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School of Computing Science and Engineering

Bachelor of Computer Applications

Mid Term Examination - May 2024

Duration : 90 Minutes

Max Marks : 50

Sem IV - E1UA404B - Design and Analysis of Algorithms

General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) Distinguish between worst-case and average-case time complexity with suitable example. K2 (2)
- 2) Discuss the conditions under which binary search is preferred or outperforms linear search. K1 (3)
- 3) Differentiate between priori and posteriori Analysis. K2 (4)
- 4) Discuss the applicability of the Master Theorem in solving recurrence relations. Provide situations where the Master Theorem can and cannot be applied. K2 (6)
- 5) Solve the following recurrence using Master Theorem: K3 (6)
$$T(n) = 2T\left(\frac{n}{2}\right) + n \log n$$
- 6) Demonstrate each step for sorting the below given array using Merge Sort and Write the Recurrence Relation for Merge sort. 21, 89, 8, 56, 23, 89, 4, 10, 15, 8 K3 (9)
- 7) Consider the following array and what is the status of the array after fourth pass when we use the insertion sort. Array elements are: 20,16,12,8,4,1 K4 (8)
- 8) Outline the merge operation in the merge sort algorithm. Provide a step-by-step explanation of how two sorted subarrays are merged into a single sorted array by taking a suitable example. K4 (12)

OR

Explain the concept of inorder traversal in Binary Search Tree (BST). Discuss how inorder traversal can be used to retrieve elements from a BST in sorted order. Provide an algorithm for performing inorder traversal. K4 (12)