Introduction to Programming in Python

UCLA Anderson School of Management (Fall 2020)

Master of Financial Engineering

Introduction

Hi MFE Class of 2021!

Welcome to the Python programming workshop. My name is Anand, I am a first year Ph.D. student in finance at Anderson. In this workshop, we will explore the fascinating world of programming in Python and discuss some applications on real world problems. This document will walk you through the workshop structure and the required software. This will involve downloading and installing just one software (Anaconda), which comes with the Python programming language and multiple environments (Jupyter, Spyder, etc.) to write and compile your code.

Workshop Structure

This workshop is divided into 4 classes and each class is dedicated to a specific module on Python programming. A list of topics that we will cover in this workshop are -

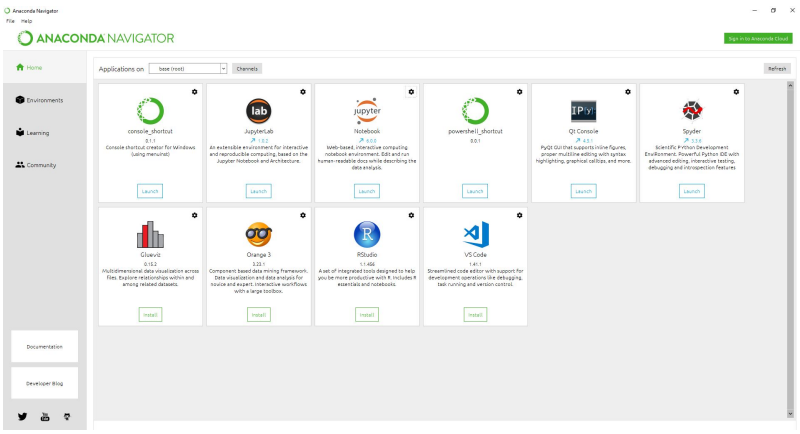
- **Module I** - Data types, data structures, variables, NumPy, and matrix operations
- **Module II** - Pandas and data analysis
- **Module III** - Logical statements, loops, functions, and plotting
- **Module IV** - Optimization (introduction), good programming practices, and programming interview questions

Python

Python was originally designed for readability and flexibility. It is a language that displays complexity through simplicity. The applications range from software development to database management and from web applications to analyzing big data. Compared to R, which is geared specifically towards data analysis, Python is more versatile. Compared to MATLAB, which is not open source, Python is free. And finally, compared to lower-level programming languages like C++ & Java, Python is relatively easy to learn!

Installing Anaconda

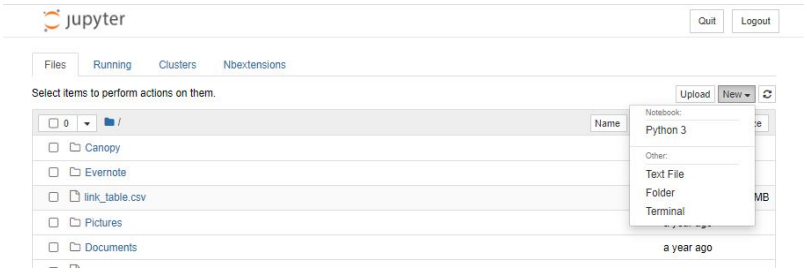
The most recent version of Python is Python3. The interpreter we will be installing for Python3 is Anaconda. The link to download and install is - **https://www.anaconda.com/distribution/#download-section**. Click, download and install **Python3.7** for your operating system (Windows, Linux, or macOS). After successfully installing Anaconda on your system and opening it, you will see the following screen -



For the purpose of this workshop, we will be using Jupyter notebooks. However, you are encouraged to explore other Python environments like Spyder and Jupyter Lab.

Jupyter Notebook

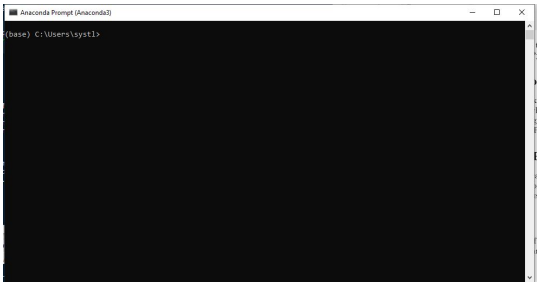
For the next step, launch the Jupyter notebook. Your Jupyter notebook will open in a web browser.



Jupyter Notebook is a web based interactive environment. The extension under which a Jupyter Notebook is saved is ".ipynb". The Jupyter Notebook can support multiple programming languages (**Ju**lia, **Pyt**hon, **R**, etc.) and can be converted to number of open standard output formats (HTML, PDF, .py etc.). You will get familiar with this interface over the next few days.

Anaconda Prompt

The command prompt (CMD) allows you to communicate with your computer. Post installation, a new command prompt (specifically for Anaconda) is also installed. Anaconda command prompt is just like command prompt, but it makes sure that you are able to use anaconda and conda commands from the prompt, without having to change directories or your path (which can be quite painful!).



We will be using only the **Anaconda Prompt** and not your system's command prompt for installing and updating packages. Once you open Anaconda Prompt you will see the following black screen. Mac users

open launchpad and click on the terminal icon.

Resources

With growing number of books and online resources, I have tried to list some of the resources that will be helpful to continue your education in Python beyond this workshop. This list is not exhaustive by any means and you are encouraged to look further -

Books

- Python For Finance by Yves Hilpisch, O'Reilly 2014 (Intermediate Level)
- Python For Data Analysis by Wes McKinney, O'Reilly 2013 (Intermediate Level)
- Other mentions: Pro Python by Marty Alchin, Python Cookbook by David Beazly

Websites (For Queries and Competitions)

- Hacker Rank (competitive programming challenges platform)
- Stack Overflow is every programmers go-to website for queries and bugs. There is a good chance someone else had the same problem as you and an expert has provided a solution to the problem on this website. You'll be visiting this website .. a lot!
- Kaggle (Data science & quant finance competitions)
- Quantopian (quant trading and back testing platform)

Conclusion

You are now all equipped to explore Python! Over the course of this workshop, experienced programmers in any other language can pick up Python very quickly, and beginners will find the clean syntax and indentation structure easy to learn.

If any questions arise, do not hesitate to contact me. I look forward to our meeting soon!

–

Anand Systla (Email : *asystla92@g.ucla.edu*)