History Of Python

Python Programming Language Foundation stone was conceived in the year **1980** and its implementation was began in the year 1989. So Python Programming is Older than Java Programming Language.

Python Programming Language was officially released in the year 1991 (Feb).

It was designed and developed by **“Guido Van Rossum”**. So he is called the “Father of Python”.

It was Developed at CWI (Centrum Winkunde Informatica) Institute in Netherlands.

Python Programming Lang Managed and Maintained by a Non-Commercial Organization Called “PYTHON Software Foundation (PSF) "

The official website of PYTHON Software Foundation (PSF) is *www.python.org*

Features of Python:

Features of a language are nothing but Services OR Facilities Provided by Language Developers and they are Available in Languages and Used by Language Programmers for developing Real Time Applications.

Python Programming Language Provides 11 Features. They are

1. Simple

2. Freeware and Open Source

3. Platform Independent Language

4. Dynamically Typed

5. Interpreted Programming Language

6. High Level

7. Robust (Strong)

8. Both Functional (Procedure) and Object-Oriented Programming Language (OOPs)

9. Extensible

10. Embedded

11. Supports Third APIs Such as NumPy, Pandas, SciPy, Scikit, matplotlib, seaborn, nlp etc

Lets Discuss on each features in detail:

**1. SIMPLE**

Python is one of the SIMPLE Programming Language because of the 3 Important Technical Factors. They are:

**Factor-1**

Python Programming Provides "Rich Set of Modules (Libraries)". So Python programmers are Re-Using the Pre-defined Code without writing the own Code every-time.

**Definition of Module-**>A Module is a collection of Functions, Attributes and Class Names.

Examples: calendar, math, qrcode, random, os, threading...etc

**Factor-2**

Python Programming Provides In-built Garbage Collection Facility by executing Garbage Collector Program. So the Garbage Collector collects the un-used memory space and improves the performance of Python Based Applications.

**Definition of Garbage Collector:**

Garbage Collector is one of the In-Built Python Program in Python Software and It goes on running Behind the Regular Python Program and whose Role is to Collect Un-Used Memory space and Improves the Performance of Python Based Applications.

Thus Garbage Collector talks about Automatic Memory Management.

**Factor-3**

Python Programming Language Provides User-Friendly Syntaxes and Makes the programmer to develop Error-Free Programs within Limited Span of Time.

**2. Freeware and Open Source**

**What is Freeware?**

=>If any software downloaded Freely without purchasing it then that Software comes under Freeware category.

Examples: Python, Java, Power BI etc.

**What is Open Source?**

The standard Name of Python Software is "CPYTHON". Many Software companies came forward and Customized CPYTHON and developed their own in-house tools.

So The Customized Versions of CPYTHON are called "Python Distributions".

Some of the Python Distributions are as follows:

1. JPython OR Jython----->Used for Running Java Based Applications

2 Iron Python OR IPython--->used to run C#.net Applications

3. Ruby Python ------>Used to Run Ruby Applications

4. Micro Python----->Used to run / develop Micro Controller Applications

5. Ankonda Python---->used to Run Big data / Hadoop Based Applications

5. StackLess Python--->Used for Concurrency Applications...etc

**3. Platform Independent Lang**

A Platform is nothing but Type of OS being Used to run Application / Program.

In this context, we have two types of Programming languages. They are

1. Platform Dependent Language

2. Platform Independent Language

1**. Platform Dependent Language**

In Platform Dependent Language , Data Types differs from one OS to another OS.

Example: C,C++....etc

**2. Platform Independent Lang**

In Platform Independent Language, Data Types memory remains same on all types of OS.

In Effective Platform Independent Language, all types of Values will be store in the form of OBJECTs and they can store Un-Limited amount of data.

Hence java Object contains Size Restrictions whereas Python Objects contains Un-limited Size and can store Unlimited values.

Examples: Java, Python.

**NOTE**: In Python all values are stored in the form of Objects.

4. Dynamically Typed

In IT, we have Two Types of Programming languages. They are

1. Static Typed Programming Languages

2. Dynamically Typed Programming Languages

**1. Static Typed Programming Languages**

In Static Typed Programming Languages, It is mandatory to Specify Variable Declaration for storing Inputs in main memory of Computer.

Examples Language: C, C++, Java, C#.net....etc

**Examples Statements:**

int x,y,z; // Variable Declaration--mandatory

x=10

y=30

z=x+y

**2. Dynamically Typed Programming Languages**

Dynamically Typed Programming Languages depends on type of values we are assigning, whose data type automatically / Implicitly assigned by Python Execution Environment.

There is No Need to write Variable declaration in Dynamically Typed Programming Languages.

Examples: Python

**Example Statements:**

>>> a=100

>>> b=200

>>> c=a+b

>>> print(a,type(a))-----------100 <class 'int'>

>>> print(b,type(b))----------200 <class 'int'>

>>> print(c,type(c))----------300 <class 'int'>

============================================

5. Interpreted Programming

===============================================

=>When we develop any python program, we must give some file name with an extension .py (File Name.py).

=>When we execute python program, two process taken place internally

a) Compilation Process

b) Execution Process.

=>In COMPILATION PROCESS, The python Source Code submitted to Python Compiler and It reads the source Code, Check for errors by verifying syntaxes and if no errors found then Python Compiler Converts into Intermediate Code called BYTE CODE with an extension .pyc (FileName.pyc). If erros found in source code then we get error displyed on the console.

=>In EXECUTION PROCESS, The PVM reads the Python Intermediate Code(Byte Code) and Line by Line and Converted into Machine Understable Code (Executable or binary Code) and It is read by OS and Processer and finally Gives Result.

=>Hence In Python Program execution, Compilation Process and Execution Process is taking place Line by Line conversion and It is one of the Interpretation Based Programming Language.

--------------------------------------------------------------------

Definition of PVM ( Python Virtual Machine )

--------------------------------------------------------------------

=>PVM is one program in Python Software and whose role is to read LINE by LINE of Byte Code and Converted into Machine Understable Code (Executable or binary Code)

=======================================

6. High Level Programming

=======================================

=>In this context, we have two types of languages. They are

1. Low Level Programming Languages

2. High Level Programming Languages

-----------------------------------------------------------------

1. Low Level Programming Languages:

-----------------------------------------------------------------

=>In Low Programming Languages, data is always stored in the form of low level values such as Binary data, Octal Data and Hexa Decimal data. These Number System are not directly understandable end-users

Example : a=0b1010101010

b=0xBEE

c=0o23

-----------------------------------------------------------------

2. High Level Programming Languages

-----------------------------------------------------------------

=>In these languages, Internally, Even the programmer specifies the data in the form of Low Level Format such Binary data, Octal Data and Hexa Decimal data, automatically Python Programming Language Execution Environment Converts into High Level data, which is understandable by end-users . Hence Python is one of the High Level Programming Languages.

Examples:

----------------

>>> a=0b101010111110000

>>> b=0b10101111000

>>> print(a)-----------------------22000

>>> print(b)----------------------1400

>>> a=0xBEE

>>> print(a)-----------------------3054

>>> bin(22000)-----------------'0b101010111110000'

>>> hex(3054)----------------'0xbee'

======================================x================================

======================================

7. Robust (Strong)

======================================

=>Python is one of the Robust programming lang bcoz it provides "Exception handling" facility. If the

Python programmer uses Exception handling then Python Based Applications Becomes Robust.

-----------------------------------------

=>Definition of Exception

-----------------------------------------

=>All Runtime Errors are called Exception.

=>By default, All Programming Lang, when exception occurs then we get Technical Error Messages.

=>In Industry It is not recommended to generate technical Error Messages bcoz these messages are not understandable by End-users.

=>Industry is recommended to generate user-Friendly Error messages by using "Exception handling".

---------------------------------------------------------

=>Definition of Exception Handling

---------------------------------------------------------

=>The Process of Converting Technical Error Messages into user-freindly error messages is called

Exception Handling.

=========================================x========================================

======================================

9 Extensible and 10 Embedded

======================================

Extensible:

------------------

=>A programming is lang is said to be "Extensible" iff It provides Programming Faclities

to other languages

=>Example: Python Programming Provides its Programming Facilities to C,C+,Java..etc

and hence Python is one of the Extensible Programming Lang.

----------------------

Embedded:

----------------------

=>A programming Lang is said to be Embedded iff It takes the Programming Services of Other languaes.

=>For Example: Python Programming Embedded the Programming Services of C bcoz C is the Fastest Programming Lang.

==================================================

==================================================

10. Supports Third Party APIs Such as numpy, pandas, scipy, scikit, keras,

matplotlib, nlp..etc

==================================================

=>Most of the Supports Third Party APIs Such as numpy, pandas, scipy, scikit, keras,

matplotlib, nlp..etc are providing Easiness to Python programmer in the case Complex Maths Calculations(Numpy), Businness Analysis and Analytics (Pandas)..etc