



ACCA4020

Introduction: Program, Algorithm and Flowchart

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Program, Algorithm and Flowchart

- **Program** – A set of instructions to the computer to perform a specific task or solve a particular problem.

A typical programming task can be divided into two phases:

1. Problem solving phase

- Produce an ordered sequence of steps that describe solution of problem
 - Analyse the problem
 - Write an **algorithm** (ordered sequence of steps that describe the solution)
 - Draw a **flowchart** (Pictorial representation of the algorithm)

2. Implementation phase

- Implement the program in some programming language
 - Convert the algorithm/flowchart to program
 - Execute the program

Program, Algorithm and Flowchart

Algorithm – A step-by-step process or set of instructions designed to perform a specific task or solve a problem.

It provides a clear and logical sequence of actions that must be followed to achieve the desired output from given inputs.

Characteristics of a Good Algorithm:

Well-defined inputs and outputs: The algorithm should take input and produce output clearly.

Finite Steps: It should terminate after a specific number of steps.

Unambiguous: Each step should be clear and well-defined.

Efficient: It should solve the problem using minimal resources (time and space).

Generalisable: It should work for various inputs.

Program, Algorithm and Flowchart

Example 1: Finding the sum of two numbers

1. Start
2. Input First Number, Num1
3. Input Second Number, Num2
4. Calculate the sum, $\text{Sum} = \text{Num1} + \text{Num2}$
5. Print Sum
6. Stop.

Example 2: To check if a number is Even or Odd

1. Start
2. Input the Number, Num
3. if Num **mod** 2 == 0 then
4. print "Even"
5. else
6. print "Odd"
7. Stop

Program, Algorithm and Flowchart

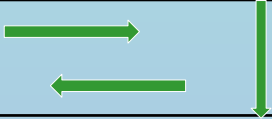
Class activity

1. Write an algorithm to find the largest of two numbers.
2. Write an algorithm to find the largest of three numbers
3. Write an algorithm to calculate the area of a circle.
4. Write an algorithm to find the power of a Number (n^x)

Program, Algorithm and Flowchart

Flowchart : A graphical representation of an algorithm, using standardized symbols to depict the actions and flow of execution. It is the visual representation of the logical steps of a process.

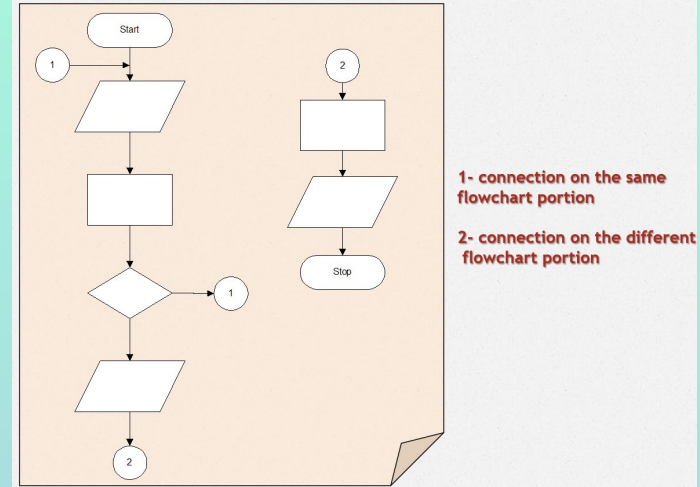
Flowchart Symbols

Symbol	Operation
	Start/Stop : Used to indicates the start and end of a flowchart. Single flow line. Only one “Start” and “Stop” terminal for each program
	Input/Output: Used whenever data is entered (input) or displayed (output). One flow line enters and one flow line exits
	Decision making; Used to represent operations in which there are two possible selections. One flow line enters and two flow lines (labeled as “Yes” and “No”) exit.
	Process : Used whenever data is being manipulated; One flow line enters and one flow line exits
	Flow line : Used to indicate the direction of flow of control.
	On Page Connection : Used to connect remote flowchart portion on the same page. One flow line enters and one flow line exits
	Off-page Connector: Used to connect remote flowchart portion on different pages. One flow line enters and one flow line exits.

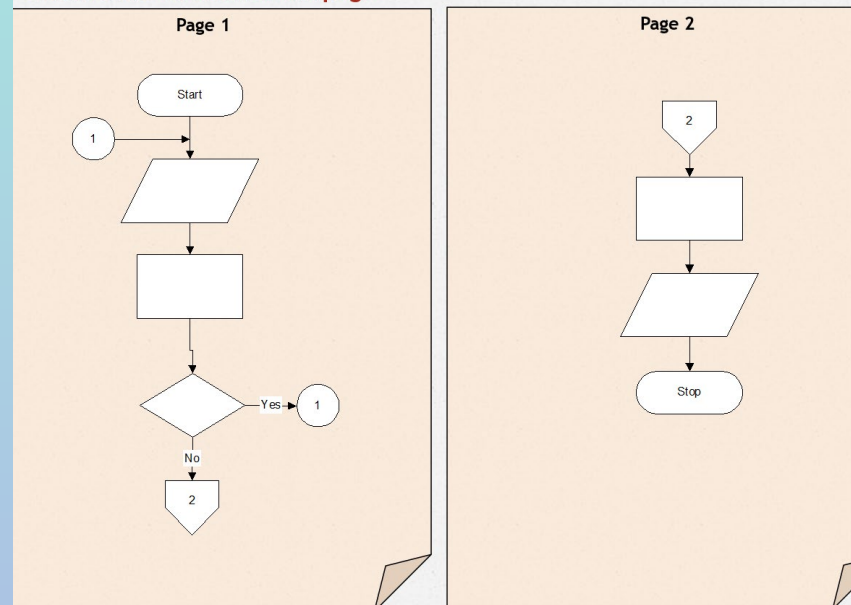
Program, Algorithm and Flowchart

Flowchart Symbols

Connectors on the same page



Connectors on a different page



Program, Algorithm and Flowchart Sequence

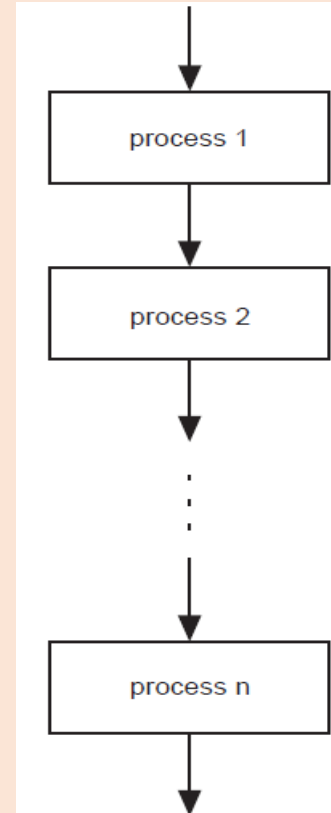
In a computer program or an algorithm, sequence involves simple steps which are to be executed one after the other.

The steps are executed in the same order in which they are written

In **Algorithm**,
sequence is expressed as:

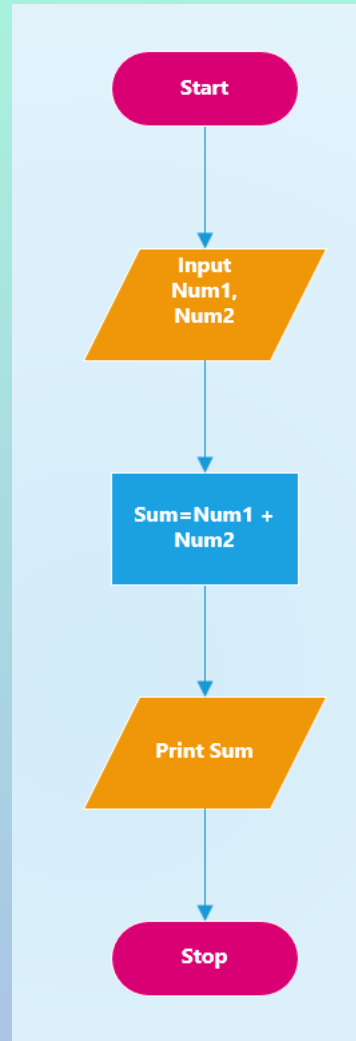
process 1
process 2
...
...
process n

In a **flowchart**,
sequence is expressed as:



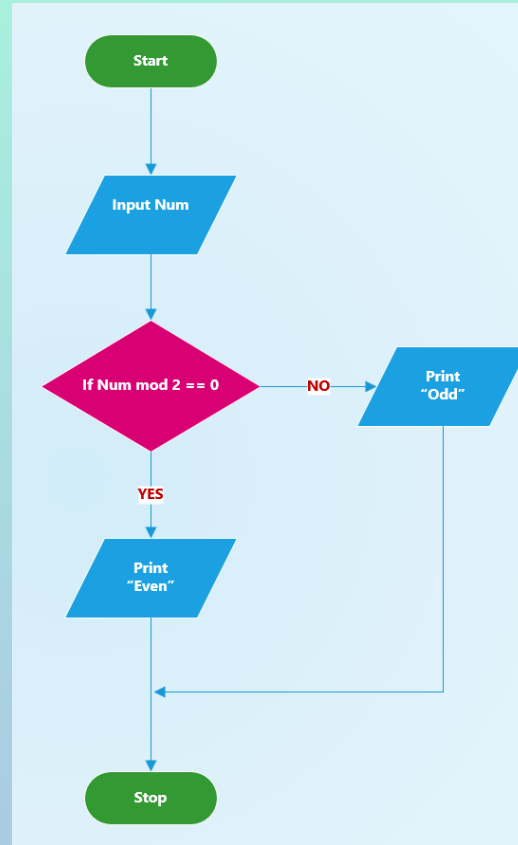
Program, Algorithm and Flowchart

Example 1: Flowchart for Finding the sum of two numbers



Program, Algorithm and Flowchart

Example 2: Flowchart to check if a number is Even or Odd



Program, Algorithm and Flowchart

Class activity

1. Draw a flowchart to find the largest of two numbers.
2. Draw a flowchart to find the largest of three numbers
3. Draw a flowchart to calculate the area of a circle.
4. Draw a flowchart to find the power of a Number (n^x)

Challenging

1. Draw a flowchart to Find the Median of Three Numbers.
2. Draw a flowchart to calculate the final bill amount after applying a discount.

Details:

Input: total bill amount

Apply discount based on the following rules:

If the bill is greater than 100, apply 10% discount

If the bill is between 50 and 100 (inclusive), apply 5% discount

If the bill is less than 50, no discount

Output: final bill amount

Program, Algorithm and Flowchart

Next Session : Programming