you want Pdb not to touch the SIGINT handler, set *nosigint* to true.

The *readrc* argument defaults to true and controls whether Pdb will load .pdbrc files from the filesystem.

Example call to enable tracing with *skip*:

```
import pdb; pdb.Pdb(skip=['django.*']).set_trace()
```

New in version 3.1: The *skip* argument.

New in version 3.2: The *nosigint* argument. Previously, a SIGINT handler was never set by Pdb.

Changed in version 3.6: The *readrc* argument.

run(*statement*, *globals=None*, *locals=None*)
runeval(*expression*, *globals=None*, *locals=None*)
runcall(*function*, **args*, ***kwds*)
set_trace()
See the documentation for the functions explained above.

28.3.1 Debugger Commands

The commands recognized by the debugger are listed below. Most commands can be abbreviated to one or two letters as indicated; e.g. `h(elp)` means that either `h` or `help` can be used to enter the help command (but not `he` or `hel`, nor `H` or `Help` or `HELP`). Arguments to commands must be separated by whitespace (spaces or tabs). Optional arguments are enclosed in square brackets (`[]`) in the command syntax; the square brackets must not be typed. Alternatives in the command syntax are separated by a vertical bar (`|`).

Entering a blank line repeats the last command entered. Exception: if the last command was a *list* command, the next 11 lines are listed.

Commands that the debugger doesn't recognize are assumed to be Python statements and are executed in the context of the program being debugged. Python statements can also be prefixed with an exclamation point (`!`). This is a powerful way to inspect the program being debugged; it is even possible to change a variable or call a function. When an exception occurs in such a statement, the exception name is printed but the debugger's state is not changed.

The debugger supports *aliases*. Aliases can have parameters which allows one a certain level of adaptability to the context under examination.

Multiple commands may be entered on a single line, separated by `;;`. (A single `;` is not used as it is the separator for multiple commands in a line that is passed to the Python parser.) No intelligence is applied to separating the commands; the input is split at the first `;;` pair, even if it is in the middle of a quoted string.

If a file `.pdbrc` exists in the user's home directory or in the current directory, it is read in and executed as if it had been typed at the debugger prompt. This is particularly useful for aliases. If both files exist, the one in the home directory is read first and aliases defined there can be overridden by the local file.

Changed in version 3.2: `.pdbrc` can now contain commands that continue debugging, such as *continue* or *next*. Previously, these commands had no effect.

h(elp) `[command]`
Without argument, print the list of available commands. With a *command* as argument, print help about that command. `help pdb` displays the full documentation (the docstring of the *pdb* module). Since the *command* argument must be an identifier, `help exec` must be entered to get help on the `!` command.

w(here)
Print a stack trace, with the most recent frame at the bottom. An arrow indicates the current frame, which determines the context of most commands.

d(own) [count]
Move the current frame *count* (default one) levels down in the stack trace (to a newer frame).

u(p) [count]
Move the current frame *count* (default one) levels up in the stack trace (to an older frame).

b(reak) [([filename:]lineno | function) [, condition]]
With a *lineno* argument, set a break there in the current file. With a *function* argument, set a break at the first executable statement within that function. The line number may be prefixed with a filename and a colon, to specify a breakpoint in another file (probably one that hasn't been loaded yet). The file is searched on *sys.path*. Note that each breakpoint is assigned a number to which all the other breakpoint commands refer.

If a second argument is present, it is an expression which must evaluate to true before the breakpoint is honored.

Without argument, list all breaks, including for each breakpoint, the number of times that breakpoint has been hit, the current ignore count, and the associated condition if any.

tbreak [([filename:]lineno | function) [, condition]]
Temporary breakpoint, which is removed automatically when it is first hit. The arguments are the same as for *break*.

cl(ear) [filename:lineno | bpnumber [bpnumber ...]]
With a *filename:lineno* argument, clear all the breakpoints at this line. With a space separated list of breakpoint numbers, clear those breakpoints. Without argument, clear all breaks (but first ask confirmation).

disable [bpnumber [bpnumber ...]]
Disable the breakpoints given as a space separated list of breakpoint numbers. Disabling a breakpoint means it cannot cause the program to stop execution, but unlike clearing a breakpoint, it remains in the list of breakpoints and can be (re-)enabled.

enable [bpnumber [bpnumber ...]]
Enable the breakpoints specified.

ignore bpnumber [count]
Set the ignore count for the given breakpoint number. If count is omitted, the ignore count is set to 0. A breakpoint becomes active when the ignore count is zero. When non-zero, the count is decremented each time the breakpoint is reached and the breakpoint is not disabled and any associated condition evaluates to true.

condition bpnumber [condition]
Set a new *condition* for the breakpoint, an expression which must evaluate to true before the breakpoint is honored. If *condition* is absent, any existing condition is removed; i.e., the breakpoint is made unconditional.

commands [bpnumber]
Specify a list of commands for breakpoint number *bpnumber*. The commands themselves appear on the following lines. Type a line containing just `end` to terminate the commands. An example:

```
(Pdb) commands 1
(com) p some_variable
(com) end
(Pdb)
```

To remove all commands from a breakpoint, type `commands` and follow it immediately with `end`; that is, give no commands.

With no *bpnumber* argument, `commands` refers to the last breakpoint set.

You can use breakpoint commands to start your program up again. Simply use the *continue* command, or *step*, or any other command that resumes execution.

Specifying any command resuming execution (currently *continue*, *step*, *next*, *return*, *jump*, *quit* and their abbreviations) terminates the command list (as if that command was immediately followed by end). This is

because any time you resume execution (even with a simple next or step), you may encounter another breakpoint—which could have its own command list, leading to ambiguities about which list to execute.

If you use the 'silent' command in the command list, the usual message about stopping at a breakpoint is not printed. This may be desirable for breakpoints that are to print a specific message and then continue. If none of the other commands print anything, you see no sign that the breakpoint was reached.

s(tep)
Execute the current line, stop at the first possible occasion (either in a function that is called or on the next line in the current function).

n(ext)
Continue execution until the next line in the current function is reached or it returns. (The difference between *next* and *step* is that *step* stops inside a called function, while *next* executes called functions at (nearly) full speed, only stopping at the next line in the current function.)

unt(il) [lineno]
Without argument, continue execution until the line with a number greater than the current one is reached.

With a line number, continue execution until a line with a number greater or equal to that is reached. In both cases, also stop when the current frame returns.

Changed in version 3.2: Allow giving an explicit line number.

r(eturn)
Continue execution until the current function returns.

c(ont(inue))
Continue execution, only stop when a breakpoint is encountered.

j(ump) lineno
Set the next line that will be executed. Only available in the bottom-most frame. This lets you jump back and execute code again, or jump forward to skip code that you don't want to run.

It should be noted that not all jumps are allowed – for instance it is not possible to jump into the middle of a `for` loop or out of a `finally` clause.

l(ist) [first[, last]]
List source code for the current file. Without arguments, list 11 lines around the current line or continue the previous listing. With `.` as argument, list 11 lines around the current line. With one argument, list 11 lines around at that line. With two arguments, list the given range; if the second argument is less than the first, it is interpreted as a count.

The current line in the current frame is indicated by `->`. If an exception is being debugged, the line where the exception was originally raised or propagated is indicated by `>>`, if it differs from the current line.

New in version 3.2: The >> marker.

ll | longlist
List all source code for the current function or frame. Interesting lines are marked as for *list*.

New in version 3.2.

a(rgs)
Print the argument list of the current function.

p expression
Evaluate the *expression* in the current context and print its value.

Note: `print()` can also be used, but is not a debugger command — this executes the Python *print()* function.

pp expression
Like the *p* command, except the value of the expression is pretty-printed using the *pprint* module.

whatis expression
Print the type of the *expression*.

source expression
Try to get source code for the given object and display it.

New in version 3.2.

display [expression]
Display the value of the expression if it changed, each time execution stops in the current frame.

Without expression, list all display expressions for the current frame.

New in version 3.2.

undisplay [expression]
Do not display the expression any more in the current frame. Without expression, clear all display expressions for the current frame.

New in version 3.2.

interact
Start an interactive interpreter (using the *code* module) whose global namespace contains all the (global and local) names found in the current scope.

New in version 3.2.

alias [name [command]]
Create an alias called *name* that executes *command*. The command must *not* be enclosed in quotes. Replaceable parameters can be indicated by `%1`, `%2`, and so on, while `%*` is replaced by all the parameters. If no command is given, the current alias for *name* is shown. If no arguments are given, all aliases are listed.

Aliases may be nested and can contain anything that can be legally typed at the pdb prompt. Note that internal pdb commands *can* be overridden by aliases. Such a command is then hidden until the alias is removed. Aliasing is recursively applied to the first word of the command line; all other words in the line are left alone.

As an example, here are two useful aliases (especially when placed in the `.pdbrc` file):

```
# Print instance variables (usage "pi classInst")
alias pi for k in %1.__dict__.keys(): print("%1.",k,"=",%1.__dict__[k])
# Print instance variables in self
alias ps pi self
```

unalias name
Delete the specified alias.

! statement
Execute the (one-line) *statement* in the context of the current stack frame. The exclamation point can be omitted unless the first word of the statement resembles a debugger command. To set a global variable, you can prefix the assignment command with a `global` statement on the same line, e.g.:

```
(Pdb) global list_options; list_options = ['-l']
(Pdb)
```

run [args ...]
restart [args ...]
Restart the debugged Python program. If an argument is supplied, it is split with *shlex* and the result is used as the new *sys.argv*. History, breakpoints, actions and debugger options are preserved. *restart* is an alias for *run*.

q(uit)
Quit from the debugger. The program being executed is aborted.

debug code
Enter a recursive debugger that steps through the code argument (which is an arbitrary expression or statement to be executed in the current environment).

retval
Print the return value for the last return of a function.

28.4 The Python Profilers

Source code: Lib/profile.py and Lib/pstats.py

28.4.1 Introduction to the profilers

cProfile and *profile* provide *deterministic profiling* of Python programs. A *profile* is a set of statistics that describes how often and for how long various parts of the program executed. These statistics can be formatted into reports via the *pstats* module.

The Python standard library provides two different implementations of the same profiling interface:

1. *cProfile* is recommended for most users; it's a C extension with reasonable overhead that makes it suitable for profiling long-running programs. Based on lsprof, contributed by Brett Rosen and Ted Czotter.
2. *profile*, a pure Python module whose interface is imitated by *cProfile*, but which adds significant overhead to profiled programs. If you're trying to extend the profiler in some way, the task might be easier with this module. Originally designed and written by Jim Roskind.

Note: The profiler modules are designed to provide an execution profile for a given program, not for benchmarking purposes (for that, there is *timeit* for reasonably accurate results). This particularly applies to benchmarking Python code against C code: the profilers introduce overhead for Python code, but not for C-level functions, and so the C code would seem faster than any Python one.

28.4.2 Instant User's Manual

This section is provided for users that "don't want to read the manual." It provides a very brief overview, and allows a user to rapidly perform profiling on an existing application.

To profile a function that takes a single argument, you can do:

```
import cProfile
import re
cProfile.run('re.compile("foo|bar")')
```

(Use *profile* instead of *cProfile* if the latter is not available on your system.)

The above action would run *re.compile()* and print profile results like the following: