GETTING STARTED WITH PYTHON

Computer Science

Class XI

2020-21

OBJECTIVES OF THE SESSION

❖To understand the concept of computational thinking.

❖To differentiate between Interpreter and Compiler based Languages.

❖To understand the features of Python.

❖To know the feature and limitations of Python.

❖To get introduced to different modes of Python.

COMPUTATIONAL THINKING

Computers can be used to help us to solve problems. However, before a problem can be tackled or solved, the problem itself and the ways in which it could be solved need to be understood.
Computational thinking allows us to do this.

The four cornerstones of computational thinking
1. <u>Decomposition</u> - breaking down a complex problem or system into smaller, more manageable parts
2. <u>Pattern recognition</u> - looking for similarities among and within problems
3. <u>Abstraction</u> - focusing on the important information only, ignoring irrelevant detail
4. <u>Algorithms</u> - developing a step-by-step solution to the problem, or the rules to follow to solve the problem

COMPILER VS INTERPRETER

Compiler - The language processor that translates the complete source program as a whole in one go into machine code is called compiler. Some of the examples are C and C++ compilers. If there are any errors in the source code, the compiler specifies the errors at the end of compilation with line numbers. The errors must be removed before the compiler can successfully recompile the source code again.

Interpreter The language processor that translates a single statement of source program into machine code and executes it immediately before moving on to the next line is called an Interpreter. If there is an error in the statement the interpreter terminates its translating process at that statement and displays an error message. Only after removal of the error, the interpreter moves on to the next line for execution.

PYTHON INTRODUCTION

It is widely used general purpose,high level programming language.Developed by Guido van Rossum in 1991.

It is used for:
- Software development,
- Web development (server-side),
- System scripting,
- Mathematics.

FEATURES OF PYTHON

1. **Easy to use** – Due to simple syntax rule
2. **Interpreted language** – Code execution & interpretation line by line
3. **Cross-platform language** – It can run on Windows, Linux, Mac etc. equally
4. **Expressive language** – Less code to be written as it itself express the purpose of the code.
5. **Completeness** – Support wide rage of library
6. **Free & Open Source** – Can be downloaded freely and source code can be modify for improvement

IMPLEMENTATION OF PYTHON

The language is used by companies in real revenue generating products, such as:

1. In operations of Google search engine, YouTube, etc.
2. Bit Torrent peer to peer file sharing is written using Python
3. Intel, Cisco, HP, IBM, etc use Python for hardware testing.
4. i-Robot uses Python to develop commercial Robot.
5. NASA and others use Python for their scientific programming task.

SHORTCOMINGS OF PYTHON

1. Lesser libraries – as compared to other programming languages like c++,java,.net

2. Slow language – as it is interpreted languages,it executes the program slowly.

3. Weak on Type-binding – It does not pin point on use of a single variable for different data type.

ALGORITHM

- An algorithm is an effective method expressed as a finite list of well defined instructions for calculating a function, starting from an initial state and initial input. The instructions describe a computation, which will eventually produce output, when executed. We can use algorithm to solve any kind of problems. However, before writing a program, we need to write the steps to solve the problem in simple English language. This step-by-step procedure to solve the problem is called algorithm.

PROBLEM SOLVING PROCESS

- The problem solving process starts with the problem specifications and ends with a concrete (and correct) program. Programming means a problem solving activity, which consists of four steps. They are

i.   **Understanding the problem;**

ii. **Devising a plan;**

iii. **Executing the plan; and**

iv. **Evaluation**

MODES IN PYTHON

(i) **Interactive mode -**Python, in interactive mode, is good enough to learn, experiment or explore, but its only drawback is that we cannot save the statements for further use and we have to retype all the statements to re-run them.

(ii) **Script mode -** In script mode, we type Python program in a file and then use the interpreter to execute the content from the file.

Note: Result produced by Interpreter in both the modes, viz., Interactive and script mode is exactly same.