IPython Interactive Python shell

START HERE

`obj?`
Help on an object

`!<command>`
Run a shell command

`obj.<TAB>`
Complete attributes

`%debug`
Debug last error

`%run <script.py>`
Run a script here

`%history`
Show past input

`%timeit <expr>`
Time an expression

`%load_ext autoreload`
Reload edited modules

In[n] your input → runs **Out[n]** result → saved as **_ __ ___** last 3 outputs

CONCEPTS

Magics start with % (line) or %% (cell). With automagic on, the % may be left off.

Install with pip install ipython and start it with ipython.

HELP AND INSPECTION

`<obj>?`
Show docs for an object

`<obj>??`
Show source code too

`<obj>.<TAB>`
Complete attributes and methods

`*<pattern>*?`
Search names by wildcard
*For example np.*load*? lists matching names in np.*

`%psource <obj>`
Print an object's source

`%pdoc <obj>`
Print an object's docstring

`%pfile <obj>`
Show the file defining it

`%quickref`
Quick reference card

`%magic`
Full magic system docs

`%lsmagic`
List all magics

`%<magic>?`
Docs for one magic

RUNNING CODE

`%run <script.py> <args>`
Run a script in this session

`%run -i <script.py>`
Run in the session namespace

`%run -t <script.py>`
Time the script

`%run -p <script.py>`
Profile the script

`%run -d <script.py>`
Step through under pdb

`%run -m <module>`
Run a module like python -m

`%load <file>`
Load code into the prompt

`%edit`
Compose input in your editor

`%paste`
Paste clipboard code as-is

RUNNING CODE (cont.)

`%cpaste`
Paste block, end with --

`%%writefile <file>`
Write the cell to a file

`%save <file> <range>`
Save history lines to a file

`%reset`
Clear all variables

`%reset -f`
Clear without asking

TIMING

`%time <stmt>`
Time one run

`%timeit <stmt>`
Time many runs, average

`%timeit -n <N> -r <R> <stmt>`
Set loops and repeats

`%%time`
Time the whole cell

`%%timeit`
Time a cell, with setup line

`%prun <stmt>`
Profile a statement

HISTORY AND OUTPUT

`%history`
Show session input

`%history -n`
Include line numbers

`%history -g <text>`
Search all stored history

`%history -l <N>`
Show last N lines

`%rerun`
Re-run the previous line

`%rerun -g <text>`
Re-run latest match

`In[<n>]`
Input of cell n

`Out[<n>]`
Output of cell n

`_ / __ / ___`
Last three outputs

`%macro <name> <n1-n2>`
Bind lines to a name

`%store <var>`
Persist a variable

SHELL AND SYSTEM

`!<command>`
Run a shell command

SHELL AND SYSTEM (cont.)

`<var> = !<command>`
Capture output as a list

`!<command> {<pyvar>}`
Insert a Python value
$var works too; escape a literal dollar with $$.

`%%bash`
Run the cell in bash

`%cd <dir>`
Change directory

`%pwd`
Print working directory

`%ls`
List the current directory

`%env <VAR>=<value>`
Set an env variable

`%alias <name> <cmd>`
Define a shell alias

`%pushd <dir>` / `%popd`
Directory stack

`%pip install <pkg>`
Install into this environment

`%conda install <pkg>`
Conda install, same env

DEBUGGING

`%debug`
Open pdb after an exception

`%pdb on`
Debug every uncaught error

`%pdb off`
Stop auto-debugging

`%xmode Verbose`
Richer tracebacks
Modes: Plain, Context, Verbose, Minimal.

`%tb`
Show last traceback again

`%debug --breakpoint <file:line>`
Start debugging at a line

MODULES AND WORKSPACE

`%load_ext autoreload`
Enable the extension

`%autoreload 2`
Reload all before each run

`%autoreload 1`
Reload only %aimport modules

`%autoreload 0`
Disable reloading

`%aimport <module>`
Mark module for reload

MODULES AND WORKSPACE (cont.)

`%who`
List variable names

`%whos`
List variables with types

`%who_ls`
Variable names as a list

`%matplotlib inline`
Plot inside the frontend

CONFIG AND SHORTCUTS

`ipython profile create`
Create default config files

`ipython --profile=<name>`
Start with a profile

`ipython -i <script.py>`
Run, then stay interactive

`ipython -c "<code>"`
Run a one-liner

`ipython locate`
Print the IPython dir

`%automagic`
Toggle dropping the %

Keyboard

Key	Does
`Tab`	Complete or cycle
`Ctrl+R`	Search history
`Ctrl+O`	Open new line
`Esc Enter`	Force run block
`Ctrl+L`	Clear screen
`Ctrl+D`	Exit

Startup scripts: put .py or .ipy files in ~/.ipython/profile_default/startup/; they run in filename order.

RECIPES

Edit a module and keep going

```
%load_ext autoreload
%autoreload 2
import mymod
mymod.run()
# edit mymod.py, then call again
```

Debug a failing script

```
%run script.py
%debug
# or start under pdb from the top:
%run -d script.py
```

Compare two implementations

```
%timeit sorted(data)
%timeit -n 100 -r 5 list_sort(data)
```

Shell output into Python

```
files = !ls *.csv
for f in files: print(f)
%%bash
grep -c error app.log
```