Python Programming

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PYTHON LANGUAGE FUNDAMENTALS - 3

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Learning Mantra

If you really strong in the basics, then remaining things will become so easy.

Agenda:

1. Features of Python

- Portability
- Dynamically Typed
- Python is both Procedure oriented and Object oriented
- Interpreted
- Extensible
- Embedded
- Extensive Library

2. Limitations of Python

3. Flavours of Python

5. Portability

- In general portable means movable. In our childhood days, we heard about portable TV (14 inches), which can be moved from one place to another place very easily.
- Another place where we commonly used the term Portability is mobile number portability.

Now, **Python application Portability** means,

- Assume that one windows machine is there, in this machine your python application is running without any difficulty. Because of license issue or security issue you want to move to Linux machine. If you are migrating to Linux machine from Windows is it possible to migrate your python application or not? **Yes,** because Python application never talks about underlying platform. Without performing any changes in your Python application, you can migrate your Python application from one platform to another platform. This is called **Portability.**

6. Dynamically Typed

- In Python we are not required to declare type for variables. Whenever we are assigning the value, based on value, type will be allocated automatically. Hence Python is considered as dynamically typed language.
- But Java, C etc. are Statically Typed Languages because we have to provide type at the beginning only.
- This dynamic typing nature will provide more flexibility to the programmer.

7. Python is both Procedure oriented and Object oriented

- Python language supports both Procedure oriented (like C, Pascal etc.) and object oriented (like C++,Java) features. Hence we can get benefits of both like security and reusability etc.

8. Interpreted

- We are not required to compile Python code.
- If you consider C program, we have to compile and execute the code.
- If you consider Java program, we have to compile and execute the code.
- If you consider Python program, we have execute the code. We are not required to compile. Internally Interpreter is responsible for compilation of the Python code.
- If compilation fails interpreter raised syntax errors. Once compilation success then PVM (Python Virtual Machine) is responsible to execute.

9. Extensible

- You can extend the functionality of Python application with the some other languages applications. what it means that -

Let us assume that some C program is there, some Java program is there, can we use these applications in our Python program or not?

Yes, we can use other language programs in Python.

What is the need of that?

1. Suppose We want to develop a Python application, assume that some **xyz functionality** is required to develop the Python application.

2. There is some java code is already there for this **xyz functionality**. It is non python code. **Is it possible to use this non-python code in side our python application.**

Yes, No problem at all.

The main advantages of this approach are:

1. We can use already existing legacy non-Python code.

2. We can improve performance of the application.

10. Embedded

- Embedded means it is same as extensible in reverse.
- We can use Python programs in any other language programs. i.e., we can embed Python programs anywhere.

11. Extensive Library

- In Python for every requirement, a readymade library is available.
- Lakhs of libraries are there in Python. No other programming language has this much of library support.
- Python has a rich inbuilt library.
- Being a programmer we can use this library directly and we are not responsible to implement the functionality.

Eg: Write a Python program to generate 6 digit OTP

In Python to generate random numbers, already a library is available. By make use of that library we can write the code in easy manner.

```
from random import randint
print(randint(0,9),randint(0,9),randint(0,9),randint(0,9),randint(0,9),randint(0,9))
```

Output: 5 0 8 8 3 1

Conclusion:

1. These are the 11 key features of Python programming language.

2. Among various features of Python discussed above, the following 3 features are specific to Python

- **Dynamically Typed**
- **Both Procedural Oriented and Object Oriented**
- **Extensive Library**

These 3 Features are not supported by any other programming languages like C,C++ and Java etc.,

Limitations and Flavours of Python

Limitations of Python:

- Even though Python is effective programming language, there are some areas where Python may not work up to the mark.
- Now a days, Machine Learning (ML) is the trending word. To develop ML application, Python is the best choice.
- The reason is Python contains several libraries, using those libraries we can develop ML applications very easily.

For example, in Python we have the following modules to perform various operations:

- There is a module called as **numpy,** which adds mathematical functions to Python.
- To import and read data set, we have another module in Python called as **pandas.**
- To project the data in the form of Graphs, there is an another module is available in Python called as **mathplotlib**.

1.Suppose We want to develop mobile applications, Python is the worst choice. Why?

- The main reason for this is, Python, as of now, not having library support to develop mobile applications.

Which programming language is the best choice for mobile applications?

- Android, IOS, Swift are the kings in Mobile application development domain.

2.Suppose We want to develop Enterprise applications such as Banking, Telecom applications, where multiple services are required (For ex, transaction management, Security, Messaging etc.,).

- To develop these end-to-end applications Python is not best suitable, because, Python doesn't have that much Library support to develop these applications as of now.

3.We are already discussed that, Python is interpreted programing language, here execution can be done line by line. That's why performance wise Python is not good. Usually Interpreted programming languages are performance wise not up to the mark.

To improve performance, Now people are added JIT compiler to the PVM. This works in the following manner:

- Instead of interpreting line by line every time, a group of lines will be interpreted only once and every time that interpreted code is going to used directly. JIT compiler is responsible to do that.
- JIT compiler + PVM flavour is called **pypy**. If you want better performance then you should go for **pypy**(Python for speed) version. [JIT ➔ Just In Time]

Note : These 3 are the various limitations of the Python.

Flavours of Python:

- As we are already discussed that Python is an Open source. That means it's source code is available to everyone.
- Assume that the standard Python may not fulfil our requirement. So, what we need to do is, we have to access the source code and make some modifications and that **customized Python version** can fulfil my requirement.
- For Python, multiple flavours are available, each flavour itself is a customized version to fulfil a particular requirement.

Following are the various flavours of Python:

1. **CPython:**
   - It is the standard flavour of Python. It can be used to work with C language Applications
2. **Jython or JPython:**
   - It is for Java Applications. It can run on JVM
3. **IronPython:**
   - It is for C#.NET platform
4. **PyPy:**
   - The main advantage of PyPy is performance will be improved because JIT compiler is available inside PVM.
5. **RubyPython**
   - For Ruby Platforms
6. **AnacondaPython**
   - It is specially designed for handling large volume of data processing.

Any question?

If you try to practice programs yourself, then you will learn many things automatically

Spend few minutes and then enjoy the study

Thank You