Python Crash Course

For Data Scientist

Notice

Please note, this is not meant to be a comprehensive overview of Python or programming in general.

Outline – Part 1

- Introduction
- Data types
  - Numbers
  - String
  - Printing
  - Lists
  - Dictionaries
  - Booleans
  - Tuples
  - Sets
- Python Comparison Operators
- Python statements
  - if, elif, else Statements
  - for Loops
  - while Loops
- Methods and functions
  - lambda expressions
  - map and filter
- Error handling
- Modules and Packages
- Object Oriented Programming

Outline – Part 2

- **Most popular data Python Data Science Libraries**
  - **NumPy**
  - **SciPy**
  - **Pandas**
  - **MatplotLib**
  - **Seaborn**
  - **Scikit-learn**
  - **And much more (Dask, …)**

Outline – Part 3

- **Data Science project**
  - **Cross-industry standard process for data mining**
  - **Exploratory data analysis**
  - **Data preparation**
    - **Missing data imputation**
    - **Data Encoding and scaling**
    - **Feature selection**
  - **Model construction**
    - **Cross-validation**
    - **Grid-search**
    - **Ensemble methods**
  - **Model deployment**

Python version

Python 2 or Python 3 ? Definitely 3

- https://www.python.org/
- https://pythonclock.org/

Python version

- Why Python ?

The rich ecosystem of libraries and tooling, and the convenience of the language itself, make Python an excellent choice.

- Many distributions of Python, such as
  - WinPython,
  - ActivePython,
  - **Anaconda**,
  - Enthought Canopy,
  - Python(x,y),
  - Pyzo

Python version

- Why Python ?

For this course, let's install Anaconda for python 3

  - https://www.anaconda.com/products/individual

Python version

- Virtual Environment
  - Virtual Environments allow you to set up virtual installations of Python and libraries on your computer
  - You can have multiple versions of Python or libraries and easily activate or deactivate these environments
  - Virtual environment = a self-contained directory tree that contains a Python installation for a particular version of Python, plus a number of additional packages

Python version

- Why Virtual Environment?
  - Sometimes you'll want to program in different versions of a library
  - For example:
    - You develop a program with SciKit-Learn 0.17
    - SciKit-Learn 0.18 is released
    - You want to explore 0.18 but don't want you old code to break

Python version

- Virtual Environment

Several ways to create a virtual environment

- Using venv module of python (default)
  - python3 -m venv tutorial-env
  - source tutorial-env/bin/activate
  - pip3 search astronomy
  - pip3 install novas or pip install novas=2.1.0
  - source deactivate
  - Virtual Environments allow you to set up virtual installations of Python and libraries on your computer
- Using Virtualenv Environment
- Using Pipenv Environment

Python version

- Virtual Environment

Several ways to create a virtual environment

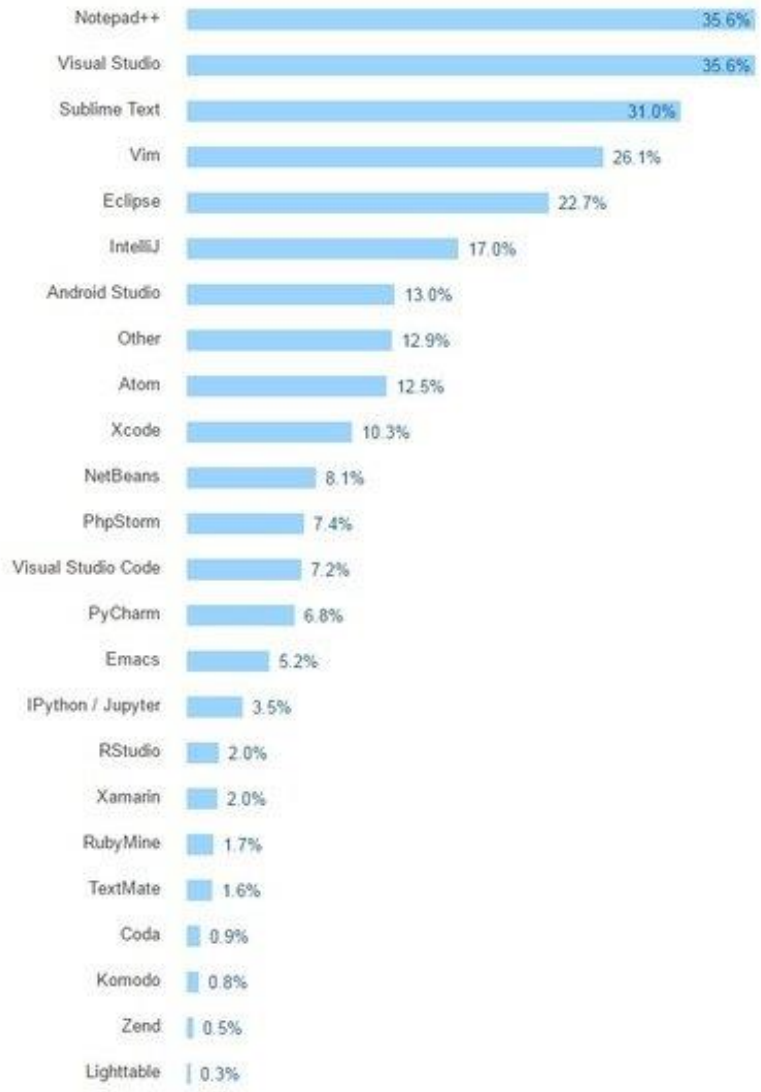
- Using Anaconda (Conda) a Environment

https://conda.io/docs/user-guide/tasks/manage-environments.html

  - conda create --name myenv
  - conda install numpy
  - conda install anaconda
  - conda activate myvenv
  - conda deactivate

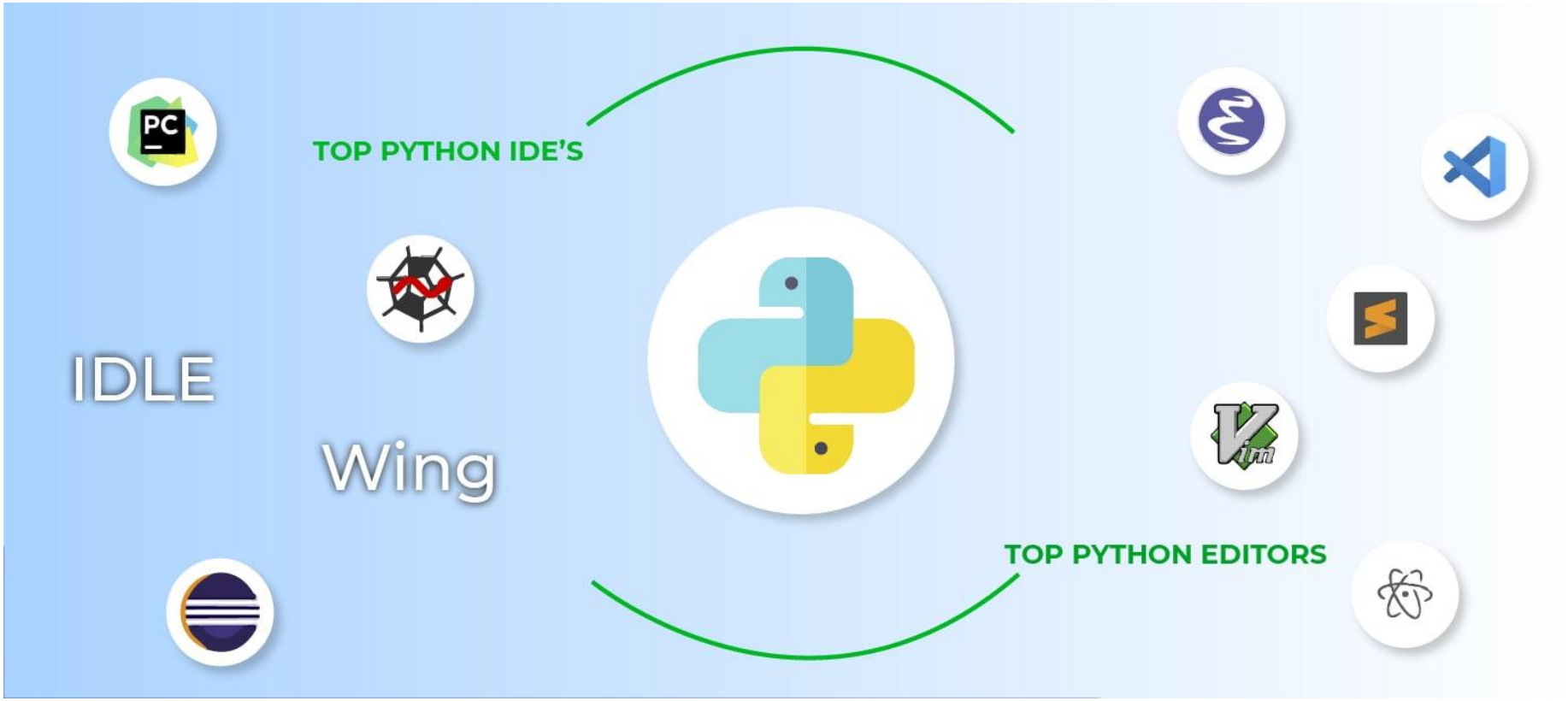
Python IDE

- IDEs versus Text Editors



Python IDE

- Python IDEs for python



Python IDE

- Python IDEs for Data Science
  - Spyder
  - **PyCharm**
  - Rodeo
  - Atom
  - **Jupyter Notebook**
  - **Jupyter Lab**
  - **Visual Studio Code**
  - **PyDev**

Python IDE

- Python IDEs for Data Science

  – http://www.jupyter.org/

  and

  – try it with python in http://jupyter.org/try
    - Code Cell
    - Markdaown Cell

Python IDE

- Python IDEs for Data Science

  Now, let's launch Jupyter Notebook in your PC

  - Open a terminal window or **anaconda prompt**
  - Enter the startup folder with cd
  - Create and/or activate your virtual environment
  - Type **jupyter notebook** to launch the Jupyter Notebook App
    - If note installed, use **conda install -c conda-forge jupyterlab** (or using **pip3 or mamba)**
    - The notebook interface will appear in a new browser window or tab.
  - Ask for help if needed