Introduction to Programming in Python

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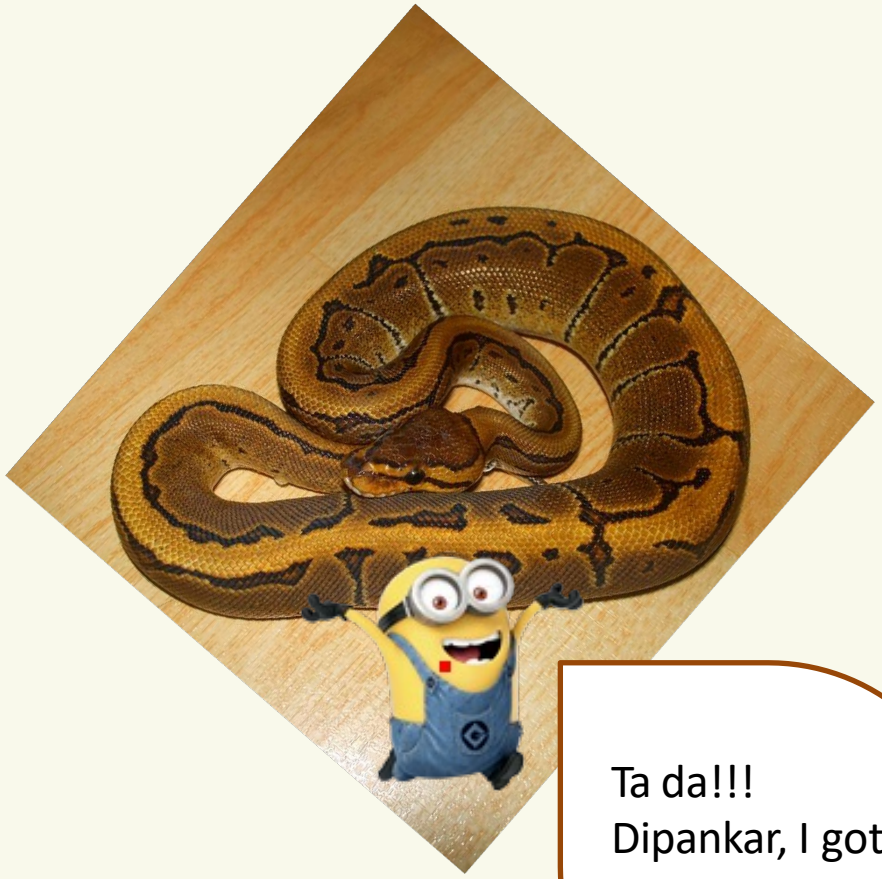
We are ready to learn about Python!!! Kevin is getting one for us.



Ta da!!! Dipankar, I got a Python for the lesson.

Python Programming Language

Easy

Useful

Powerful

Popular

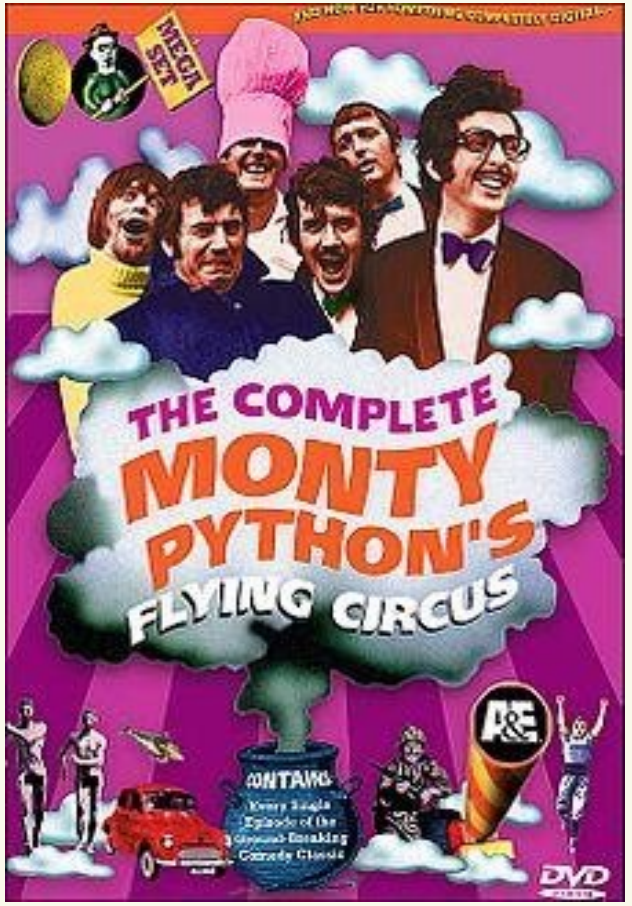
General Purpose

Large Libraries

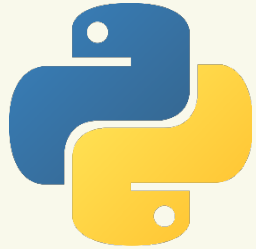
Introduction to Python

Guido van Rossum

- 1989 - Christmas Holidays
- Name that was short, unique, and slightly mysterious
- High-level general-purpose programming language
  - 3 level languages – Machine, Assembly and High-Level languages (Python, Java, C++ etc)
- Interpreted, Interactive, Object-oriented programming language
  - Python can be used for different computational solutional tasks.
- Third party modules (extensive set of libraries)



Introduction to Python



- **Portable:** runs on different operating systems (Unix/Linux, Windows, Mac).
- **Used for:** system scripting, software and web development.
- **Syntax:** simple (English language), relies on **indentation**, whitespaces.
- **Writing code:** Terminal (text editor), Integrated Development Environment (Eclipse, NetBeans), Juypter notebook.
  - .py extension is python related extension for files to be used and stored.
- **Version:** Python 2 (legacy), Python 3 (present and future) - https://wiki.python.org/moin/Python2orPython3?
- Python Software Foundation https://www.python.org/psf/

Bioinformatics
Data Science

Resources

- About Python - https://docs.python.org/3/faq/general.html
- Python for Beginners - https://wiki.python.org/moin/BeginnersGuide
- Python Tutorial - https://docs.python.org/3/tutorial/index.html
- Python Books - https://wiki.python.org/moin/PythonBooks

Installation – Python (Conda and Pip)

Installation – Python (Conda and Pip)

- Download and Install  :https://www.python.org/downloads/
  - ✓ Check Python version –> python --version / python –V

- Install and manage python packages (Python Package Index):
  1. Pip (Python Package Installer) – this is a package installer for Python
     - ✓ pre-installed if you are using Python 2 >=2.7.9 or Python 3 >=3.4
     - ✓ Check pip version –> pip --version / pip –V
  2. Conda (Anaconda) – open-source package and environment management system **(I am using Anaconda)**
     - ✓ created for Python but it can package and distribute software for other languages
     - ✓ Anaconda, Miniconda, and Anaconda Repository
     - ✓ Download and Install
     - ✓ List of installed packages (Anaconda Prompt) -> conda list

Anaconda Navigator

File Help

ANACONDA NAVIGATOR

Sign in to Anaconda Cloud

- Home
- Environments
- Learning
- Community

Documentation

Applications on base (root) Channels Refresh

CMD.exe Prompt
0.1.1
Run a cmd.exe terminal with your current environment from Navigator activated
Launch

JupyterLab
1.2.6
An extensible environment for interactive and reproducible computing, based on the Jupyter Notebook and Architecture.
Launch

Notebook
6.0.3
Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.
Launch

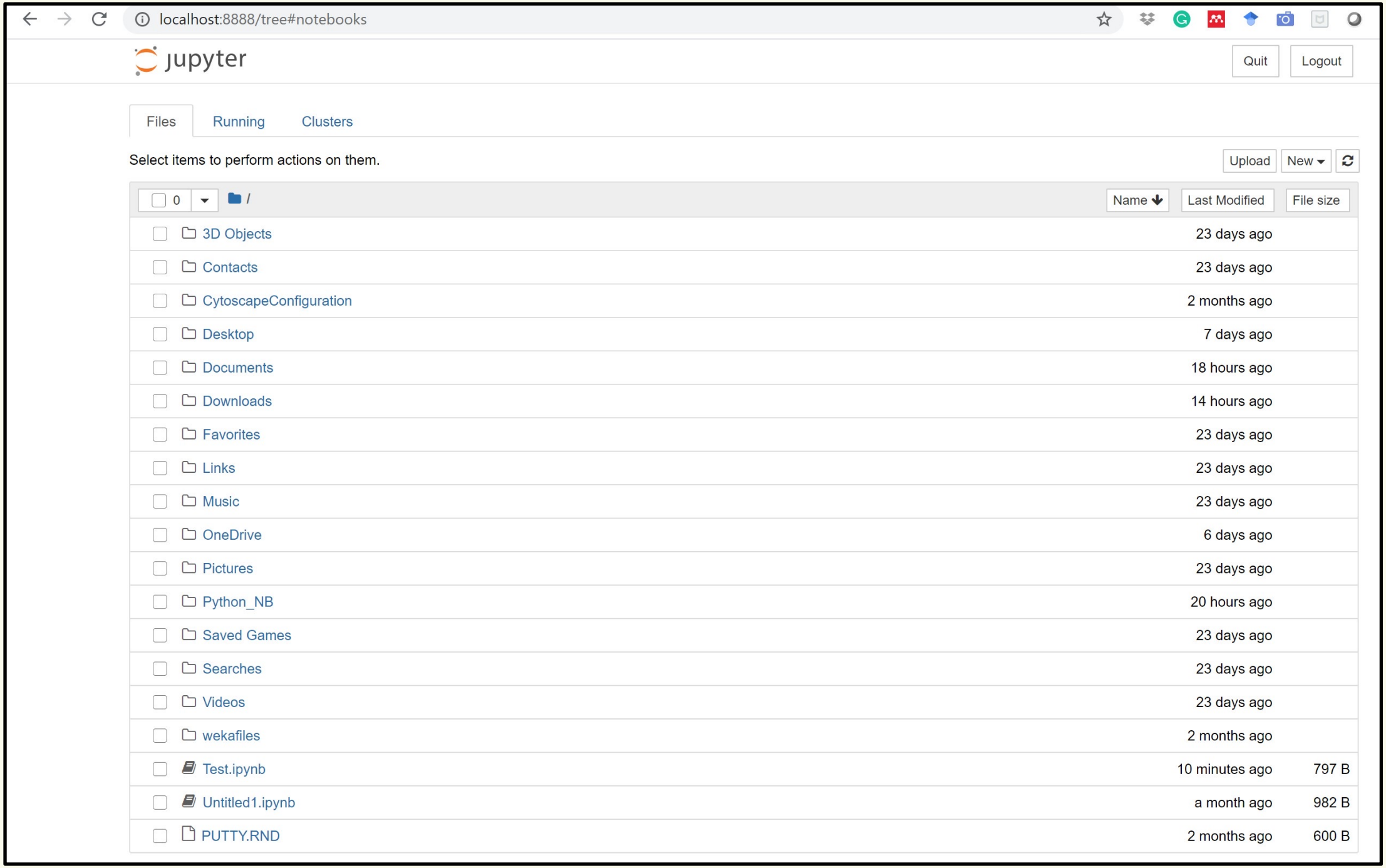
Orange 3
3.23.1
Component based data mining framework. Data visualization and data analysis for novice and expert. Interactive workflows with a large toolbox.
Launch

Powershell Prompt
0.0.1
Run a Powershell terminal with your current environment from Navigator activated
Launch

Qt Console
4.6.0
PyQt GUI that supports inline figures, proper multiline editing with syntax highlighting, graphical calltips, and more.
Launch

Spyder
4.0.1
Scientific PYthon Development EnviRonment. Powerful Python IDE with advanced editing, interactive testing, debugging and introspection features
Launch

Glueviz
0.15.2
Multidimensional data visualization across files. Explore relationships within and among related datasets.
Install

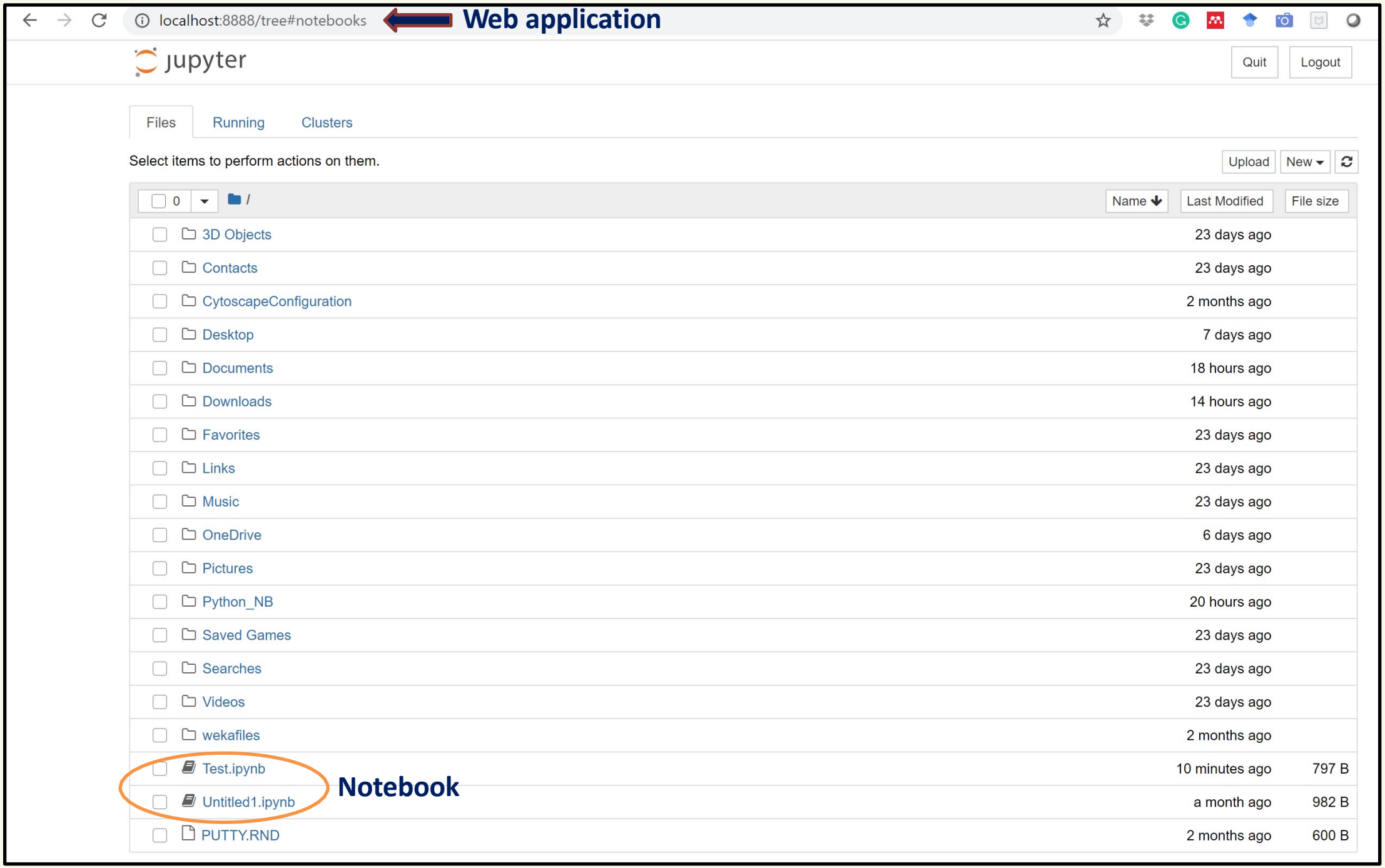

localhost:8888/tree#notebooks
jupyter
Quit
Logout
Files
Running
Clusters
Select items to perform actions on them.
Upload
New
0
/
Name
Last Modified
File size
3D Objects 23 days ago
Contacts 23 days ago
CytoscapeConfiguration 2 months ago
Desktop 7 days ago
Documents 18 hours ago
Downloads 14 hours ago
Favorites 23 days ago
Links 23 days ago
Music 23 days ago
OneDrive 6 days ago
Pictures 23 days ago
Python_NB 20 hours ago
Saved Games 23 days ago
Searches 23 days ago
Videos 23 days ago
wekafiles 2 months ago
Test.ipynb 10 minutes ago 797 B
Untitled1.ipynb a month ago 982 B
PUTTY.RND 2 months ago 600 B

Jupyter Notebook

- Interactive computing environment – code + text
  - ✓ Code, Plots, Narrative text, Equations, Images, Video

- Jupyter notebook has three components:
  - ✓ **Web application -** writing and running code interactively [runs on your localhost. E.g. - http://localhost:8888/tree]
  - ✓ **Notebook documents -** content visible in the notebook web application (in general called as a notebook)
  - ✓ **Kernel -** processes to execute the notebook web application (handles computation)

Ref: What is Juypter Notebook?


localhost:8888/tree#notebooks
Web application
jupyter
Quit
Logout
Files
Running
Clusters
Select items to perform actions on them.
Upload
New
0
/
Name
Last Modified
File size
3D Objects 23 days ago
Contacts 23 days ago
CytoscapeConfiguration 2 months ago
Desktop 7 days ago
Documents 18 hours ago
Downloads 14 hours ago
Favorites 23 days ago
Links 23 days ago
Music 23 days ago
OneDrive 6 days ago
Pictures 23 days ago
Python_NB 20 hours ago
Saved Games 23 days ago
Searches 23 days ago
Videos 23 days ago
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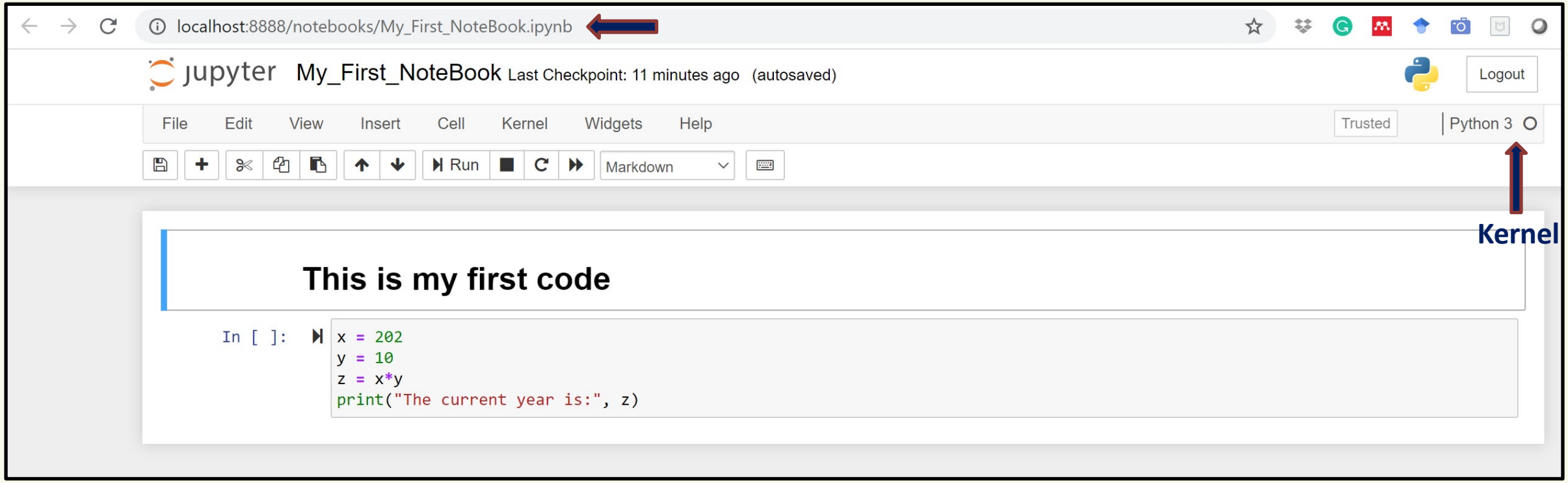
Test.ipynb 10 minutes ago 797 B
Untitled1.ipynb a month ago 982 B
PUTTY.RND 2 months ago 600 B
Notebook

➢ File extension for a notebook - *.ipynb [where, * - file name]



➢Can be exported to different static formats [HTML, reStructeredText, LaTeX, PDF, and slide shows] – use “nbconvert” utility [jupyter nbconvert *.ipynb --to slides].