

Many Reasons for Promoting Python as an Introductory Language for Beginners

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Abstract— To create interest among the new programmers, it is very important to find a programming language which is not only user friendly and easy in practice but also suits the present demand of the industries. Almost every well recognized Universities and Schools in India offering computer science as a subject, design their curriculum to such a degree that suits the present demand without taking into account the difficulties faced by the learners at their initial stages. Offering a highly complex programming languages at beginning may create a great dislike about programming among the fresh learners. This paper will enlighten the features of Python programming and why it is suitable to opt for the beginners at preliminary stage of learning.

Keywords: Python, Python for Beginners

I. INTRODUCTION

Introductory programming courses emphasized the importance of employability as a consideration for instructors [1]. Study shows difficult and complex programming at initial level of learning create a lack of interest among learners, thus it is very necessary to introduce the beginners with a programming language which not only easy to learn but also a futuristic one. Unlike C++, Java and other programming languages, Python syntax is more readable and incisive. As a beginner, it allow to understand the concept speedy with less mental efforts. Most programming languages require more (syntax) code to achieve the task, but it is the beauty of Python that it can accomplish the job with minimal codes. This can be better understand with the help of sample Python code mentioned here under. One can see that a single line of code constitute a complete program to display a text.

Sample Code: `print("Hello Python")`

With the simplicity of Python’s syntax, you won’t need to memorize lots of syntax and code that are included in many different places. This will open up hours of time, for you to focus on more advanced concepts that develop your true programming skills, rather than just your ability to memorize syntax – which is an important aspect of programming, but not a true measurement of your proficiency [2].

Python, since coming into existence in 1991, has taken giant strides in the world of programming. Built by a Dutch programmer named Guido Van Rossum, Python is an advanced programming language that emphasizes immensely on the concept of code readability. It follows a syntax that allows programmers to build a framework using fewer lines of code [3].

Apart from its simplicity to write fewer lines of code, Python has been used to create some websites in the world of internet which clearly indicates its popularity as well as its future scope:

- Google
- YouTube

- Quora
- Dropbox
- Yahoo!
- Reddit
- Instagram
- Spotify

II. REASONS FOR POPULARITY?

Python’s syntax and semantics give emphasis to the code simplicity. The language’s design is influenced by a group of 19 principles called the Zen of Python. The result of a small survey done in a school is put under Table 1. A Grading (superior, good and poor) is given to the various benchmark to compare three languages namely C++, Java and Python along with descriptions. Here the poor doesn't mean like worst but it mean hard to learn and code.

Benchmarks	Superior	Good	Poor
Ease of use	Python	C++	Java
Object Oriented Programming	Python C++ Java	-	-
Style	Python	C++	Java
Web Framework	Python	Java	C++
Lines of code	Python	-	C++ Java
Popularity	Python	Java	C++
Libraries	Python	Java	C++
Visualization	Python	Java	C++

Table 1: Gradding for Different Languages

III. FEWER LINES OF CODE

The main reason of Python to become so popular among the programmer is its simplicity and less amount of codes to get the work done. To get a better understanding about the simplicity of Python's code, we will take an example of visualization, where we can see that with very less amount of code in Python a pie chart can be generated as shown Figure 1.

Sample Code:

```
import matplotlib.pyplot as plt
labels = 'Python', 'C++', 'Ruby', 'Java'
sizes = [215, 130, 245, 210]
plt.pie(sizes, labels=labels, colors=colors,
autopct='%1.1f%%', shadow=True, startangle=140)
plt.axis('equal')
plt.show()
```

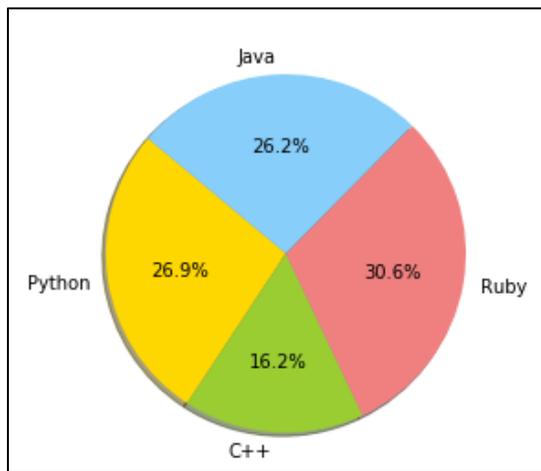


Fig. 1: Pie chart visualization with Python.

If the same chart is generated through the other language like Java, C# or C++ a good number of lines of code is required to write.

IV. WHAT MAKES DIFFERENCE?

Python is often compared to other interpreted languages such as Java, JavaScript, Perl, Tcl, or Smalltalk. Python is an interpreted and dynamically typed language. There are many things which make the Python easier and different from other languages. Some of the features are listed here under.

- Python programs are generally expected to run slower than Java programs, but they also take much less time to develop. Python programs are typically 3-5 times shorter than equivalent Java programs.
- Dynamic data typing is a new concept introduced in Python so that programmer wastes no time in declaring the types of arguments or variables.
- Python doesn't pursue the prototype of old for loop which are being used in JavaScript, C, C++, Java, PHP, and a whole bunch of other programming languages. Python loop can iterate the String, List, File and many other objects easily.
- List, Tuple, Dictionary are few special data structures introduced in Python which give very good comfort to the programmer to handle the variety of data differently.
- Python has a different mechanism to allocate memories hence help great in saving. The dynamic allocation and referencing technique is most powerful tool used for memory management.

V. ROBUST SET OF LIBRARIES

The Python has robust set of standard library (written in C) is very extensive and offers a wide range of services. Nowadays, it is much easier and more efficient to do the job in comparison to the old days with different Python libraries, frames and modules. Today, Python is one of the most popular programming languages for this task and has replaced many industry languages, one of the reasons being its vast library collection.

A. Numpy

NumPy is a very popular library for dealing with the multi-dimensional array and matrix, with the help NumPy higher-

level mathematical functions can be accessed. It is very useful for scientific computations as well.

B. SciPy

SciPy is another very popular library in Python which has several modules for accessing variety of functions related to linear algebra, integration and image manipulations along with ordinary differential equation solving and signal processing.

C. Pandas

Pandas is an open source Python package that offers numerous tools for data analysis. The package includes several data structures that can be used for various data manipulation tasks. It also has a variety of methods that can be invoked for data analysis, which is useful when working on data science and machine learning problems in Python.

D. Matplotlib

Matplotlib is a Python library that generates publication class visualization in a variety of formats and in interactive environments on all platforms. Matplotlib tries to make things easier and difficult things achievable with no efforts. You can generate diagrams, histograms, power spectra, bar graphs, error diagrams, scatter plots with just a few lines of code.

VI. MANIFOLD PROGRAMMING PARADIGM

Python can be used to develop different applications like web applications, graphic user interface based applications, software development application, scientific and numeric applications, network programming, Games and 3D applications and other business applications.

It makes an interactive interface and easy development of applications. Python is mainly compatible with major platforms and systems because of which it is used mainly for developing applications. With help of python interpreters, python code can be run on specific platforms and tools as it supports many operating systems.

As python is an object oriented and interpreted high level programming language and it allows you to run the code on multiple platforms. Uses of Python also helps in accessing the database easily. Python helps in customizing the interfaces of different databases like MySQL, Oracle, Microsoft SQL Server, PostgreSQL, and other databases. It has an object database like Durus and ZODB [4].

VII. CONCLUSION

Python has many characteristics like high level in built data structures, dynamic data typing, and binding, that make it attractive and easier to the beginners' for speedy program development. Python is an open-source software and easily available to use. It has many packages that user can download to make their task easy.

Python makes easy for debugging and if an interpreter throws an error, an exception will be raised or stack trace will also get printed. Today Python is accepted by all growing industries and build their application. Many third party tools are also available which can be used for designing integrative programs with less efforts. Today Python is highly used language in web development area. Django based

framework is most popular tool provide a very systematic approach for development of web applications.

Python proves that it is going to remains a stable programming language. Python is considered great for deployment of automation and web application, but many non-developers are first introduced to the Python language and its ecosystem when starting their data work.

One of the inimitable property of Python is that it not only used for education purpose but now it is being accepted commercially for development of industrial level applications. Many famous industries like Google, Yahoo which are big giant in the field of software and technology are making use of Python, which is a good sign for Python learners and developers.

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