

Module : M03

Familiarization with the basics of Python Programming



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Introduction to Python

- Python is an easy to learn yet powerful object oriented programming language. It is very high level programming language yet as powerful as many other programming languages like C, C++, Java etc.
- Python programming language was developed by Guido Van Rossum in February 1991 and further developed by the Python Software Foundation. It was designed with an emphasis on code readability, and its syntax allows programmers to express their concepts in fewer lines of code.
- It is based on two programming languages :
 - ABC language, created as a replacement of BASIC and
 - Modula-3
- Python is named after the comedy television show Monty Python's Flying Circus. It is not named after the Python snake.
- There are two major Python versions: Python 2 and Python 3. Both are quite different.

Features of Python

- 👉 Free and Open Source : It is freely available without any cost. It is open source means its source-code is also available which you can modify, improve .
- 👉 Easy to use : It is compact and very easy to use OOP language with very simple syntax rules.
- 👉 Expressive Language : It is more capable to expressing the code's purpose than many other languages.

Ex. //In C++ Swapping values

```
int x=2,y=3,temp;
```

```
temp=x;
```

```
x=y;
```

```
y=temp
```

#In Python: Swap values

```
x,y=2,3
```

```
x,y=y,x
```

- 👉 Interpreted Language : It interprets and executes the code line by line at a time.
- 👉 Complete Language: All types of required functionality is available through various modules of Python standard library.

- 🐍 Cross-platform Language: It can run on variety of platforms like Windows, Linux/UNIX, Macintosh, Supercomputers, Smart phones etc. It is a portable language.
- 🐍 Variety of Applications: Python is being used in many diverse fields/applications like :
 - 🐍 Scripting
 - 🐍 Web Applications
 - 🐍 Game developments
 - 🐍 System Administrations
 - 🐍 Rapid Prototyping
 - 🐍 GUI Programs
 - 🐍 Database Applications

Limitations of Python

- 👉 Not the Fastest Language : It is not a fully compiled language. So, execution tend be slower. It is first semi-compiled into an internal byte-code which is then executed by a Python Interpreter.
- 👉 Lesser Libraries than C,Java, Perl
- 👉 Not Strong on Type-binding : It is not very strong on catching “Type mismatch” issues.
- 👉 Not Easily Convertible : Because of its lack of syntax, it is difficult to translate a Python program into another programming language program which has strong syntax.

Working in Python

There are various Python distributions available today:

- 👉 Default installation available from www.python.org is called CPython installation.
- 👉 Anaconda Python distribution is highly recommended distribution that comes preloaded with many packages and libraries e.g. NumPy, SciPy, Panda etc.
- 👉 Many popular IDEs are also available e.g. Spyder IDE, PyScripter IDE etc. Of these, Spyder IDE is already available as a part of Anaconda Python distribution.

Working in Default CPython

Working in Interactive Mode(Python IDLE)

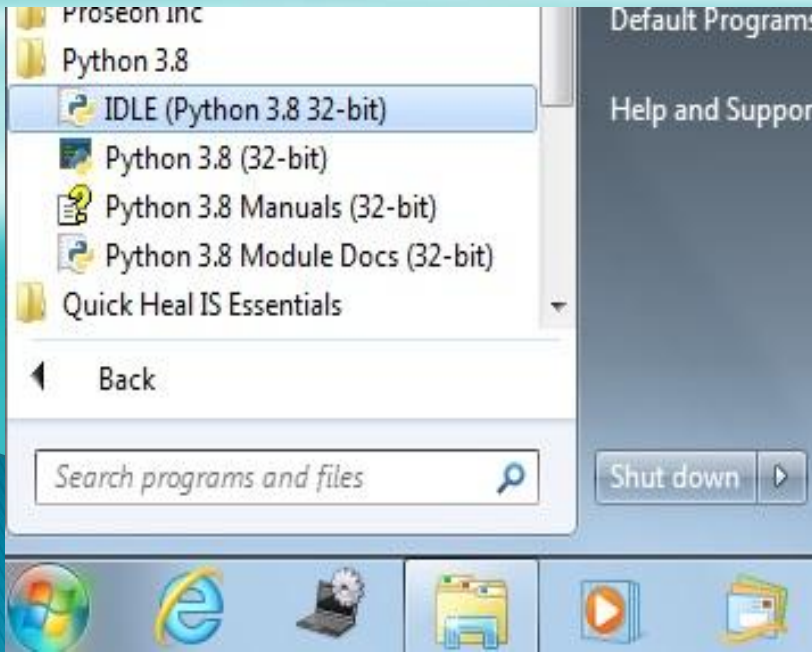
In interactive mode, you type one command at a time and the Python executes the given command there and then and gives the output.

To work in interactive mode, follow the following steps:

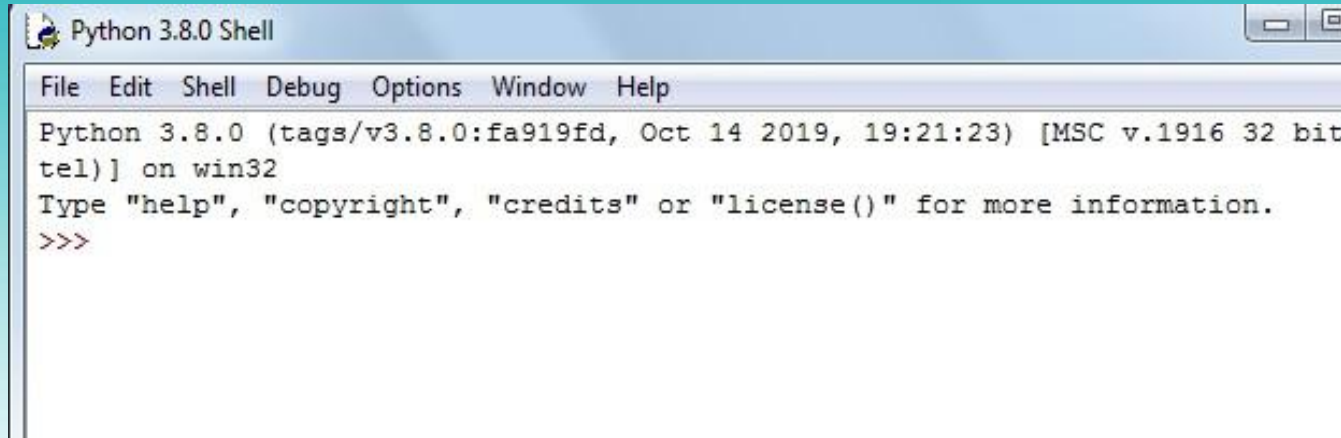
i) Click Start button→All Programs→Python 3.8→IDLE

Or

Click Start button→All Programs→Python 3.8→Python 3.8

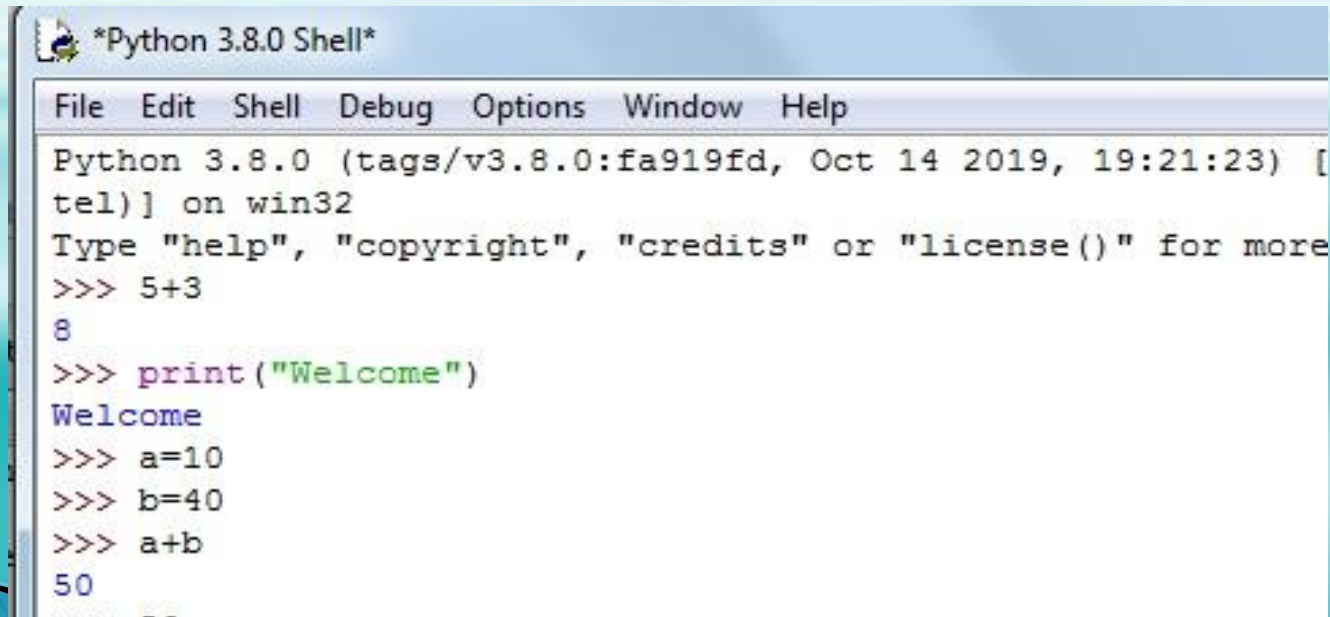


ii) It will open Python shell with Python prompt >>>



```
Python 3.8.0 Shell
File Edit Shell Debug Options Window Help
Python 3.8.0 (tags/v3.8.0:fa919fd, Oct 14 2019, 19:21:23) [MSC v.1916 32 bit
tel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
```

iii) Type command in front of Python prompt



```
*Python 3.8.0 Shell*
File Edit Shell Debug Options Window Help
Python 3.8.0 (tags/v3.8.0:fa919fd, Oct 14 2019, 19:21:23) [
tel)] on win32
Type "help", "copyright", "credits" or "license()" for more
>>> 5+3
8
>>> print("Welcome")
Welcome
>>> a=10
>>> b=40
>>> a+b
50
```


Working in Script Mode(Python IDLE)

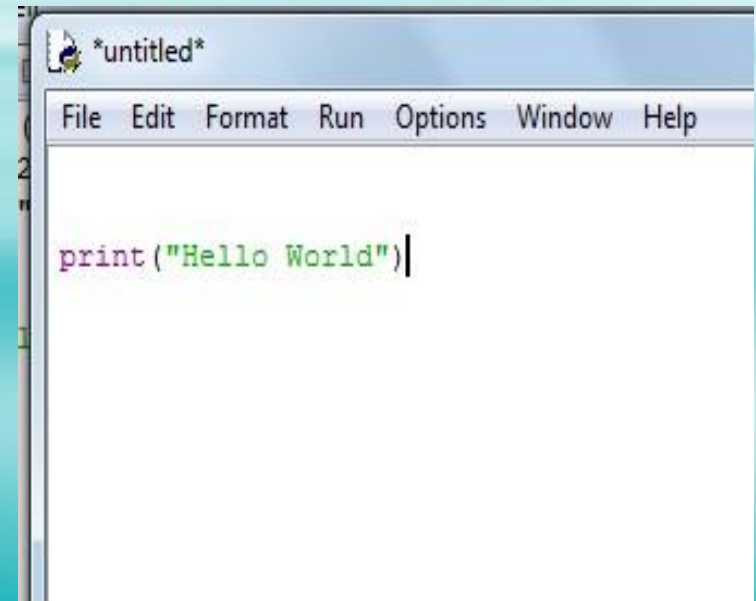
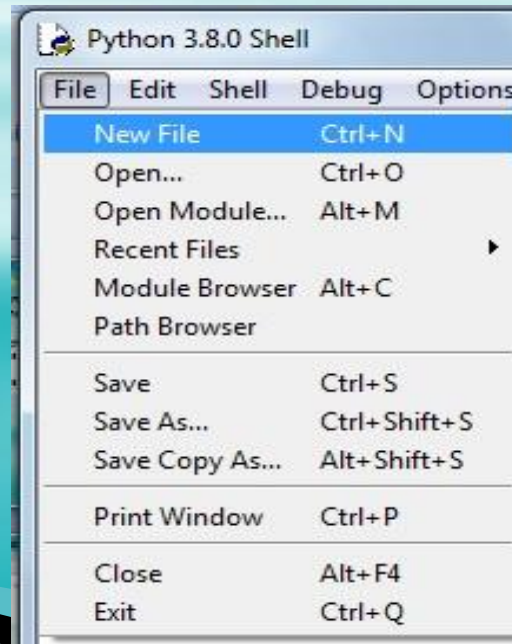
In Script mode you can save all the commands in the form of program file and show all the output lines together which is not possible in Interactive mode.

To work in interactive mode, follow the following steps:

Step 1 : Click Start button→All Programs→Python 3.8→IDLE

Step 2 : File→New

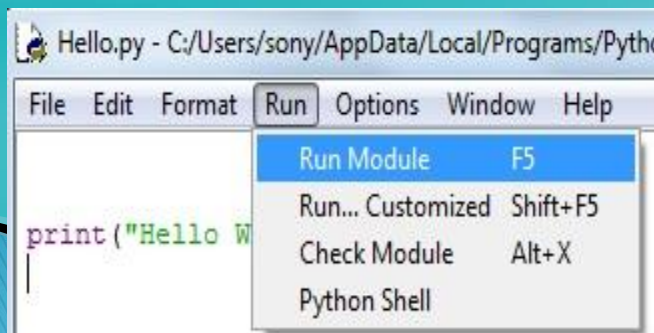
Step 3 : In the new window, type the commands to save in the form of a program.



Step 4 : Click File→Save and save the file with an extension .py



Step 5 : Run→Run Module or Press F5 key



Working in Anaconda Distribution

Anaconda distribution provides the following tools that you can use to work in Python.

- 🐡 Jupyter notebook: It is a web based, interactive computing environment.
- 🐡 Spyder : It is a powerful Python IDE with many useful editing, interactive testing and debugging features

Working in Spyder IDE

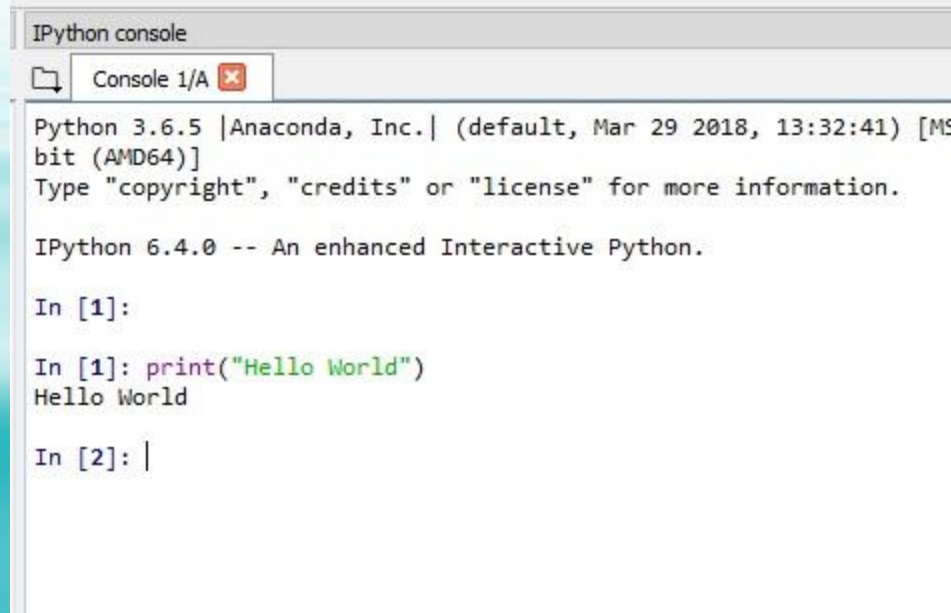
To launch Spyder IDE:

Start button → Programs → Anaconda → Spyder



Interactive Mode

To work in interactive mode in Spyder IDE, type the command in the Ipython console pane of spyder window. It will give the output of the command therer itself.



```
IPython console
Console 1/A
Python 3.6.5 |Anaconda, Inc.| (default, Mar 29 2018, 13:32:41) [MS
bit (AMD64)]
Type "copyright", "credits" or "license" for more information.

IPython 6.4.0 -- An enhanced Interactive Python.

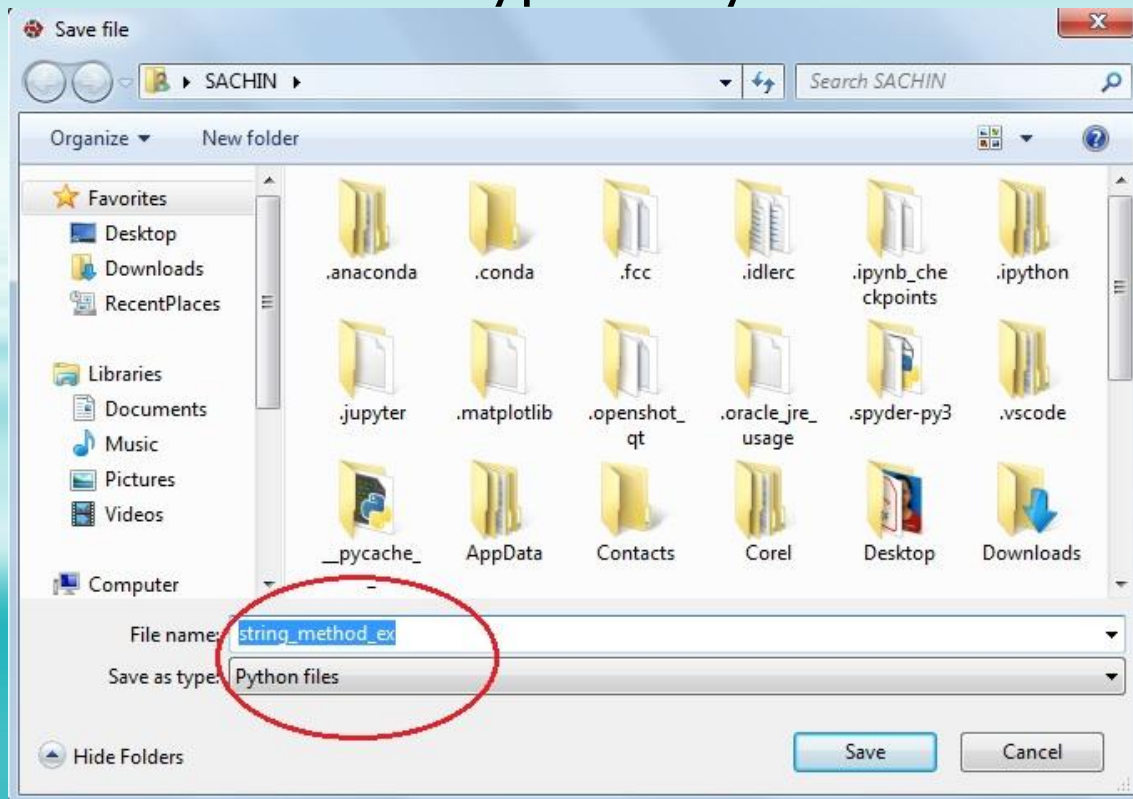
In [1]:

In [1]: print("Hello World")
Hello World

In [2]: |
```


Script Mode

- To work in script mode in Spyder IDE, type commands in the editor pane.
- To save current script, use command File→Save or File→Save As
- Make sure to select file type as Python Files



- Click on the Run icon on the toolbar or Click Run→Run or Press F5 key

My First Program–Hello World

1. Start Spyder IDE
2. Click File→New File and type the following text in the editor window.

```
#My First Program  
print("Hello World")
```
3. Save as type as Python Files and give .py extension.
4. Run your script : Click on Run icon [▶] or by clicking Run→Run command or pressing F5 key.
5. It will show the output in the console window

Understanding print()

To print or display output, Python provides print function.

Syntax: print(["prompt"],[variable1 /Expr1],[variable2 /Expr2],.....)

E.g. print("Hello World")

```
print("Percentage=",percent)
```


The Hello World Program

The image shows the Spyder Python IDE interface. The main editor window displays a Python script named `Hello.py` with the following content:

```
1 # -*- coding: utf-8 -*-  
2 """  
3 Created on Tue Oct 20 22:41:30 2020  
4  
5 @author: sony  
6 """  
7  
8 print("Hello World")
```

The IPython console on the right shows the execution of the script:

```
Python 3.6.5 [Anaconda, Inc.] (default, Mar 29 2018, 13:32:41) [MSC v.  
1900 64 bit (AMD64)]  
Type "copyright", "credits" or "license" for more information.  
  
IPython 6.4.0 -- An enhanced Interactive Python.  
  
In [1]: runfile('C:/Users/sony/Hello.py', wdir='C:/Users/sony')  
Hello World  
  
In [2]:
```

Thank You

References: 1)Computer Science with Python By Sumita Arora
2)<https://www.tutorialsteacher.com/python/statistics-module>
3)CBSE Revised Syllabus