

Session 1 – “Introduction to Programming Fundamentals”

Programming (Dictionary Definition) *A set of related measures or activities with a particular long-term aim.*

Programming requires tools/software/IDE along with understanding and knowledge of language syntax. Programming helps to automate, collect, manage, calculate, and analyze data.

Each programming language has its own unique qualities and uses:

- General purpose languages: Python or Java (powerful languages & can solve complex problems)
- Low level languages: Assembly or C
- Web design languages: HTML, CSS

Interpreter (Dictionary Definition) *A computer program that directly executes instructions written in a high-level programming language, without requiring them previously to have been compiled into a machine language program. e.g., python, ruby, java, etc.*

Compiler (Dictionary Definition) *A computer program that translates a high-level programming language to machine code for the computer to execute. e.g., Java or C++ (**source code**) to machine language (**object code**).*

Literals (Dictionary definition) *constant values assigned to constant variables.*

Operators (Dictionary definition) *a character that represents a specific mathematical or logical action or process.*

Operator types: Arithmetic, Logical, Comparison, Assignment and Bitwise

Functions (Dictionary Definition) *A block of organized, reusable code to perform a specific task. Functions can receive data and return results as needed. There are two types of functions: predefined (built-in functions*

already present in a language) and User-defined (functions built by programmers for problem solving and avoiding redundancy in code).

Variable (Dictionary Definition) *an abstract storage location associated with a specific name with known or unknown quantity of information.*

Input is information either collected from the user or entered by the programmer in the code.

Output is the result generated by the program.

Session 2 – “Control Flow and Decision Making”

Conditional Statement (Dictionary Definition) *the checkpoints in the program that determines behavior according to a given situation.*

if (***this is true***) then (***do this***) else (***do that***)

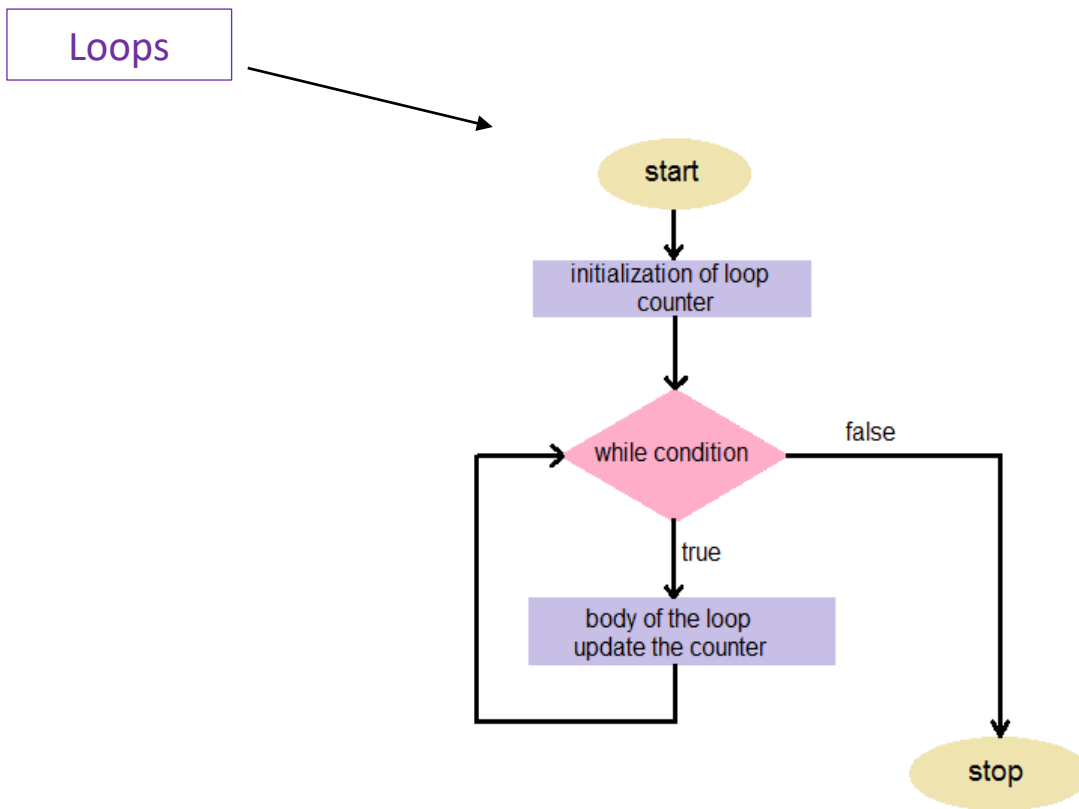
Loops (Dictionary Definition) *a set of instructions that runs for either a set number of times or until a condition is reached.*

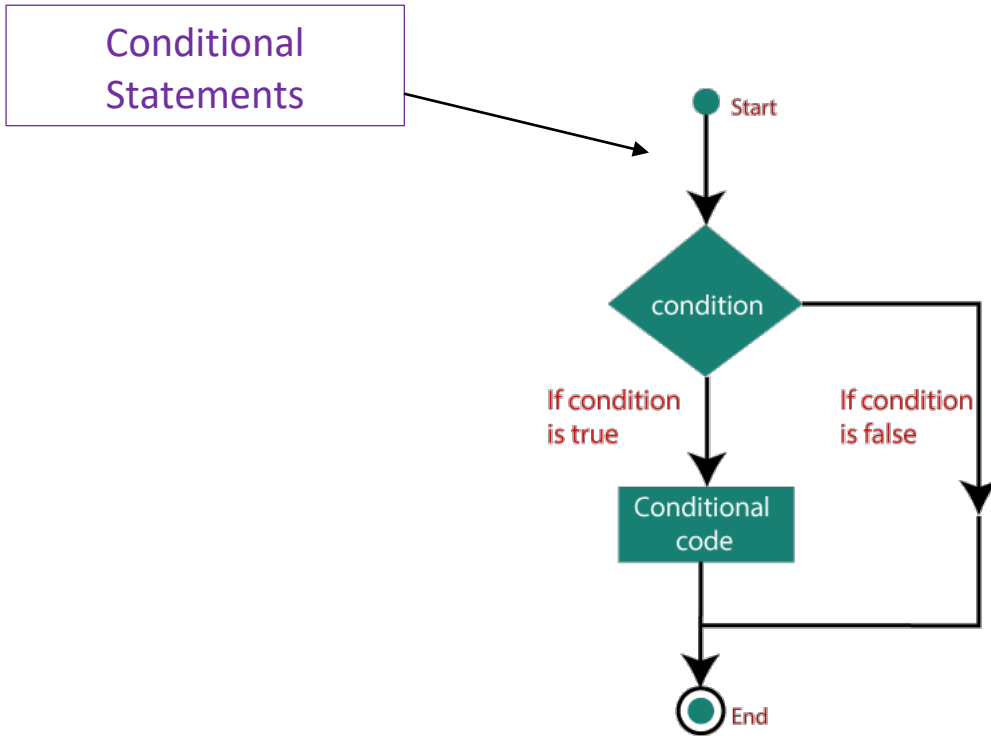
Loop Types: *for, while*

An iterator is set for running a loop for a fixed number of times. Use 'break' or 'continue' for loops based on conditions or users' actions/input. Loops can be nested & have conditional statements.

Iterator: An object used to loop through collections.

Iterable: An object that can be looped over or iterated using a loop.





Session 3 – “Object-Oriented Programming and Modules”

Object-Oriented Programming (Dictionary Definition) *a programming paradigm based around the idea of objects and classes rather than functions and logic.*

Objects (Dictionary Definition) *a data field with unique attributes and behavior. They are allocated memory space whenever they are created.*

Classes (Dictionary Definition) *a template for creating and declaring objects, no memory is allocated to a class.*

Attributes - Class attributes are attributes which are owned by the class itself. They will be shared by all the instances of the class.

Methods (Dictionary Definition) *A procedure associated with a class; this defines the behavior of the object created from that class.* Methods can accept parameters, manipulate them, and return values.

Encapsulation: (Definition) *A process to keep the data and methods together as a single unit*

Abstraction: (Definition) *A process to keep only the relevant data visible about an object to the user to reduce complexity*

Inheritance: (Definition) *A process where a class derives from another class.*

Polymorphism: (Definition) *Ability of a variable, function, or an object to take various form.*

Event-Driven Programming (Definition) *A method of programming where the flow of code is determined by events.*

Events in programming can be user input, output of a function, result of a program instruction, etc.

Event Handler: *A callback routine that takes place asynchronously once an event takes place.*

Asynchronous Execution - code doesn't run line by line but based on the events.

Non-blocking event - *program that doesn't block the execution of the next process.*

Module (Definition) *A part of code that be joined to the other code for easy reusability.*

Like a function, modules are designed to solve problems and can be reused.

Modular Programming (Definition) *A software design technique that emphasizes separating the functionality of a program into independent, interchangeable modules, such that each contains everything necessary to execute only one aspect of the desired functionality.*