSITE

If this is set to a non-empty string it is equivalent to specifying the `-s` option (Don't add the user site directory to `sys.path`).

PYTHONUNBUFFERED

If this is set to a non-empty string it is equivalent to specifying the `-u` option.

PYTHONVERBOSE

If this is set to a non-empty string it is equivalent to specifying the `-v` option. If set to an integer, it is equivalent to specifying `-v` multiple times.

PYTHONWARNINGS

If this is set to a comma-separated string it is equivalent to specifying the `-W op?` option for each separate value.

PYTHONHASHSEED

If this variable is set to `"random"`, a random value is used to seed the hashes of `str` and `bytes` objects.

If `PYTHONHASHSEED` is set to an integer value, it is used as a fixed seed for generat?

ing the hash() of the types covered by the hash randomization. Its purpose is to allow low repeatable hashing, such as for selftests for the interpreter itself, or to allow a cluster of python processes to share hash values.

The integer must be a decimal number in the range [0,4294967295]. Specifying the value 0 will disable hash randomization.

PYTHONINTMAXSTRDIGITS

Limit the maximum digit characters in an int value when converting from a string and when converting an int back to a str. A value of 0 disables the limit. Conversions to or from bases 2, 4, 8, 16, and 32 are never limited.

PYTHONMALLOC

Set the Python memory allocators and/or install debug hooks. The available memory allocators are malloc and pymalloc. The available debug hooks are debug, malloc_debug, and pymalloc_debug.

When Python is compiled in debug mode, the default is pymalloc_debug and the debug hooks are automatically used. Otherwise, the default is pymalloc.

PYTHONMALLOCSTATS

If set to a non-empty string, Python will print statistics of the pymalloc memory allocator every time a new pymalloc object arena is created, and on shutdown.

This variable is ignored if the \$PYTHONMALLOC environment variable is used to force the malloc(3) allocator of the C library, or if Python is configured without pymalloc support.

PYTHONASYNCIODEBUG

If this environment variable is set to a non-empty string, enable the debug mode of the asyncio module.

PYTHONTRACEMALLOC

If this environment variable is set to a non-empty string, start tracing Python memory allocations using the tracemalloc module.

The value of the variable is the maximum number of frames stored in a traceback of a trace. For example, PYTHONTRACEMALLOC=1 stores only the most recent frame.

PYTHONFAULTHANDLER

If this environment variable is set to a non-empty string, faulthandler.enable() is called at startup: install a handler for SIGSEGV, SIGFPE, SIGABRT, SIGBUS and SIGILL signals to dump the Python traceback.

This is equivalent to the -X faulthandler option.

PYTHONEXECUTABLE

If this environment variable is set, `sys.argv[0]` will be set to its value instead of the value got through the C runtime. Only works on Mac OS X.

PYTHONUSERBASE

Defines the user base directory, which is used to compute the path of the user site-packages directory and installation paths for `python -m pip install --user`.

PYTHONPROFILEIMPORTTIME

If this environment variable is set to a non-empty string, Python will show how long each import takes. This is exactly equivalent to setting -X importtime on the command line.

PYTHONBREAKPOINT

If this environment variable is set to 0, it disables the default debugger. It can be set to the callable of your debugger of choice.

Debug-mode variables

Setting these variables only has an effect in a debug build of Python, that is, if Python was configured with the `--with-pydebug` build option.

PYTHONDUMPREFS

If this environment variable is set, Python will dump objects and reference counts still alive after shutting down the interpreter.

AUTHOR

The Python Software Foundation: <https://www.python.org/psf/>

INTERNET RESOURCES

Main website: <https://www.python.org/>

Documentation: <https://docs.python.org/>

Developer resources: <https://devguide.python.org/>

Downloads: <https://www.python.org/downloads/>

Module repository: <https://pypi.org/>

Newsgroups: `comp.lang.python`, `comp.lang.python.announce`

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