# Class 8
# Chapter -4
# Algorithm and Flowchart

## A. Tick (✓) the correct option.

1. Algorithm is a _____ of steps to perform a task.
   ☞ **c. Sequence**
2. Which of the following is not a characteristic of algorithm?
   ☞ **c. Compressibility**
3. Which of the following statements is true?
   ☞ **b. A decision box can have two exit points**
4. Which of the following symbols will you use to represent addition of two numbers?
   ☞ **c. Process**
5. Eating food is a process of
   ☞ **c. Loop Construct**

## B. Write T for True and F for False.

1. An algorithm is a graphical representation of the steps used to solve a problem.
   ☞ **F** (That's a flowchart, not an algorithm.)
2. A connector is used to connect two different parts of a flowchart.
   ☞ **T**
3. The direction of flow of data in a flowchart is from bottom to top.
   ☞ **F** (It is from top to bottom or left to right.)
4. When an algorithm is executed, it should terminate after a certain or finite number of steps.
   ☞ **T**
5. An algorithm can be converted into a program.
   ☞ **T**

## C Write the functions of the following Flowchart symbols:

1. **Start/Stop (Ellipse):** Indicates the beginning or end of a flowchart.
2. **Input/Output (Parallelogram):** Used to take input from the user or display output.
3. **Process (Rectangle):** Represents a process or action to be performed.
4. **Decision (Diamond):** Used to check a condition; has two outputs (Yes/No).
5. **Connector (Circle):** Connects two different parts of a flowchart.

## D. Answer the following.

**1. What do you understand by the term loops? How do you represent loops in algorithms and flowcharts? Explain with an example.**

☞ A **loop** is a process in which a set of instructions is repeated multiple times until a condition is met.

- **In Algorithm:** we use steps like "Repeat until condition" or "Go to Step X."
- **In Flowchart:** a decision box checks the condition, and arrows loop back to repeat steps.

**Example (Print numbers 1 to 5):**

- Algorithm:
  1. Start
  2. Set A = 1
  3. Print A
  4. A = A + 1
  5. If A ≤ 5, go to Step 3
  6. Stop
- Flowchart: A loop with a decision diamond checking if A ≤ 5.

**2.State the significance of using a flowchart.**

- Flowcharts provide a clear **visual representation** of problem-solving steps.
- They make it easier to **understand, analyze, and debug** algorithms.
- Help programmers to **communicate logic** effectively before coding.
- Reduce errors by planning properly.

**3.Briefly explain the limitations of an algorithm.**

- Writing an algorithm takes **time**.
- Difficult to represent **branching and loops** in simple text form.
- When there are **too many steps**, algorithms become lengthy and hard to understand.

**4 Write an algorithm to find the area of a rectangular field.**

**Algorithm:**

Step-1: Start

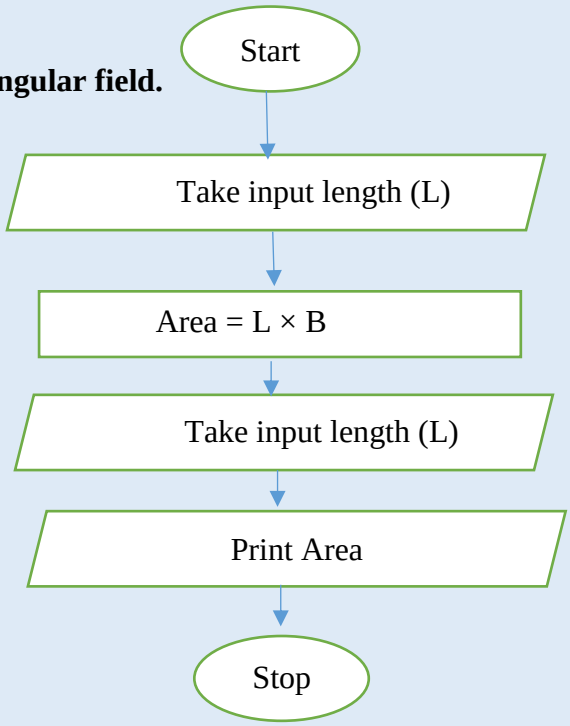
Step2: Take input length (L)

Step-3: Take input breadth (B)

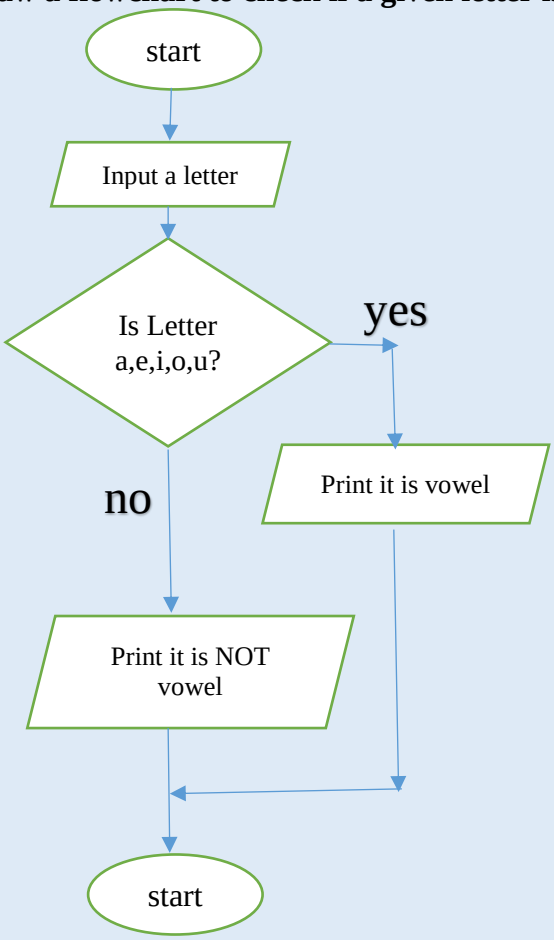
Step-4: Area = L × B

Step-5: Print Area

Step-6: Stop



**5. Draw a flowchart to check if a given letter is a vowel or not.**




**Algorithem (description):**

**Step-1: Start**

**Step-2:** Input a letter

**Step-3:** Decision: check, is the letter = A, E, I, O, U (or a, e, i, o, u)?

**Step-4: IF Yes** → Print "Vowel"

**Step-5: IF No** → Print "Not a vowel"

**Step-6: Stop**

# Some extra questions

## Fill in the Blanks (with Answers)

1. A set of instructions to solve a problem is called an **algorithm**.
2. A **flowchart** is the graphical representation of an algorithm.
3. The **ellipse** symbol is used to represent Start and Stop in a flowchart.
4. A **rectangle** is used to show processing in a flowchart.
5. A **parallelogram** is used to take input or display output in a flowchart.
6. A **diamond** shape in a flowchart is used to represent a decision.
7. An algorithm should always terminate after a **finite** number of steps.
8. Every algorithm must produce at least one **output**.
9. The arrows in a flowchart are called **flow lines**.
10. A **connector** is used to join two different parts of a flowchart.
11. The process of repeating steps in an algorithm is called a **loop**.
12. Eating food step-by-step is an example of a **loop construct**.
13. Writing an algorithm helps in finding and eliminating **errors** before coding.
14. Algorithms are not dependent on any computer **language**.
15. Flowcharts make it easier to **understand** the logic of a problem.
16. The first flowcharts were introduced by **Frank Gilberth** in 1921.
17. An algorithm is always written in a **step-by-step** manner.
18. A decision box in a flowchart has at least **two exit points**.
19. When a condition is checked in a flowchart, the two possible answers are **Yes** and **No**.
20. The three main steps in problem solving are: writing an algorithm, creating a flowchart, and converting it into a **program**.

### Multiple Choice Questions (20)

**1.** An algorithm is a:
a) Diagram
b) Flowchart
c) Sequence of steps
d) Program
☞ **Answer: c) Sequence of steps**

**2.** Which of the following is a graphical representation of an algorithm?
a) Chart
b) Flowchart
c) Program
d) Diagram
☞ **Answer: b) Flowchart**

**3.** Which flowchart symbol is used to represent decision-making?
a) Ellipse
b) Rectangle
c) Diamond
d) Parallelogram
☞ **Answer: c) Diamond**

**4.** A parallelogram in a flowchart is used for:
a) Process
b) Input/Output
c) Start/Stop
d) Connector
☞ **Answer: b) Input/Output**

**5.** A rectangle in a flowchart represents:
a) Decision
b) Process
c) Start
d) Output
☞ **Answer: b) Process**

**6.** Which of the following is NOT a characteristic of an algorithm?
a) Input
b) Output
c) Finiteness
d) Infinite loops
☞ **Answer: d) Infinite loops**

**7.** The Start/Stop symbol in a flowchart is drawn as:
a) Circle
b) Diamond
c) Ellipse
d) Square
☞ **Answer: c) Ellipse**

**8.** The arrows in a flowchart are called:
a) Connectors
b) Flow lines
c) Pointers
d) Symbols
☞ **Answer: b) Flow lines**

**9.** An algorithm must always terminate after:
a) A condition
b) Finite number of steps
c) Infinite steps
d) Any number of steps
☞ **Answer: b) Finite number of steps**

**10.** Which of the following introduced flowcharts in 1921?
a) Charles Babbage
b) Frank Gilberth
c) Ada Lovelace

d) Alan Turing

☞ **Answer: b) Frank Gilberth**

**11.** A decision box always has at least:
a) One exit point
b) Two exit points
c) Three exit points
d) No exit point

☞ **Answer: b) Two exit points**

**12.** Which symbol is used to connect different parts of a flowchart?
a) Ellipse
b) Connector
c) Rectangle
d) Arrow

☞ **Answer: b) Connector**

**13.** The first step in problem solving is:
a) Writing a program
b) Writing an algorithm
c) Drawing a flowchart
d) Debugging the program

☞ **Answer: b) Writing an algorithm**

**14.** Flowcharts are helpful because they:
a) Increase errors
b) Confuse students
c) Simplify problem solving
d) Replace programs

☞ **Answer: c) Simplify problem solving**

**15.** The process of repeating a set of instructions is called:
a) Branching
b) Looping
c) Sequencing
d) Decision making

☞ **Answer: b) Looping**

**16.** Which of the following is an advantage of algorithms?
a) They are language-independent
b) They are confusing
c) They are graphical
d) They are always short

☞ **Answer: a) They are language-independent**

**17.** Which of the following is NOT true about flowcharts?
a) They use symbols
b) They show sequence
c) They are text-only
d) They show conditions

☞ **Answer: c) They are text-only**

**18.** Eating food step-by-step is an example of:
a) Decision
b) Loop construct
c) Flowchart
d) Algorithm only
☞ **Answer: b) Loop construct**

**19.** An algorithm to add two numbers must have:
a) Only input
b) Only output
c) Both input and output
d) No input
☞ **Answer: c) Both input and output**

**20.** Which of the following is a limitation of algorithms?
a) They are independent of language
b) They can be converted to programs
c) They take more time to write
d) They are easy to understand
☞ **Answer: c) They take more time to write**

## True/False Questions (with Answers)

**1.** An algorithm is a sequence of steps to solve a problem.
☞ **True**
**2.** A flowchart is a graphical representation of an algorithm.
☞ **True**
**3.** Every algorithm must produce more than one output.
☞ **False** (It may produce at least one output.)
**4.** The ellipse symbol in a flowchart is used for Start and Stop.
☞ **True**
**5.** The rectangle symbol in a flowchart is used to take input.
☞ **False** (It is used for processing.)
**6.** Flow lines in a flowchart show the direction of the process.
☞ **True**
**7.** Algorithms depend on computer programming languages.
☞ **False** (They are independent of language.)
**8.** A decision box in a flowchart has only one exit point.
☞ **False** (It has at least two exit points.)
**9.** Flowcharts can have multiple Start and Stop points.
☞ **False** (They should have only one logical start and stop.)
**10.** The process of repeating instructions is called a loop.
☞ **True**
**11.** Writing an algorithm helps in finding errors before programming.
☞ **True**
**12.** The parallelogram symbol is used for input and output in a flowchart.
☞ **True**
**13.** Finiteness means that an algorithm should end after a certain number of steps.
☞ **True**
**14.** A connector is used to join two different parts of a flowchart.
☞ **True**

**15.** Frank Gilberth introduced flowcharts in 1921.
☞ **True**
**16.** In a flowchart, data flows from bottom to top.
☞ **False** (It flows top to bottom or left to right.)
**17.** Algorithms are difficult to understand because they are written in computer code.
☞ **False** (They are written in simple steps, language-independent.)
**18.** Eating food step by step is an example of a loop construct.
☞ **True**
**19.** Flowcharts use shapes and symbols to represent instructions.
☞ **True**
**20.** One limitation of algorithms is that writing them may take more time.
☞ **True**

# Extra Questions and Answers (10)

**1.** Define an algorithm.
☞ An algorithm is a step-by-step sequence of instructions to solve a problem.

**2.** Write any two characteristics of an algorithm.
☞ (i) Finiteness – it must end after finite steps.
☞ (ii) Definiteness – each instruction must be clear.

**3.** Which symbol is used in a flowchart to represent input/output?
☞ A parallelogram.

**4.** What is the purpose of a decision symbol in a flowchart?
☞ To check a condition and give outputs based on **Yes/No**.

**5.** Who introduced the first flowchart and in which year?
☞ Frank Gilberth in 1921.

**6.** What are flow lines used for in a flowchart?
☞ To show the direction of the flow of instructions.

**7.** Give one advantage of writing an algorithm.
☞ It helps find and eliminate errors before converting it to a program.

**8.** Give one limitation of algorithms.
☞ Writing an algorithm takes more time.

**9.** Write the three steps involved in solving a problem using computers.
☞ (i) Writing an algorithm
☞ (ii) Developing a flowchart
☞ (iii) Converting into a program

**10.** Which flowchart symbol is used to represent the start and end of a program?
☞ An ellipse.

## Short-Answer Descriptive Questions (10)

**1. What is an algorithm? Give an example.**
☞ An algorithm is a step-by-step procedure to solve a problem.
*Example:* To add two numbers:

1. Start
2. Input two numbers
3. Add the numbers
4. Display the sum
5. Stop

**2. Write any three characteristics of a good algorithm.**
☞ A good algorithm must have:

1. **Finiteness** – it must end after a finite number of steps.
2. **Definiteness** – instructions should be clear and unambiguous.
3. **Input/Output** – it must have specified input and output.

**3. What is a flowchart? Why is it used?**
☞ A flowchart is a diagram that uses symbols to represent the steps of an algorithm. It is used because it makes the logic easier to understand and helps in finding errors before programming.

**4. Explain the use of the decision symbol in a flowchart.**
☞ The decision symbol (diamond) is used to check conditions. It has two paths, usually labeled **Yes** and **No**, which help in choosing the correct flow of execution.

**5. What are flow lines in a flowchart?**
☞ Flow lines are arrows that show the direction of the sequence of steps in a flowchart. They connect different symbols.

**6. What is the difference between an algorithm and a flowchart?**
☞ An algorithm is written in simple English step-by-step, while a flowchart is a graphical representation of an algorithm using symbols.

**7. Mention one advantage and one disadvantage of flowcharts.**
☞ Advantage: Flowcharts make it easy to understand the logic of a problem.
☞ Disadvantage: Flowcharts are time-consuming to draw and modify.

**8. Who introduced flowcharts and when?**
☞ Flowcharts were first introduced by **Frank Gilberth in 1921**.

**9. Why are algorithms important in computer programming?**
☞ Algorithms help in solving problems step-by-step, making programming easier, systematic, and error-free.

**10. Write the three main steps of problem solving using computers.**
☞ The three steps are:

1. Writing an algorithm
2. Developing a flowchart

3. Converting into a program

## Long-Answer Descriptive Questions (10)

**1. Explain the term algorithm. Write an algorithm to find the largest of two numbers.**

☞ An algorithm is a step-by-step sequence of instructions designed to solve a problem.

*Algorithm to find the largest of two numbers:*

1. Start
2. Input two numbers A and B
3. If A > B, then Largest = A
4. Else Largest = B
5. Print Largest
6. Stop

**2. Write the advantages and disadvantages of algorithms.**

☞ **Advantages:**

1. Easy to understand as they use simple English.
2. Helps to detect errors before programming.
3. Can be used for any programming language.

☞ **Disadvantages:**

1. Writing algorithms takes more time.
2. They cannot show the actual logic visually.
3. For complex problems, algorithms become lengthy.

**3. What is a flowchart? Draw and explain the basic symbols used in flowcharts.**

☞ A flowchart is a diagram that represents an algorithm using symbols and arrows.

**Symbols:**

- **Ellipse (Oval):** Start/Stop
- **Rectangle:** Processing
- **Parallelogram:** Input/Output
- **Diamond:** Decision
- **Arrow:** Flow lines

**4. Write the differences between algorithms and flowcharts.**

☞ **Algorithm:**

1. Written in step-by-step sentences.
2. Easy to write but difficult to visualize.
3. Language-independent.

☞ **Flowchart:**

1. Represented using symbols.
2. Easier to understand visually.
3. Takes more time to draw and modify.

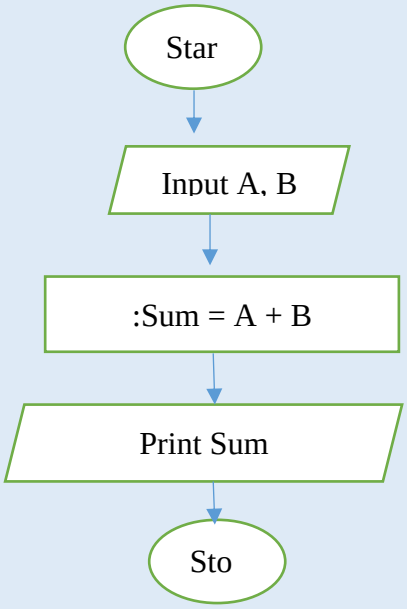
**5. Write an algorithm and draw a flowchart to add two numbers.**

☞ **Algorithm:**

1. Start
2. Input A and B
3. Sum = A + B
4. Print Sum
5. Stop

☞ **Flowchart:**

(Start → Input A, B → Process: Sum = A + B → Output: Sum → Stop)



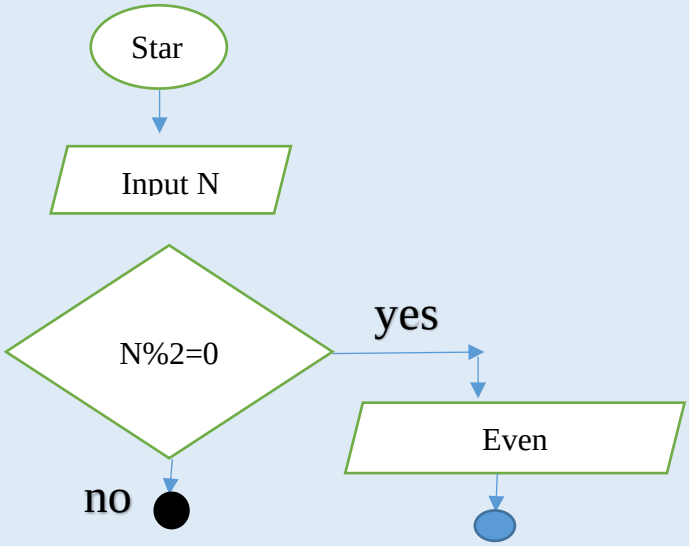

**6. Write an algorithm and flowchart to check whether a number is even or odd.**

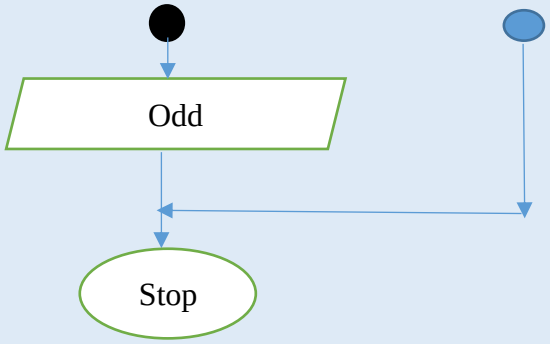
☞ **Algorithm:**

1. Start
2. Input N
3. If N % 2 = 0, then print "Even"
4. Else print "Odd"
5. Stop

☞ **Flowchart:**

(Start → Input N → Decision: N%2=0 → Yes: Even, No: Odd → Stop)






**7. Explain the importance of flowcharts in problem solving.**

☞ Flowcharts are important because:

1. They provide a clear visual understanding of logic.
2. Easy to detect mistakes before coding.
3. Saves time in debugging.
4. Acts as a blueprint for writing programs.
5. Can be used for documentation and training purposes.

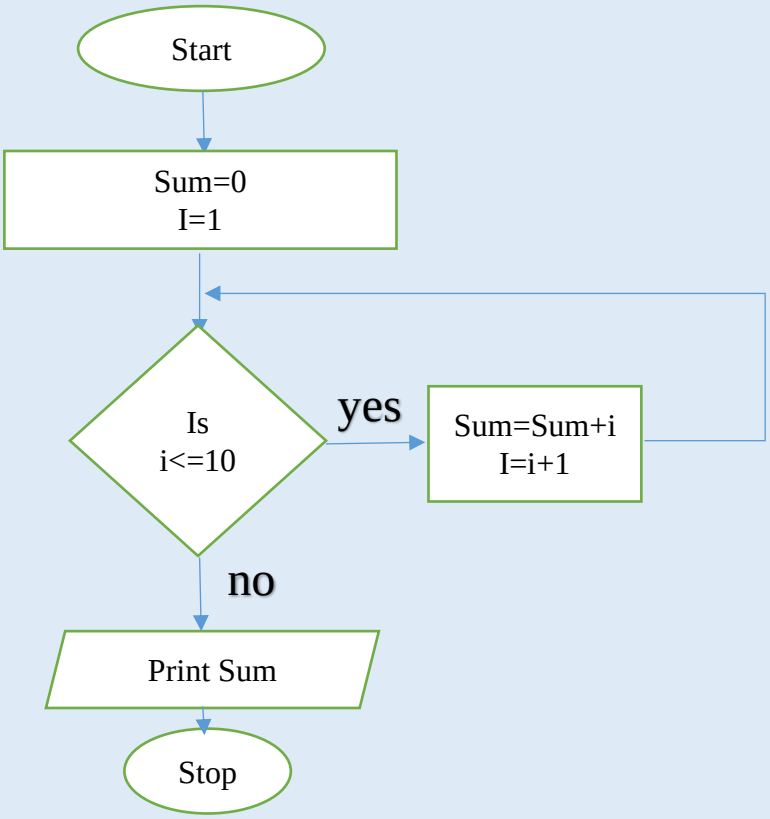
**8. Write an algorithm and flowchart to calculate the sum of the first 10 natural numbers.**

☞ **Algorithm:**

1. Start
2. Set Sum = 0, i = 1
3. Repeat while i ≤ 10
   - Sum = Sum + i
   - i = i + 1
4. Print Sum
5. Stop

☞ **Flowchart:**

(Start → Initialize Sum=0, i=1 → Decision: i ≤ 10 → Yes → Sum=Sum+i, i=i+1 → Loop back → No → Print Sum → Stop)



**9. Explain the limitations of flowcharts.**

☞ Limitations:

1. Time-consuming to draw.
2. Difficult to modify once prepared.
3. Not suitable for very complex programs.
4. Sometimes becomes too lengthy.
5. Cannot represent detailed logic.

**10. Write an algorithm and flowchart to find the largest of three numbers.**

☞ **Algorithm:**

1. Start
2. Input A, B, C
3. If A > B and A > C, then Largest = A
4. Else if B > C, then Largest = B
5. Else Largest = C
6. Print Largest
7. Stop

☞ **Flowchart:**

(Start → Input A, B, C → Decision: A > B and A > C → Yes: A → No → Decision: B > C → Yes: B → No: C → Print Largest → Stop)