Jaypee University of Engineering and Technology, Guna

Advanced Programming Lab-3   18B17CI673
Lab Exercise 4: Backtracking

Title: Implementation and Analysis of Backtracking Algorithms

Mode: Self Learning

Outcomes:
1. Understand the concept of Backtracking
2. Learn how to solve problems using Backtracking
3. Analyze the performance of Backtracking algorithms

Methodology:

Simulation is a powerful technique for modeling complex systems that are difficult to analyze using mathematical or analytical methods. Simulation involves generating a sequence of events or states that approximate the behavior of the system over time. Backtracking can be used to simulate systems that have a large number of possible states or transitions.

In this experiment, we will use backtracking algorithms to simulate various types of systems, including discrete-event systems, continuous systems, and stochastic systems. We will study the different types of models used in simulation, such as Markov chains, queuing models, and differential equations. We will also learn how to implement simulation algorithms using backtracking, and how to analyze the performance of these algorithms in terms of time and space complexity

Steps:
1. Study the concept of Backtracking and its types of problems.
2. Implement the Backtracking 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 Backtracking algorithms.

Experiments:
1. N-Queens Problem
2. Sudoku Solver
3. Rat in a Maze Problem
4. Hamiltonian Path Problem

5. Knight's Tour Problem
6. Graph Coloring Problem
7. Subset Sum Problem
8. Combination Sum Problem
9. Permutations Problem
10. Word Search Problem