

# LECTURE 2

## 1. Algorithm:

As stated earlier an algorithm can be defined as a finite sequence of effect statements to solve a problem. An effective statement is a clear, unambiguous instruction that can be carried out .Thus an algorithm should special the action to be executed and the order in which these actions are to be executed.

## Algorithm properties:

- **Finiteness**: the algorithm must terminate a finite number of steps.
- **Non-ambiguity**: each step must be precisely defined. At the completion of each step, the next step should be uniquely determined.
- **Effectiveness**: the algorithm should solve the problem in a reasonable amount of time.

**Example 1:** Develop an algorithm that inputs a series of number and output their average .

A computer algorithm can only carry out simple instruction like:

- "Read a number".
- "Add a number to anther number".
- "Output a number".

Thus an algorithm is:

1. Carry out initialization required.
2. Read first number.
3. While the number of numbers is not complete do
4. begin
5. Add the number to the accumulated sum.
6. increment the count of numbers entered.

7. Read next number.
8. End
9. Evaluate the average.

**Example 2:** Devolve an algorithm that allows the user to enter the count of numbers in a list followed by these numbers. The algorithm should find and output the minimum and the maximum numbers in the list.

An algorithm for this might be:

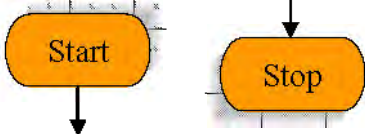

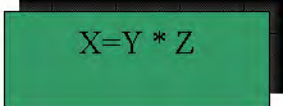
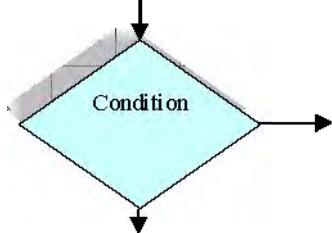
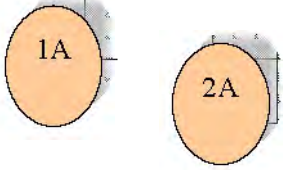
- Initialize.
- Get count of numbers.
- Enter numbers and find maximum and minimum .
- Output result.

The user might enter zero for the count. To deal with this case the above general case can be extended as follows to be an algorithm:

1. Initialize the require variables.
2. Get count of numbers.
3. If count is zero then exit.
4. Otherwise begin.
5. Enter numbers.
6. Find max and min.
7. Output result.
8. End.

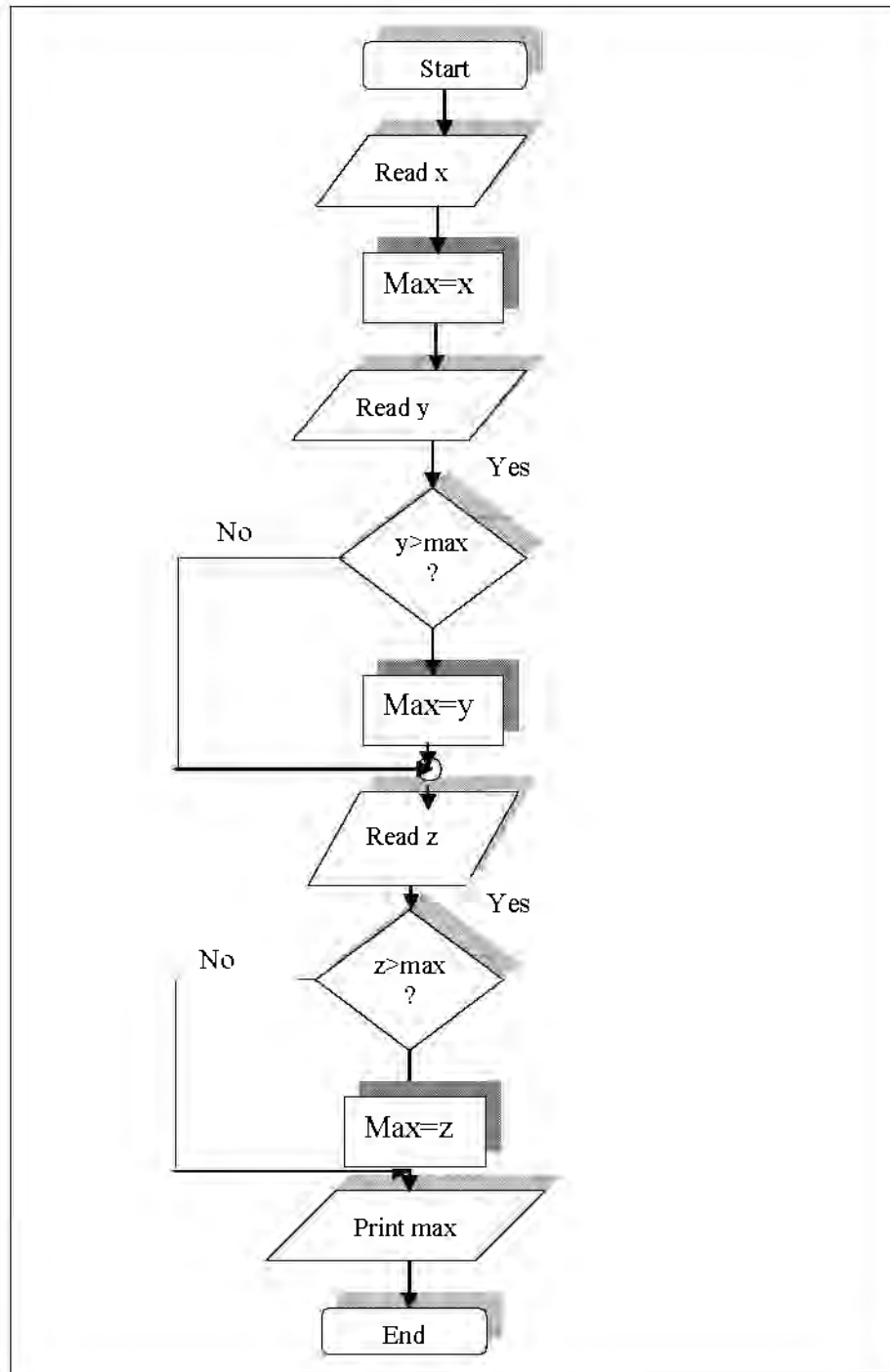
## **2. Flowcharts**

A flowchart is a graphical representation of an algorithm or of a portion of an algorithm .Flowcharts are drawn using symbols. The main symbols used to draw a flowchart are shown in following figure.

	<p>Start and Stop Symbols</p>
	<p>Input and Output Symbols</p>
	<p>Mathematical and logical processing symbol</p>
	<p>Decision making symbol</p>
	<p>Connector symbols</p>

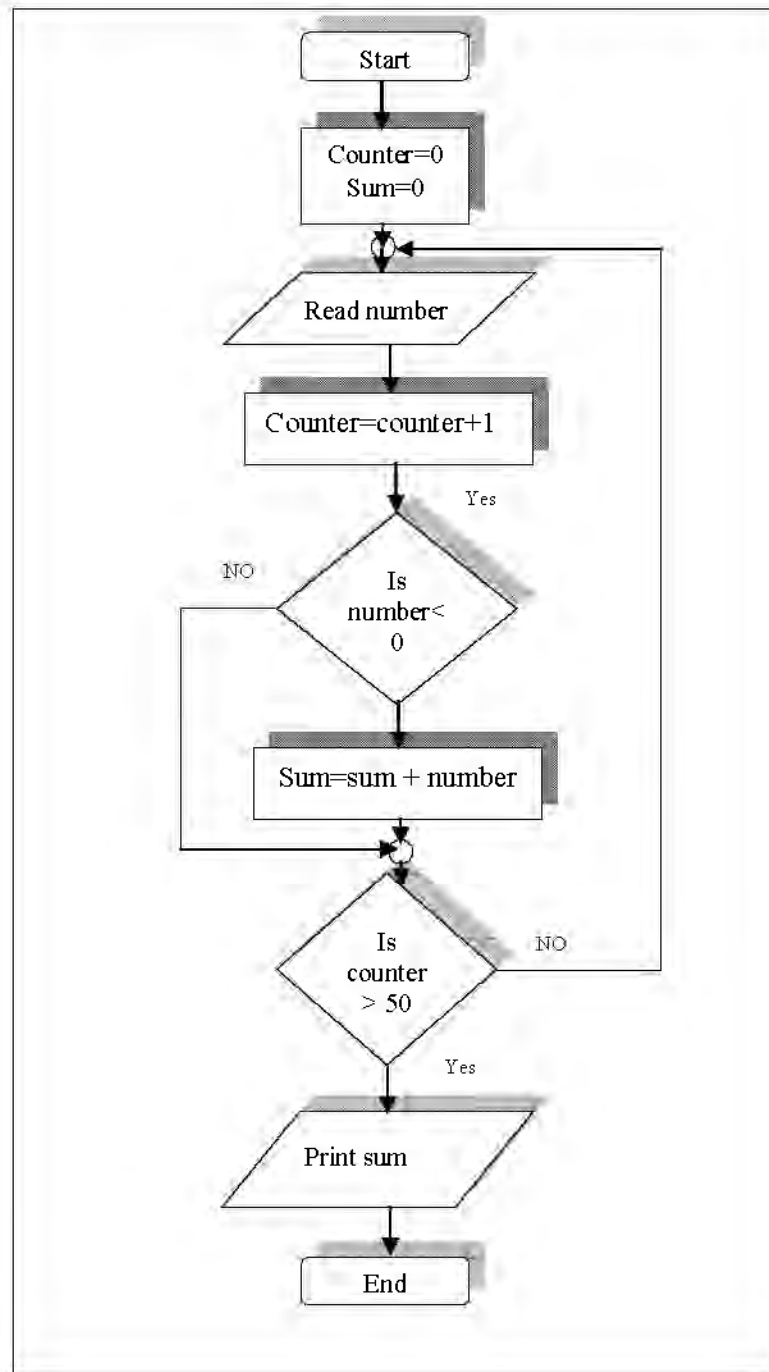
**Example 1:**

Draw a flowchart to read 3 numbers: x , y and z and print the largest number of them.



**Example 2:**

Draw the flowchart required to find the sum of negative numbers among 50 numbers entered by the user.



# WORK SHEET (1)

## AN INTRODUCTION

Q1: What do you mean by program?

Q2: Why C++ language becomes quite popular?

Q3: Talk briefly about C++ program development process?

Q4: Write an algorithm and flowcharts for the following:

- a. Sum the even numbers for n numbers.
- b. Display numbers from 0 to 10.
- c. The multiplication of 10 numbers.