PYTHON PROGRAMMING LANGUAGE

SIDDHESH RAJENDRA MEHTA
MIS : 111903105

October 19, 2020

1 Introduction

Python is an interrupted, high-level, general purpose programming language. Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant whitespace. The main advantage of python is that it is rich in libraries. Usage of python in programming also reduces the size of code. There are many inbuilt functions available. ***Python is supported by many operating systems like windows, ununtu and many more.*** **According to the latest TIOBE Programming Community Index, Python is one of the top 10 popular programming languages of 2017. Python is a general purpose and high level programming language. You can use Python for developing desktop GUI applications, websites and web applications. Also, Python, as a high level programming language, allows you to focus on core functionality of the application by taking care of common programming tasks. The simple syntax rules of the programming language further makes it easier for you to keep the code base readable and application maintainable. Here is symbol of Python language.**

2 Importance of Python

Python supports the use of modules and packages, which means the programs will design in module style and code can be decreased according to the project. Once you developed a package or module, this can use in another project also if we need an easy to export and import these modules. One of the most favorable benefits through Python is interpreter and standard libraries both are available for a free charge, both binary and source form. Here it is an attractive option for developers, no worries about paying high development costs. Python developers are known as Pythonist. So, you can use Python for Game Development, Web Development, Scraping Data from the web, Data Analysis, Creating GUI applications, enterprise level using scientific and many more. Here are some important applications of Python.

2.1 Web Applications:

Python helps to create and develop an application in Social Networking. Python used to develop bigger websites like Quora, Pinterest, etc.

2.2 Big Data Analysis :

Python comes to the picture to save from a danger where other programming languages have failed in fetching live streaming data from the internet. Data is growing rapid rate at every moment. Likewise, twitter reveals the statistics that are 350 million tweets daily and 500 million accounts. Investigation of this data in deeper manner is called Big Data Analysis. Hence, Python is an outstanding programming language that can communicate with the live streaming servers.
`A number of scientists and researchers are working in this domain`

2.3 IOT :

We can learn Python very easily and supported by a large, helpful community. When small devices have enough memory then developers turn to Python. The syntax of Python is very easy and simple and it attracts the programmers. It will be the first for biologists and scientists, for instance. It is only the language choice for the most popular micro-controller in the market - the *Raspberry Pi*. By using Python we can build effective tools from the same board and libraries used in elementary school.
Almost all training literature has been written in Python and most of the schools use these platform to teach computer programming. Hence Python offers many benefits to organizations. *This is the blog Why is Python Important.*

2.4 Readable and Maintenance of Code :

While writing a software application, you must focus on the quality of its source code to simplify maintenance and updates. The syntax rules of Python allow you to express concepts without writing additional code. At the same time, Python, unlike other programming languages, emphasizes on code readability, and allows you to use English keywords instead of punctuations. Hence, you can use Python to build custom applications without writing additional code. The readable and clean code base will help you to maintain and update the software without putting extra time and effort.

2.5 Multiple Programming Paradigms :

Like other modern programming languages, Python also supports several programming paradigm. It supports object oriented and structured programming fully. Also, its language features support various concepts in functional and aspect-oriented programming. At the same time, Python also features a dynamic type system and automatic memory management. The programming paradigms and language features help you to use Python for developing large and complex software applications.

3 Data Structures in Python

Simple data structures are as follows :

1. **List**
2. **Tupple**
3. **Dictionary**
4. **Set**

Some of the advanced data structures are as follows :

- **Stack**
- **Queue**
- **Linked List**
- **Binary Trees**
- **Hash Table**

4 Python Versions

Some of the recent Python 3 version release dates are as follows.

Sr. No.	Python Version	Release Data
1	Python 3.8	14 Oct 2019
2	Python 3.7	27 June 2018
3	Python 3.6	23 Dec 2016
4	Python 3.5	13 Sep 2015
5	Python 3.4	16 Mar 2014

Using Python programming we can find solutions difficult equations. For example..

$$y = x^3 + x^2 + 5x^1 + 22 \tag{1}$$

$$y = x^4 + 122x^3 + 1200 \tag{2}$$

5 Applications of Python :

5.1 GUI-Based Desktop Applications:

Python has simple syntax, modular architecture, rich text processing tools and the ability to work on multiple operating systems which make it a desirable choice for developing desktop-based applications. There are various GUI toolkits like wxPython, PyQt or PyGtk available which help developers create highly functional Graphical User Interface (GUI). The various applications developed using Python includes:

Image Processing and Graphic Design Applications: Python has been used to make 2D imaging software such as Inkscape, GIMP, Paint Shop Pro and Scribus. Further, 3D animation packages, like Blender, 3ds Max, Cinema 4D, Houdini, Lightwave and Maya, also use Python in variable proportions.

Scientific and Computational Applications: The higher speeds, productivity and availability of tools, such as Scientific Python and Numeric Python, have resulted in Python becoming an integral part of applications involved in computation and processing of scientific data. 3D modeling software, such as FreeCAD, and finite element method software, such as Abaqus, are coded in Python.

Games: Python has various modules, libraries and platforms that support development of games. For example, PySoy is a 3D game engine supporting Python 3, and PyGame provides functionality and a library for game development. There have been numerous games built using Python including Civilization-IV, Disney's Toontown Online, Vega Strike etc.

5.2 Web Frameworks and Web Applications:

Python has been used to create a variety of web-frameworks including CherryPy, Django, TurboGears, Bottle, Flask etc. These frameworks provide standard libraries and modules which simplify tasks related to content management, interaction with database and interfacing with different internet protocols such as HTTP, SMTP, XML-RPC, FTP and POP. Plone, a content management system; ERP5, an open source ERP which is used in aerospace, apparel and banking; Odoo – a consolidated suite of business applications; and Google App engine are a few of the popular web applications based on Python.

5.3 Enterprise and Business Applications:

With features that include special libraries, extensibility, scalability and easily readable syntax, Python is a suitable coding language for customizing larger applications. Reddit, which was originally written in Common Lips, was rewritten in Python in 2005. Python also contributed in a large part to functionality in YouTube.

5.4 Operating Systems:

Python is often an integral part of Linux distributions. For instance, Ubuntu's Ubiquity Installer, and Fedora's and Red Hat Enterprise Linux's Anaconda Installer are written in Python. Gentoo Linux makes use of Python for Portage, its package management system.

5.5 Language Development:

Python's design and module architecture has influenced development of numerous languages. Boo language uses an object model, syntax and indentation, similar to Python. Further, syntax of languages like Apple's Swift, CoffeeScript, Cobra, and OCaml all share similarity with Python.

5.6 Prototyping:

Besides being quick and easy to learn, Python also has the open source advantage of being free with the support of a large community. This makes it the preferred choice for prototype development. Further, the agility, extensibility and scalability and ease of refactoring code associated with Python allow faster development from initial prototype.

Since its origin in 1989, Python has grown to become part of a plethora of web-based, desktop-based, graphic design, scientific, and computational applications. With Python available for Windows, Mac OS X and Linux / UNIX, it offers ease of development for enterprises. Additionally, the latest release Python 3.4.3 builds on the existing strengths of the language, with drastic improvement in Unicode support, among other new features.