

# Introduction



## Introduction

# Algorithm and Program Design

APD

In this subject you have learn the basic of algorithm and flowcharts. Algorithm are solve the lots of problems in our life. Algorithm is followed by the step-by-step instruction and A flowchart is a graphical representation of an algorithm.

The Points links here:

**Algorithm**

**Need and Properties of Algorithm**

**Flowchart**

## Algorithm

**It is a step-by-step instruction or process to get out of specific task.**

An algorithm is used to provide a solution to a particular problem in form of well-defined steps.

Whenever you use a computer to solve a particular problem, the steps, which lead to the solution, should be properly communicated to the computer.

While executing an algorithm on a computer, several operations such as additions and subtractions are combined to perform more complex mathematical operations.

Algorithms can be expressed using natural language, flowcharts, etc.

### **Advantages of Algorithms:**

1. It is a step-wise representation of a solution to a given problem, which makes it easy to understand.
2. An algorithm uses a definite procedure.
3. It is not dependent on any programming language, so it is easy to understand for anyone even without programming knowledge.
4. Every step in an algorithm has its own logical sequence so it is easy to debug.
5. By using algorithm, the problem is broken down into smaller pieces or steps hence; it is easier for programming to convert it into actual program.

### **Disadvantages of Algorithms:**

1. Algorithm is time consuming.
2. Difficult to show Branching and looping in algorithm.
3. Big tasks are difficult to put in algorithm.

### **Algorithms steps:**

Step 1: start

Step 2: Instruction

Step 3: end

### **Example:**

Q: Write an algorithm for addition of two numbers?

Step 1: start

Step 2: Give 2 numbers a & b

Step 3: add a & b store in c

Step 4: Display c

Step 5: stop

## Need and Properties of Algorithm

### Need of Algorithm:

To understand the basic idea of the problem.

To understand the principle of designing.

A good design can produce a good solution.

To understand the basic principles of designing the algorithms.

To compare the performance of the algorithm with respect to other techniques.

It is the best method of description without describing the implementation detail.

The Algorithm gives a clear description of requirements and goal of the problem to the designer.

### Properties of Algorithm

1. **Input:** An algorithm must have a zero or more quantities as input which are externally supplied.
2. **Output:** An algorithm must produce one or more output after processing set of statements.
3. **Definiteness:** Each instruction must be clear and distinct.
4. **Finiteness:** The algorithm must terminate after a finite number of steps.
5. **Effectiveness:** Each operations must be definite also it should be feasible.

## Flowchart

A flowchart is a graphical representation of an algorithm.

It makes use of symbols that are connected among them to indicate the flow of information and processing.

### Symbols of Flowchart

#### 1. Start/End (also known as Terminal)

An Oval represents a start and end point of flowchart.



#### 2. Input/Output:

A parallelogram represents input or output. Take input from device and display the output from device.



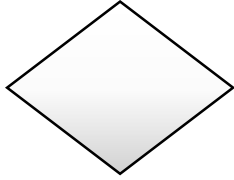
#### 3. Process

A rectangle represents a process. All arithmetic process (Addition, Subtraction, Multiplication, Division) are indicated by symbol.



#### 4. Decision

A diamond indicates a decision. These symbols based on yes/no or true/false operations.



#### 5. Arrows

A line is a connector that shows relationships between the representative shapes.



#### 6. Flow Lines

The flow chart shows the exact sequence in which instructions are executed.

#### Advantages of Flowchart:

- Flowcharts are better way of communicating the logic of system.
- Flowcharts act as a guide for blueprint during program designed.
- Flowcharts helps in debugging process.

#### Disadvantages of Flowchart:

- It is difficult to draw flowchart for large and complex programs.
- In this, there is no standard to determine the amount of detail.

- Difficult to reproduce the flowcharts.
- It is very difficult to modify the Flowchart.

### Example:

Q : Draw a Flowchart for addition of two numbers?

