BRS GLOBAL SCHOOL
Affiliated to CBSE, New Delhi, Affiliation No. 830346

Subject: Computer Science

Chapter 2

Algorithm and flowchart

A. Fill in the blanks:

1. Algorithm
2. Sequence
3. Flowchart
4. Maintenance
5. Program logic
6. Complex
7. Decision

B. State True or False:

1. True
2. False
3. False
4. True
5. False
6. True
7. True

C. Multiple Choice Questions:

1. (A) Programmer

2. (B) Flow lines

3. (A) Input / Output box

4. (C) Start / Stop box

5. (C) Three

6. (C) Repetition construct

D. Answer in one word or sentence:

1. Program

2. Connectors

3. Output box

4. Decision / Condition box

5. Processing box

E. Answer the following:

1. What is an algorithm? Write the characteristics of an algorithm.

Ans: Algorithm is a process or set of rules to be followed in calculations or other problem-solving operations, especially by a computer.

A good algorithm must have the following features:

- Each instruction should be written in a simple and precise manner so that everyone can understand.
- The steps of algorithm should finally be executable by the computer.
- Each instruction should be executed within a reasonable time.
- It should involve finite number of steps to reach to a solution.
- After the instructions are executed, the user must get the desired result.

2. Why is it advisable to plan the logic of a program before writing it? Explain the role of an algorithm problem solving.

Ans: It is advisable to plan the logic of a program before writing it because if a programmer forgets to place some instructions, or writes the instructions in a wrong sequence, or does not know how to perform the process manually, then a computer will produce the wrong result.

- A problem can be solved by using a computer only if an algorithm can be written for it.
- While writing an algorithm we can identify:
  - The step-by-step procedure.
  - The major decision points.
  - The variables necessary to solve the problem.
- The problem is reduced to a series of smaller problems of more manageable size.
- Decision making becomes a more rational process
- Every step has got its own logical sequence, which can easily be debugged.
- It has got a definite procedure that can be executed with in a fixed period of time.

3. Explain the various types of constructs used in developing an algorithm.

Ans: Any algorithm can be developed using three constructs, which are as follows:

- Sequence
- Decision
- Repetition

i. Sequence Construct: It is a series of steps or statements that are executed in the sequence they are written.

ii. Decision Construct: Defines one or more courses of action depending on the evaluation of a condition. A condition is an expression that is either true or false.

If **condition** is **TRUE**
do action 1
else
do action 2
end if

iii. Repetition Construct: This construct allows one or more statements to be repeated as long as a given condition is true.

while (**condition** is **TRUE)**
do action 1
do action 2
.
.
.
Do action N

end while

4. What do you understand by a flowchart? Name the various symbols used while drawing a flowchart.

Ans: A flowchart is a pictorial representation of steps or an algorithm used to solve a particular problem.

Symbol Name	Symbol	function
START/STOP BOX Oval		Used to represent start and end of flowchart
INPUT/OUTPUT BOX Parallelogram		Used for input and output operation
PROCESSING BOX Rectangle		Processing: Used for arithmetic operations and data-manipulations
DECISION/CONDITION BOX Diamond		Decision making. Used to represent the operation in which there are two/three alternatives, true and false etc
FLOW LINES Arrows		Flow line Used to indicate the flow of logic by connecting symbols
CONNECTORS Circle		Page Connector

5. Write the advantages of a flowchart.

The benefits of flowcharts are as follows:

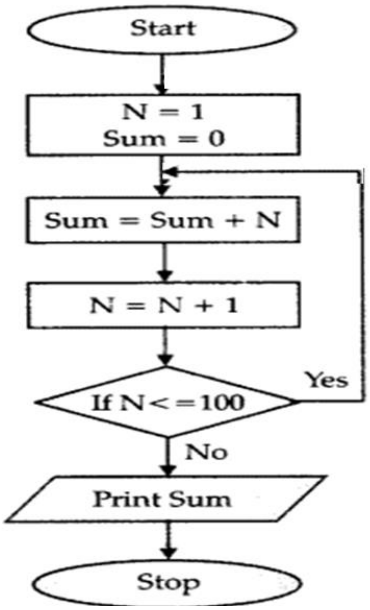
i. **Communication:** The pictorial representation of the flowchart provides better communication. It is easier for the programmer to explain the logic of a program.
ii. **Effective Analysis:** It is very useful technique, as flowchart is a pictorial representation, which helps the programmer to analyze the problem in detail.
iii. **Proper Documentation:** Flowcharts serve as a good program documentation, which is needed for various purposes to solve the problems.

iv. **Efficient Coding:** Flowchart acts as a roadmap for the programmers. It gives a clear idea to the programmers to write a program.

v. **Proper Debugging:** Using a flowchart, we can systematically detect, locate, and remove mistakes from a program.

vi. **Efficient Program Maintenance:** The maintenance of operating a program becomes easy with the help of flowchart. It helps the programmer to put efforts more efficiently on that part.

The execution steps to find the sum of 100 numbers Flowchart



Initialization : N=1 SUM=0

STEP 1: SUM = 0 + 1 = 1

N = 1 + 1 = 2

IF 2 <= 100 (TRUE repeat the same process)

STEP 2: SUM = 1 + 2 = 3

N = 2 + 1 = 3

IF 3 <= 100 (TRUE repeat the same process)

STEP 3: SUM = 3 + 3 = 6

N = 3 + 1 = 4

IF 4 <= 100 (TRUE repeat the same process)

STEP 4: SUM = 6 + 4 = 10

N = 4 + 1 = 5

IF 5 <= 100 (TRUE repeat the same process)

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-
-

STEP 97: SUM = 4656 + 97 = 4753

N = 97 + 1 = 98

IF 98 <= 100 (TRUE repeat the same process)

STEP 98: SUM = 4753 + 98 = 4851

N = 98 + 1 = 99

IF 99 <= 100 (TRUE repeat the same process)

STEP 99: SUM = 4851 + 99 = 4950

N = 99+1 = 100

IF 100 <= 100 (TRUE repeat the same process)

STEP 100: SUM = 4950 + 100 = 5050

N = 100 + 1 = 101

IF 101 <= 100 (FALSE, PRINT THE SUM)