53 (IT 304) DTST

2019

DATA STRUCTURES

Paper : IT 304

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ***any five*** *questions.*

1. *(a)* Write the differences between stack and queue with examples. 4

   (b) Write an algorithm to convert an infix expression to its postfix form using stack. 8

   (c) Convert $A \$ B * C - D + E / F / (G + H)$ into its postfix form using stack. 8

Contd.

2. (a) Construct the expression tree for the following expression tree :
$E(2a+5b)\ (x-7y)^4$. 6

(b) Write the recursive function in C for the Towers of Hanoi problem. 6

(c) Draw the recursive tree of Tower of Hanoi. 8

3. (a) Write a function to add a node in a single linked list. 10

(b) Complete the following function for reversing the element of a linked list. 10

4. (a) Construct a binary tree from pre-and in-order traversal.

Pre-order	A	B	D	I	E	J	C	F	G
In-order	D	I	B	E	J	A	F	C	K

10

(b) Show how the following integers can be inserted in an empty binary search tree in the order they are given :
50, 30, 10, 90, 100, 40, 60, 20, 110
10

5. (a) Write an algorithm for Merge sor

(b) Show how the merge sort algorithm sort the following array in increa order :
100 90 80 70 60 50 40 30

6. (a) Insert the following keys in order to build them into an AVL tree :
a z b y c x d w e v

(b) Construct a B-tree of order 3 with following data :
50, 40, 60, 30, 70, 20, 80, 10, 90, 9, 99

7. (a) Consider an array containing following 8 integers :
30, 10, 70, 20, 50, 60, 80, 40. Sup we want to sort the array u selection sort, show the content o array after every pass.

(b) Give the adjacency matrix adjacency of the following graph.