

SAVITIBAI PHULE UNIVERSITY

M.Sc.(Computer Science) Sem-II

Practical Examination (From 2023-2024)

SUBJECT: CS-554-MJP : Lab Course on CS-551-MJ (Design and Analysis of Algorithms)

Time: 3 Hours

Max. Marks: 35

Q.1) Write a program to sort a list of n numbers in ascending order using selection sort and determine the time required to sort the elements. [15 Marks]

Q.2) Write a program to sort a given set of elements using the Quick sort method and determine the time required to sort the elements. Repeat the experiment for different values of n, the number of elements in the list to be sorted. The elements can be read from a file or can be generated using the random number generator.

[15 Marks]

Q.3 Viva

[5 Marks]

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Q.1) Write a program to sort n randomly generated elements using Heapsort method. [15 Marks]

Q.2) Write a program to implement Strassen's Matrix multiplication [15 Marks]

Q.3) Viva [5 Marks]

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Q.1) Write a program to sort a given set of elements using the Quick sort method and determine the time required to sort the elements [15 Marks]

Q.2) Write a program to find Minimum Cost Spanning Tree of a given undirected graph using Prims algorithm [15 Marks]

Q.3) Viva [5 Marks]

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Q.1) Write a program to implement a Merge Sort algorithm to sort a given set of elements and determine the time required to sort the elements [15 Marks]

Q.2) Write a program to implement Knapsack problems using Greedy method [15 Marks]

Q.3) Viva [5 Marks]

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Q.1) Write a program for the Implementation of Kruskal's algorithm to find minimum cost spanning tree. [15 Marks]

Q.2) Write a program to implement Huffman Code using greedy methods and also calculate the best case and worst-case complexity. [15 Marks]

Q.3) Viva [5 Marks]

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Q-1) Write a program for the Implementation of Prim's algorithm to find minimum cost spanning tree. [15 Marks]

Q.2) Write a Program to find only length of Longest Common Subsequence. [15 Marks]

Q.3) Viva [5 Marks]

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Q-1) Write a program for the Implementation of Dijkstra's algorithm to find shortest path to other vertices [15 Marks]

Q.3) Write a program for finding Topological sorting for Directed Acyclic Graph (DAG) [15 Marks]

Q.3) Viva [5 Marks]

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Q.1) Write a program to implement Fractional Knapsack problems using Greedy Method

[15 Marks]

Q.2) Write Program to implement Traveling Salesman Problem using nearest neighbor algorithm

[15 Marks]

Q.3) Viva

[5 Marks]

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Q.1) Write a program to implement optimal binary search tree and also calculate the best-case complexity. [15 Marks]

Q.2) Write a program to implement Sum of Subset by Backtracking [15 Marks]

Q.3) Viva [5 Marks]

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Q.1) Write a program to implement Huffman Code using greedy methods [15 Marks]

Q-2) Write a program to solve 4 Queens Problem using Backtracking [15 Marks]

Q.4) Viva [5 Marks]

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Max. Marks: 35

Q.1) Write a programs to implement DFS (Depth First Search) and determine the time complexity for the same. [15 Marks]

Q.1) Write a program to find shortest paths from a given vertex in a weighted connected graph, to other vertices using Dijkstra's algorithm. [15 Marks]

Q.3) Viva [5 Marks]

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Q.1) Write a program to implement BFS (Breadth First Search) and determine the time complexity for the same. [15 Marks]

Q.2) Write a program to sort a given set of elements using the Selection sort method and determine the time required to sort the elements. [15 Marks]

Q.3) Viva [5 Marks]

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Q.1) Write a program to find minimum number of multiplications in Matrix Chain Multiplication. [15 Marks]

Q.2) Write a program to implement an optimal binary search tree and also calculate the best case and worst-case complexity. [15 Marks]

Q.3) Viva [5 Marks]

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Q.1) Write a program to sort a list of n numbers in ascending order using Insertion sort and determine the time required to sort the elements.

[15 Marks]

Q.2) Write a program to implement DFS and BFS. Compare the time complexity

[15 Marks]

Q.3) Viva

[5 Marks]

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Q.1) Write a program to implement to find out solution for 0/1 knapsack problem using

LCBB (Least Cost Branch and Bound).

[15 Marks]

Q.2) Write a program to implement Graph Coloring Algorithm

[15 Marks]

Q.3) Viva

[5 Marks]

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Max. Marks: 35

Q.1) Write a program to implement to find out solution for 0/1 knapsack problem using dynamic programming. [15 Marks]

Q.2) Write a program to determine if a given graph is a Hamiltonian cycle or not. [15 Marks]

Q.3) Viva [5 Marks]

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Q.1) Write a program to implement solve 'N' Queens Problem using Backtracking.

[15 Marks]

Q.2) Write a program to find out solution for 0/1 knapsack problem.

[15 Marks]

Q.3) Viva

[5 Marks]

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Q.1) Write a program to implement Graph Coloring Algorithm. [15 Marks]

Q.2) Write a program to find out live node, E node and dead node from a given graph. [15 Marks]

Q.3) Viva [5 Marks]

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Max. Marks: 35

Q.1) Write a program to determine if a given graph is a Hamiltonian cycle or Not.

[15 Marks]

Q.2) Write a program to show board configuration of 4 queens' problem.

[15 Marks]

Q.3) Viva

[5 Marks]

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Q.1) Write a program to implement for finding Topological sorting and determine the time complexity for the same.

[15 Marks]

Q.2) Write a program to solve N Queens Problem using Backtracking.

[15 Marks]

Q.3) Viva

[5 Marks]