

C0-R4.B3: DATA STRUCTURE THROUGH JAVA

NOTE:

1. Answer question 1 and any FOUR from questions 2 to 7.
2. Parts of the same question should be answered together and in the same sequence.

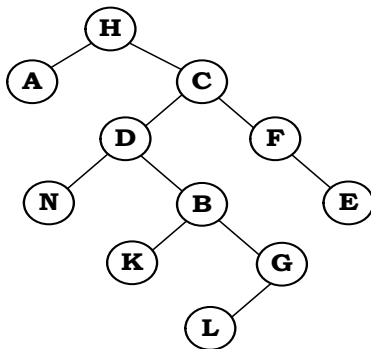
Time: 3 Hours

Total Marks: 100

1.
 - a) Discuss features of Object Oriented Programming.
 - b) What is Recursion? Explain Tower of Hanoi Problem using Recursion for N=3 disk.
 - c) List the different applications of stack data structure.
 - d) Define graph. Explain storage representation techniques of a graph.
 - e) What is complexity? Which are the two ways to measure complexity of an algorithm? Explain with suitable example.
 - f) Explain Abstract class with suitable example.
 - g) State difference between Bubble sort and Selection sort.

(7x4)

2.
 - a) What is Data Structure? Discuss the importance of data structure in computer science. Classify hierarchy of data structures with suitable example.
 - b) Define singly linked list. Write an algorithm or java code to count number of nodes in singly linked list.
 - c) What is Binary Tree? Traverse the following tree in Preorder, In order and Post order.



(8+5+5)

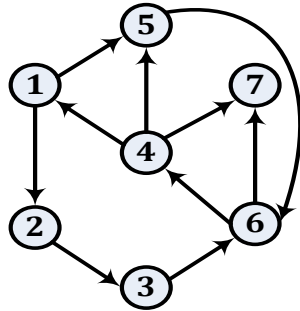
3.
 - a) Explain method overloading and method overriding with suitable example.
 - b) Construct the Binary Search Tree for following data.
90, 31, 75, 42, 67, 55, 62, 58, 65, 64.
After creation of BST, delete 62 and draw final Binary Search Tree.
 - c) Write a short note on Priority Queue.

(8+6+4)

4.
 - a) Explain Brute-force String pattern matching with suitable example.
 - b) Show circular queue contents with front and rear after each step with size=5. Initially queue is empty.
 - i) Insert 10, 20, 30
 - ii) Delete
 - iii) Insert 40, 50, 60, 70
 - c) Trace the following numbers using radix sort.
9, 1106, 9099, 6, 7101, 990, 15, 99, 10, 909.

(6+6+6)

- 5.
- Write a Java code for Binary Search method. Also write complexity of Binary search method in Best case, Average Case and Worst Case.
 - For the given Graph:
 - Prepare adjacency matrix
 - Apply Depth First Search and Breath First Search strategy. Starting node is 1. Also show the step by step contents of the data structure used in traversal.



- What is inheritance? Explain different types of inheritance. **(8+6+4)**
- 6.
- What is the limitation of simple Queue? How to overcome this limitation? Write a Java code to implement simple Queue data structure.
 - What is AVL Tree? Discuss insert operation in AVL tree with suitable example. **(10+8)**
- 7.
- Explain Asymptotic notations with suitable example.
 - What is the use of 'this' keyword in java? Explain with example.
 - Trace the following numbers using insertion sort.
9, 1106, 6, 7101, 990, 15, 99, 10 **(6+6+6)**