# Introduction to Python

<u>Python</u> is a widely used general-purpose, high level programming language. It was initially designed by **Guido van Rossum in 1991** and developed by Python Software Foundation. It was mainly developed for emphasis on code readability, and its syntax allows programmers to express concepts in fewer lines of code. Python is a programming language that lets you work quickly and integrate systems more efficiently.

There are two major Python versions- **Python 2 and Python 3**.

- On 16 October 2000, Python 2.0 was released with many new features.

- On 3rd December 2008, Python 3.0 was released with more testing and includes new features.

**Beginning with Python programming:**

### 1) Finding an Interpreter:

Before we start Python programming, we need to have an interpreter to interpret and run our programs. There are certain online interpreters like **https://ide.geeksforgeeks.org/**, http://ideone.com/ or http://codepad.org/ that can be used to start Python without installing an interpreter.

***Windows***: There are many interpreters available freely to run Python scripts like IDLE (Integrated Development Environment) which is installed when you install the python software from **http://python.org/downloads/**

### 2) Writing first program:

# Script Begins

Statement1 Statement2

Statement3

# Script Ends

**<u>Why to use Python:</u>**

**The following are the primary factors to use python in day-to-day life:**

### 1. Python is object-oriented

Structure supports such concepts as polymorphism, operation overloading and multiple inheritance.

### 2. Indentation:Indentation is one of the greatest feature in python

### 3. It"s free (open source)

Downloading python and installing python is free and easy

### 4. It"s Powerful

- Dynamic typing
- Built-in types and tools
- Library utilities
- Third party utilities (e.g. Numeric, NumPy, sciPy)
- Automatic memory management

### 5. It"s Portable

- Python runs virtually every major platform used today
- As long as you have a compaitable python interpreter installed, python programs will run in exactly the same manner, irrespective of platform.

### 6. It"s easy to use and learn

- No intermediate compile
- Python Programs are compiled automatically to an intermediate form called byte code, which the interpreter then reads.
- This gives python the development speed of an interpreter without the performance loss inherent in purely interpreted languages. ☐Structure and syntax are pretty intuitive and easy to grasp.

### 7. Interpreted Language

Python is processed at runtime by python Interpreter

### 8. Interactive Programming Language

Users can interact with the python interpreter directly for writing the programs

### 9. Straight forward syntax

The formation of python syntax is simple and straight forward which also makes it popular.

**Installation:**

There are many interpreters available freely to run Python scripts like IDLE (Integrated Development Environment) which is installed when you install the python software from http://python.org/downloads/

**Steps to be followed and remembered:**

Step 1: Select Version of Python to Install.

Step 2: Download Python Executable Installer.

Step 3: Run Executable Installer.

Step 4: Verify Python Was Installed On Windows.

Step 5: Verify Pip Was Installed.

Step 6: Add Python Path to Environment Variables (Optional)



**Working with Python**

**Python Code Execution:**

**Python"s traditional runtime execution model:** Source code you type is translated to byte code, which is then run by the Python Virtual Machine (PVM). Your code is automatically compiled, but then it is interpreted.

Source                          Byte code                          Runtime
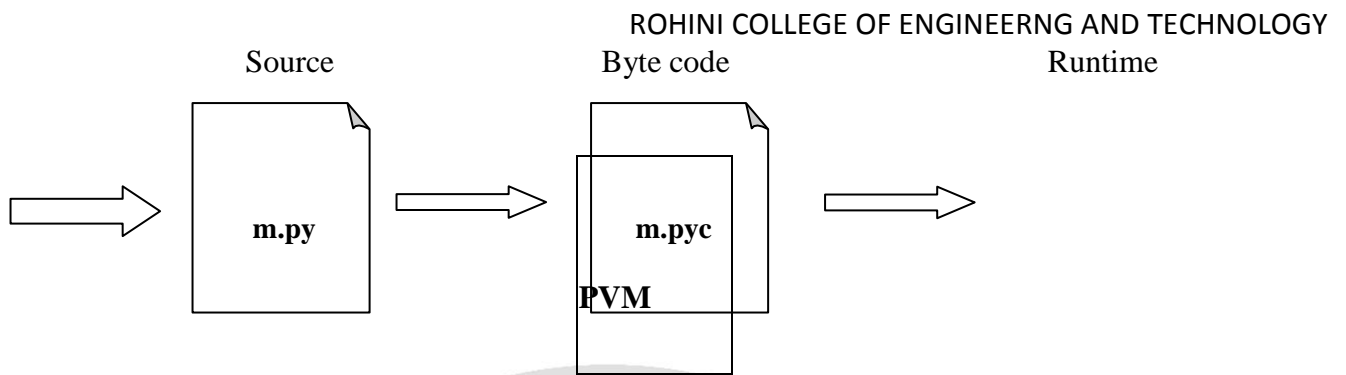


**Source code extension is .py**

**Byte code extension is .pyc (Compiled python code)**

There are two modes for using the Python interpreter:

- Interactive Mode

- Script Mode

**Running Python in interactive mode:**

Without passing python script file to the interpreter, directly execute code to Python prompt. Once you"re inside the python interpreter, then you can start.

>>> print("hello world") hello world
# Relevant output is displayed on subsequent lines without the >>> symbol

>>> x=[0,1,2]

# Quantities stored in memory are not displayed by default. >>> x
#If a quantity is stored in memory, typing its name will display it. [0, 1, 2]
>>> 2+3

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The chevron at the beginning of the 1st line, i.e., the symbol >>> is a prompt the python interpreter uses to indicate that it is ready. If the programmer types 2+6, the interpreter replies 8.

**Running Python in script mode:**

Alternatively, programmers can store Python script source code in a file with the .py extension, and use the interpreter to execute the contents of the file. To execute the script by the interpreter, you have to tell the interpreter the name of the file. For example, if you have a script name MyFile.py and you're working on Unix, to run the script you have to type:

**python MyFile.py**

Working with the interactive mode is better when Python programmers deal with small pieces of code as you can type and execute them immediately, but when the code is more than 2-4 lines, using the script for coding can help to modify and use the code in future.

**Example:**