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INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Four Year B.Tech III Semester End Examinations(Regular) - November, 2019

Regulation: IARE – R18

DATA STRUCTURES

Time: 3 Hours

(Common to CSE | IT | ECE | ME | CE)

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT – I

1. (a) Explain the importance of data structures used in various algorithmic designs with a suitable example. [7M]
- (b) Consider the following list of integers: [1,9,33,47,5,6,7,80,9,10] and write the procedure for finding the element '7' using binary search. [7M]
2. (a) Explain the insertion sort algorithm with an example? Demonstrate the linear search algorithm with suitable example. [7M]
- (b) Write a program to implement bubble sort algorithm for following list.
12, 11, 13, 5, 6, 7, 22, 8 [7M]

UNIT – II

3. (a) Explain the basic operations on queue. Elaborate applications of queue with example. [7M]
- (b) Write an algorithm for deleting an element from the circular queue with suitable example. [7M]
4. (a) Define stack. Describe the operations of stack using arrays. [7M]
- (b) Consider the stack of elements = {4,6,2,1,5}. Check the status of stack after performing the following operations
 - i) Push(8),Push(7),Push(3)
 - ii) Pop(),Pop(),Pop() [7M]

UNIT – III

5. (a) What is a self-referential structure? Represent the node structure in the linked list with an example. [7M]
- (b) Write a program to modify the linked list such that all even numbers appear before all the odd numbers in the modified linked list. [7M]
6. (a) List out the types of linked lists . Explain queue implementation using linked list. [7M]
- (b) Write an algorithm for following deletion into the linked list with suitable example
 - i) Deletion an element from beginning
 - ii) Deletion an element after an arbitrary element [7M]

UNIT – IV

7. (a) Define a binary tree. What are the different types of binary trees available? [7M]
(b) Given Preorder, Inorder and Postorder traversals of some tree, write an algorithm to check if they all are of the same tree or not? [7M]
8. (a) Define a full binary tree and complete binary tree. Explain the array and linked representation of a binary tree using a suitable example. [7M]
(b) Write the in-order, pre-order and post-order traversals for the given binary tree in Figure 1. [7M]

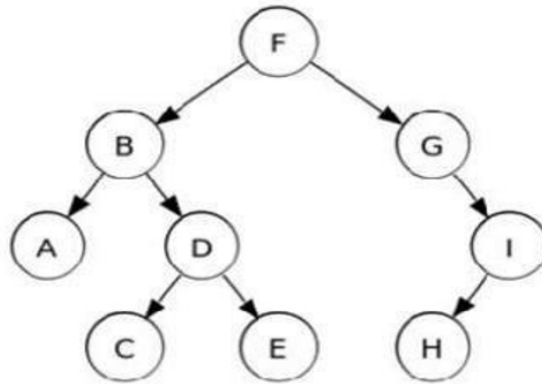


Figure 1

UNIT – V

9. (a) Describe the different possibilities to delete node from BST? Explain with example? [7M]
(b) Insert the following sequence of elements into an AVL tree, starting with an empty tree: 10, 20, 15, 25, 30, 16, 18, 19. and delete 30 in the AVL tree that you got. [7M]
10. (a) Define binary search tree and its operations. Write the applications of trees? [7M]
(b) Consider a hash table with 9 slots. The hash function is $h(k) = k \bmod 9$. The collisions are resolved by chaining. The following 9 keys are inserted in the order: 5, 28, 19, 15, 20, 33, 12, 17, 10. Find the maximum, minimum and average chain length in the hash table. [7M]