53 (IT 304) DTST

2014

DATA STRUCTURE

Paper : IT 304

Full Marks : 100

Pass Marks : 30

Time : Three hours

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

*Answer **any five** questions out of seven.*

1. *(a)* What is data structure ? Explain it briefly. 5

   (b) Write the algorithm for the following cases : 5×3=15

   (i) Delete first node of a circular link list.

   (ii) Delete node after a given node of a doubly link list.

   (iii) Delete the first node of a doubly circular link list.

2. *(a)* Construct a binary tree from given inorder and preorder traversal : 5

inorder : E A C K F H D B G

preorder : F A E K C D H G B

(b) Write algorithm for the basic operation of push-pop and display of dqueue. Write the C program for the same. 7+8=15

3. *(a)* Insert the following keys in the sequence into an AVL tree cleanly indicating the various rotations used. 8

8, 3, 6, 7, 9, 12, 11, 10, 2, 1, 4, 5

(b) Write an algorithm to convert from infix to postfix expression. Convert the following infix expression into postfix expression.

$$P+(q/r+(s*t)/u)*\vee$$ 5+7=12

4. *(a)* Briefly explain what is abstract data type. 5

(b) Explain in brief threaded binary tree. 5

(c) Apply merge sort on the following. 10

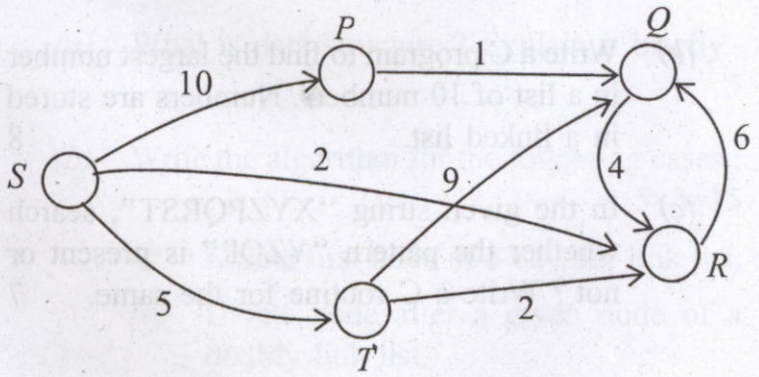
17 28 7 39 3 63 13 61

5. (a) Discuss in detail deletion and insertion of a particular node to a binary search tree with an example. 10

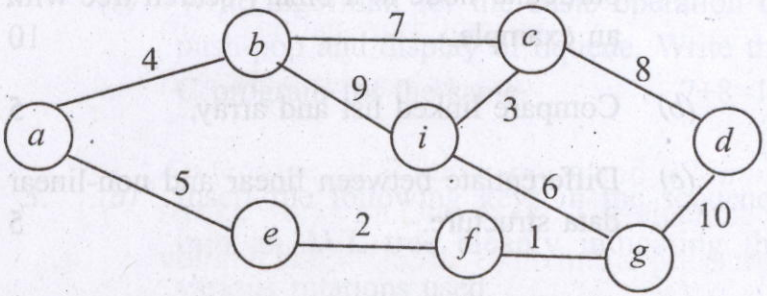
(b) Compare linked list and array. 5

(c) Differentiate between linear and non-linear data structure. 5

6. (a) Run Dijkstra Algorithm on the graph shown below. Consider S to be source node. 8



(b) What is spanning tree ? Give *one* practical application of MST problem. By using Prims Algorithm find the MST for the graph given below. 2+2+8=12



7. (a) What is an algorithm ? What is time and space complexity of an algorithm ? 1+2+2=5

(b) Write a C program to find the largest number in a list of 10 numbers. Numbers are stored in a linked list. 8

(c) In the given string "XYZPQRST", search whether the pattern "YZQP" is present or not ? Write a C routine for the same. 7