SONIYA KAMBLE – Assignment 8 - SQL

1. What is algorithm?

An algorithm is a step-by-step procedure or set of rules designed to solve a specific problem or accomplish a particular task. It provides a clear and unambiguous sequence of instructions that can be followed to achieve the desired outcome, often used in computing, mathematics, and various real-life scenarios.

Key Characteristics of Algorithms:

1. Finite Steps: The process must have a clear starting and ending point.
2. Definiteness: Each step must be precisely defined and unambiguous.
3. Input: An algorithm can have zero or more inputs to start with.
4. Output: It must produce at least one result (output).
5. Effectiveness: All steps must be simple enough to be performed, in principle, by a human or a machine in a reasonable time.

Example of a Simple Algorithm:

Problem: Find the largest number in a list.

Algorithm:

1. Start with the first number in the list as the largest.
2. Compare the current largest number with the next number in the list.
3. If the next number is greater, update the largest number.
4. Repeat until all numbers in the list are compared.
5. Output the largest number.

Applications of Algorithms:

1. Sorting and Searching: Organizing or finding data (e.g., QuickSort, Binary Search).
2. Optimization: Finding the best solution under given constraints (e.g., Dijkstra's Algorithm).
3. Data Analysis: Processing large datasets (e.g., machine learning algorithms).
4. Everyday Tasks: GPS navigation, automated scheduling, etc.

In programming, algorithms are implemented using code in various programming languages to solve real-world problems.

2. What is flowchart?

A flowchart is a visual representation of a process, algorithm, or workflow, using various symbols to depict different types of actions or steps. It provides a clear, step-by-step graphical depiction of a sequence of activities, making it easier to understand complex processes.

Components of a Flowchart

1. Symbols: Different shapes are used to represent various actions:
2. Oval: Represents the start or end of a process.
3. Rectangle: Represents a process or task.
4. Diamond: Represents a decision point with multiple outcomes.

5. Arrow: Indicates the flow of the process from one step to another.
6. Parallelogram: Represents input or output (e.g., data entry or result).
7. Connections: Arrows connect the symbols, showing the logical flow of the process.

Purpose of a Flowchart

1. Visualization: Helps visualize and understand the sequence of steps in a process.
2. Clarity: Makes complex processes easier to communicate and analyze.
3. Problem-Solving: Assists in identifying bottlenecks or inefficiencies in a system.
4. Documentation: Serves as a reference for workflows or algorithms.
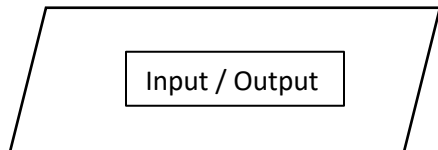
Applications of Flowcharts

1. Software Development: To design algorithms and understand workflows.
2. Business Processes: To streamline operations and improve efficiency.
3. Education: To explain procedures in a structured and visual manner.
4. Engineering and Systems: For system design and troubleshooting.

Flowcharts are an essential tool for planning and communicating processes effectively across different fields.
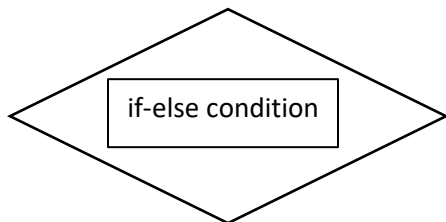
3. Draw the following flowcharts elements.

Here is the illustration of the requested flowchart elements: the input-output box, conditional box, in-page connector, and off-page connector. Let me know if you need any modifications!
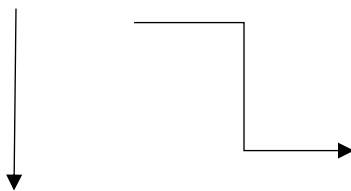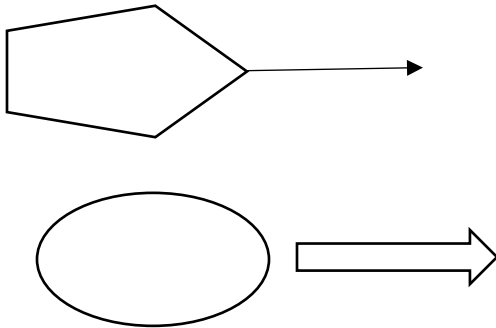
1) Input-output box.

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 _____
 \               \
  \   _____    \
   \ | Input /  |  \
    \| Output   |   \
     \|_____|_____\
```
Input / Output

2) conditional box

```
        /\
       /  \
      / __ \
     / |if- | \
    <  |else |  >
     \ |cond| /
      \ __ /
       \  /
        \/
```
if-else condition

3) In page connector

4) Off page connector:

4. Write a algorithm to find sum of two numbers and also draw flowchart for the same.

1. Start.
2. Input two numbers, A and B.
3. Calculate the sum, Sum = A + B.
4. Display the result, Sum.
5. End.

Here is the flowchart for finding the sum of two numbers.