Introduction To Python

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What is Python?

- Python is a high-level, interactive, interpreted, and object-oriented scripting language.
- It is designed to be highly readable since it uses English keywords frequently whereas the other languages use punctuations.
- It has fewer syntactical constructions than other languages.

Why Python for beginners?

- Easy – to - learn
  - Code is 3-5 times shorter than Java
  - 5-10 times shorter than C++
- Stepping Stone to Programming universe
  - Python's methodologies can be used in a broad range of applications
- Bridging the Gap between abstract computing and real world applications
  - Python is used as main programming language to do projects using Raspberry Pi
- Rising Demand for Python Programmers
  - Google, Nokia, Disney, Yahoo, IBM use Python
- Open- Source, Object – Oriented, procedural and functional
  - Not only a Scripting language, also supports Web Development and Database Connectivity

History of Python

- **Guido Van Rossum** developed Python in **early 1990s** at National Research Institute for Mathematics and Computer Science, Netherlands.
- Named after a circus show Monty Python show.
- Derives its features from many languages like **Java, C++, ABC, C, Modula-3, Smalltalk, Algol-68, Unix shell** and other scripting languages.
- Available under the GNU General Public License (GPL) – Free and open-source software.

Python Version

- **Python v0.9.0 - February, 1991**
  - Features: Exception Handling, Functions and core data types like List, Dictionary, String and others. It was object oriented and had module system
- **Python v1.0 - January 1994**
  - Features: Functional Programming tools lambda, map, filter and reduce
- **Python v2.0 - October 2000**
  - Features: List comprehensions, Garbage Collector and support for Unicode.
- **Python v3.0 - 2008**
  - Known as “Python 3000” and “Py3k”. It is not backward compatible with v2.0 and its other variants. Emphasizes more on removal of duplicate programming constructs and modules

Python Version

Python 0.9.0	February 20, 1991
Python 1.0	January 1994
Python 2.0	October 16, 2000
Python 3.0	December 3, 2008
Python 3.1	June 27, 2009
Python 3.2	February 20, 2011
Python 3.3	September 29, 2012
Python 3.4	March 16, 2014
Python 3.5	September 13, 2015
Python 3.6	December 23, 2016
Python 3.7	June 27, 2018
Python 3.8	October 14, 2019
Python 3.9	October 5, 2020
Python 3.10	October 4, 2021
Python 3.11	October 24, 2022
Python 3.12	October 2, 2023

Python Features

1. Easy-to-read
2. Easy-to-learn
3. Portable
4. Easy-to-maintain
5. Extendable
6. Interactive Mode
7. Scalable
8. GUI Programming
9. Broad Standard Library
10. Dynamic Data Type
11. Databases
12. Scripting
13. Structured
14. Garbage Collection
15. Integration with Other Languages

What can I do with Python?

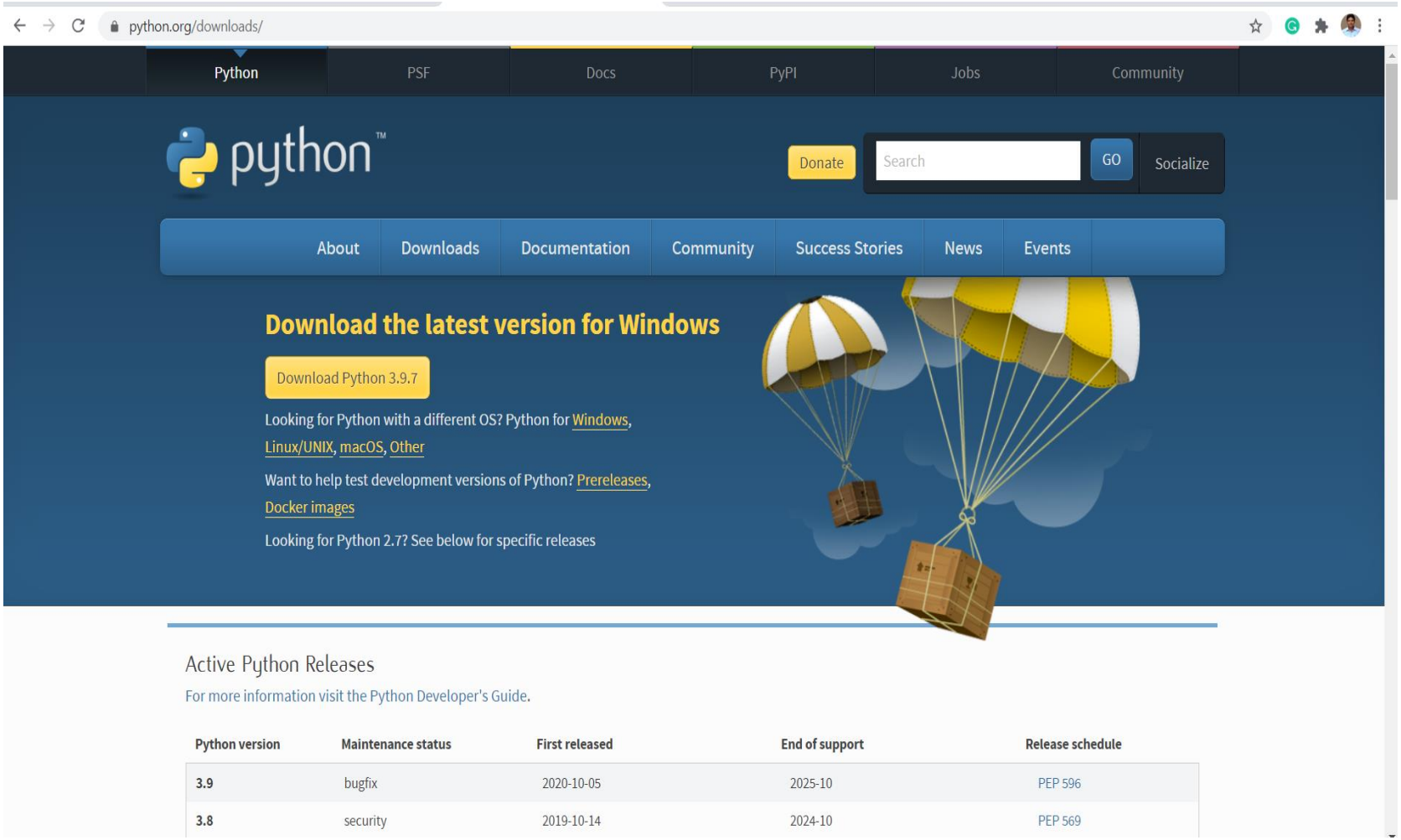
- System programming
- Graphical User Interface Programming
- Internet Scripting
- Component Integration
- Database Programming
- Gaming, Images, XML , Robot and more

Installing Python

- Python is pre-installed on most Unix systems, including Linux and MAC OS X.
- But for in Windows Operating Systems , user can download from the https://www.python.org/downloads/

  From the above link download latest version of python and install, latest version is 3.10.5 but you may use any other version depending on the machine configuration.

Installing Python



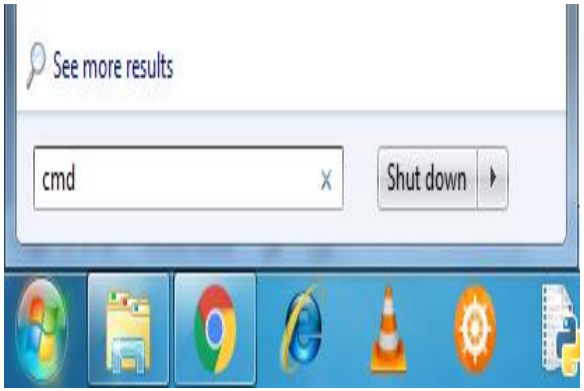
Getting Started with Python

Python is normally started by using the following three different ways:

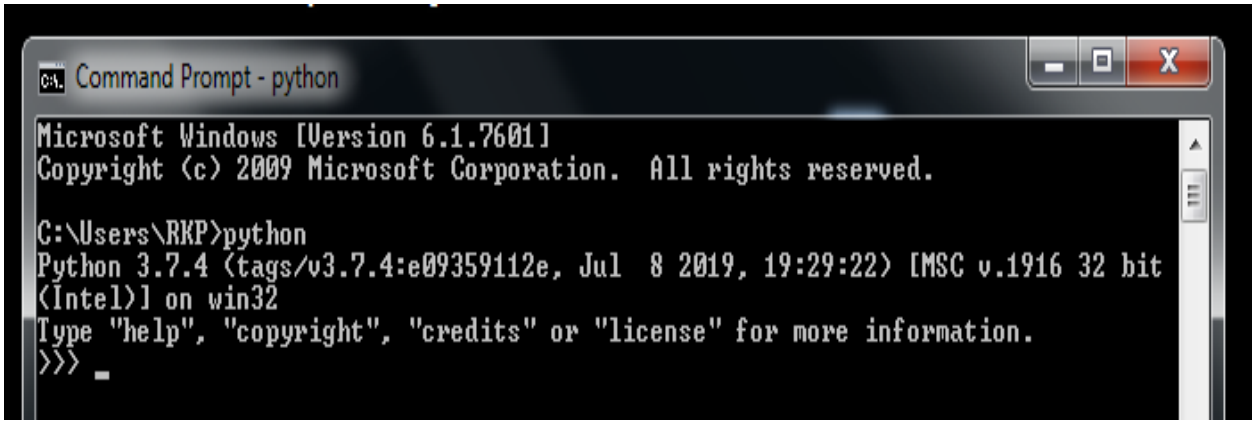
- Command Prompt (of Operating System)- suitable for interactive mode programming.
- Python Command Line- suitable for interactive mode programming.
- Integrated Development Environment (IDE)- suitable for interactive mode and script mode programming.

Opening Python from Command Prompt

- Go to the command prompt by entering ‘cmd’ at the search box under the start menu.

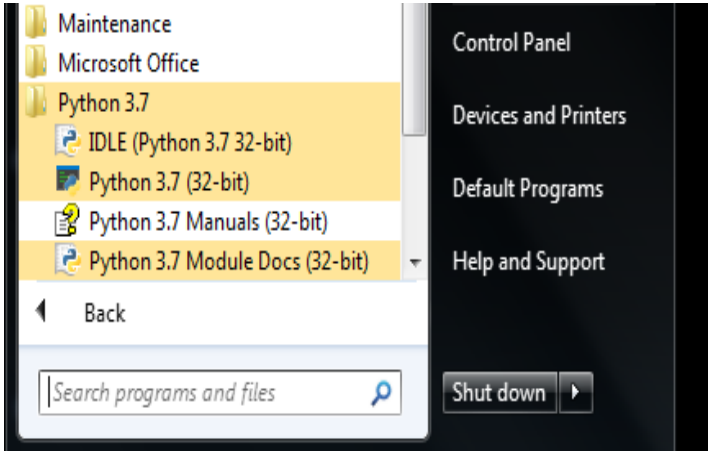


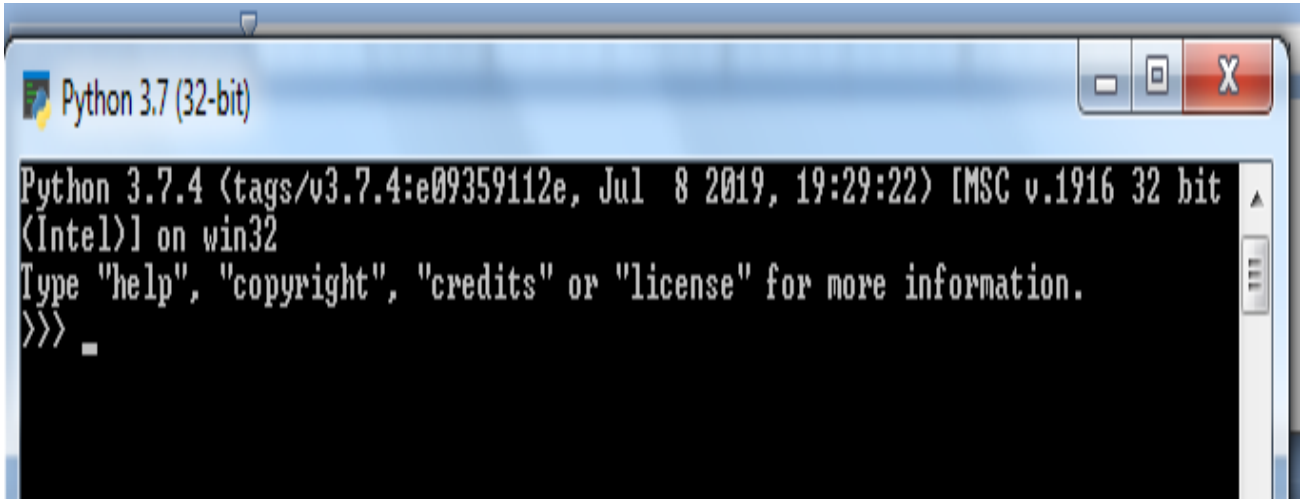
- Type python or Python or py at the command prompt to open Python in interactive mode.



Opening Python using Python Command Line

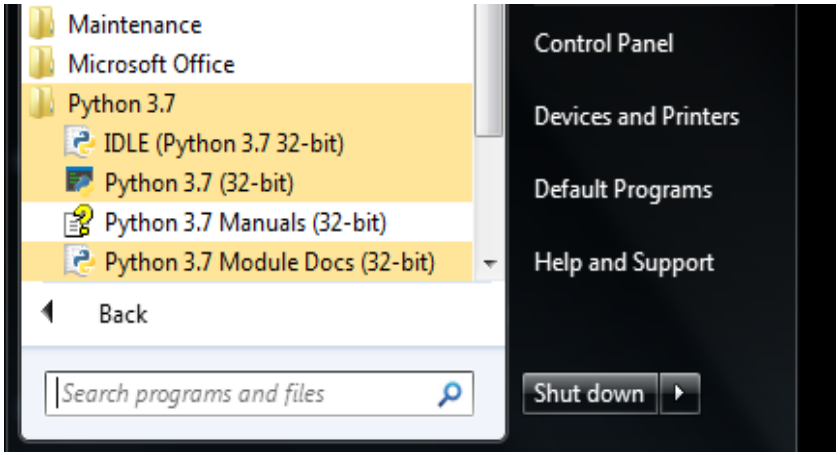
- Go to start menu and click on All Programs Select Python 3.7 and click on Python3.7 (32-bit)

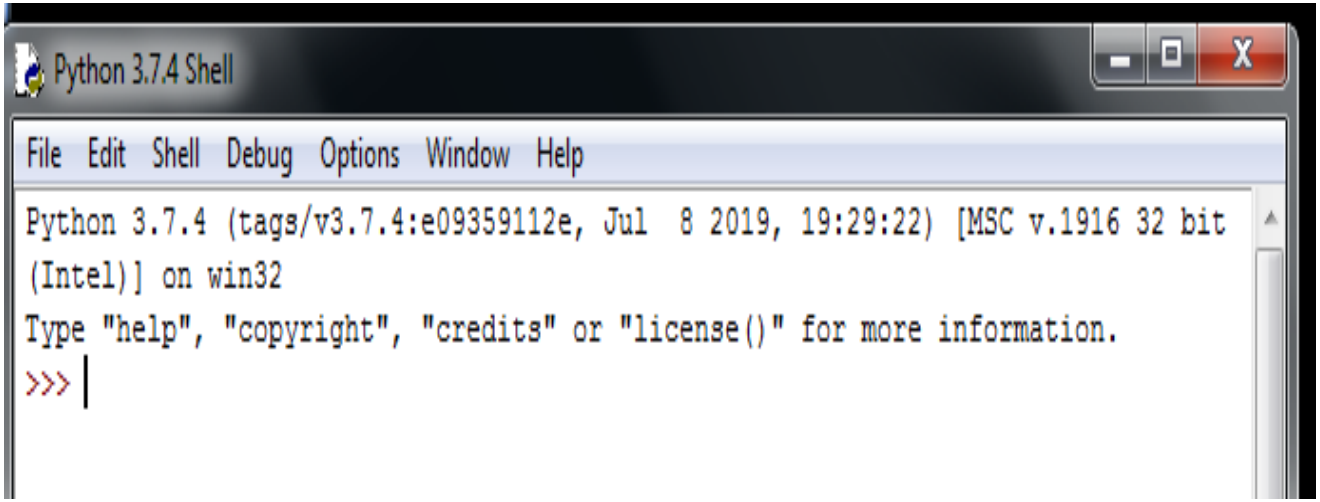




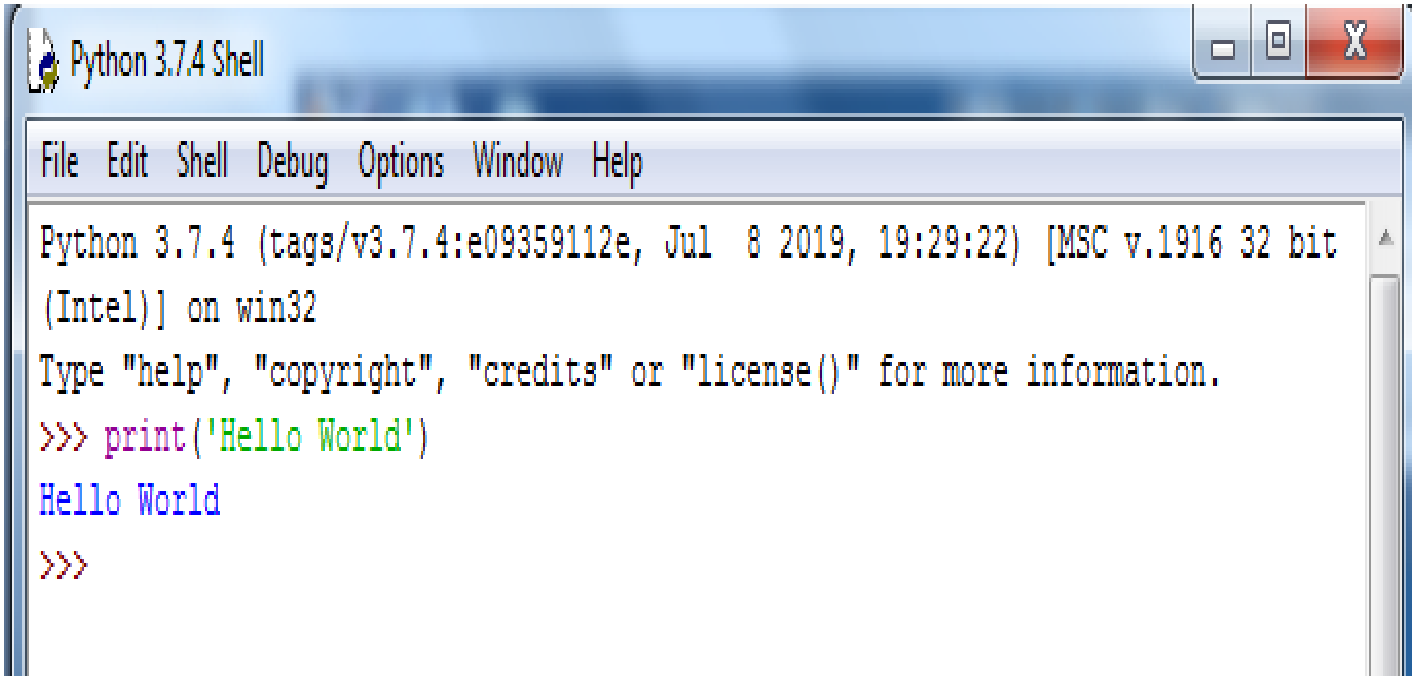
Opening Python using IDE

Go to start menu and click on All Programs Select Python 3.7 and click on IDLE.

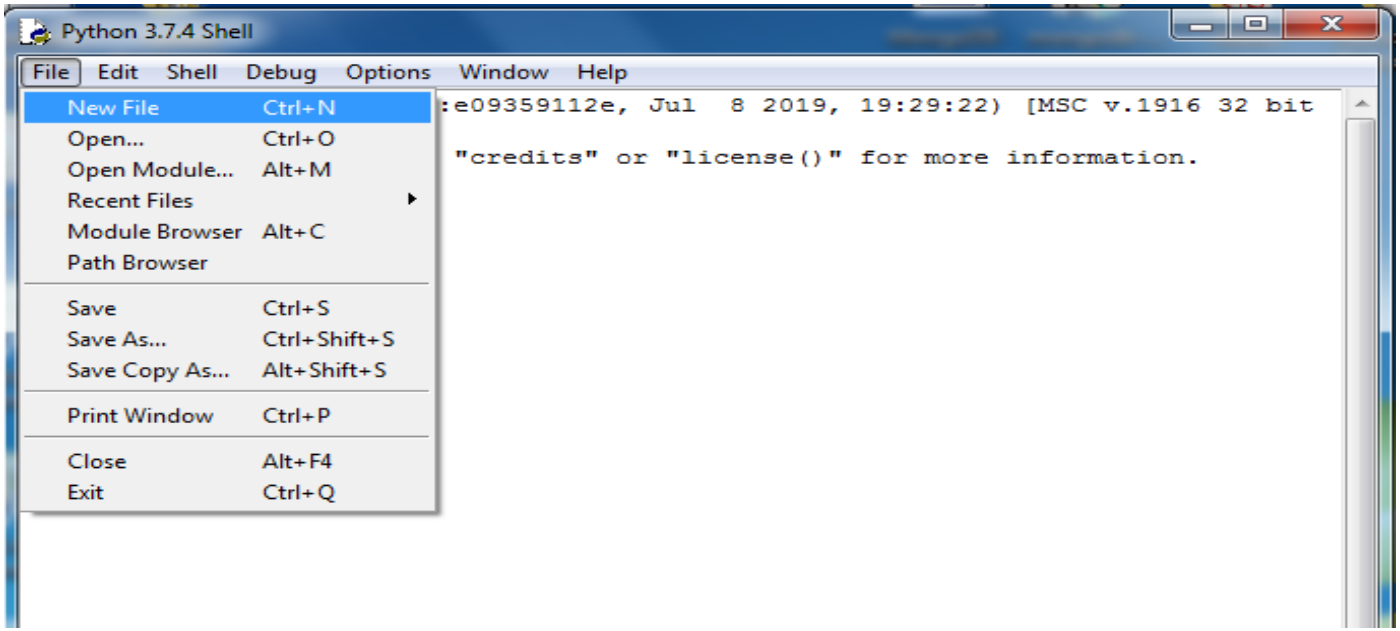


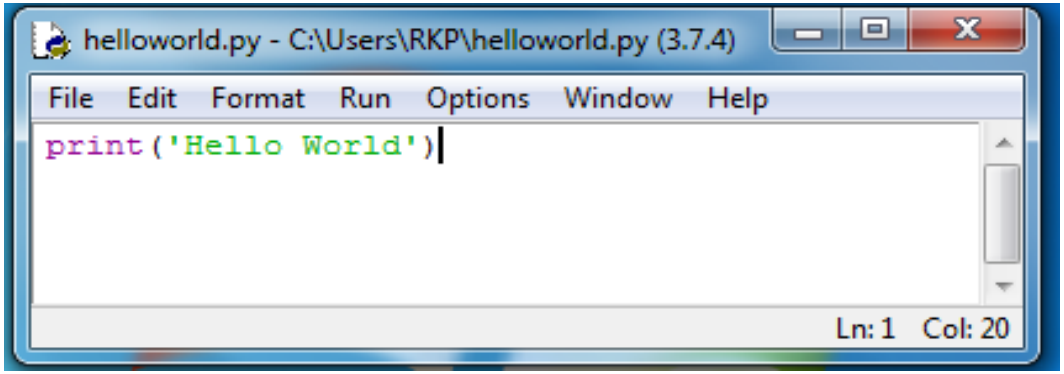


Working in Interactive Mode (IDLE)



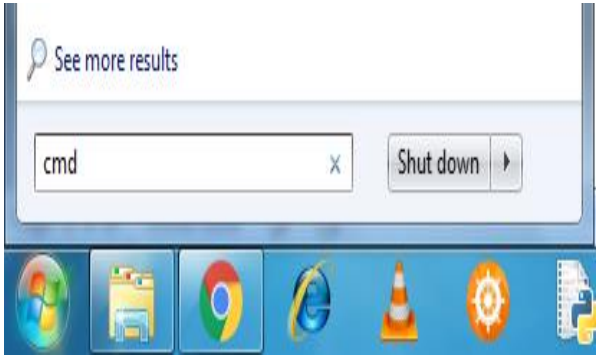
Working in Script Mode (IDLE)



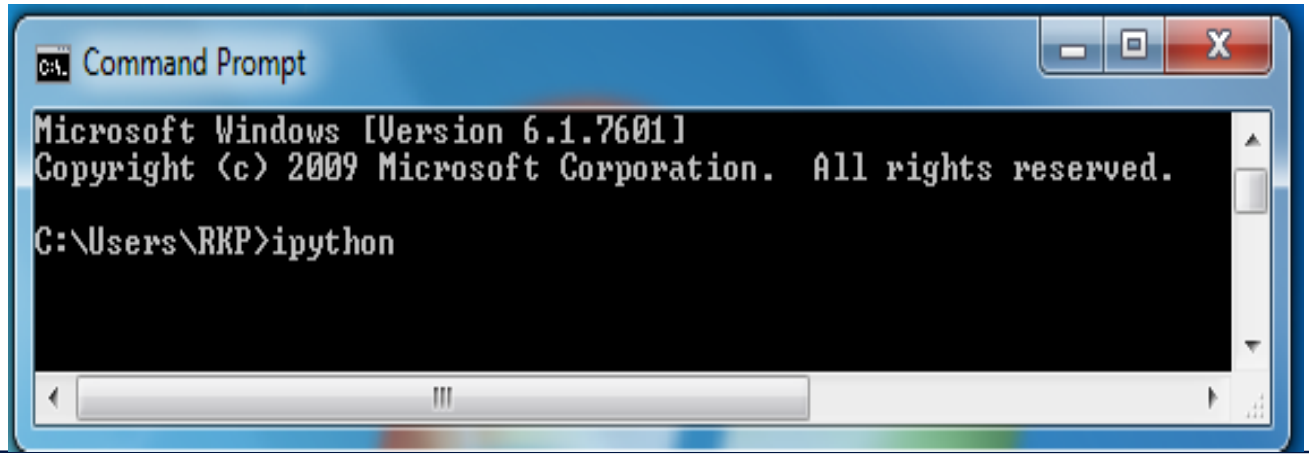


Working in IPython (Interactive Python)

- Go to the command prompt by entering ‘cmd’ at the search box under the start menu.



- Type ipython or ipython3 at the command prompt to open IPython in interactive mode.



A Sample Code

```
x = 35 - 22 # A comment.
y = "Introduction" # Another one.
z = 3.45
if x == 13 or y == "Introduction":
    x = x + 1
    y = y + " to Python" # String concatenation.
print(x)
print(y)
```

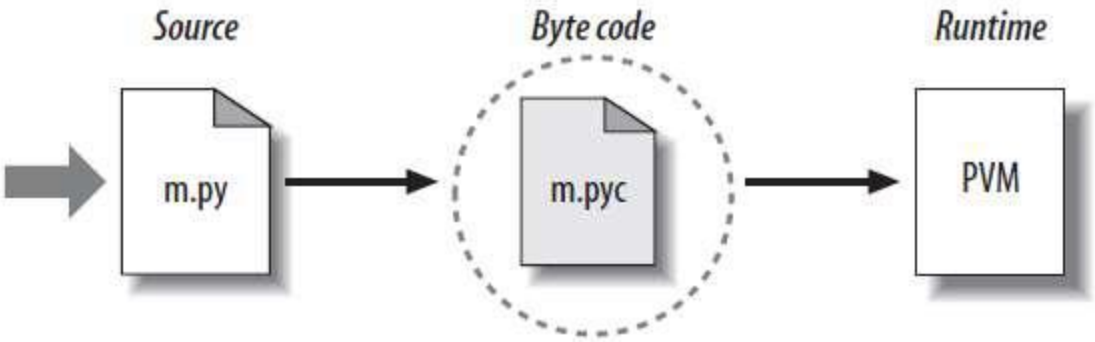
Output

```
14
Introduction to Python
```

Python Code Execution

Execution of Python program means execution of the byte code on Python Virtual Machine (PVM).

Source code is translated to byte code, which is then run by the Python Virtual Machine.



Source code extension is **.py**
Byte code extension is **.pyc (compiled python code)**

Running Script in Python Command Line

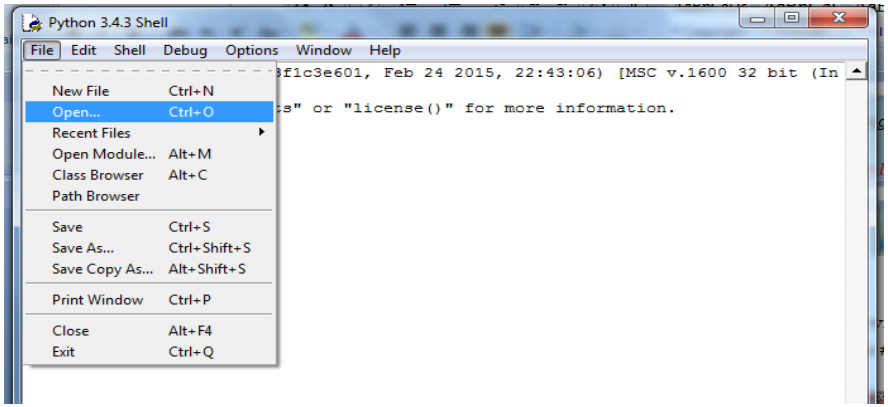
Once we are inside the Python shell, type command and press ‘Enter’ to run it.

Examples:

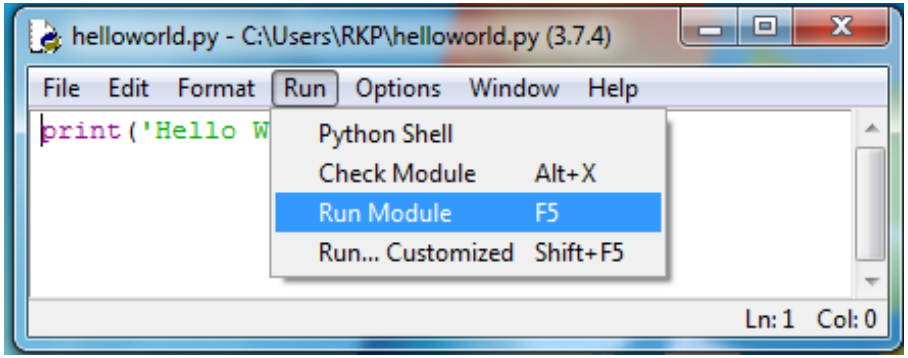
```
>>> print('Hello World'
Hello World
# Relevant output is displayed on subsequent lines without the >>> symbol
>>> x = [0,1,2]
# Quantities stored in memory are not displayed by default
>>> x
[0,1,2]
# If a quantity is stored in memory, typing its name will display it
>>> 2+3
5
```

Running Script in IDLE

- Open the existing file



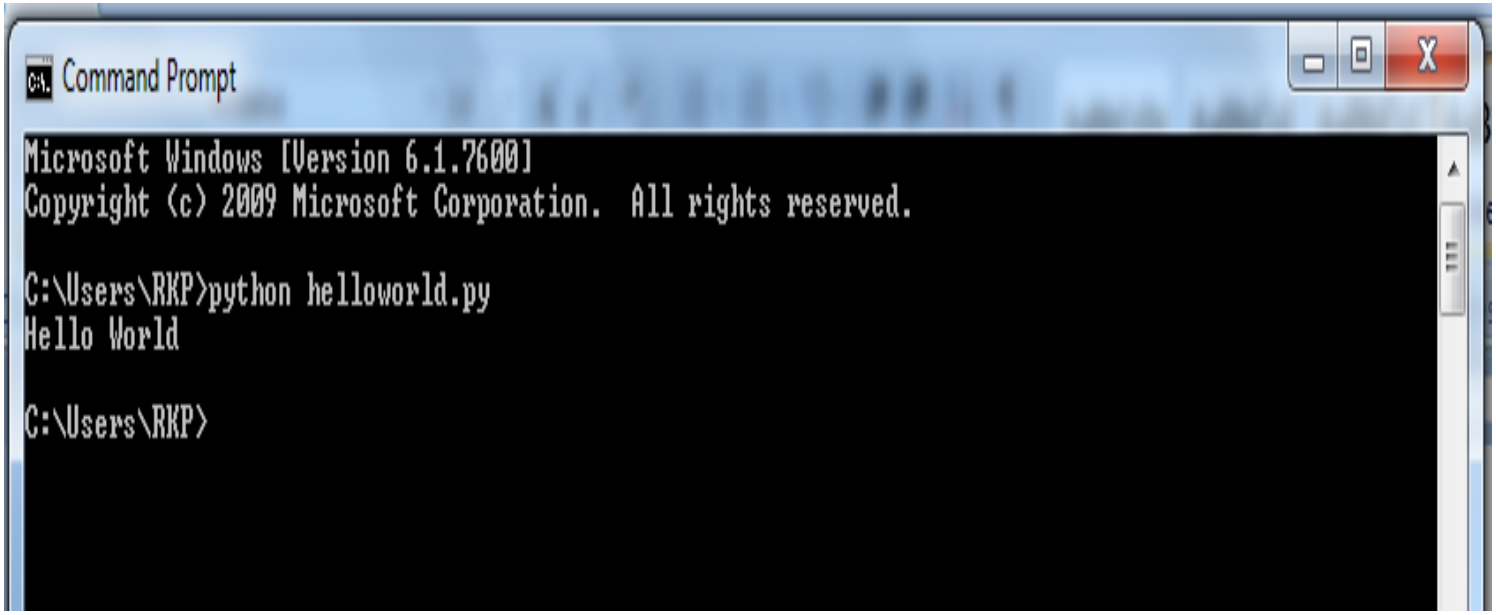
- Run the file



Running Script in Command Prompt

Invoke the Python interpreter on the application using the following command:

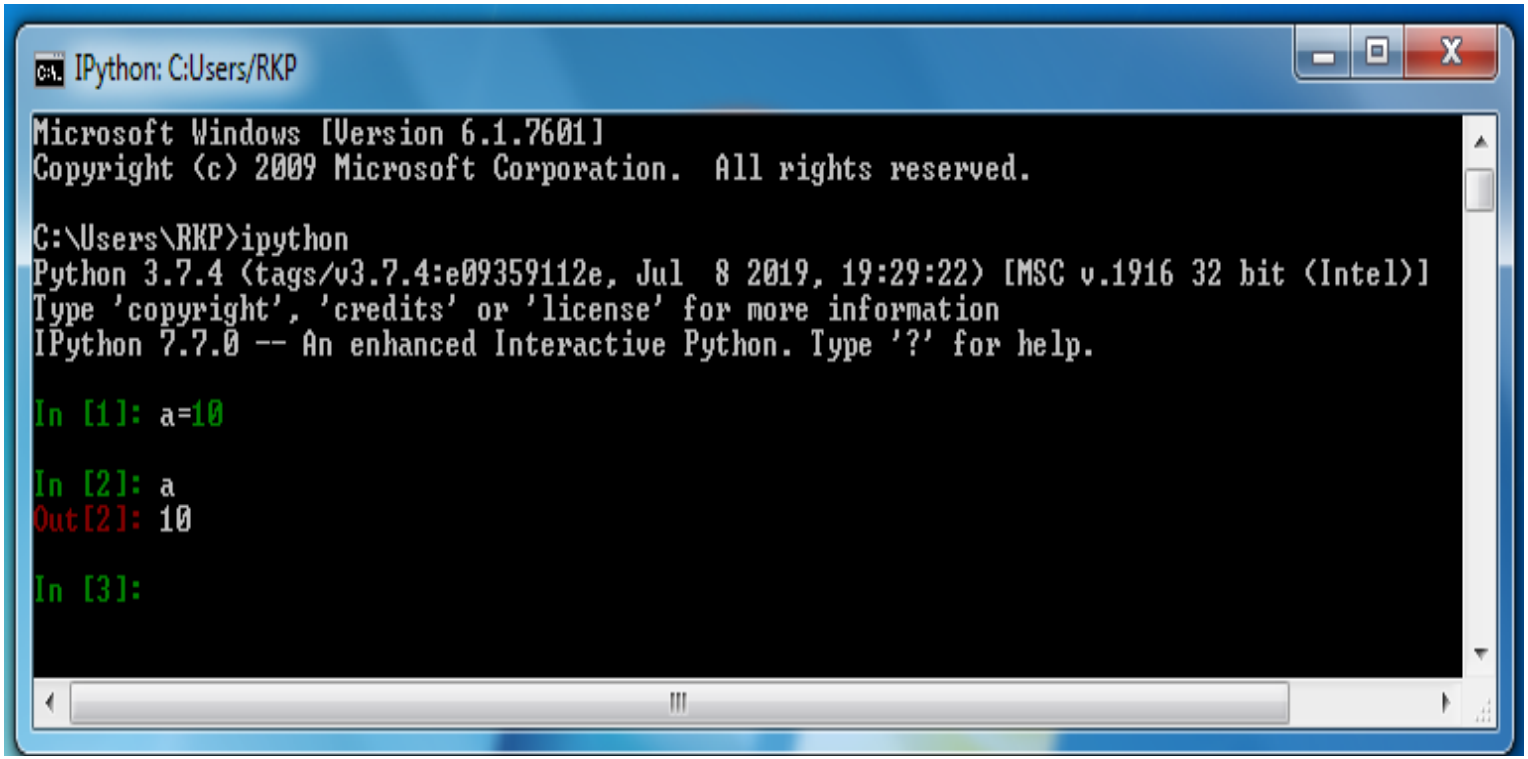
C:\>python script.py or C:\>py script.py or C:\>script.py



Running Script in IPython

Once we are inside the IPython shell, type command and press ‘Enter’ to run it.

Examples:



Recommended Book:

1. A Text Book of IT Workshop on Python Programming: Author: Atanu Das, Rajkumar Patra, Publication: Cengage Learning India Private Limited

2. Python Programming for Computer Science and Applications: Author: Atanu Das, Rajkumar Patra, Publication: Glacier Press