



**Charotar University of Science and
Technology**
Devang Patel Institute of Advance Technology and
Research
Department of Computer Engineering



Subject: Design and Analysis of Algorithms

Subject Code: CE355

Student ID: _____

Semester: 5

Academic Year: 2022-23

Student Name: _____

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 $S = \{s_1, s_2, \dots, s_n\}$ 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.					
Part -4	4.1 Program to implement Kruskal's algorithm using greedy method.	1,2,3,4				
	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					
	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 (s_i, f_i) for i th activity. Implement the program to maximize the utilization of Seminar Hall. (Maximum activities should be selected.)					

Part - 5	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. Check the program for given test cases:	1,2,3,5				
	5.2	Implement the program 4.2 using Dynamic Programming Compare Greedy and Dynamic approach.					
	5.3	Given a chain $\langle A_1, A_2, \dots, A_n \rangle$ of n matrices, where for $i=1,2,\dots,n$ matrix A_i with dimensions. Implement the program to fully parenthesize the product A_1, A_2, \dots, A_n 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.					
Part - 6	6.1	Write a program to implement BFS and DFS in Graph. 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 implement 8-Queen's problem using Backtracking.	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					