|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Roll No |  |  |  |  |  |  |  |  |  |  |  |  |

****

**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.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **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 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 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 |