Introduction to Problem Solving using

Algorithms and Flowchart

PROBLEM SOLVING

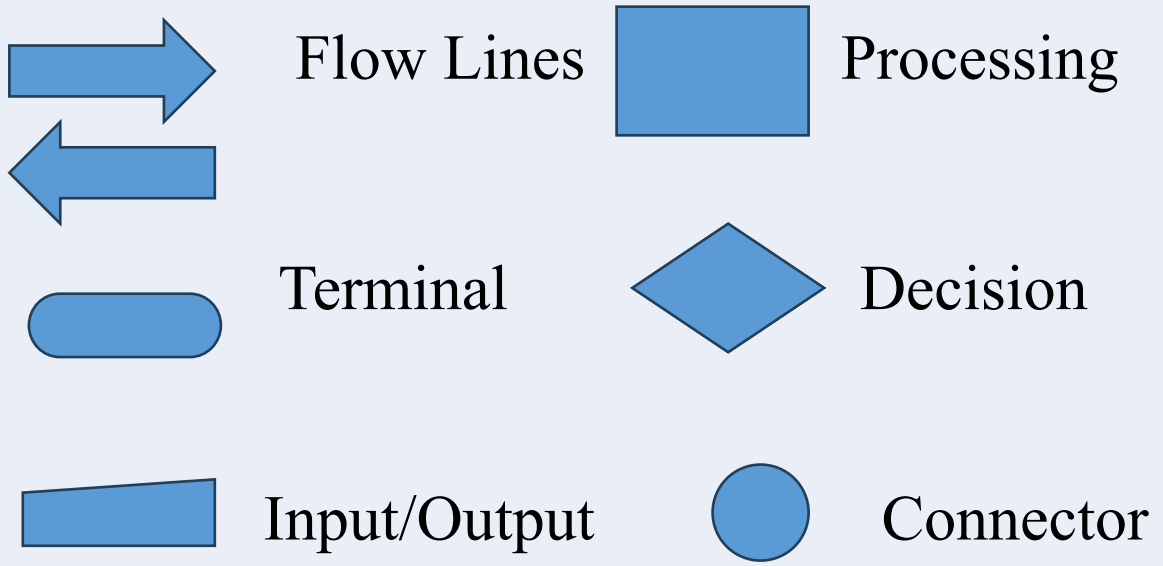
Problem solving is the systematic approach to define the problem and creating number of solutions.

The problem-solving process starts with the problem specifications and ends with a Correct program

PROBLEM SOLVING TECHNIQUES

Problem solving technique is a set of techniques that helps in providing logic for solving a problem

1. Algorithms
2. Flowchart
3. Programs.

Algorithm	Flowchart
Step by step process written in normal English language to solve the given problem.	Diagrammatic representation of the solution
Step 1 : Start : : : Step n :Stop	

ALOGRITHM

It is defined as a sequence of instructions that describe a method for solving a problem. In other words, it is step by step procedure for solving problem

Properties of Algorithms

- Should be written in simple English
- Each and every instructions should be precise and unambiguous.
- Instructions in an algorithm should not be repeated infinitely.
- Algorithm should conclude after a finite number of steps.

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- Should have an end point
- Derived results should be obtained only after the algorithm terminates

Algorithms can be constructed from basic building blocks namely, sequence, selection and iteration.

Control flow: The process of executing the individual statement in a given order is called control flow

- Sequence
- Selection
- Iteration

Sequence

All the instructions are executed one after another is called sequence execution.

Example:

Add two numbers:

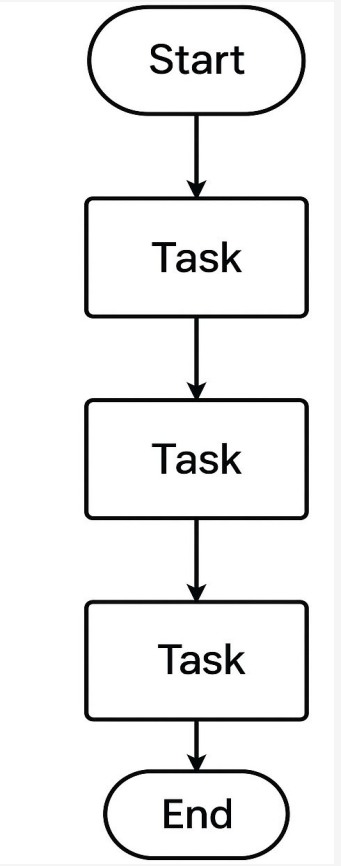
Step 1: Start

Step 2: get a,b

Step 3: calculate c=a+b

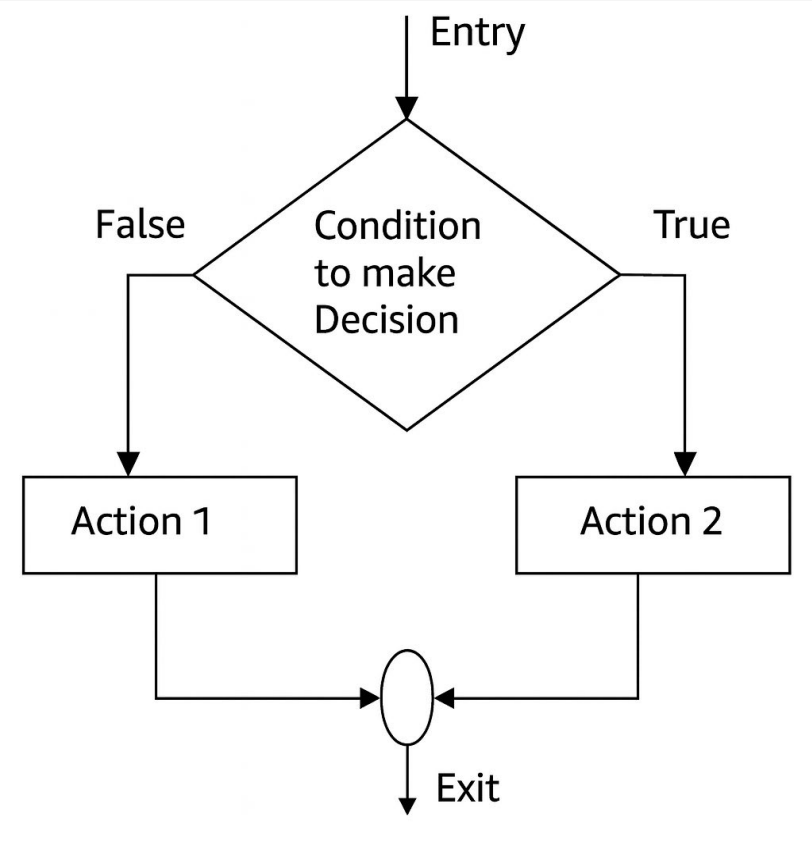
Step 4: Display c

Step 5: Stop



Selection

A selection statement causes the program control to be transferred to a specific part of the program based upon the condition. If the conditional test is true, one part of the program will be executed, otherwise it will execute the other part of the program.



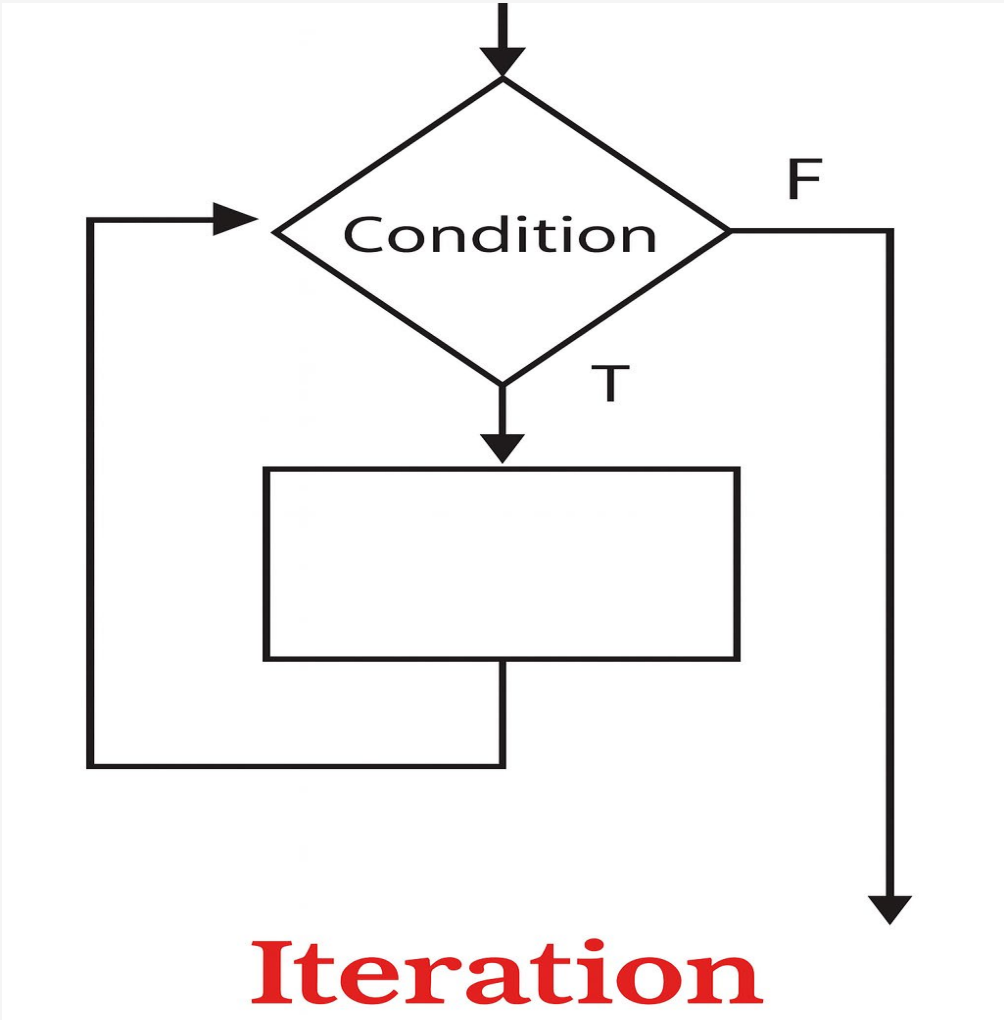
Example
Write an algorithm to check whether he is eligible to vote?

Step 1: Start
Step 2: Get age
Step 3: if age >= 18 print “Eligible to vote”
Step 4: else print “Not eligible to vote”
Step 5: Stop

Iteration

In some programs, certain set of statements are executed again and again based upon conditional test. i.e. executed more than one time. This type of execution is called looping or iteration.

Example
Write an algorithm to print all natural numbers up to n
Step 1: Start
Step 2: get n value.
Step 3: initialize i=1
Step 4: if (i<=n) go to step 5 else go to step 7
Step 5: Print i value and increment i value by 1
Step 6: go to step 4
Step 7: Stop



FLOW CHART

- Flow chart is defined as graphical representation of the logic for problem solving.
- The purpose of flowchart is making the logic of the program clear in a visual representation.

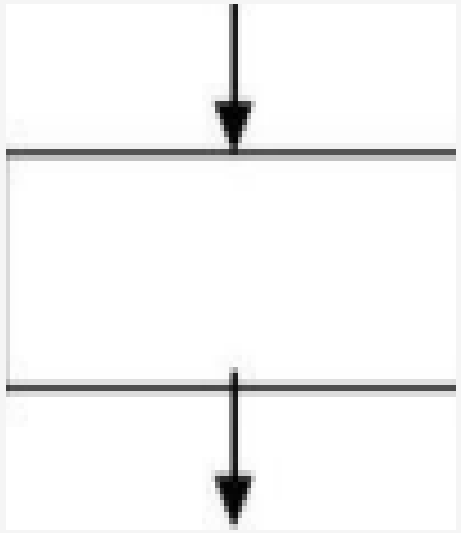
Symbol	Name	Function
	Start/end	An oval represents a start or end point
	Arrows	A line is a connector that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectangle represents a process
	Decision	A diamond indicates a decision

Rules for drawing a flowchart

1. The flowchart should be clear, neat and easy to follow.

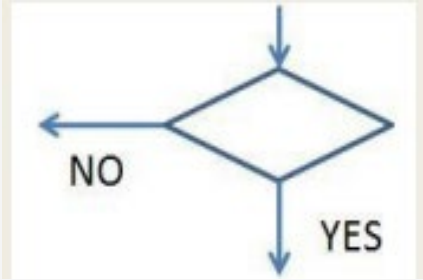
2. The flowchart must have a logical start and finish.

3. Only one flow line should come out from a process symbol.

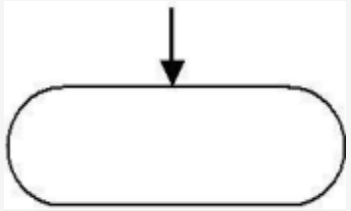


Rules for drawing a flowchart

4. Only one flow line should enter a decision symbol. However, two or three flow lines may leave the decision symbol



5. Only one flow line is used with a terminal symbol.



6. Within standard symbols, write briefly and precisely.

7. Intersection of flow lines should be avoided.

Examples of Algorithm and Flowchart

- **Sequence**

Add two numbers:

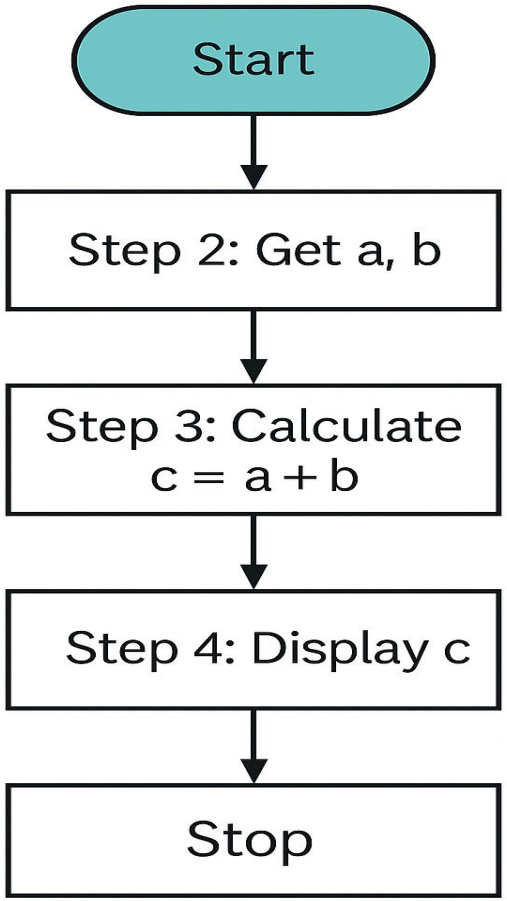
Step 1: Start

Step 2: get a,b

Step 3: calculate c=a+b

Step 4: Display c

Step 5: Stop



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Selection:

Write an algorithm to check whether he is eligible to vote?

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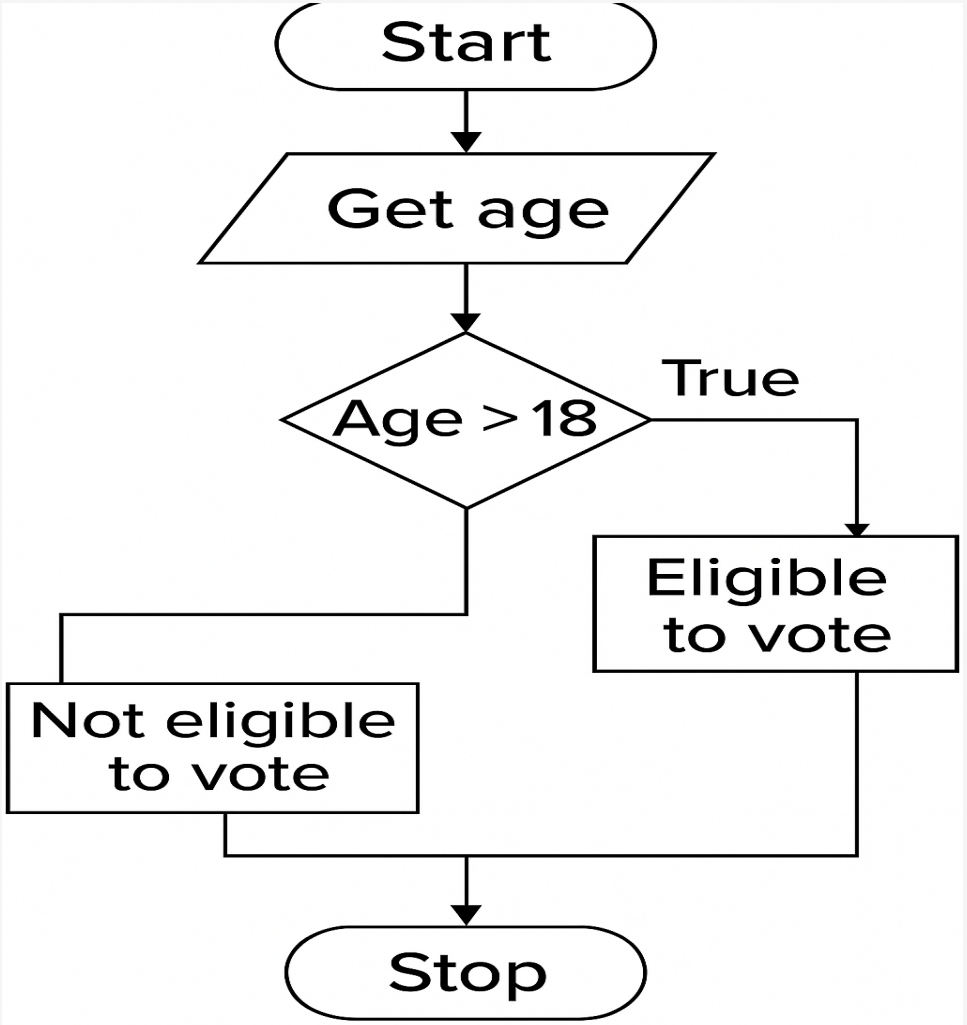

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Iteration:

Write an algorithm to print all natural numbers up to n

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Step 5: Print I value and increment I value by 1

Step 6: go to step 4

Step 7: Stop