ALGORITHM & FLOWCHART MANUAL for STUDENTS

Algorithm in Programming:

In programming, algorithm is a set of well-defined instructions in sequence to solve the problem.

HOW TO WRITE ALGORITHMS:

Step 1 **Define your algorithms input**: Many algorithms take in data to be processed, e.g. to calculate the area of rectangle input may be the rectangle height and rectangle width.
Step 2 **Define the variables**: Algorithm's variables allow you to use it for more than one place. We can define two variables for rectangle height and rectangle width as HEIGHT and WIDTH (or H & W). We should use meaningful variable name e.g. instead of using H & W use HEIGHT and WIDTH as variable name.
Step 3 **Outline the algorithm's operations:** Use input variable for computation purpose, e.g. to find area of rectangle multiply the HEIGHT and WIDTH variable and store the value in new variable (say) AREA. An algorithm's operations can take the form of multiple steps and even branch, depending on the value of the input variables.
Step 4 **Output the results of your algorithm's operations**: In case of area of rectangle output will be the value stored in variable AREA. if the input variables described a rectangle with a HEIGHT of 2 and a WIDTH of 3, the algorithm would output the value of 6.

Flowchart:

Flowchart is diagrammatic /Graphical representation of sequence of steps to solve a problem. To draw a flowchart following standard symbols are use

Symbol	Purpose	Description
	Flow line	**Used to indicate the flow of logic by connecting symbols.**

Symbol	Purpose	Description
	Terminal(Stop/Start)	Used to represent start and end of flowchart.
	Input/Output	Used for input and output operation.
	Processing	Used for airthmetic operations and data-manipulations.
	Decision	Used to represent the operation in which there are two alternatives, true and false.
	On-page Connector	Used to join different flowline
	Off-page Connector	Used to connect flowchart portion on different page.
	Predefined Process/Function	Used to represent a group of statements performing one processing task.

Section 1

Example (1)

Write the Algorithm and Draw a flowchart to add two numbers?

Algorithm

Step-1 Start

Step-2 Input first number say A

Step-3 Input second number say B

Step-4 SUM = A + B

Step-5 Display SUM

Step-6 Stop

Or

Algorithm

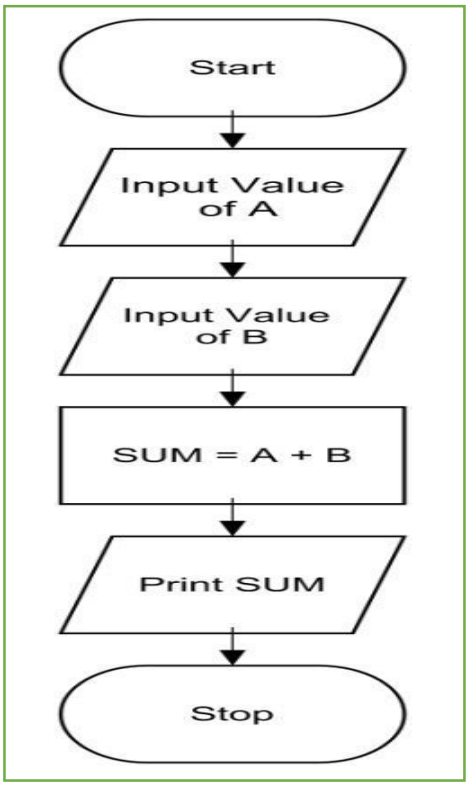
Step-1 Start

Step-2 Input two numbers say A & B

Step-3 SUM = A + B

Step-4 Display SUM

Step-5 Stop



Example (2)

Convert temperature from Celsius to Fahrenheit

C : temperature in Celsius
F : temperature Fahrenheit

Algorithm

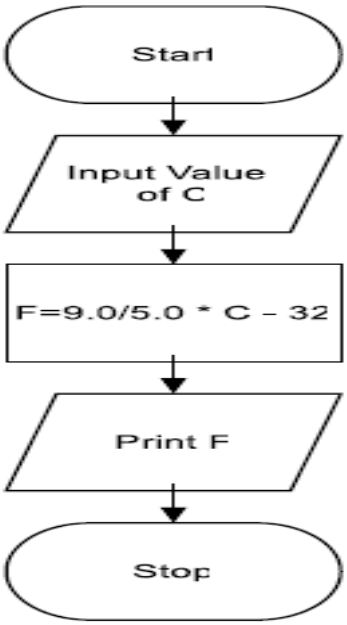
Step-1 Start

Step-2 Input temperature in Celsius say C

Step-3 F = (9.0/5.0 x C) + 32

Step-4 Display Temperature in Fahrenheit F

Step-5 Stop



Example (3)

Find Area and Perimeter of Square:

L : Side Length of Square
AREA : Area of Square
PERIMETER : Perimeter of Square

Algorithm

Step-1 Start

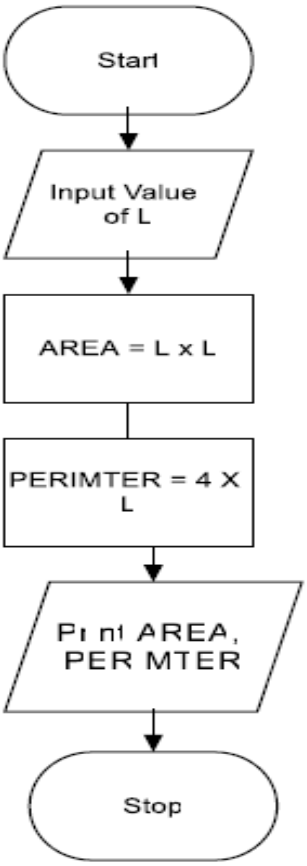
Step-2 Input Side Length of Square say L

Step-3 Area = L x L

Step-4 PERIMETER = 4 x L

Step-5 Display AREA, PERIMETER

Step-6 Stop



Example (4)

Find Area and Perimeter of Rectangle:

L : Length of Rectangle طول المستطيل
B : Breadth of Rectangle عرض المستطيل
AREA : Area of Rectangle
PERIMETER : Perimeter of Rectangle

Algorithm

Step-1 Start

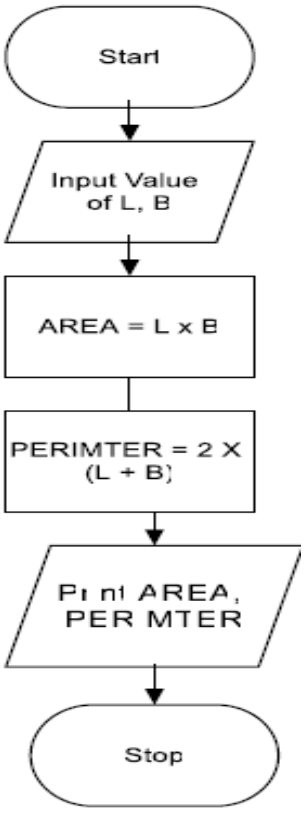
Step-2 Input Side Length & Breadth say L, B

Step-3 Area = L x B

Step-4 PERIMETER = 2 x (L + B)

Step-5 Display AREA, PERIMETER

Step-6 Stop



Example (5)

Find Area and Perimeter of Circle:

R : Radius of Circle
AREA : Area of Circle
PERIMETER : Perimeter of Circle

Algorithm

Step-1 Start

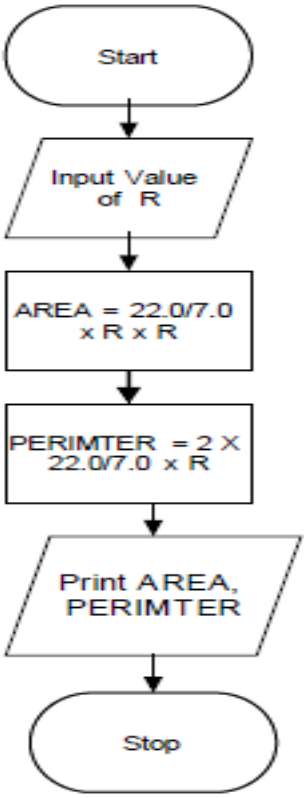
Step-2 Input Radius of Circle say R

Step-3 Area = 22.0/7.0 x R x R **(or) (3.14 ×R ×R)**

Step-4 PERIMETER = 2 x 22.0/7.0 x R **(2 × 3.14 ×R)**

Step-5 Display AREA, PERIMETER

Step-6 Stop



Example (6)

Find Area and Perimeter of Triangle:

A : First Side of Triangle
B : Second Side of Triangle
C : Third Side of Triangle
AREA : Area of Triangle
PERIMETER : Perimeter of Triangle

Algorithm

Step-1 Start

Step-2 Input Sides of Triangle A,B,C

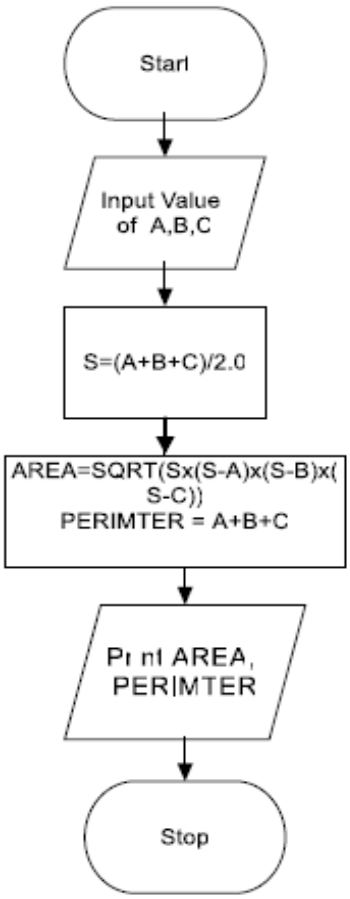
Step-3 S= (A + B + C)/ 2.0

Step-4 AREA = SQRT(S x (S-A) x (S-B) x(S-C))

Step-5 PERIMETER = A + B + C

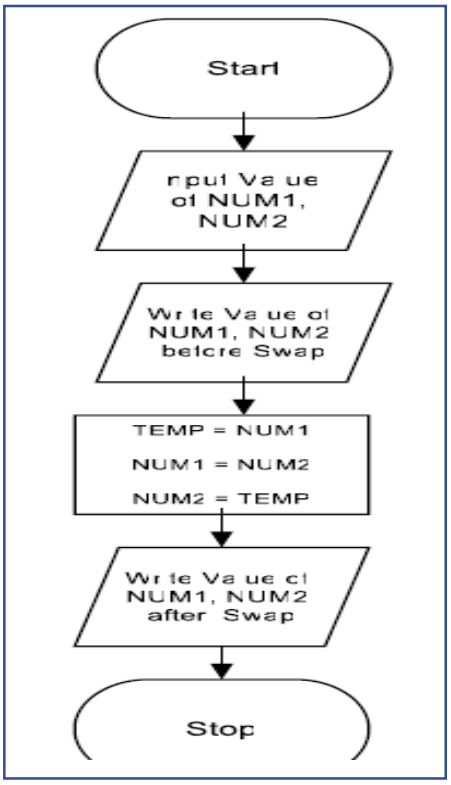
Step-6 Display AREA, PERIMETER

Step-7 Stop



Example (7)

Algorithm & Flowchart to Swap Two Numbers using Temporary Variable :



Algorithm

Step-1 Start

Step-2 Input Two Numbers Say NUM1,NUM2

Step-3 Display Before Swap Values NUM1, NUM2

Step-4 TEMP = NUM1

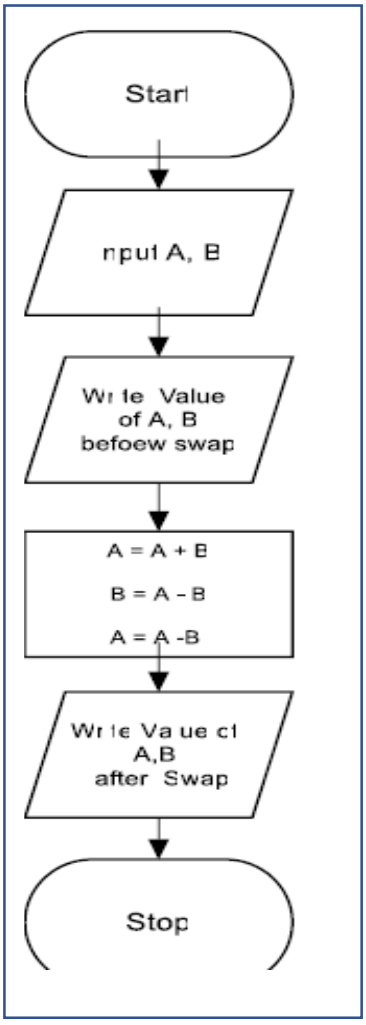
Step-5 NUM1 = NUM2

Step-6 NUM2 = TEMP

Step-7 Display After Swap Values NUM1,NUM

Step-8 Stop

Algorithm & Flowchart to Swap Two Numbers without using temporary variable :



Algorithm

Step-1 Start

Step-2 Input Two Numbers Say A,B

Step-3 Display Before Swap Values A, B

Step-4 A = A + B

Step-5 B = A - B

Step-6 A = A - B

Step-7 Display After Swap Values A, B

Step-8 Stop