Part II: Python

Python is one of the most popular general-purpose programming languages

Rank	Language	Ratings
1	Java	20.5%
2	C	14.6%
3	C++	6.7%
4	C#	4.3%
5	**Python**	**4.3%**
6	PHP	2.8%
7	Visual Basic.Net	2.6%
8	JavaScript	2.3%
9	Perl	2.3%
10	Ruby	2.2%

TIOBE Index, March 2016
http://www.tiobe.com/tiobe_index

Python has many applications

- Web development
- Application development
- Computer graphics
- Scientific computing
  - Bioinformatics
  - Machine learning
  - Simulations

https://www.python.org/about/quotes/

We use the Anaconda Python distribution

Launcher - Anaconda - Continuum Analytics

Launcher | Environment: root | Python 3.5.1-0 | Manage Channels | 1.0.0

glueviz

link visualizations of scientific datasets

Install

ipython-notebook

IPython Notebook

Launch

Version 4.0.4

ipython-qtconsole

IPython QtConsole

Launch

Version 4.0.1

orange-app

data visualization and data analysis tool

Install

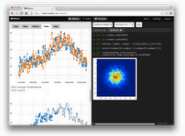
spyder-app

Scientific Python Development Environment

Launch

Version 2.3.8

Wakari



Notebook Gallery

Continuum Analytics

Documentation

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Version 4.0.4

ipython-qtconsole

IPython QtConsole

Simple python console for small problems

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Scientific Python Development Environment

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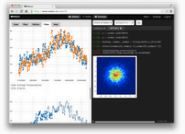
Version 2.3.8

Wakari



Notebook Gallery

Continuum Analytics

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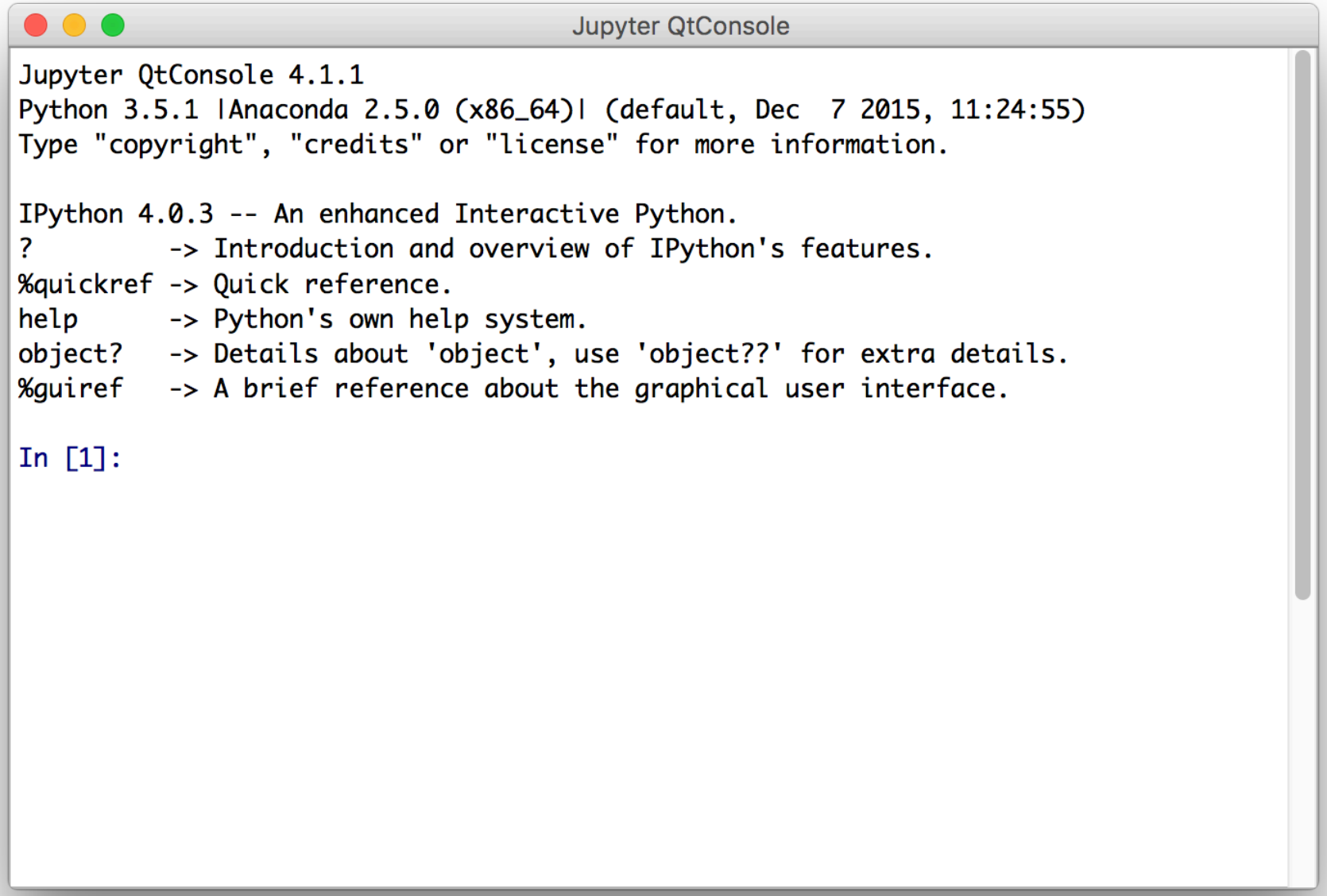
IPython QtConsole



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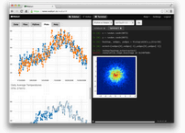
Scientific Python Development Environment

Similar to R Studio, but not as full featured.

Launch

Version 2.3.8

Wakari



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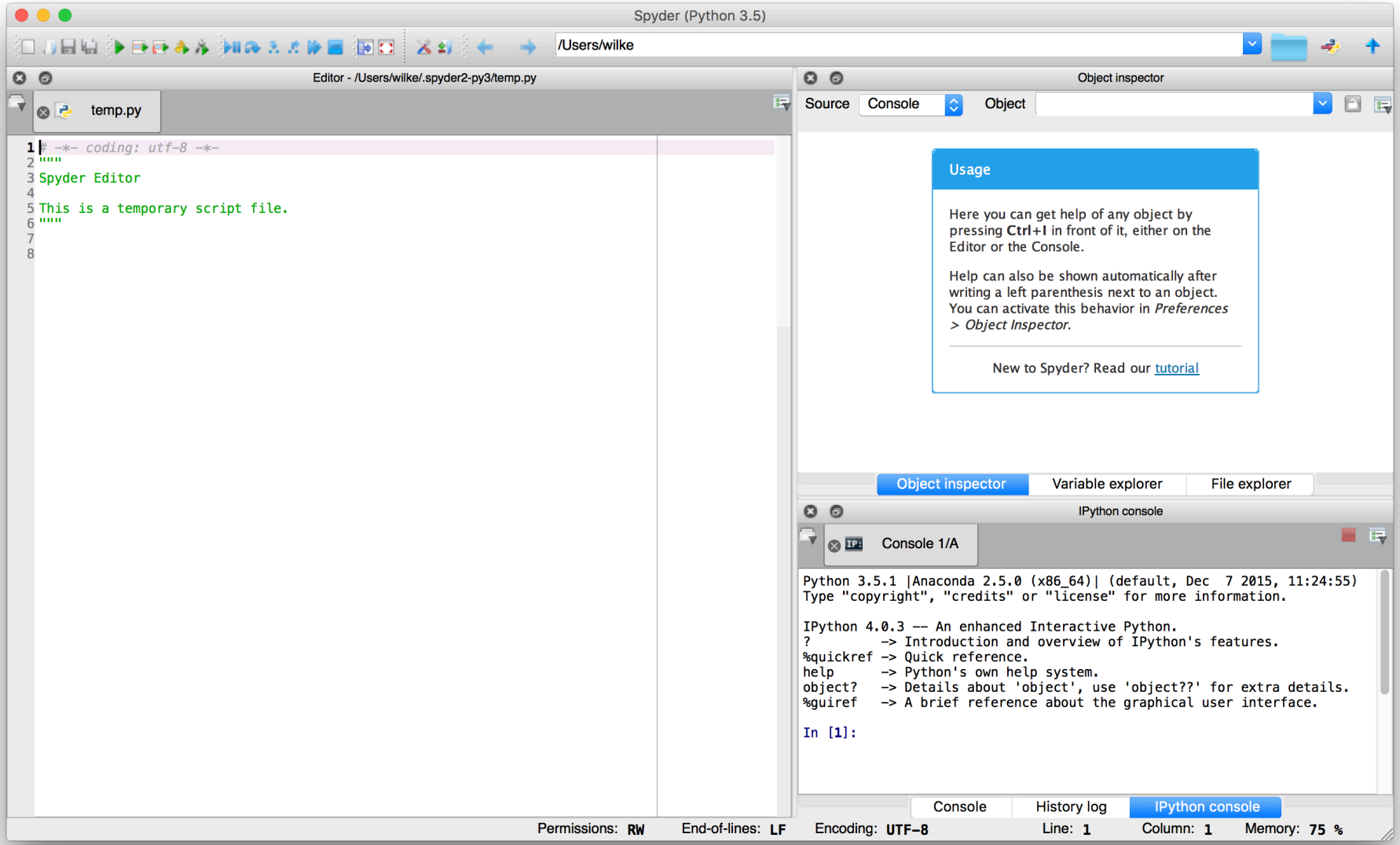
Spyder


Spyder (Python 3.5)
/Users/wilke
Editor - /Users/wilke/.spyder2-py3/temp.py
temp.py
1 # -*- coding: utf-8 -*-
2 """
3 Spyder Editor
4
5 This is a temporary script file.
6 """
7
8
Object inspector
Source
Console
Object
Usage
Here you can get help of any object by pressing Ctrl+I in front of it, either on the Editor or the Console.
Help can also be shown automatically after writing a left parenthesis next to an object. You can activate this behavior in Preferences > Object Inspector.
New to Spyder? Read our tutorial
Object inspector
Variable explorer
File explorer
IPython console
Console 1/A
Python 3.5.1 |Anaconda 2.5.0 (x86_64)| (default, Dec 7 2015, 11:24:55)
Type "copyright", "credits" or "license" for more information.
IPython 4.0.3 -- An enhanced Interactive Python.
? -> Introduction and overview of IPython's features.
%quickref -> Quick reference.
help -> Python's own help system.
object? -> Details about 'object', use 'object??' for extra details.
%guiref -> A brief reference about the graphical user interface.
In [1]:
Console
History log
IPython console
Permissions: RW
End-of-lines: LF
Encoding: UTF-8
Line: 1
Column: 1
Memory: 75 %

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Version 4.0.4

Mix text and python code, similar to R Markdown

ipython-qtconsole

IPython QtConsole

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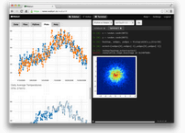
Wakari



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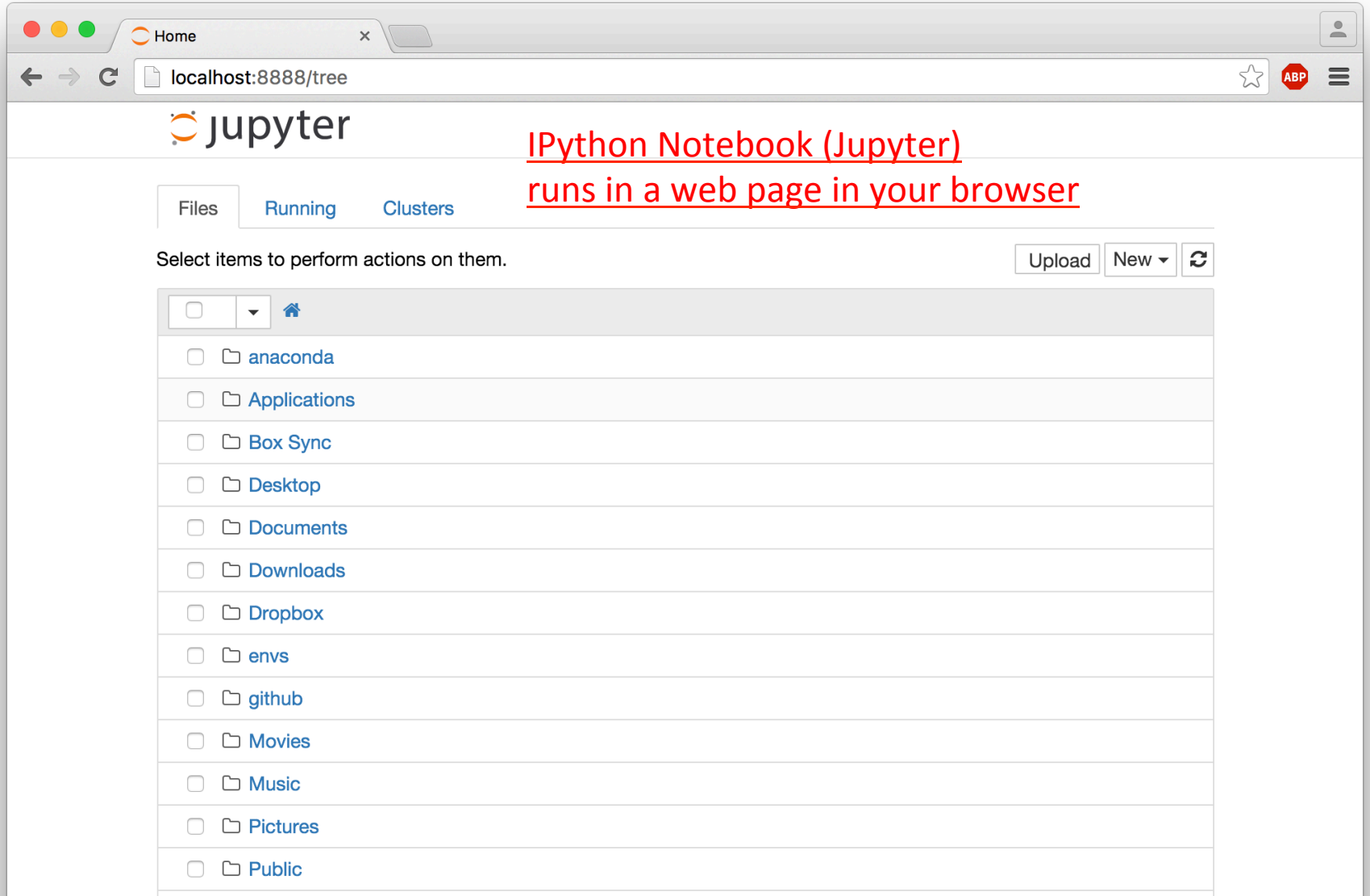
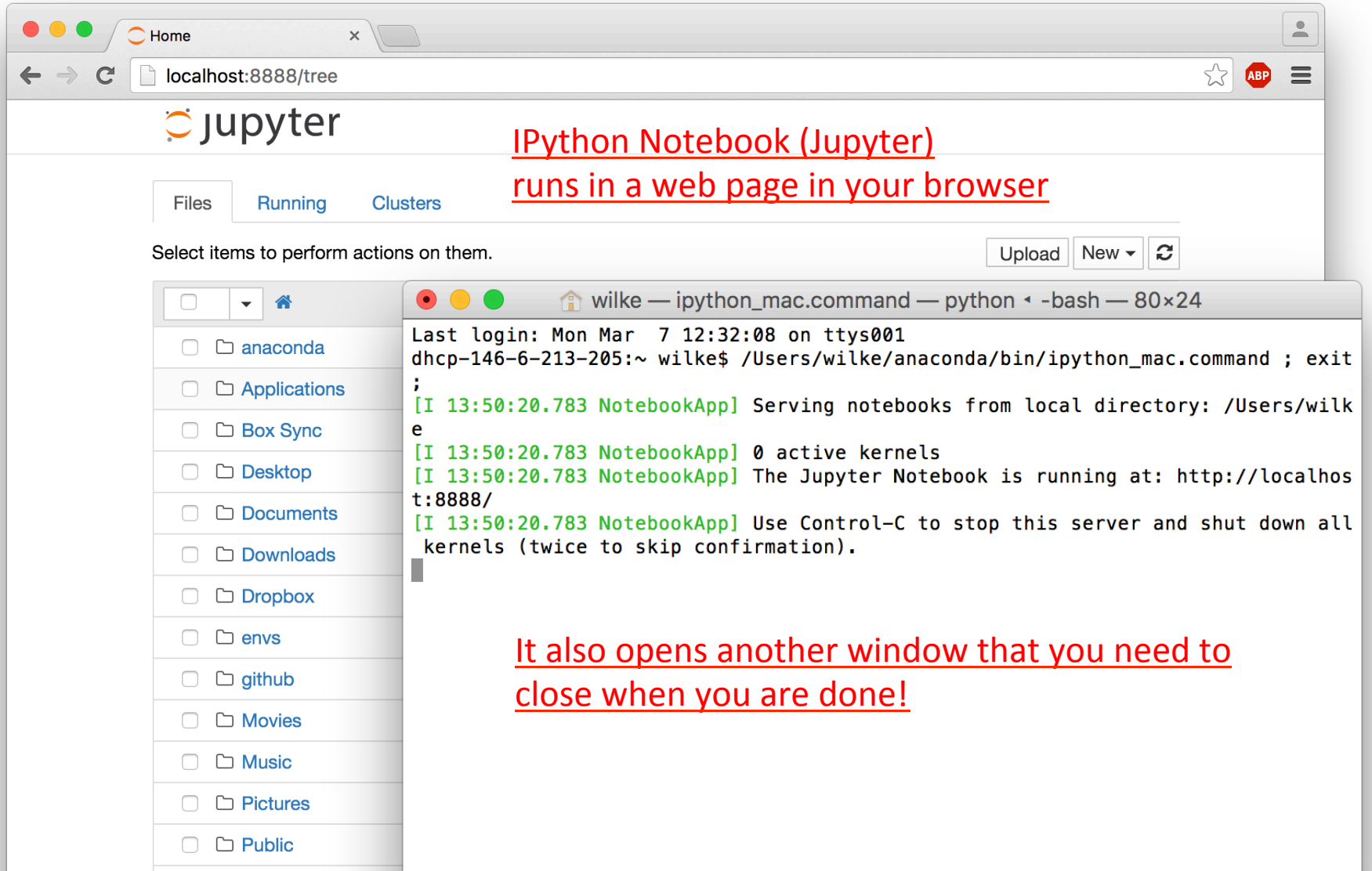
IPython Notebook



IPython Notebook



IPython Notebook (Jupyter)
runs in a web page in your browser

It also opens another window that you need to close when you are done!

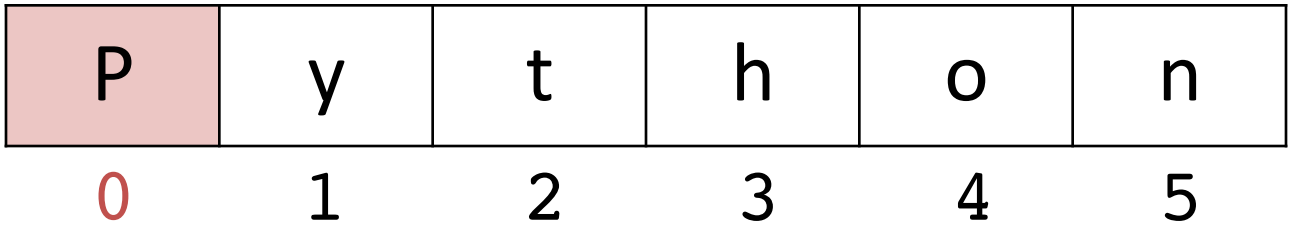
Counting like a computer scientist

```
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, ...
```

Indexing in Python

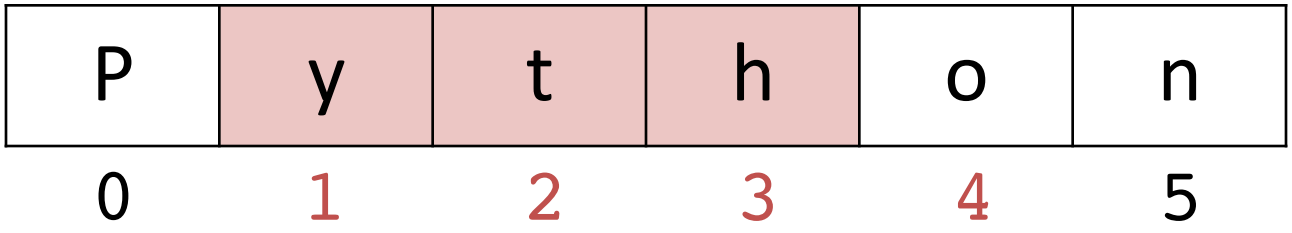
P	y	t	h	o	n
0	1	2	3	4	5

Indexing in Python




```
In [1]: x="Python"

In [2]: x[0]
Out[2]: 'P'
```

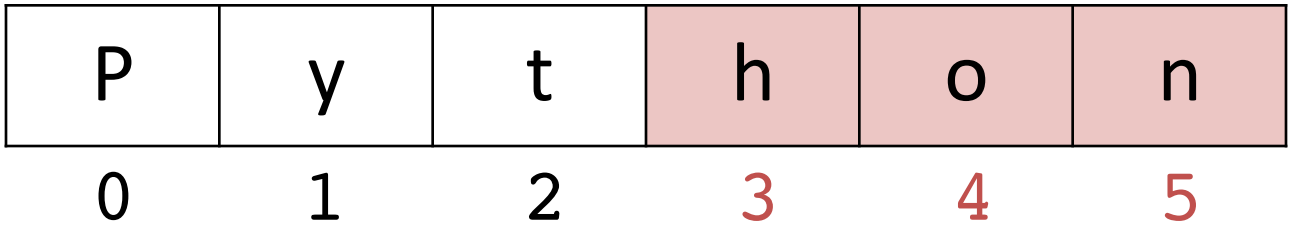
Indexing in Python




```
In [1]: x="Python"

In [2]: x[1:4]
Out[2]: 'yth'
```

We index from the first element to one past the last element

Indexing in Python



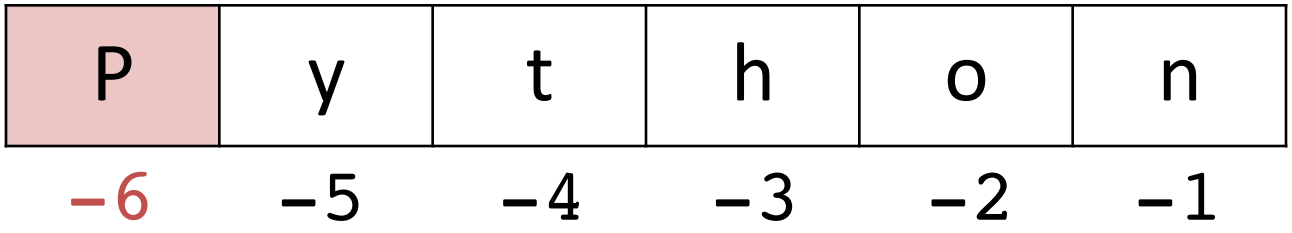

```
In [1]: x="Python"

In [2]: x[3:]
Out[2]: 'hon'
```

← Missing number means “to the end”

We can also index in reverse

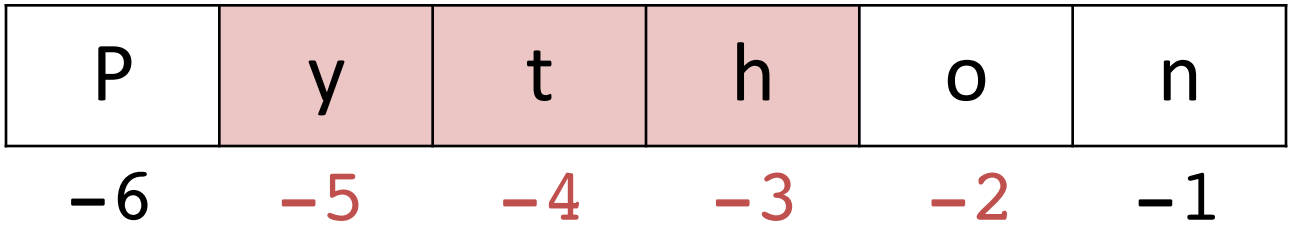
P	y	t	h	o	n
-6	-5	-4	-3	-2	-1

We can also index in reverse




```
In [1]: x="Python"

In [2]: x[-6]
Out[2]: 'P'
```

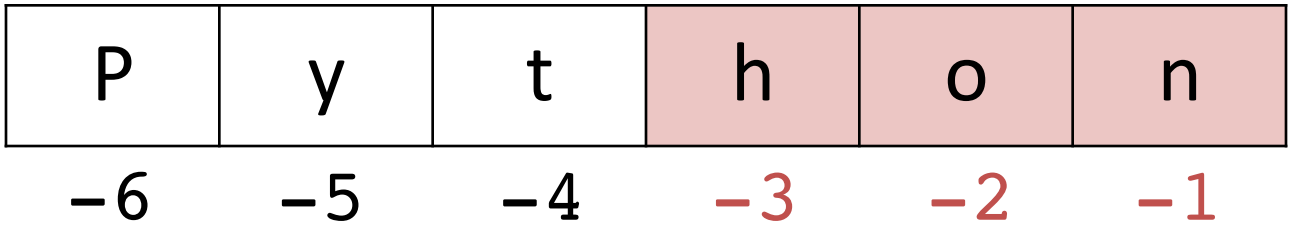
We can also index in reverse




```
In [1]: x="Python"

In [2]: x[-5:-2]
Out[2]: 'yth'
```

← Again, we index one past the last element

We can also index in reverse




```
In [1]: x="Python"

In [2]: x[-3:]
Out[2]: 'hon'
```

← This captures the last 3 characters