

Python – The Fastest Growing Programming Language

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Abstract: Python is a suitable language for both learning and real world programming. Python is a **powerful high-level, object-oriented programming** language created by Guido van Rossum. In this paper we first introduce you to the python programming characteristics and features. This paper also discusses about the reasons behind python being credited **as the most fastest growing programming language** in the recent times supported by research done over the articles procured from various magazines and popular websites. This paper features about the characteristics and most important features of python language, the types of programming supported by python and its users and its applications.

Key words: Python ,Programming languages , Real world programming.

1. INTRODUCTION

In this paper, we are going to introduce the characteristics of Python. Python is a **general-purpose**, high-level programming language which is widely used in the recent times [1][2][3]. Its design philosophy emphasizes **code readability**, and its syntax allows programmers to express concepts in **fewer lines of code than** would be possible in languages such as C [4]. The language constructs enable the user to write clear programs on both a small and large scale [5]. The most important feature in Python being it supports **multiple programming paradigms, including object-oriented, imperative and functional programming or procedural styles**. Python supports a **dynamic type system** and **automatic memory management** and has a **large and comprehensive standard library**. Python interpreters are **available for many operating systems**.

Latest reviews about python published in popular magazines and websites:

5th Largest StackOverflow Community

StackOverflow is a programming Q&A site you will no doubt become intimate with as a coding beginner. Python has 85.9k followers, with over 500k Python questions. Python questions are also the 3rd most likely to be answered when compared to other popular programming languages.

3rd Largest Meetup Community

At meetups, you can generally network and learn from fellow developers. Meetups often offer mentorship to those

who want it as well. There are 1300+ Python groups on Meetup.com, totaling 608k+ members. Thus, in terms of programming languages, Python is the 3rd largest community.

4th Most-Used Language at GitHub

Python is also known to have an abundance of libraries that assist with data analysis and scientific computing. In addition, PyGames is a neat game engine to build games with if you want to make simple games.

Career Opportunities

On Angel List, Python is the 2nd most demanded skill and also the skill with the highest average salary offered. With the rise of big data, Python developers are in demand as data scientists, especially since Python can be easily integrated into web applications to carry out tasks that require machine learning.

Reasons for Python to become the fastest-growing programming language:

Python's status as the fastest-growing programming language is being fuelled by a sharp uptick in its **use for data science**. The link has been established by a new analysis by Stack Overflow, the Q&A hub that is home to the world's largest online developer community.

Jacqueline Kazil, board director of the Python Software Foundation (PSF), predicted Python's popularity will continue grow, as the language's accessibility and utility continue to be attractive to researchers carrying out analytics. "But the share of Python developers who are visiting data science technologies is growing very rapidly. This suggests that **Python's popularity in data science and machine learning is probably the main driver of its fast growth**."

The overriding interest among Python developers in data science is reinforced by other data. Among the Python-tagged questions, the fastest growing tag is related to pandas, a data analytics software library for Python. Only introduced in 2011, it now accounts for almost 1% of Stack Overflow question views. However, the second most visited tag by Python visitors is JavaScript, likely reflecting the healthy use of Python by web developers.

By analyzing visitors by industry, Stack Overflow determined that those viewing Python-related questions are most commonly involved in academia, followed by electronics, manufacturing and software industries.

"However, Python's growth is spread pretty evenly across industries. In combination this tells a story of data science and machine learning becoming more common in many types of companies, and Python becoming a common choice for that purpose," says Robinson.

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Characteristics of python:

Python is a well designed language that can be used for real world programming. Python is a very high-level, dynamic, object-oriented, general purpose programming language that uses interpreter and can be used in a vast domain of applications. Python was designed to be easy to understand and use. Python is termed as a very user-friendly and beginner-friendly language in the recent times. Python has gained popularity for being a beginner-friendly language, and it has replaced Java as the most popular introductory language. As a dynamically typed language, Python is really flexible. Furthermore, Python is also more forgiving of errors, so you'll still be able to compile and run your program until you hit the problematic part. Python is a flexible, simple coding programming language. This language can support different styles of programming including structural and object-oriented. Other styles can be used, too. Python is very flexible, because of its ability to use modular components that were designed in other programming languages. For example, you can write a program in C++ and import it to python as a module. Then add something else to it (for example design a GUI for it).

However, there are few drawbacks with python:

Not Easy to Maintain:

Because Python is a dynamically typed language, the same thing can easily mean something different depending on the context. As a Python app grows larger and more complex, this may get difficult to maintain as errors will become difficult to track down and fix, so it will take experience and insight to know how to design your code or write unit tests to ease maintainability.

Slow:

As a dynamically typed language, Python is slow because it is too flexible and the machine would need to do a lot of referencing to make sure what the definition of something is, and this slows Python performance down.

Features of Python:

Python is simple and lovely

It is a very high-level language that has many sources for learning. Python supports a wide variety of third party tools which makes it much easier to use and motivates the users to continue with. Python has a very simple and elegant syntax. It's much easier to read and write Python programs compared to other languages like: C++, Java, C#. Python makes programming fun and allows you to focus on the solution rather than syntax. If you are a newbie, it's a great choice to start your journey with Python.

Python is portable

Python scripts can be used on different operating systems such as: Windows, Linux, UNIX, Amigo, Mac OS, etc. You can move Python programs from one platform to another, and run it without any changes.

It runs seamlessly on almost all platforms including Windows, Mac OS X and Linux.

Python is open source

Even though all rights of this program are reserved for the Python institute, but it is open source and there is no limitation in using, changing and distributing. You can freely use and distribute Python, even for commercial use. Not only can you use and distribute softwares written in it, you can even make changes to the Python's source code. Python has a large community constantly improving it in each iteration.

Python supports other technologies

It can support COM, .Net, etc objects.

Extensible and Embeddable

Suppose an application requires high performance. You can easily combine pieces of C/C++ or other languages with Python code.

This will give your application high performance as well as scripting capabilities which other languages may not provide out of the box.

A high-level, interpreted language

Unlike C/C++, you don't have to worry about daunting tasks like memory management, garbage collection and so on. Likewise, when you run Python code, it automatically converts your code to the language your computer understands. You don't need to worry about any lower-level operations.

Large standard libraries to solve common tasks

Python has a number of standard libraries which makes life of a programmer much easier since you don't have to write all the code yourself. For example: Need to connect MySQL database on a Web server? You can use MySQLdb library using import MySQLdb. Standard libraries in Python are well tested and used by hundreds of people. So you can be sure that it won't break your application.

Object-oriented

Everything in Python is an object. Object oriented programming (OOP) helps you solve a complex problem intuitively. With OOP, you are able to divide these complex problems into smaller sets by creating objects.

Python is a multi-paradigm programming language: object-oriented programming and structured programming are fully supported. Python uses dynamic typing and a combination of reference counting and a cycle-detecting garbage collector for memory management. An important feature of Python is dynamic name resolution (late binding), which binds method and variable names during program execution. Python was designed to be highly extensible. Python can also be embedded in existing applications that need a programmable interface. Python has a large standard library, commonly cited as one of Python's greatest strengths, providing tools suited to many tasks. For Internet based applications, a large number of standard formats and protocols (such as MIME and HTTP) are supported. Modules for creating graphical user interfaces, connecting to relational databases, pseudorandom number generators, arithmetic with arbitrary precision decimals, manipulating regular expressions, and doing unit testing are also included.

Python can be used to write a wide variety of programs:

Python is a well designed language that can be used for real world programming. The most common program types that can be written by Python are categorized below:

System programming

Python's internal interfaces support working with services of operating system and hence makes it a suitable language for system programming. The standard library of Python can support the different types of platforms and operating systems. It contains some tools for working with system resources such as environmental variables, files, sockets, pipe, processes, multiple threads, command line, standard stream interfaces, shell programming, etc.

Graphical User Interface (GUI)

Tkinter and wxPython are the basic interfaces for designing GUIs in Python. Tkinter is a standard object-oriented interface that is distributed with Python interpreter. It provides the essential tools for designing GUI.

Network and internet programming

Various modules are embedded in Python standard library that provide many tools for network programmers, such as: client-server connection, socket programming, FTP, Telnet, email functions, RPC, SOAP, etc.

Components integrity

Python is able to make an integrated connection between its codes and other components. Tools such as Swing and SIP can import the compiled codes of other languages for using in Python.

Database programming

Python supports most of the common databases like Sybase, Oracle, Informix, MySQL, PostgreSQL, SQLite, etc. Pickle is a standard module that can store and recover objects in files. Also, ZODB is a pure object-oriented tool for working with databases. From Python 2.5 on, SQLite was considered as a standard part of Python.

Other programming applications

Python dominates a wide extent of programming areas. For example, PyGame is a tool for game programming and PIL is used for image processing. For robotic programming, PyRo exists. A complete package for artificial intelligence, network simulation, and shell programming was published under the title NLTK. Almost in all area you can find sufficient modules that can help you to get to your goals. There are different tools for Python users with different needs. This good feature makes Python suitable for any kind of programming. Large amount of using Python by popular websites and applications is the best evidence for this matter.

Python Users:

Many corporations have used and been using this tool for different functions. Some of them are enlisted:

- Google is one of the Python users that included this language in its web search system and employed Python's creator, too.
- YouTube video sharing service makes extensive use of Python.
- Popular BitTorrent peer-to-peer file sharing system is written by Python.
- ESRI uses Python as an end-user customization tool for its popular GIS mapping products.
- NASA, Los Alamos, Fermilab, JPL, and others use Python for scientific programming tasks.
- iRobot uses Python to develop commercial robotic vacuum cleaners.
- Intel, Cisco, Hewlett-Packard, Seagate, Qualcomm, and IBM use Python for hardware testing.

- NSA uses Python for cryptography and intelligence analysis.
- IronPort email server product uses more than 1 million lines of Python code to do its job.
- One Laptop Per Child (OLPC) project builds its user interface and activity model in Python.
- Industrial Light & Magic, Pixar, and others use Python in the production of movie animation.
- JPMorgan Chase, UBS, Getco, and Citadel apply Python for financial market forecasting.

[5] Kuhlman, Dave. "A Python Book: Beginning Python, Advanced Python, and Python Exercises".

[6] <https://stackoverflow.com>

[7] <https://github.com>

Future of Python :

According to the TIOBE index, Python is the 4th most popular programming language out of 100. With the rise of Ruby on Rails and more recently Node.js, Python's usage as the main prototyping language for backend web development has diminished somewhat, especially since it has a fragmented MVC ecosystem. However, with big data becoming more and more important, Python has become a skill that is more in demand than ever, especially it can be integrated into web applications. As an open source project, Python is actively worked on with a moderate update cycle, pushing out new versions every year or so to make sure it remains relevant. In terms of search volume for anyone interested in learning Python, it has skyrocketed to the 1st place when compared to other languages.

CONCLUSION

In this paper, we introduced the Python programming language as a suitable choice for learning and real world programming. The paper has discussed the characteristics, features, types of programming support offered by python. According to these characteristics we found Python as a fast, powerful, portable, simple and open source language that supports other technologies. Then, different types of programs that can be written by Python were investigated. The paper has also discussed about the latest applications of python by some of the popular corporations. The paper has cited the reasons as to why python language is the fastest growing programming language based on the information obtained from popular and trusted magazines and websites.

REFERENCES

- [1] TIOBE Software Index (2011). "TIOBE Programming Community Index Python". 1
- [2] "Programming Language Trends - O'Reilly Radar". Radar.oreilly.com. 2 August 2006.
- [3] "The RedMonk Programming Language Rankings: January 2011 – tecosystems". Redmonk.com.
- [4] Summerfield, Mark. Rapid GUI Programming with Python and Qt.