

Time: 2.0 Hours

Answer ALL Questions

1.	a) Explain the role of Balancing in Binary Search Trees (BST) and why AVL trees are preferred over unbalanced BSTs. Provide an example. b) Problem Scenario: Efficient Student Record Management Using BST <i>A university wants to efficiently manage student records using a Binary Search Tree (BST). Each node in the BST represents a student and contains the following information:</i> ➤ Student ID (int) – serves as the unique key • Name (string) • CGPA (float) The system must support the following operations: 1. Insertion: New student records should be inserted while maintaining BST properties. 2. Searching: Given a Student ID, find and display the corresponding student's Name and CGPA. 3. Deletion: If a student record is deleted, ensure that the BST remains valid (i.e., replacing with inorder successor or predecessor). Tasks: i) (2 Marks) Define the BST node based on the above requirements. ii) (3 Marks) Illustrate step-by-step how the following Student IDs are inserted into an initially empty BST: (105, 120, 90, 75, 110, 95, 130, 125, 140) • Draw the BST after each insertion.	5 10	CO1 CO3
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