Python CLI

Interpreter and -m tools

python3 <file> script, -m or -c → compile → **Bytecode** cached in __pycache__ → run → **Interpreter** sys.path finds imports → exit → **Exit code** 0 = success

CONCEPTS

python3 -m <module> runs a module from the import path, so tools like venv, pip and pytest always match the interpreter you called.

RUN CODE

python3 *<script.py>* *<args>*
Run a script

python3 -c "*<code>*"
Run code from a string

python3 -m *<module>* *<args>*
Run a module as a script

python3 -V
Print the version

INTERACTIVE

python3
Start the REPL

python3 -i *<script.py>*
Run script, then stay in the REPL

_
Last result in the REPL

help(*<obj>***)**
Show docs for an object

dir(*<obj>***)**
List attributes of an object

INTERACTIVE (cont.)

Ctrl+D
Leave the REPL (Ctrl+Z Enter on Windows)

F2
History browser in the REPL (3.13+)

F3
Paste mode in the REPL (3.13+)

VIRTUAL ENVS AND PACKAGES

python3 -m venv .venv
Create a virtual environment

source .venv/bin/activate
Activate it (Linux, macOS)

.venv\Scripts\activate
Activate it (Windows)

deactivate
Leave the environment

.venv/bin/python *<script.py>*
Use a venv without activating

python3 -m pip install *<pkg>*
Install a package

python3 -m pip install -r requirements.txt
Install from a list

VIRTUAL ENVS AND PACKAGES (cont.)

python3 -m pip install -e .
Editable install of this project

DEV SERVERS AND TOOLS

python3 -m http.server
Serve current dir on port 8000

python3 -m http.server *<port>*
Serve on another port

python3 -m http.server -b 127.0.0.1
Listen on localhost only

python3 -m json.tool *<file>*
Validate and pretty-print JSON

TEST AND DEBUG

python3 -m pdb *<script.py>*
Debug a script from the first line

python3 -m pdb -c continue *<script.py>*
Debug, stopping on a crash

TEST AND DEBUG (cont.)

breakpoint()
Drop into the debugger from code

n / s / c / q
pdb: next, step, continue, quit

l / ll / w
pdb: list code, whole function, stack

python3 -m unittest
Discover and run unittest tests

python3 -X faulthandler *<script.py>*
Dump traceback on a crash

python3 -X dev *<script.py>*
Development mode: extra checks

MEASURE

python3 -m timeit "*<stmt>*"
Time a small statement

python3 -m timeit -s "*<setup>*" "*<stmt>*"
Time with a setup step

python3 -m cProfile -s cumtime *<script.py>*
Profile, sorted by cumulative time

MEASURE (cont.)

python3 -X importtime *<script.py>*
Show time spent on each import

FLAGS AND BEHAVIOUR

python3 -u *<script.py>*
Unbuffered stdout and stderr

python3 -O *<script.py>*
Strip assert statements

python3 -I *<script.py>*
Isolated mode: no env vars, user site or cwd

python3 --help-env
List environment variables

ENVIRONMENT VARIABLES

PYTHONPATH=*<dir>***[:***<dir>***]**
Extra module search directories

PYTHONUNBUFFERED=1
Same as -u, good for logs and containers

Where imports are found

Order	Source
1	Script dir (or cwd with -c / -m)
2	PYTHONPATH entries
3	Standard library
4	site-packages