Code : 051403

B.Tech 4th Semester Examination, 2017

Data Structures

Time : 3 hours *Full Marks : 70*

Instructions :

(i) *There are **Nine** Questions in this Paper.*

(ii) *Attempt **Five** questions in all.*

(iii) ***Question No. 1 is Compulsory.***

(iv) *The marks are indicated in the right-hand margin.*

1. Answer Any Seven 7×2=14

(a) How many number of interchanges are required to sort 5, 1, 6 in ascending order using Bubble sort? 2

(b) What is the postfix form of the expression (A + B) * (C * D – E) * F / G ?

(c) How many leaf nodes are present in a full binary tree with 2n+1 nodes? n+1

(d) A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as .....

(e) What is LIFO?

(f) What are the minimum number of multiplications and additions required to evaluate the given polynomial $P=4x^3+3x^2-15x+45$?

(g) Which of the following sorting methods would be most suitable for sorting a list which is almost sorted?

(h) What values are automatically assigned to those array elements which are not explicitly initialized?

(i) What is the time complexity of Merge sort and Heap sort algorithms?

(j) What is complete binary Tree?

2. What is Binary Search Tree (BST) ? Make a BST for the following sequence of numbers.

45, 36, 76, 23, 89, 115, 98, 39, 41, 56, 69, 48

Traverse the tree in Preorder, Inorder and Postorder. 14

3. (a) What is an algorithm? What are the characteristics of a *good algorithm?* 7

(b) What is a sparse matrix ? How is it stored in the memory of a computer? 7

4. (a) Describe about the doubly linked list with an example. Write the advantages of linked list over array. 6

(b) Show the various passes of bubble sort on an unsorted list 11,15, 2, 13, 6 8

5. (a) Define a stack. Describe ways to implement stack. 9

(b) Differentiate between system defined data types and abstract data types with suitable examples. 5

6. (a) Describe insertion sort with a proper algorithm. What is the complexity of insertion sort in worst case? 7

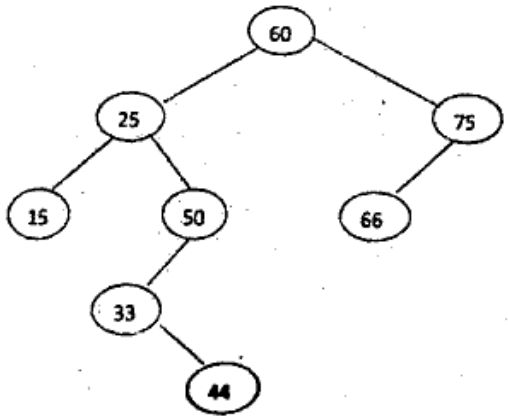
(b) Write an algorithm to insert a node in the beginning of the linked list. 7

7. (a) For the given Binary Search Tree, perform the following sequence of operations: 9

(A) Delete 44

(B) Delete 75

(C) Delete 25



(b) Write down the applications of stack and queue data structures. 5

8. (a) Construct a binary tree whose nodes on inorder and preorder are given as follows: 8

Inorder : 10, 15, 17, 18, 20, 25, 30, 35, 38, 40, 50

Preorder: 20, 15, 10, 18, 17, 30, 25, 40, 35, 38, 50

(b) What do you mean by hashing ? Explain any three popular hash functions. 6

9. Write short notes on following (any two) 7+7

(a) Sparse matrix

(b) AVL tree

(c) Binary tree traversals

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