Getting started with Python-

Introduction to Python

Contents

What is Python?

- Python is a general purpose, high level and powerful dynamic programming language.
- Python is an Object Oriented Programming language i.e. it is based on classes and objects where each object can communicate with other by exchanging messages and processing data.
- Its design philosophy is based on the importance of readability and simplicity
  - clean and easy to learn syntax
- It is Free and Open Source which means that it is free for download and the source code is freely available and open for modification and reuse.
- It compiles and runs on a wide variety of UNIX , Windows, MacOS, and various other platforms.

Why Learn Python ?

Free and Open Source	A language where in the original source code is freely available and can be modified.
Ease of Use	Python is easy to pickup and has easy readability.
Extensive support libraries	Large standard libraries include areas such as internet, string operations, operating system interface, web services.
Extensible	Python is portable and extensible. It allows to perform cross-language operations.

Why Learn Python ?

Flexible	It is very easy to write code enhancements, develop packages, develop apps , write your own functions and distribute your own software
Embeddable	Python allows to add scripting capabilities to the code in other languages.
Great Data visualization	Varied plots such as boxplots, histograms, barplots, etc are available and are high in quality and self-explanatory.
Speedy	It offers fast and effective support to the developers and programmers, it brings down the development time and cost.
Machine Learning	Easy to understand and use machine learning libraries.

History of Python

1980	• Designed by Guido Van Rossum at Centrum Wiskunde & Informatica (CWI) in the Netherlands.
1990	• Derived from the television series Monty Python's Flying Circus.
1991	• First release of Python with version 0.9.0.
1994	• Python version 1.0 is released
2000	• Python version 2.0 is released
2008	• Python version 3.0 is released
2020	• Python version 3.8.3 is released

Why Python is Used for Data Science?

- Python and R are among the most popular programming languages for Data Science and are often found opposite to each other in the room of debate on the fact that which one is more valuable. However, both the languages have their specialised features which makes them unique.

But what is making Python very popular

  - Syntax simplicity: its simple and elegant syntax is easy to get along yet being so much powerful at the same time.
  - Operability on different environments: it is easy for programmers to write maintainable, large scale robust code

- Libraries: Python provides data scientists with a set of powerful and efficient libraries like **Scikit, Numpy, Pandas, Scipy** that assist data analysis and statistical computing.

Companies Using Python

- There are around 4.3 million Python users.
- Python is widely used by:
  - Academics and Researchers.
  - Financial companies
  - Large tech companies
  - Social Media giants like Facebook and Instagram
  - Google, Netflix, Dropbox, Reddit, Quora

Python's Community

- Python has an enthusiastic user base, dedicated to encouraging use of the language, and committed to being diverse and friendly.
- The Python Software Foundation (PSF) is a non profit corporation which promotes, protects, and advances the Python programming language and supports and facilitates the growth of a diverse and international community of Python programmers.
- The PSF manages the open source licensing of Python2.1 and later and own and protect the trademarks associated with Python.
- The PSF runs a North American Pycon Conference annually and supports other Python Conferences around the world.
- PyCon is the largest annual gathering of developers, application designers and business people for the community that uses and develops the open-source Python programming language.

Source: python.org

Success Stories

- Python has been successfully implemented and is part of the winning formula for productivity, software quality, and maintainability at many companies and institutions around the world.
- Survey Monkey speeded up with Python:
  Survey monkey is the world's largest survey company, migrated from monolithic C# and .NET to Python as they were finding it slow to add, test and deploy new features. Python has speeded up the process of adding new features and handled heavy traffic without problems and solved many more issues. This transition has been a great success.
- OpenERP is a full-featured enterprise resource planning suite written in Python. Python has played a strategic role in development of OpenERP, giving the company the flexibility to be able to adapt to market or design decision changes over the years.

Success Stories

- ForecastWatch a service of Intellovations, is in the business of rating the accuracy of weather reports from companies such as Accuweather, MyForecast.com, and The Weather Channel. Python has provided high level functionality with very few lines of code, and its interactivity has made their testing code easy and made trying out new ideas or features painless and quick
- Likewise, there are many companies across industries from Software development to Arts to Business to Education to Government to Science and Engineering, where Python has given them a different shape altogether leading it to a big success.

Python Environment

- Python has a rich and powerful external library support which comprises of external modules and packages. It has large set of extremely useful built-in functions.
- Automatic memory management system which uses a mix of reference counting and a cycle detecting garbage collector.
  - Now, how does reference counting works??

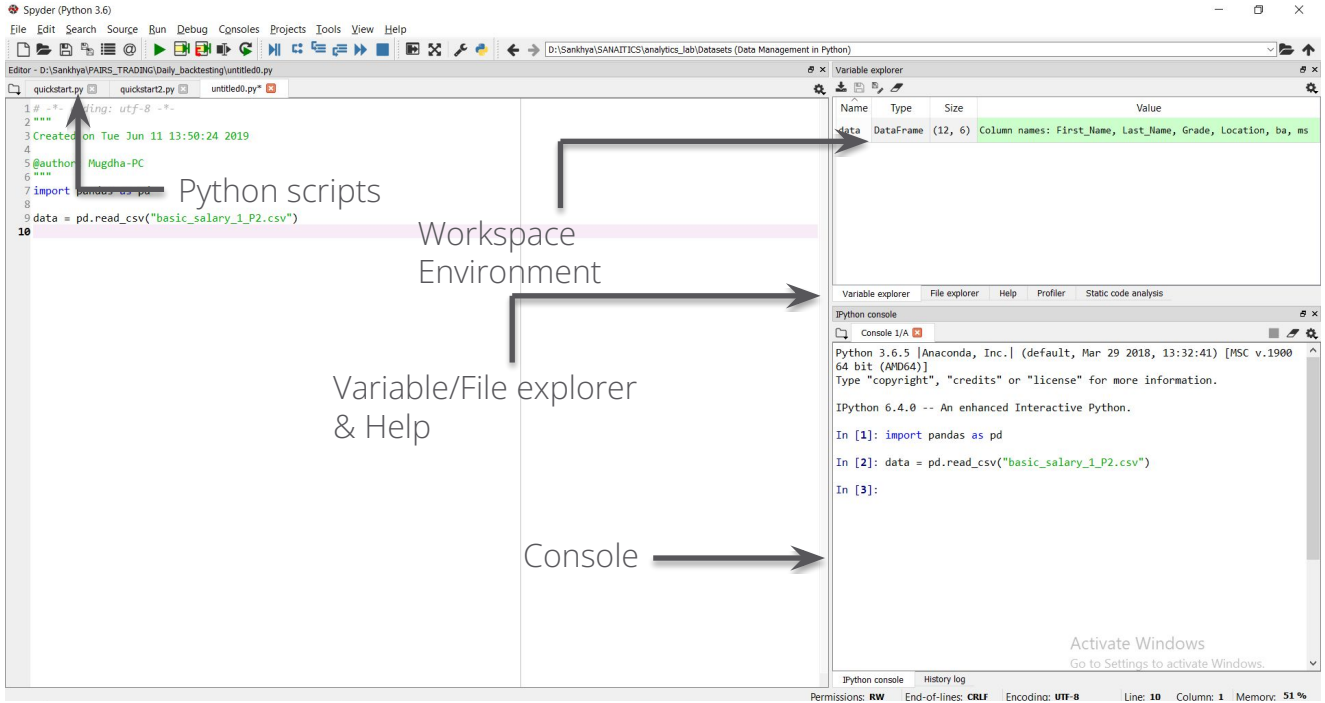
    Every Python object has a reference counter. An extra counter is kept along with each object that is created. Anytime a reference is copied counter is incremented, and anytime a reference goes out of scope, or is reset, counter is decremented.
  - What does the Cycle Detection Garbage collector do?

    It detects the objects which are no longer referenced and recycles the unused memory by freeing up the memory from those objects.
- Python commands are case sensitive.

IDE

- Integrated Development Environment(IDE) is a software which provides programmers with an interface combined with all the tools at hand
- Selection of the right IDE influences the productivity and effectiveness of Python programming
- There are many IDE's for Python (for data science) such as Spyder (Scientific PYthon Development EnviRonment) and Rodeo.
- Most recommended and widely used among these is Spyder.
- Spyder includes a Console, Editor, History log, help, variable Explorer, File Explorer and Projects

Spyder IDE


Python scripts
Workspace Environment
Variable/File explorer & Help
Console

Quick Recap

In this session, we had an introduction about Python. Here is the quick recap:

Python	• Python is an Object Oriented Programming language • It is free and open source software • It is built using packages, which contains Basic and advanced functions. • Python Community is a global community with millions of software developers who interact online and offline in thousands of virtual and physical locations.
Spyder	• Spyder is most widely used user friendly IDE.