# CLASS :VIIISUBJECT :Computer ScienceCHAPTER :Algorithms and Flowcharts (Ch 4)

## ALGORITHM

An algorithm is "rules or procedures" for solving problems and are used in all aspects of daily life activities. Two important aspects of algorithms are that the problem should be expressed in detail and without ambiguity. To solve any problem, it is important to follow the stepwise strategy.

A **pseudocode** (false code) is a language similar to English but resembles computer programming code too. For example, Read A.

#### Uses of algorithm

- Algorithm play a key role in developing computer programs.
- It can be effectively used to perform mathematical calculations to get the desired result.

<u>Characteristics</u> of a good algorithm include Input, Output, Definiteness, Effectiveness and Termination.

#### <u>Steps to develop an algorithm:</u>

To develop an algorithm, a user goes through a number of steps such as Analysis, Begin, Input, Processing and Output.

#### Rules for writing an algorithm:

- 1. Always begin the first step with START.
- 2. Always write each step in a separate line and number them.
- 3. Use the word INPUT or READ when you want an INPUT.
- 4. Use the word PRINT or WRITE when you want an OUTPUT.
- 5. Always end with STOP.
- 6. Do not make the algorithm too long.

#### An example of how to write an algorithm is given below :-

Write an algorithm to find the Simple Interest (SI) by inputting the values of Principal(P), Rate(R) and Time(T)

Step 1: START

- Step 2: INPUT P, R, T
- Step 3: Calculate the Simple Interest, SI = (P\*R\*T) / 100

Step 4: PRINT SI

Step 5: STOP

## **FLOWCHART**

A flowchart is a diagrammatic representation of an algorithm, in which different steps are shown as symbols of different shapes connected by arrows. The arrows are responsible for the direction of flow of program.

<u>Different shapes</u> used in a flowchart and their functions are listed below:

Symbol	Name	Function
	Start/end	An oval represents a start or end point
>	Arrows	A line is a connector that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectangle represents a process
	Decision	A diamond indicates a decision

## <u>Use of flowchart</u>

- Flowchart helps to understand the stepwise working of a process easily.
- It is used in engineering, computer programming, entertainment, education and physical sciences for performing various tasks.

#### Steps to design of flowchart

Step 1: Understand the process for which the flowchart is to be drawn.

- Step 2: List the steps of the process (algorithm).
- Step 3: Begin with START symbol.
- Step 4: Write the first step in appropriate symbol.
- Step 5: Write each successive step in its respective symbol.
- Step 6: Add arrows between symbols to show the flow of control.
- Step 7: Make sure all the flow paths reach the single STOP box.

#### Rules for designing a flowchart

- A flowchart has only one START box and one STOP box.
- The direction of flow in a flowchart is either from top to bottom or from left to right.
- The flow of control follows only one path.

#### An example of how to draw a flowchart is given below :-

Draw a flowchart to find the average of three numbers.



## DECISION MAKING

A computer uses the IF... ELSE statement for decision-making.

1. When the condition after IF is true, the computer follows the instructions after THEN.

2. When the condition after IF is false, the computer evaluates instruction after ELSE and then proceed further. This process is also known as conditional problem solving.

#### <u>Note:</u>

In algorithms, the IF... THEN... ELSE statement is used whereas in flowcharts, IS... YES... NO is used through a decision box.

## <u>Below is an example of decision making with algorithm and</u> <u>flowchart :-</u>

Write an algorithm and draw a flowchart to enter temperature in Fahrenheit, convert it into Celsius and print whether the body temperature is normal or not.

## ALGORITHM:

Step 1: START

Step 2: Read temperature in Fahrenheit, F

Step 3: Calculate temperature in Celsius as C = 5/9 \* (F - 32)

Step 4: IF (C = 37)

THEN

PRINT Body temperature is normal

#### ELSE

PRINT Body temperature is not normal

Step 5: STOP



# **ASSIGNMENT:**

## Answer the following questions:

- 1.) What do you mean by pseudocode? Give 1 example.
- 2.) What is an algorithm?
- 3.) Mention the rules for writing an algorithm.
- 4.) What is a flowchart? Write the rules for drawing a flowchart.
- 5.) What is conditional problem solving?
- 6.) Draw the different shapes used in a flowchart and give their uses.
- 7.) Write an algorithm and draw a flowchart to find the circumference of a circle with a given radius.
- 8.) Write an algorithm and draw a flowchart to find the greater of 2 numbers input by the user.