



Daffodil International University
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Final Examination, Spring 2025
Course Code: CSE123, Course Title: Data Structures
Level:1 Term:2 Batch: ALL

Time: 2.0 Hours

Marks: 40

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	a) Explain the role of Balancing in Binary Search Trees (BST) and why AVL trees are preferred over unbalanced BSTs. Provide an example.	5	CO1
	b) Problem Scenario: Efficient Student Record Management Using BST	10	CO3
<p><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></p> <ul style="list-style-type: none">• Student ID (int) – serves as the unique key• Name (string)• CGPA (float) <p>The system must support the following operations:</p> <ol style="list-style-type: none">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). <p>Tasks:</p> <ol style="list-style-type: none">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) <ul style="list-style-type: none">• Draw the BST after each insertion.			

