SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 107

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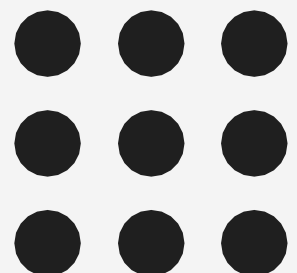**Approved by AICTE, Recognized by UGC & Affiliated to Anna University, Chennai**

Department of Artificial Intelligence and Data Science

Course Name – Computational Thinking and Python Programming

I Year / I Semester

Unit 2-DATA, EXPRESSIONS, STATEMENTS

INTRODUCTION TO PYTHON

Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language.
It was created by Guido van Rossum during 1985- 1990.
Python got its name from "Monty Python's flying circus". Python was released in the year 2000.

Python is interpreted: Python is processed at runtime by the interpreter. You do not need to compile your program before executing it.
Python is Interactive: You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
Python is Object-Oriented: Python supports Object-Oriented style or technique of programming that encapsulates code within objects.
Python is a Beginner's Language: Python is a great language for the beginner- Level programmers and supports the development of a wide range of applications.

Python Features:

Easy-to-learn: Python is clearly defined and easily readable. The structure of the program is very simple. It uses few keywords.
Easy-to-maintain: Python's source code is fairly easy-to-maintain.
Portable: Python can run on a wide variety of hardware platforms and has the same interface on all platforms.
Interpreted: Python is processed at runtime by the interpreter. So, there is no need to compile a program before executing it. You can simply run the program.
Extensible: Programmers can embed python within their C,C++,JavaScript, ActiveX, etc.
Free and Open Source: Anyone can freely distribute it, read the source code, and edit it.
High Level Language: When writing programs, programmers concentrate on solutions of the current problem, no need to worry about the low level details.
Scalable: Python provides a better structure and support for large programs than shell scripting.

Applications:

Bit Torrent file sharing
Google search engine, YouTube
Intel, Cisco, HP,IBM
i–Robot
NASA
Face book, Drop box

Python interpreter:

Interpreter: To execute a program in a high-level language by <u>translating it one line ata time.</u>

Compiler: To translate a program written in a high-level language into a low-level language <u>all at once</u>, in preparation for later execution

Compiler	Interpreter
Compiler Takes **Entire** program as input	Interpreter Takes **Single** instruction as input
Intermediate Object Code is **Generated**	**No** Intermediate is Object Code **Generated**
Conditional Control Statements are Executes **faster**	Conditional Control Statements are Executes **slower**
Memory Requirement is **More**(Since Object Code is Generated)	**Memory Requirement** is **Less**
Program need not be **compiled** every time	Every time higher level program converted into lower level is program
Errors are displayed after **entire program** is checked	**Errors** are displayed for **every instruction** interpreted (if any)
Example : C Compiler	**Example** : PYTHON

Modes of python interpreter:
Python Interpreter is a program that reads and executes Python code. It uses 2 modes of Execution.
• Interactive mode
• Script mode
Interactive mode:
• Interactive Mode, as the name suggests, allows us to interact with OS.
• When we type Python   statement, **interpreter displays the result(s) immediately. Advantages:**
• Python, in interactive mode, is good enough to learn, experiment or explore.
• Working in interactive mode is convenient for beginners and for <u>testing small pieces of code.</u>
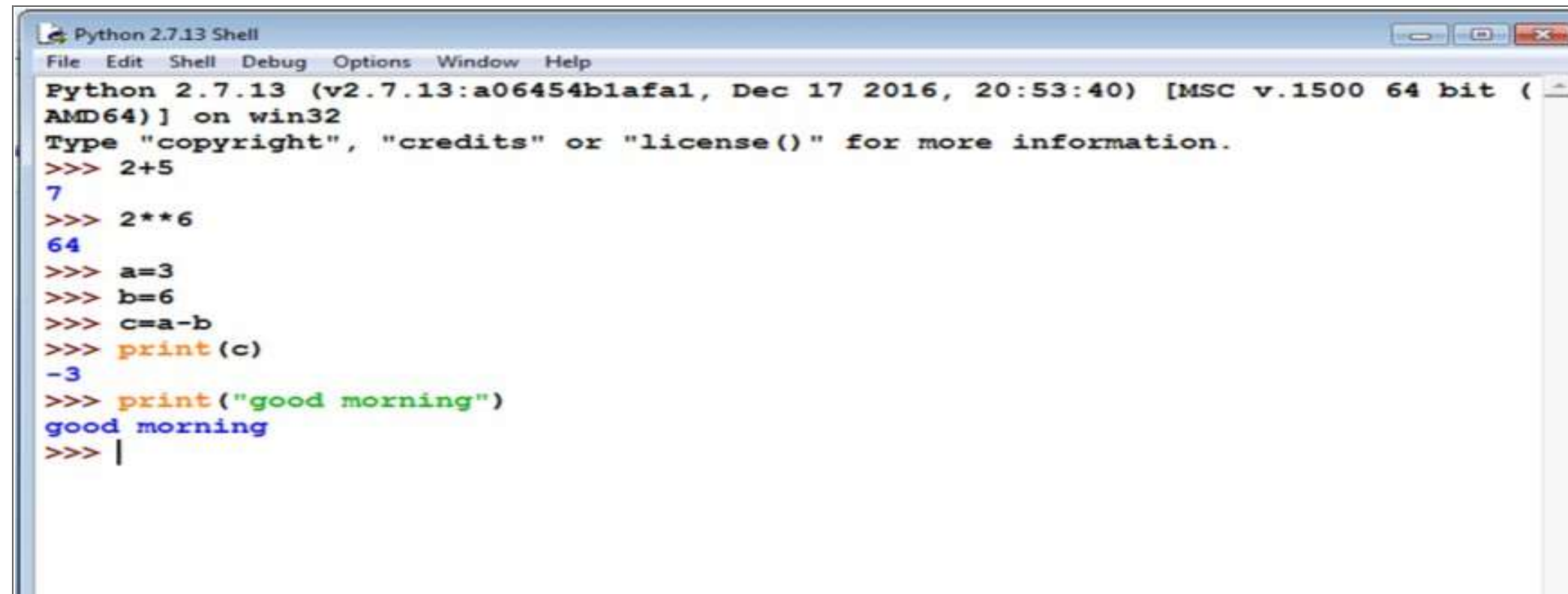**Drawback:**
• We <u>cannot save the statements</u> and have to retype all the statements once again to re-run them. In interactive mode, you type Python programs and the interpreter displays the result:
  >>> 1 + 1
  2

The chevron, >>>, <u>is the prompt the interpreter uses</u> to indicate that it is ready for you to enter code. If you type 1 + 1, the interpreter replies 2.
>>> print ('Hello, World!') Hello, World!

This is an example of a print statement. It displays a result on the screen. In this case, the result is the words.

```
Python 2.7.13 Shell
File   Edit   Shell   Debug   Options   Window   Help
Python 2.7.13 (v2.7.13:a06454b1afa1, Dec 17 2016, 20:53:40) [MSC v.1500 64 bit (
AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>> 2+5
7
>>> 2**6
64
>>> a=3
>>> b=6
>>> c=a-b
>>> print(c)
-3
>>> print("good morning")
good morning
>>> |
```

Script mode:

In script mode, we type python program in a file and then use interpreter to execute the content of the file.

Scripts can be saved to disk for future use.**Python scripts have the extension .py**, meaning that the filename ends with**.py**

Save the code with **filename.py** and run the interpreter in script mode to execute the script.

Example1:

```
print(1)
x = 2
print(x)
```

Output:

```
>>>1
2
```

Interactive mode	Script mode
A way of using the Python interpreter by typing commands and expressions at the prompt.	A way of using the Python interpreter to read and execute statements in a script.
Can't save and edit the code	Can save and edit the code
If we want to experiment with the code, we can use interactive mode.	If we are very clear about the code, we can use script mode.
we cannot save the statements for further use and we have to retype all the statements to re-run them.	we can save the statements for further use and we no need to retype all the statements to re-run them.
We can see the results immediately.	We can't see the code immediately.

Integrated Development Learning Environment(IDLE):

Is a **graphical user interface** which is completely written in Python.

It is bundled with the default implementation of the python language and also comes with optional part of the Python packaging.

Features of IDLE:

Multi-window text editor with syntax highlighting.

Auto completion with **smart indentation**.

Python shell to display output with syntax highlighting.