Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Final Examination, Fall-2023

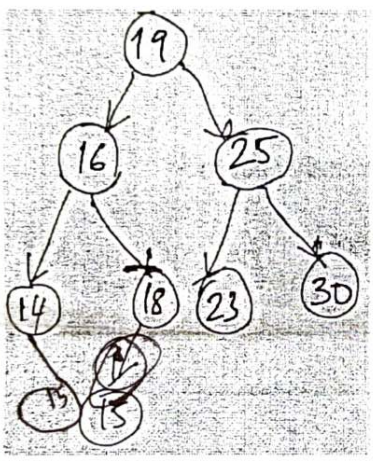
Course Code: CSE~~123~~, Course Title: Data Structures

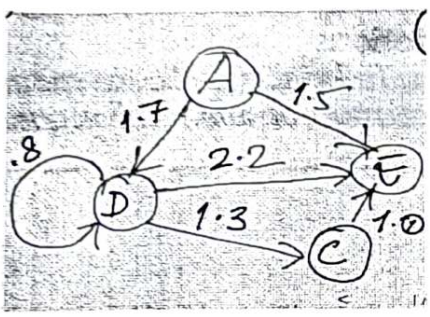
Level:1 Term:2 Batch: 61

Time: 2 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.		Consider the following figure of a BST:  Answer the following questions: (A) Show the traversal of the tree using inorder, preorder and postorder traversal technique. (B) Suppose a new node having data 12 is to be inserted and node 18 is to be deleted, show the operation of insertion and deletion and elaborate briefly. (C) Show the implementation scheme using link list nodes for the above BST. (D) Why BST is popular in computing.	4 3 2 2	CO2 CO2 CO2 CO1
2.		(A) A given set of data in an array is {13, 15, 17, 19, 24, 9, 11, 14, 8, 5}. Insert the above data in an empty AVL tree and show each step of AVL formation including rotations. (B) Why AVL plays a significant role in data search using BST.	8 2	CO2 CO1

3.		For the data set shown in an array {23, 15, 19, 6, 33, 45, 4, 55, 8, 22, 39, 2}, answer the following questions: (A) Form a minHeap and maxHeap and show each necessary intermediate tree. Identify total number of percolations needed for minHeap and maxHeap. (B) Suppose the node 15 is to be deleted in minHeap you have formed above, write the process of deletion for node 15. (C) How heap data structure is different from BST. (D) Why percolation is needed in Heap.	4 3 2 2	CO2 CO2 CO1 CO1
4.		Consider the following Graph:  Answer the following questions: (A) Represent the graph using Adjacency matrix and Adjacency list. (B) Why Graph data structure has significance in real-life. (C) How indegree and outdegree signifies using graph computing.	4 2 2	CO2 CO1 CO1

Good Luck