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**Presidency University**

**Bengaluru**

 **School Of Computer Science and Engineering & Information Science**

**Summer-Term End Term Examinations, Aug 2024**

**Date**: 06.08.2024

**Time**: 01.00PM-04.00 PM

**Max Marks**: 100

**Weightage**: 50%

**Odd Semester**: 2023 - 24

**Course Code**: CSA 2005

**Course Name**: Analysis of algorithms

**Department: SOIS**

 **Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

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| **Q.No** | **Questions** | **Marks** | **CO** | **RBT** |
| 1 | 1. Define Worst-case, Best-case efficiencies
 | 4 | CO1 | L1 |
| 1. List down basic efficiency classes
 | 6 | CO1 | L2 |
| 1. Briefly explain asymptotic notations
 | 10 | CO1 | L3 |
| OR |
| 2 | 1. Describe Notion of Algorithm
 | 4 | CO1 | L1 |
| 1. List down the steps involved in mathematical analysis of Recursive Algorithms
 | 6 | CO1 | L2 |
| 1. Identify the time complexity (upper bound) for the below iterative functions

A(){ int i=1,s=1;while(s<=n){i++;s=s+i;printf(“Ravi”);}} | 10 | CO1 | L3 |

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| 3 | 1. In brief explain brute force strategy of programming
 | 4 | CO2 | L1 |
| 1. Write and apply bubble sort algorithm on following set of integers 8,5, 7,3,2.
 | 6 | CO2 | L2 |
| 1. Define Knapsack problem and apply on following set of data having bag capacity m=15
 | 10 | CO2 | L3 |

OR

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| 4 | 1. Write selection sort algorithm
 | 4 | CO2 | L1 |
| 1. Briefly explain Traveling Salesman Problem (TSP) using brute force strategy with example
 | 6 | CO2 | L2 |
| 1. Write an algorithm to find uniqueness of elements in an array and give the mathematical analysis of this non recursive algorithm with all steps.
 | 10 | CO2 | L3 |

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| 5 | 1. What are different variation in decrease and conquer
 | 4 | CO3 | L1 |
| 1. Briefly explain working of insertion sort algorithm with an example.
 | 6 | CO3 | L2 |
| 1. Give an analysis of merge sort algorithm ? What types of Datasets work best for Merge Sort? How does the Divide and Conquer Strategy work with Merge Sort?
 | 10 | CO3 | L3 |

OR

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| 6 | 1. When does the worst case occur in Merge Sort?
 | 4 | CO3 | L1 |
| 1. Briefly explain decrease and conquer with two advantages and disadvantages
 | 6 | CO3 | L2 |
| 1. Write and explain Merge sort algorithm
 | 10 | CO3 | L3 |

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| 7 | 1. Compare and contrast between greedy method and dynamic programming method
 | 4 | CO4 | L1 |
| 1. Define Dynamic programming and briefly list down its properties
 | 6 | CO4 | L2 |
| Apply all pair shortest path algorithm (Warshall) for the below graph https://www.gatevidyalay.com/wp-content/uploads/2018/07/Floyd-Warshall-Algorithm-Problem-01.png | 10 | CO4 | L3 |

OR

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| 8 | 1. Why to choose greedy approach and explain the greedy choice property.
 | 4 | CO4 | L1 |
| 1. List down the steps involved in Dijikstras algorithm
 | 6 | CO4 | L2 |
| 1. List down any five characteristic components of greedy algorithm
 | 10 | CO4 | L3 |

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| 9 | When to Use a Backtracking Algorithm? | 4 | CO1 | L1 |
| 1. How does the backtracking algorithm differ from other search algorithms? Can the backtracking algorithm handle problems with a large search space?
 | 6 | CO1 | L2 |
| 1. Draw state space tree for N queens problem with 4 \*4 chess board having 4 queens Q1,Q2,Q3,Q4.
 | 10 | CO1 | L3 |

OR

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| 10 | List and explain applications of backtracking  | 4 | CO2 | L1 |
| 1. How do I determine the constraints or conditions for backtracking? What happens if there is no valid solution in the search space?
 | 6 | CO2 | L2 |
| 1. Define minimum spanning tree (MST) and explain working principle of Prims algorithm
 | 10 | CO2 | L3 |