

Python Material by Mr. JS Rao Sir

Generally Every website has 3 ends,

1. Frontend part
2. Backend part
3. Database part

1. Frontend part:

- A person who knows Frontend work very well and who can do any part of frontend work is called Frontend Developer.
- Every Frontend Developer must know about all UI Technologies.
For example, HTML , CSS , Bootstrap , JavaScript, etc...
- A good Frontend developer can easily solve user problems and he/she must be responsible for frontend designing.

2. Backend part:

- A person who knows Backend work very well and who can do any part of backend coding is called Backend Developer.
- Every Backend Developer must know any one or two backend technologies like **Python or Java or .Net or PHP.....**
- A good Backend Developer can easily write the logics which are required to handle the server or database and he/she must be responsible for any kind of backend work.

3. Database part:

- A person who knows database logics and work on database side then call database developer.
- DB developers required to learn at least any one database like MySQL, Mongo DB, etc..

Full Stack Web Developer:

- A person who can do both frontend and backend and database works very well is called Full Stack Web Developer.
- Stack means layer, so full stack means all layers.
- A person who knows all layers of website is called Full Stack Web Developer.
- Full Stack Web Developer must know about database also along with frontend and backend technologies.

About UI Technologies:

The Frontend Technologies are nothing but UI Technologies.

1. UI stands for User Interface.
2. An interface is a set of items or menus through which a user communicates with a Server.
3. UI is a junction between a user and a computer program.
4. UI Technologies are
 1. HTML
 2. CSS
 3. Bootstrap
 4. Javascript
 5. jQuery
 6. DOM

1. What is Program ?

- A Set of instructions to perform particular task is called as program.

2. What is Software ?

- Set of programs to perform multiple task is called as Software.

3. what is the purpose of program or Software ?

- To communicate with electronic device.
- One electronic device to communicate with another electronic device.
- To make things easy to reduce humans works we need program or software.

For example : Bank Software

4. How to develop software ?

By using programming languages we can develop.

5. Why general purpose python is a programming language ?

Python is used to develop not only one type of application , it is used in more than one type of applications.

Applications of Python:

The following real time applications are developed by using PYTHON programming,

1. Web Applications

1. Java ---> Servlets, JSP,..etc

2. C#.Net ---> ASP.Net
3. Python----> Django, Flask, Pyramid, etc..

2. Artificial Inteligence (A.I) Applications
 3. Machine learning Applications
 4. Deep learning Applications
 5. Data Science Applications
 6. Devopps applications
 7. Text Processing Applications
 8. Image Processing Applications
 9. Web Scrapping / Harvesting Applications.
 10. Health care Applications
 11. Testing applications
 12. Games/Animation applications
 13. IOT applications
 14. Robotics applications
 15. Data Visulization Applications
 16. Embeded Systems
 17. Languages Development
 18. Automation Testing
 19. Operating Systems
 20. Console Based Applications
 21. GUI based Applications.
- etc.....

About Python Indroduction :-

- Python is a Powerful , general purpose, dynamic, high-level, and interpreted programming language.
- It supports Object Oriented programming approach to develop applications.
- It is simple and easy to learn and provides lots of high-level data structures.

- Python is easy to learn , powerful and versatile scripting language, which makes it attractive for Application Development.

History of Python Programming Language :

- Python Programming Language conceived in the year 1980.
- Python Programming Language implementation begin in the year 1989.
- Python Programming Language officially released in the year 1991 Feb 21.
- Python Programming Language was developed by the "Guido Van Rossum".
- Guido Van Rossum was developed Python Programming Language at mathematical reaserch institute called as CWI (Centrum Wiskunde Informatica), which is located at "Netherlands".
- The Predecessor of Python Programming Language is ABC programming language.

Python Programming language Inspired from What languages?

Guido Van Rossum developed the python language by taking the different language features. They are like,

1. Functional Oriented Programming language like ---->> C-language
2. Object Oriented Programming language like ---->> C++ , Java
3. Scripting Oriented Programming language like---->> PERL ,Shell Script
4. Modular Oriented Programming language like ---->> Modulo3

Why name came as Python ?

Guido Van Rossum is loving one populer british comidy movie called as "Manty Pythons Circus Flying". That's why this name taken by author.

Versions of Python:

- Python Programming Language contains 3 types of Versions Majorly. They are,
 1. Python 1.X where 1 represents Major version and X represents minor versions like 0,1,2,3,4,5,6
 2. Python 2.X where 2 represents Major version and X represents minor versions like 0,1,2,3,4,5,6,7
 3. Python 3.x where 3 represents Major version and X represents minor versions like 0,1,2,3,4,5,6,7,8,9,10,11,

- Python 3.X does not have backward compatibility with Python 2.x
- Python Software is officially maintained by a Non-Commercial Organization called "**Python Software Foundation(PSF)**".
- The official web site for Python Software downloading is **www.python.org/**

Features of Python Language.

- Features of a language are nothing but Services / Facilities Provided by Language.
- Developers and those features are used by Real Time programmers for developing real time applications.

For example : latest Mobiles features.

1. Simple and easy to learn.
2. Easy-to-read
3. Expressive Language
4. Free and Open Source
5. Dynamic Memory Allocation
6. Interpreted Language
7. Cross-platform or Portable Language
8. Object-Oriented Language
9. Databases
10. Embeddable
11. Extensible
12. Scalable
13. Automatic garbage collector

Features of Python Explanation.

1. Simple and easy to learn:

- Python is having simple structure, and a clearly defined syntax. This allows the student to pick up the language quickly.

2. Easy-to-read:

- Python code is more clearly defined and visible to the eyes.

3. Expressive Language :

- Python can perform complex tasks using a few lines of code.
- A simple example, the hello world program you simply type `print("Hello World")`.
- It will take only one line to execute, while Java or C takes multiple lines.

4. Free and Open Source :

- Python is freely available for everyone.
- It is freely available on its official website www.python.org.
- It has a large community across the world that is dedicatedly working towards make new python modules and functions.
- Anyone can contribute to the Python community.
- The open-source means, "**Anyone can download its source code without paying any money**".

5. Dynamic Memory Allocation:

- In Python, we don't need to specify the data-type of the variable.
- When we assign some value to the variable, it automatically allocates the memory to the variable at run time.
- Suppose we are assigned integer value 15 to x, then we don't need to write `int x = 15`. Just write `x = 15`.

6. Interpreted Language:

- Python is an interpreted language, it means the Python program is executed one line at a time.
- The advantage of being interpreted language, it makes debugging easy and portable.

7. Cross-platform or Portable Language:

- Python can run equally on different platforms such as Windows, Linux, UNIX, and Mac os, etc.
- So, we can say that Python is a portable language.
- It enables programmers to develop the software for several competing platforms by writing a program only once.

8. Object-Oriented programming Language:

- Python supports object-oriented language and concepts of classes and objects come into existence.
- It supports inheritance, polymorphism, and encapsulation, etc.
- The object-oriented procedure helps to programmer to write reusable code and develop applications in less code.

9. Databases:

- Python provides interfaces or modules to communicating with all major commercial databases.

For example, MySQL DB, Oracle DB, SQL Server DB , Mongo DB, etc...

- Using python we can communicate with different databases by installing those interfaces or modules using PIP command.

For example : pymysql , mysqlclient, cx_Oracle, mongoddb, etc....

Syntax : `pip install pymysql`

10. Embeddable:

- The code of the other programming language can use in the Python source code.
- We can use Python source code in another programming language as well.
- It can embed other language into our code.

11. Extensible:

- You can add low-level modules to the Python interpreter. These modules enable programmers to add to or customize their tools to be more efficient.

12. Scalable:

- Python provides a better structure and support for large programs than shell scripting.
- We can develop using python low level , mediam level and high level programs.

13. Automatic garbage collector

- Python supports automatic garbage collection.

For example,

```
a = 10
```

```
b = 20
```

```
a = 30
```

```
print(a)
```

Output: 30 # but not 10. It means 'a' variable value replaced by 30 value.

- Here 10 value is initially assigned to a variable, next 20 assigned to b variable and 30 assigned again to same a variable only.
- So 10 value is replaced by 30 in variable a .
- So python garbage collector automatically removes a = 10 statement.

Is Python Scripting language ? :

- Most of the people are calling python is a Scripting language because the way of developing python applications and execution of python applications are similar to the scripting languages.

Q) Differences between programming and scripting languages ?

Scripting language:

1. Scripting languages are Interpreter based languages.
2. Scripting language programs or applications not required compilation.
3. Scripting language programs or applications directly we can run without compiling.
4. Scripting language programs or applications takes longer time to execute.
5. For example, shell script, Perl

Programming Language:

1. Programming language are compiler based languages
2. Programming language programs requires explicitly compilation.
3. Programming language programs or applications directly we can not run without compiling.
4. Programming language programs or applications takes less time to execute.
5. For example, C , C++, Java

Installation of Python Software:

- Download the required python latest software version from the following website <https://www.python.org/downloads/>
- Select **windows** option and click **download button**
- **Double click** on the downloaded Installer file and install it by following steps.
- Latest Python 3 release is : **3.11.X** version

Adding Python PATH Environment Variables:

After downloading and installing Python Software, by default it is installing in C-Drive like below,

PATH : C:\Users\Lenovo\AppData\Local\Programs\Python\Python311

- It is required for **adding Python Interpreter** to the Environment variable section.

PATH : C:\Users\Lenovo\AppData\Local\Programs\Python\Python311\Scripts

- It is required for **adding** Python **PIP** command to the Environment variable section.
- Using PIP we can install Third party Python Packages/Modules.
C:\Users\Lenovo> pip install required_module_Name

Development of Python application or Programs

- We can develop python applications or programs in 2 modes. They are,
 1. Interactive mode
 2. Batch Mode

1. Interactive mode

- Interactive mode is a command line shell.
- In command line shell if we write any Python statement immediately that statement will execute and gives the result.
- Interactive mode is used to test the features of the Python (What Python can do ?)
- Open command prompt and enter **python**.
C:\Users\Lenovo> python
- now we are going to get python prompt area like below
>>>
- Now we can test python coding basics like below
>>> a = 10
>>> print(a)
10
>>> type(a)
<class 'int'>
>>> print("Hello")
Hello
- **NOTE:** Interactive mode is not used for development of the business applications.
- To overcome this problem then we can use Batch Mode.

2 . Batch mode

- In Batch mode we write group of python statements in any one of the Editors or IDE's.

Different Editors are :

1. notepad, ----->> default in Windows.
2. Notepad++
3. Editplus

4. nano ----->> default in linux

5. IDLE

Different IDE's are :

1. Pycharm

2. Visual Studio.

3. Sublimetext

4. Atom

5. Eclipse

6. NetBeans

Etc....



➤ After writing the group of Python statements in anyone of the Editor or IDE , we save the Python file with extension **.py**

For example : FileName.py

➤ After developing the .py files , we submit those files to the python interpreter directly.

➤ Batch mode is used for development of business applications.

For Example :

Step1: Open the Notepad

Step2: Write the following code

```
i = 200
```

```
j = 100  
print( i + j )  
print( i - j )
```

Step3: Save the above file with `Basic.py` in any one location.

Step4: Open the command prompt upto python file storing location (`Basic.py`) and execute python file.

```
D:\Python_Programs> python Basic.py ----->> click enter
```

Output :

```
300  
100
```

Note : `IDLE` --->> [Integrated Development Language Environment](#)

- When ever we install python software in windows os along with the python software `IDLE` or python GUI editor will be installed.
- In `IDLE` editor we can develop the Python programs in interactive and batch mode.
- After developing the python application in `IDLE` editor directly we can run that python by using shortcut key(`F5`).
- Within the `IDLE` editor we can perform the debugging operation of the python applications.

How to Create a python program using `IDLE` tool ?

Open `IDLE` tool --->> Click on **File** menu --->> Click on **New File Ctrl + N** ---->> Then it will open a python Notepad prompt --->> Now create a python program whatever we want ---->> Then Click on **File** menu --->> Click on **Save Ctrl + S**

---->> Then it will open Python software location prompt --->> Choose your required folder wherever you want to save ---->> Give file any file name and save with `.py` extension like **Sample.py**

How to Execute a python program using `IDLE` tool ?

Click on **Run** menu --->> Click on **Run Module F5** ---->> Now output will show on `IDLE` shell.