**UNIT – 1**

**ALGORITHMIC PROBLEM SOLVING**

Question Bank

1. **Define Algorithm.**

An Algorithm is a set of high-level instructions that can be used to accomplish a task. It is described in natural human understandable language. A task is broken into several instructions that written in a particular order.

1. **Define Flowchart.**

A Flowchart is a diagrammatic or pictorial representation of an algorithm that describes flow of control in a program. Instructions are represented in predefined shapes. Shapes are connected with flow lines.

1. **Define Pseudo code.**

Pseudo code is an informal high-level description of the operating principle   of a computer program or other algorithm. It resembles the programming language structures but instructions and keywords are independent from programming languages.

1. **List out the Characteristics of Good Algorithm.**
   * Finite
   * Well defined
   * Effective
   * Efficiency
   * Abstraction
   * Reusability
2. **What is Recursion?**

Recursion is a technique which allows a function to call itself. A function that incorporates recursion technique is called recursive functions. Using recursion we can solve classical problem of recursion called tower of Hanoi.

1. **Write any four algorithmic design techniques.**

Four Algorithmic Design Techniques are,

* + Brute Force Approach
  + Dynamic Programming
  + Divide-and-Conquer
  + Backtracking

1. **What are the various building blocks of an algorithm?**

The various building blocks of an Algorithm are,

* + Sequence
  + Selection
  + Iteration
  + Function

1. **What is Backtracking?**

Backtracking is a general algorithmic technique that considers searching every possible combination of solution, in order to solve an optimization problem.

1. **Define the term Memorization.**

Memorization is a technique of storing solutions to sub-problems instead of re-computing them. It reuses the previous solution to achieve current output.

1. **What is Brute Force?**

Brute Force is an approach where every possible solution in the solution domain is considered to find the best optimal solution.

1. **Write an Algorithm to find the sum of two numbers.**

Step 1: Start

Step 2: Get two numbers from user and store it in variable Number1 and Number2.

Step 3: Compute sum with Number1 and Number2 and store in Sum

Step 4: Display Sum

Step 5: Stop

1. **What is the use of Algorithm Analysis?**

Analysis of Algorithm is used to check an algorithms performance and resource usage without using any specific programming language. This helps in making various decisions while designing an algorithm. Algorithms are tested with 3 types of case inputs [Best Case, Worst Case, Average Case] and improved based on the results.

1. **What is Selection?**

Selection is the programming construct through which a computer executes one or other set of instructions according to whether a particular condition is met or not.

1. **What is Data Structure?**

Data structure defines the way in which data are stored for efficient search and retrieval. Different data structures are suited for different problems.

1. **Define Worst-Case Analysis.**

Worst-Case Analysis is a measure that calculates the resources (e.g. running **time**, memory) an **algorithm** requires in the **worst**-**case**. It gives an upper bound on the resources required by the **algorithm**.

1. **What is the use of Big-O Notation?**

Big O-Notation is the most common notation used to express the performance of an algorithm. Big O-Notation reflects an algorithm`s order of growth.

1. **Define Divide-and-Conquer.**

Divide-and-Conquer is a method that divides the problem into smaller sub-problem and then solves the sub problems. Once these sub-problems are solved, it combines the partial solution to find the solution of the original problem.

1. **Define Backtracking.**

Backtracking is a general algorithmic technique that considers searching every possible combination of solution and when there is no solution, this approach backtracks to the point where the different alternatives for the possible solutions are present and it chooses the next alternative.

1. **Draw the flow chart to get a number from user and determine given number is odd or even?**
2. **Define Program.**

A program is a set of instructions that a computer follows in order to perform a particular task.

**PART – B**

**10 – Marks**

1. What are the steps involved in solving a Problem using an algorithm? Discuss each step briefly.
2. Explain briefly about the various Building Blocks of an Algorithm.
3. Describe briefly about Pseudo code and provide suitable pseudo code for finding the minimum in a list.
4. Explain the various symbols used in flowchart and draw a flowchart to determine the square root of number using Newton’s methods.
5. Explain about the various development strategies/technique for Algorithm.
6. Solve the Tower of Hanoi problem for n=3 disks. Provide pseudo code for the same.
7. Draw Flowchart and Pseudo code for finding the minimum in a list.
8. Find the Factorial of a given number using both Iteration and recursion.
9. Explain about the various building blocks of an algorithm.
10. Provide Pseudo code and Flowchart for inserting a card in a list of Sorted cards.
11. Briefly explain the steps in algorithmic problem solving.