

Jaypee University of Engineering and Technology, Guna

Lab Exercise 1: Recursion

Title: Implementation and Analysis of Recursive Algorithms

Mode: Self Learning

Outcomes:

1. Understand the concept of recursion and recursive algorithms
2. Learn how to solve problems using recursion
3. Analyze the performance of recursive algorithms

Methodology:

Theory: Introduction to recursion, types of recursion, recursive algorithms and their advantages and disadvantages, recursion stack, tail recursion, etc.

Implementation: Implementing recursive algorithms in C++/Java/Python or any other programming language of your choice, with operations like Fibonacci series, Factorial, Tower of Hanoi, Binary Search, etc.

Analysis: Analyzing the time and space complexity of the implemented recursive algorithms.

Steps:

1. Study the concept of recursion and recursive algorithms.
2. Implement the recursive algorithms using the chosen programming language.
3. Test the implemented algorithms for different inputs.
4. Analyze the performance of the implemented algorithms in terms of time and space complexity.
5. Write a report on the implementation and analysis of recursive algorithms.

Experiments:

1. Tower of Hanoi
2. All Permutations of a string taken from user
3. Printing all the binary strings of length n
4. Calculate Greatest Common Divisor (GCD) using Euclid's algorithm
5. Implement merge sort algorithm using recursion
6. Solve the N Queen problem in chess using Recursion
7. Remove a given element from a linked list using recursion
8. Solve egg dropping problem using recursion.