INTRODUCTION TO PYTHON

Overview:

Python is used for general purpose programming. It is easy to use and understand. It can be used on a variety of operating systems. It forms a gateway into the realm of programming. A lot of start-ups and small businesses use python since it is free of cost and any product is easy to build with lesser codes. Time management is better with python. The scope of python is ever increasing, and it becomes important to know the subject when one chooses to delve into web development or data science.

Learning outcomes:

- ✓ Knowing about python
- ✓ Features of python
- ✓ Installing Anaconda Navigator
- ✓ Launching Jupyter notebook
- ✓ Basics about Jupyter notebook

What happens to be amongst the most in-demand programming languages was in-fact started as a hobby by its creator Guido Van Rossum to keep him occupied during Christmas. Today, almost all big companies use python for their services in some way or the other. Amongst the renowned ones are Google, Pinterest, Netflix, Quora, etc.

First things first, what is Python?

Python is a programming language, just like C, C++ and Java. It is a scripting language. It is a Object-oriented- this means that its paradigm is based on 'objects' and 'classes'. Python is dynamically typed, meaning, the interpreter gives the variable a type during runtime based on its value and it does type checking during the same.

Features of Python:

Python has various features, major ones of which are:

- Easy to understand: The python code is easy to understand because the syntax is uncomplicated and in English. Python does not use braces for different functions, it uses indentation which makes the code look clean and neat, thus making it readable.
- High-level language: a high level programming language is that which is user-friendly and resembles natural human language.
- It is an interpreted language: The python code is executed one line at a time unlike C++ which is executed all at once. The interpreter displays the output one line at

once, which means that if there is any error, unless the error is resolved, the code will not be executed any further.

- Object-oriented program: as mentioned before, an OOP means that python treats it as an object.
- Open-source: Python is an open source programming language. It's codes are freely available for usage. It is an interpreted language that can be used by anybody for any purpose.
- Platform-independent: Python can be run on platform such as Windows, Linux, Mac. The code for a program on each of these platforms will be the same.
- Extensible and embeddable: One can run codes from other languages on Python, which makes it an extensible programming language and the other way around- they can also run python codes on C++, Java or any other programming language. Hence, it is also embeddable.
- Large Standard Library: Python has a collection of modules that make it easy for people to code in it. Modules are sets of code that are pre-written so that one doesn't have to re-write commonly used commands every time. Modules can be used by importing them.

A python file is saved with a .py extension. It is easy, fast and efficient. It has a wide range of applications some of which are web development, scripting, data science, prototyping and programming a database. All of python's features like simplicity, easy of use, flexibility, portability, development speed and programmer friendliness puts its use above other programming languages'.

Python IDEs

- ### What is an IDE?

Integrated Development Environment, in easy words, allows programmers to combine various parts of a program in a single GUI based application. An IDE ideally constitutes of a source code editor, build automation tools and debugger. There are some IDEs that are multi-language, like Eclipse and Visual Studio. IDEs are easy to setup, they make development faster and easier, thus, saving efforts. IDEs also help correct errors and show where the code is wrong.

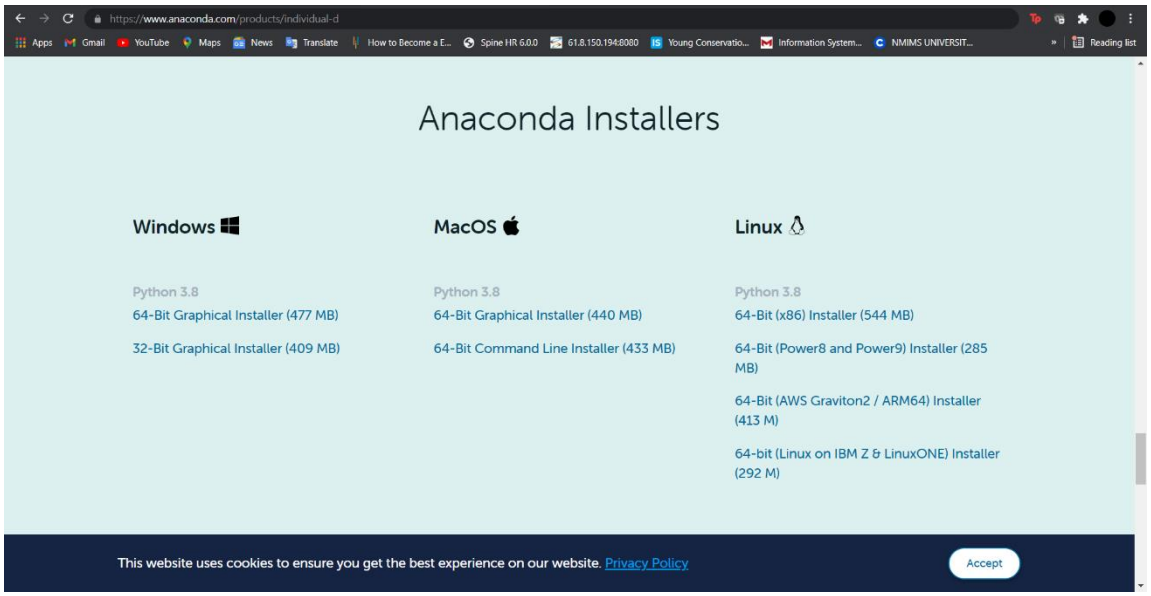
In Python, the most frequently used IDEs include Spyder, Jupyter, PyCharm, IDLE and Atom. For the course, we will be using Jupyter, which is part of the Anaconda distribution.

- ### Anaconda Distribution:

Anaconda distribution is a Python and R data science distribution. It is easy to download and is open source. It has over 7500 packages. A package is a collection of modules. All of it freely available and Anaconda also provides community support which is available for all python related queries one has.

Steps to Install Anaconda:

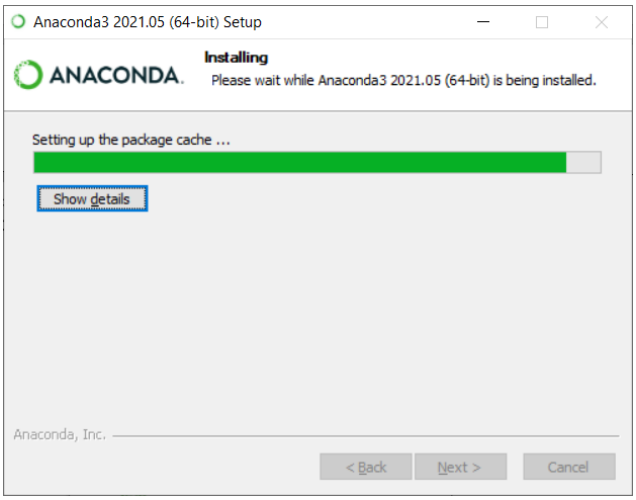
- Go to the anaconda website. https://www.anaconda.com/products/individual-d



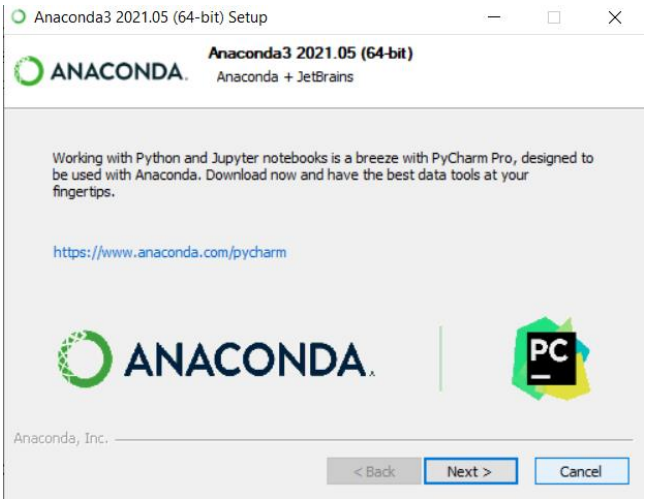
On the website, click on download for your respective operating system (i.e., Windows, Mac, Linux)

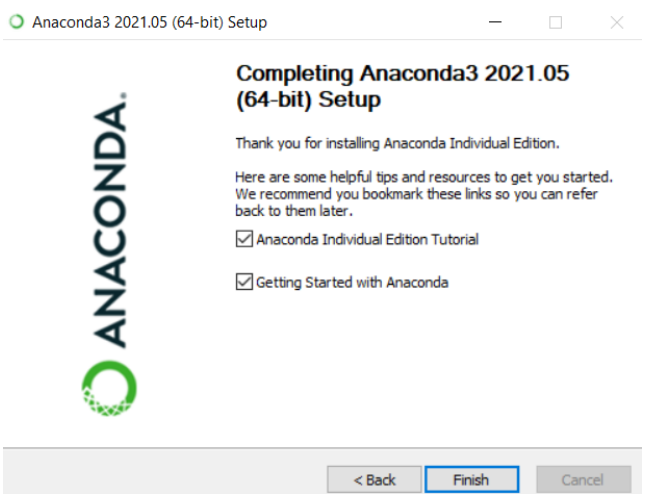
- The site should give you a prompt to save the file, select the location where you want to place the file.
- Once downloaded, open it. You should see a prompt like this. Click on next.

- Click on 'I agree' and do not change any settings/presets that are there. Click on Next. Specify a destination on the computer. Click Next and it should start the installation. Once done, click on Next.



- Click on Next once again. And click on Finish.

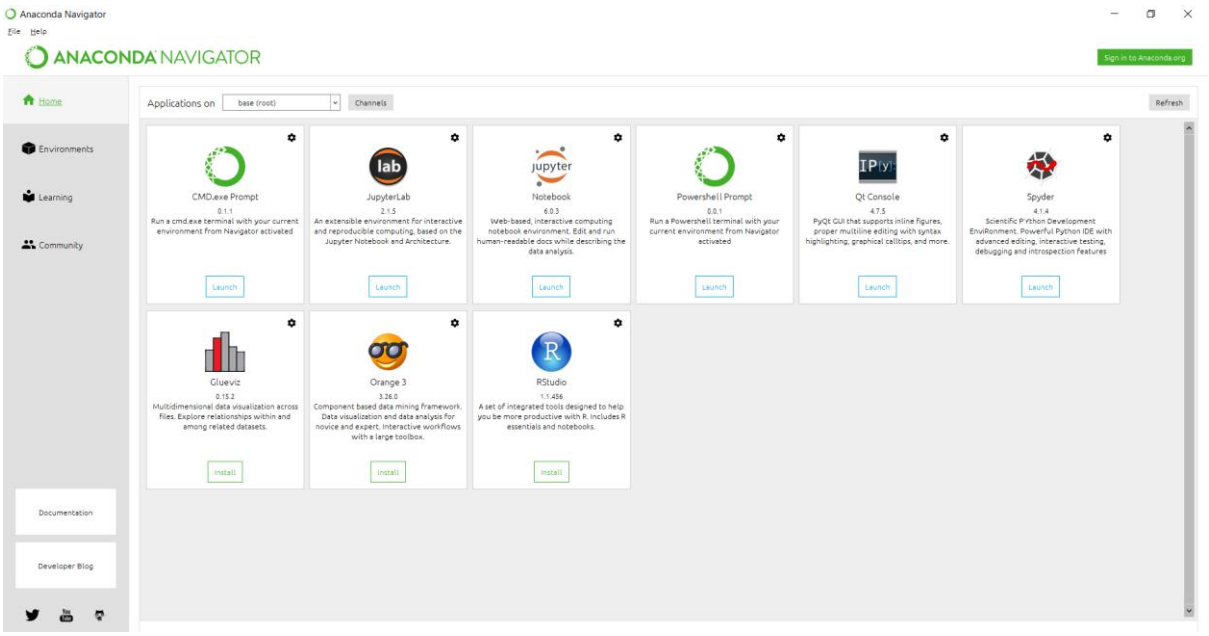




Once you are done downloading the Anaconda Navigator, you will be redirected to a website. For tutorials you can glance over the website and explore.

LAUNCHING A JUPYTER NOTEBOOK

- Go on your search bar, and search for the Anaconda Navigator you just downloaded. It takes a while to open.
- You must see a screen like this:



These are some of the applications that are part of the Anaconda distribution by default.

- Go to Jupyter Notebook and click on Launch.
- You should be redirected to a website

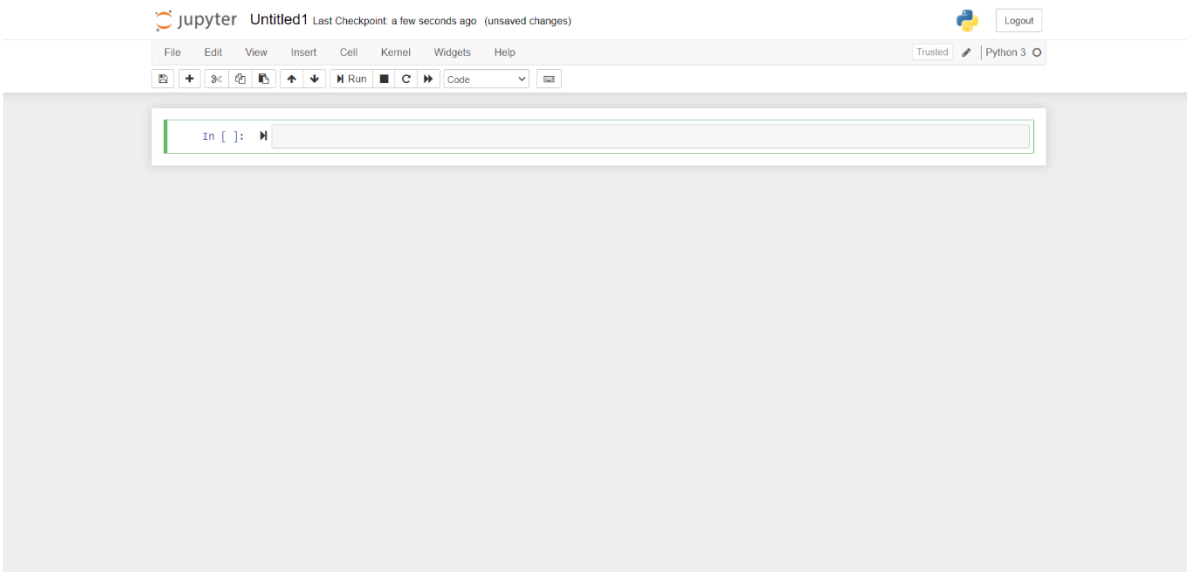
The site's URL is http://localhost:8888/tree

The '8888' part in the URL might change if another notebook is open in the background. The files shown on the page are ones that are there on your computer

- To open a Jupyter notebook:

Go to New, click on 'Python 3' under the Notebook tab.

Once you click Python 3, another tab opens and you can see the Notebook window.



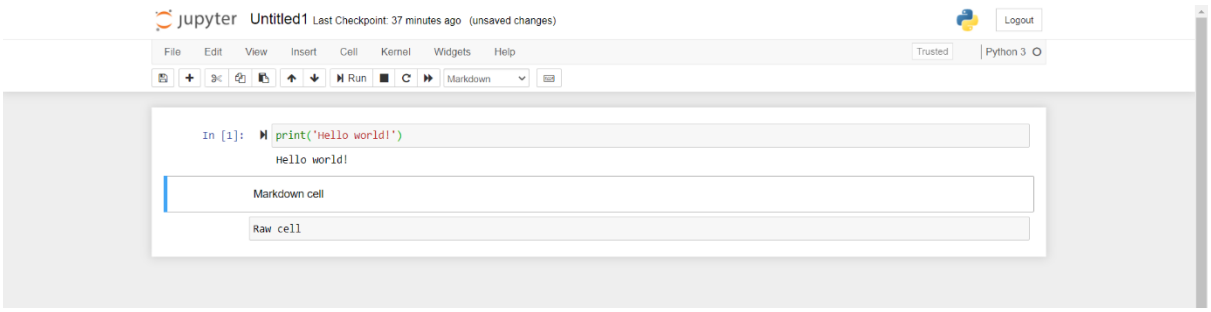
Parts of the notebook window:

- 'Untitled1' here is the name of the notebook, you can edit it by double clicking on it or saving the notebook.
- The checkpoint shows the last time changes were made and saved on the notebook.
- The menu bar is one directly below it, the pane which begins with File. All of those tabs are used to make changes in the way the notebook works.
- The Toolbar lies below the Menu bar. It gives icons to select most used operations by simply clicking on them, such as new notebook for the '+', Run to run the cell, etc.
- The kernel shows the type of kernel the current notebook uses (i.e. here, Python 3).

There are three types of cells in the Jupyter notebook, namely, Code, Markdown, and Raw Cells.

- The Code cells are used to write the code and program. It has to be properly indented and must have clear syntax.
- The Markdown cells are used to document what you write, it is descriptive text.
- Raw cells are a place where you can write the output directly. These cells are not evaluated. They are like comments.

Every cell is a Code cell by default. One can change its type by the drop down on the Toolbar.



Code cell when executed, gives the solution as above. Markdown cell when executed appears as a note/text.

SHORTCUTS

Operation	Shortcut Key
Run	Ctrl + Enter
Create a new cell	Shift + M
Copy a cell	c
Paste cell	Shift + v
Delete cell	Double click ‘d’
Change type of Cell to: Code	Y
Change type of Cell to: Markdown	M
Change type of Cell to: Raw Cell	R
Save (edit checkpoint)	Ctrl + S