Python Programming

RGM College of Engineering & Technology (Autonomous)

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PYTHON LANGUAGE FUNDAMENTALS

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Learning Mantra

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

Agenda:

1. **Python as All Rounder**
2. **Where We Can Use Python?**
3. **Features of Python**
   - Simple and easy to learn
   - Freeware and Open Source
   - High Level Programming Language
   - Platform Independent

Python as All Rounder

C --> Procedural/Functional Programming Language

C++, Java --> Object Oriented Programming Languages

Perl, Shell Script ---> Scripting Languages

- C language missing the benefits of Object oriented programming features like, Encapsulation, Inheritance and Polymorphism etc.,
- Similarly OOP languages are not make use of the functional programming features up to the maximum extent.
- Scripting language: Group of lines one by one will have to execute.

NOTE: Every Programming language having it's own specific behavior, that specific paradigm benefits only they are going to get.

What about Python?

Is it Functional Programming language?

(OR)

Is it Object Oriented Programming language?

(OR)

Is it Scripting Language?

While developing Python, Guido Van Rossum borrowed -

- Functional programming features from C
- Object Oriented Programming features from C++ (Because, Java was not developed at that time)
- Scripting language features from Perl, Shell Script.

So, **Python is considered as All Rounder.** Python can enjoy the benefits of all types of programming language paradigms.

1. Python as Scripting Language:

- Scripting Language: Scripting language means a group of lines of code will be there and they will be executed line by line.
- No functions concept, No classes concept, just a group lines will be executed one by one.

```
print("Python as Scripting language")
print("Python as Scripting language")
print("Python as Scripting language")
print("Python as Scripting language")
print("Python as Scripting language")
print("Python as Scripting language")
```

```
Python as Scripting language
Python as Scripting language
Python as Scripting language
Python as Scripting language
Python as Scripting language
Python as Scripting language
```

2. Python as Functional Programming Language:

```
def f1():
        print("Python as Functional Programming language")
        print("Python as Functional Programming language")
        print("Python as Functional Programming language")
        print("Python as Functional Programming language")
f1()
```

```
Python as Functional Programming language
Python as Functional Programming language
Python as Functional Programming language
Python as Functional Programming language
```

3. Python as Object Oriented Programming Language:

```
class Test:
        def m1(self):
                print("Python as Object Oriented Programming Language")
test = Test()       # Object Creation
test.m1()           # Method Invoking
```

```
Python as Object Oriented Programming Language
```

Note:

- Most of the syntax used in Python borrowed from '**C**' & '**ABC**' Programming Languages.

Where We Can Use Python?

We can use Python everywhere. The most common important application areas are as follows:

1. For developing Desktop Applications:

The Applications which are running on a single systems (i.e., Stand alone applications)

Eg: Simple Calculator application.

2. For developing Web Applications

Eg: Gmail Application, Online E-commerce applications, Facebook application, Blog applications etc.,

3. For Network Applications

Eg: Chatting applications, Client-Serveur applications etc.,

4. For Games development

5. For Data Analysis Applications

6. For Machine Learning applications

7. For developing Artificial Intelligence, Deep Learning, Neural Network Applications

8. For IOT

9. For Data Science

That's why Python is called as **"General Purpose Programming Language".**

Which Software companies are using Python?

- Internally Google and YouTube use Python coding
- NASA and New York Stock Exchange Applications developed by Python.
- Top Software companies like Google, Microsoft, IBM, Yahoo, Dropbox, Netflix, Instagram using Python.

Features of Python

1. Simple and easy to learn

- Consider English Language, how many words are there in English?
  - Crores of words are there in English language. If you want to be perfect in English, you should aware about all these words.
- If you consider Java, You should aware of 53 words. That means when compared to English, learning Java is easy.
- If you consider Python Programming language, You should aware about 33 Words (Reserved Words). The person who can understand these 33 words, then he will become expert in Python.
- So, Python is a simple programming language. When we read Python program, we can feel like reading English statements.

For example, if you consider **ternary operator** in C or Java,

x = (10>20)?30:40; ---> **C or Java Statement**

- If we ask any person, what this line is doing? 99% of Non-programming people are going to fail unless and until if they know C or Java.

If I write the same thing in python,

x = 30 if 10>20 else 40 ----> **Python Statement**

- If we ask any person, what this line is doing? 99% of Non programming people are going to give correct answer.
- When compared with other languages, we can write programs with very less number of lines (i.e., Concise Code) .
- Hence more readability and simplicity in the python code.
- Because of the concise code, we can reduce development and cost of the project.

2. Freeware and Open Source

Freeware and Open source are not same.

Freeware:

- To use Python, How much License fee we need to paid?
- We need not pay single rupee also to make use of Python. It is freeware, any person can use freely, even for business sake also.
- If you consider Java, Java is vendered by Oracle. (Commercial)
- If you consider C# , C# is vendered by Microsoft. (Commercial)

- If you consider Python, who is vendor for Python? There is no vendor for Python, there is one charitable Foundation, **Python Software Foundation (PSF)** is responsible for maintenance of Python.
- PSF is Non-Profit oriented Organization.
- To use Python, you need not pay any money to PSF. If you want to donate voluntarily for this foundation, you can pay.
- The corresponding Website for PSF is **python.org**, from where you have to download Python software.
- But for Java, from it's 11 version onwards it is the paid version. If you want to use for your personal use or business sake, compulsory license must be required.
- C# & .NET also requires license to use.

Open Source:

- The Source code of the Python is open to everyone, so that we can we can customize based on our requirement. Because of this multiple flavors of Python is possible.

For Example,

1. **Jython** is customized version of Python to work with Java Applications.
2. **Iron Python** is customized version of Python to work with C## & .NET Applications.
3. **Anaconda Python** is customized version of Python to work with Big data Applications.

- One main advantage of Python is for every requirement specific version is availble in the market.
- We can use our specific version of python and fulfill our requirement.

3. High Level Programming Language

- High level programming language means Programmer friendly language.
- Being a programmer we are not required to concentrate low level activities like memory management and security etc..
- Any programmer can easily read and understand the code.
- Let's see the below example,

```
a = 20
b = 30
print(a+b)
```

- **Output:** 50

4. Platform Independent

Assume that one C program is there, We have three machines are there, which are working on three platforms (i.e., Windows, Linux, MAC). Now, we want to distribute One C application to the clients who are working on different platforms. Then what we need to do is,

- For Windows, a separate C program must be required. A C program for Windows system can't run on Linux machine or MAC machine.
- For Linux, a separate C program must be required. A C program for Linux system can't run on Windows machine or MAC machine.
- For MAC, a separate C program must be required. A C program for MAC system can't run on Linux machine or Windows machine.

So, Compulsory for every platform you have to write the platform specific application. Now we have three applications and three platforms. So, **C programming language is platform dependent language.**

Assume that one Python program is there, We have three machines are there which are working on three platforms (i.e., Windows, Linux, MAC). Now, we want to distribute One Python application to the clients who are working on different platforms. Then what we need to do is,

- Write the Python program once and run it on any machine. This is the concept of Platform Independent nature.

So, **Python programming language is Platform Independent Language.**

How platform independent nature is implemented in Python?

- If you want to run Python application on Windows platform, what must be required is **Python Virtual Machine (PVM)** for Windows is required.
- If we provide Python application to the PVM for Windows, PVM is responsible to convert the python program into Windows specific and execute it.
- In the same way, If you want to run Python application on Linux platform, what must be required is Python Virtual Machine (PVM) for Linux is required. If We provide Python application to the PVM for Linux, PVM is responsible to convert the python program into Linux specific and execute it.

- In the same way, If you want to run Python application on MAC platform, what must be required is Python Virtual Machine (PVM) for MAC is required. If We provide Python application to the PVM for MAC, PVM is responsible to convert the python program into MAC specific and execute it.
- **Platform specific conversions are taken care by PVM.**
- **Python program is Platform independent.**
- **Python Virtual Machine is Platform dependent.**

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