Subject: Design and Analysis of Algorithms Semester: 5 Subject Code: CE355 Academic Year: 2022-23

Student ID: 20DCE019 Student Name: Yatharth Chauhan

Practical Index

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr.**  **No.** |  | **AIM** | **CO** | **Start Date** | **End Date** | **Grade** | **Signature with Date** |
| **Part -1** | **1.1** | Implement and perform analysis of Factorial of a given number (Iterative and Recursive) | 1,5 |  |  |  |  |
| **1.2** | Implement and perform analysis of Fibonacci Series of a given number (Iterative and Recursive) |  |  |  |  |
| **1.3** | Implement and Perform analysis of Matrix Addition and Matrix Multiplication (Iterative) |  |  |  |  |
| **1.4** | Find a subset of a given set S = {s1,s2,....., sn} of n positive integers whose sum is equal to a given positive integer d. For example, if S= {1, 2, 5, 6, 8} and d = 9 there are two solutions {1,2,6} and {1,8}.  A suitable message is to be displayed if the given problem instance doesn't have a solution. |  |  |  |  |
| **Part -2** | **2.1** | Implement and Perform analysis of Bubble Sort | 1,2 |  |  |  |  |
| **2.2** | Implement and Perform analysis of Selection Sort |  |  |  |  |
| **2.3** | Implement and Perform analysis of Insertion Sort |  |  |  |  |
| **Part - 3** | **3.1** | Implement and perform analysis of worst case of Merge Sort and Quick sort. Compare both algorithms | 1,3,5 |  |  |  |  |
| **3.2** | Implement the program to perform Linear Search and Binary Search. Also compare Time complexity of both. |  |  |  |  |
|  | **4.1** | Program to implement Kruskal’s algorithm using greedy method. |  |  |  |  |  |
| **Part - 4** | **4.2** | Let S be a collection of objects with profit-weight values. Implement the fractional knapsack problem for S assuming we have a sack that can hold objects with total  weight W. Check the program for given test cases | 1,2,3,  4 |  |  |  |  |
| **4.3** | Suppose you want to schedule N activities in a Seminar Hall. Start time and Finish time of activities are given by pair of (si,fi) for ith activity.  Implement the program to maximize the utilization of Seminar Hall. |  |  |  |  |
|  |  | (Maximum activities should be selected.) |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **5.1** | A cashier at any mall needs to give change of an amount to customers many times in a day. Cashier has multiple number of coins available with different denominations which is described by a set C. Implement the program for a cashier to find the minimum number of coins required to find a change of a particular amount A. Output should be the total number of coins required of given denominations. | | |  |  |  |  |  |
| **Part - 5** |  | Check the program for given test cases: | | | 1.2,3,  5 |
| **5.2** | Implement the program 4.2 using Dynamic Programing Compare Greedy and Dynamic approach. | | |  |  |  |  |
|  | **5.3** | Given a chain < A1, A2,…,An> of n matrices, where for i=1,2,…,n matrix Ai with dimensions. Implement the program to fully parenthesize the product A1,A2,…,An in a way that minimizes the number of scalar multiplications. Also calculate the number of scalar multiplications for all possible combinations of matrices. | | |  |  |  |  |  |
|  | **5.4** | Program to implement all pairs shortest path. | | |  |  |  |  |  |
|  | **6.1** | Write a program to implement BFS and DFS in Graph. | | |  |  |  |  |  |
| **Part -6** | Compare Time Complexity of both algorithms. | | | 1,2,3,  4 |
| **6.2** | From a given vertex in a weighted graph, implement a program to find shortest paths to other vertices using | | |  |  |  |  |
|  |  | Dijkstra’s algorithm. | | |  |
| **Part – 7** | **7.1** | Program to  using Backtracking. | implement | 8-Queen’s problem | 1,2,3,  5 |  |  |  |  |
| **Part - 8** | **8.1** | Implement a straightforward, string matching naive  algorithm to solve the problem. | | | 1,2,3 |  |  |  |  |
| **8.2** | Implement Rabin karp algorithm and test it on the given  test cases | | |  |  |  |  |