

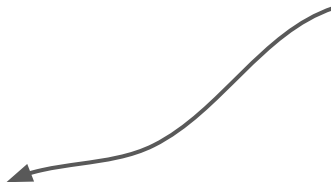
Python

...and Anaconda and Jupiter



Python



- Python, a quick introduction
- Anaconda
- Jupyter Notebooks
- The Basics of Python
 - Numbers, strings, functions, etc.
- Exercises



Refer to document on
Blackboard



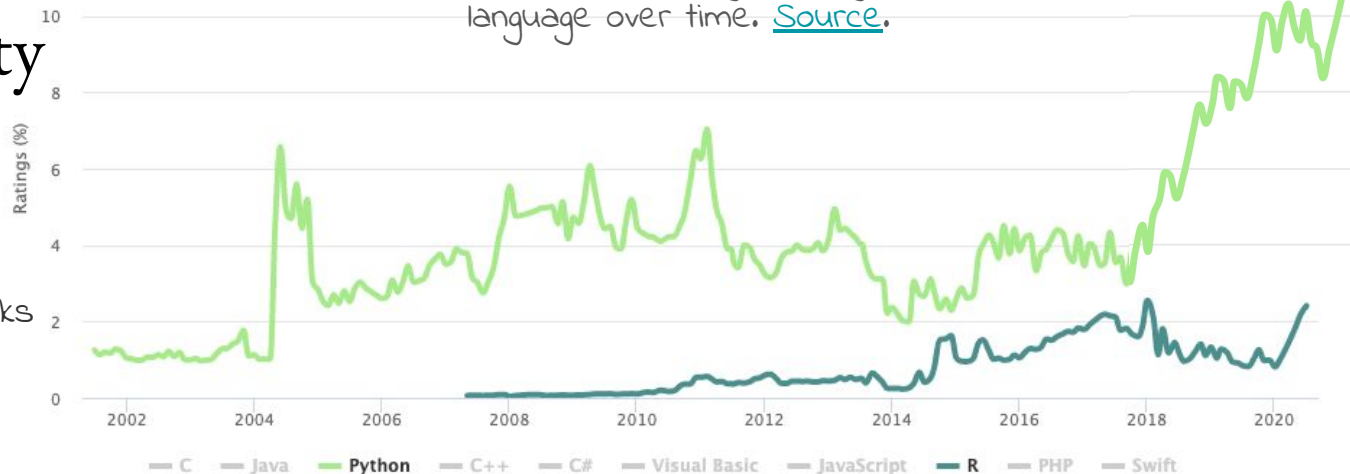
Python, a quick introduction

- Released in 1991
- General purpose language, i.e. not developed for a specific purpose
 - Ordinary software development
 - Web frameworks
 - Web scraping
 - Scientific computing
 - Text and image processing
- Consistently ranked in the top ten most popular programming languages
 - July, 2021: [3rd most popular language](#) (behind Java and C)
 - In trend continues, Python may as well be the most popular programming language next year 
 - Sidenote: R went from 8th position to 12th position since July, 2020 



Python Popularity

Most popular programming language over time. [Source](#).

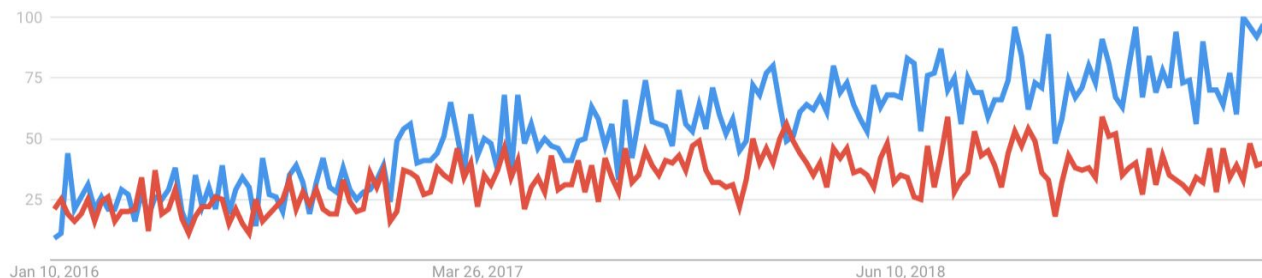


"Python seems to have the best chances to become number 1, thanks to its market leadership in the booming field of data mining and artificial intelligence."

Google search-term trends:
"Python data science"
"R data science"



Check out [this article](#) for a comparison of Python & R.



Anaconda: Installation

- Anaconda [is a python distribution](#)
 - Aims to provide everything you need (python wise) for data science “out of the box”.
 - Conda uses environments to handle different versions of Python and Python packages.
- Installation
 - Follow [instructions](#).
- Getting started
 - Follow this slide deck.
 - Follow and/or understand the walk-through follow [Getting Started With Conda](#).
- Having trouble?
 - Try out YouTube tutorials on installation.
 - Ask fellow students.



Anaconda: Environments

You should use [environments](#) to avoid configuring your root (default, also called **base**) environment.

To create an environment, open your terminal and type:

```
conda create --name iidsp python=3.7
```

Feel free to replace “**iidsp**” with any other environment name.

When conda asks you to proceed, type **y: proceed ([y]/n)?**

This creates the environment. This environment uses the specified version of Python (3.7). Most recent is ~3.9, but we will stick with 3.7 for now.



Anaconda: Environments

Verify that the new environment
was installed correctly by [listing all
environments](#):

```
conda info --envs
```

Activate an environment:

```
conda activate iidsp
```

The following NEW packages will be INSTALLED:

ca-certificates	pkgs/main/osx-64::ca-certificates-2020.6.24-0
certifi	pkgs/main/osx-64::certifi-2020.6.20-py36_0
libcxx	pkgs/main/osx-64::libcxx-10.0.0-1
libedit	pkgs/main/osx-64::libedit-3.1.20191231-haf1e3a3_0
libffi	pkgs/main/osx-64::libffi-3.3-h0a44026_1
ncurses	pkgs/main/osx-64::ncurses-6.2-h0a44026_1
openssl	pkgs/main/osx-64::openssl-1.1.1g-h1de35cc_0
pip	pkgs/main/osx-64::pip-20.1.1-py36_1
python	pkgs/main/osx-64::python-3.6.10-hf48f09d_2
readline	pkgs/main/osx-64::readline-8.0-h1de35cc_0
setuptools	pkgs/main/osx-64::setuptools-47.3.1-py36_0
sqlite	pkgs/main/osx-64::sqlite-3.32.3-hffcf06c_0
tk	pkgs/main/osx-64::tk-8.6.10-hb0a8c7a_0
wheel	pkgs/main/osx-64::wheel-0.34.2-py36_0
xz	pkgs/main/osx-64::xz-5.2.5-h1de35cc_0
zlib	pkgs/main/osx-64::zlib-1.2.11-h1de35cc_3

Proceed ([y]/n)? y

Preparing transaction: done

Verifying transaction: done

Executing transaction: done

#

To activate this environment, use

#

\$ conda activate iidsp

#

To deactivate an active environment, use

#

\$ conda deactivate

(base) nick@MacBook-Pro ~ %



Anaconda: Environments

From inside an environment, we can execute (run) Python scripts. In this following example, we activate an environment, write a Python print statement (a function that prints a string), and finally the environment is exited by deactivating.

```
nick_180213 (zsh)
(base) nick@MacBook-Pro ~ % conda activate iidsp
(iidsp) nick@MacBook-Pro ~ % python
Python 3.6.10 |Anaconda, Inc.| (default, May  7 2020, 23:06:31)
[GCC 4.2.1 Compatible Clang 4.0.1 (tags/RELEASE_401/final)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Hello World!")
Hello World!
>>> exit()
(iidsp) nick@MacBook-Pro ~ % conda deactivate
(base) nick@MacBook-Pro ~ %
```



Anaconda: Jupyter Notebook

Jupyter Notebooks is a great tool for learning and executing Python.

Install Jupyter using the following command **from within the new environment** using:

```
conda install jupyter
```

[Run the Jupyter Notebook App](#) from within the new environment using:

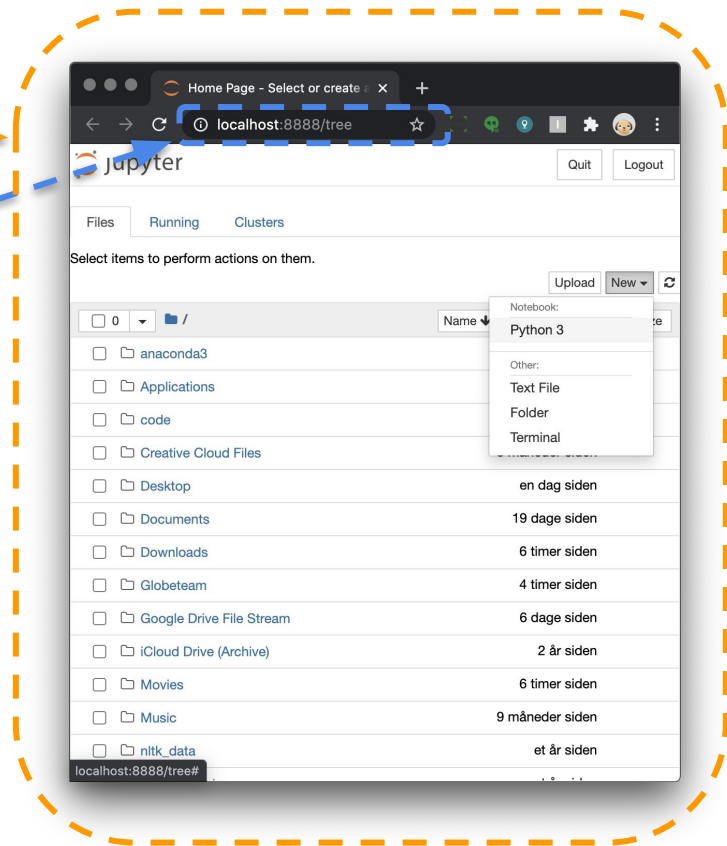
```
jupyter notebook
```

To close the notebook application, simply type [ctrl]+[c] in the Terminal/Cmd.










```
nick_180213 (python3.6)
(iiidsp) nick@MacBook-Pro ~ % jupyter notebook
[I 23:21:58.743 NotebookApp] Serving notebooks from local directory: /Users/nick
[I 23:21:58.744 NotebookApp] The Jupyter Notebook is running at:
[I 23:21:58.744 NotebookApp] http://localhost:8888/?token=35681df2ca6ec36b6419c7b29f25c29a84faf3435bea8a29
or http://127.0.0.1:8888/?token=35681df2ca6ec36b6419c7b29f25c29a84faf3435bea8a29
[I 23:21:58.744 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 23:21:58.748 NotebookApp]

To access the notebook, open this file in a browser:
file:///Users/nick/Library/Jupyter/runtime/nbserver-89302-open.html
Or copy and paste one of these URLs:
http://localhost:8888/?token=35681df2ca6ec36b6419c7b29f25c29a84faf3435bea8a29
or http://127.0.0.1:8888/?token=35681df2ca6ec36b6419c7b29f25c29a84faf3435bea8a29
```



Documents/teaching/au/introdu...

localhost:8888/tree/Documents/teaching/au/introduction_to_data_science_in_python/slides/assets120%

 jupyter

QuitLogout

FilesRunningClusters

Select items to perform actions on them.

☐ 0 ▾

/ Documents / teaching / au / introduction_to_data_science_in_python / slides / assets

Name ▾

UploadNew ↕

..

The notebook list is empty.

Notebook:

Python 3

Other:

Text File

Folder

Terminal

localhost:8888/tree/Documents/teaching/au/introduction_to_data_science_in_python/slides/assets#

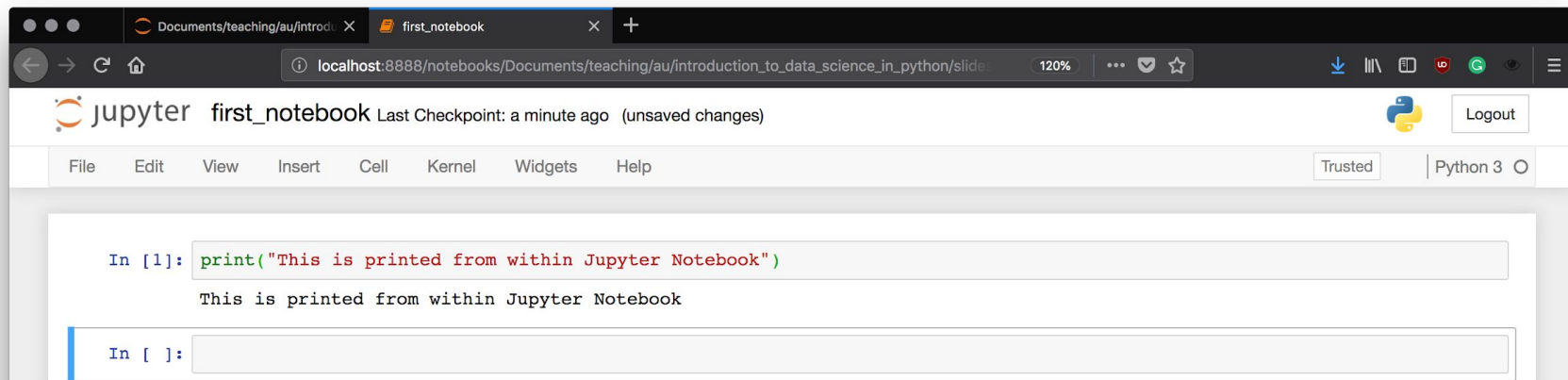


Jupyter Notebook

Once a notebook has been created, you can write python scripts in cells, execute the cells using [shift]+[enter].

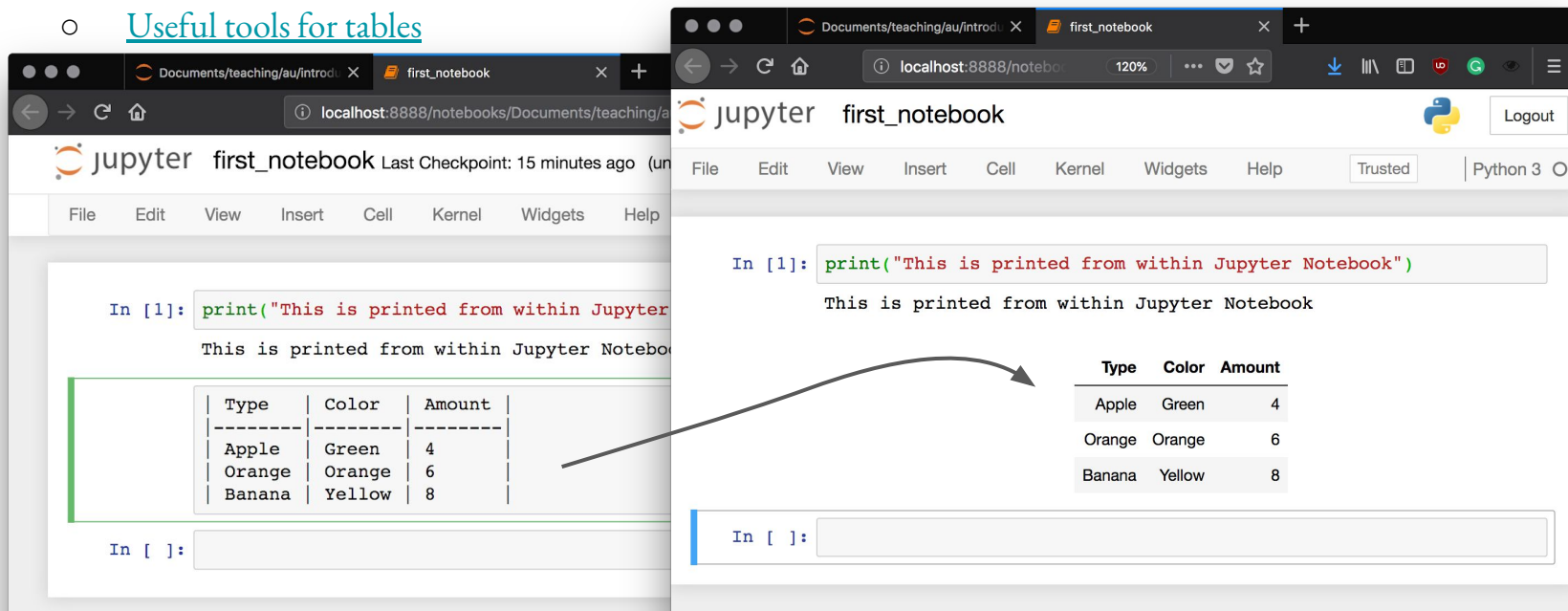
[This tutorial](#) gives a quick introduction to Jupyter Notebook.

Make sure you understand the workflow of these notebooks, as we will be using them throughout the course.



Jupyter Notebook

- [Official documentation](#)
- [Markdown documentation](#) by Github
 - Used for formatting text inside text-cells in notebooks
 - [Useful tools for tables](#)



The image displays two overlapping Jupyter Notebook windows. The background window shows a code cell with the following content:

```
In [1]: print("This is printed from within Jupyter Notebook")
```

Below the code, the output of the print statement is displayed:

Type	Color	Amount
Apple	Green	4
Orange	Orange	6
Banana	Yellow	8

The foreground window shows the same code cell, but the output of the print statement is displayed below the code:

```
In [1]: print("This is printed from within Jupyter Notebook")
```

This is printed from within Jupyter Notebook

Type	Color	Amount
Apple	Green	4
Orange	Orange	6
Banana	Yellow	8

An arrow points from the table in the background window to the table in the foreground window.

Next up?

A group should be 2-4
(preferably 2-3) students

IN-CLASS

INDIVIDUAL

IN-CLASS

INDIVIDUAL / GROUP

INDIVIDUAL / GROUP

INDIVIDUAL / GROUP

IN-CLASS

1. Short walk-through of [jupyter_notebook.ipynb](#).
2. Install A-Z (Anaconda, your environment, python, everything...).
3. A peak into Python: Hands on basics in Jupyter Notebook.
4. Open [jupyter_notebook.ipynb](#) and go through the notebook.
5. Go through the basics of python ([the_basics_of_python.ipynb](#)).
6. Exercises ([exercises_the_basics_of_python.ipynb](#)).
7. Wrap-up & Questions.

