Printed Pages: 4 NCS - 301

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2012267 Roll No.

B.TECH

Regular Theory Examination (Odd Sem - III), 2016-17

DATA STRUCTURES USING 'C'

Time : 3 Hours *Max. Marks : 100*

Section - A

1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (10×2=20)

a) Define time complexity and space complexity of an algorithm.

b) What are the merits and demerits of array data structures?

c) How do you push elements in a linked stack?

d) Differential linear and non linear data structures.

e) What is the significance of priority queue?

f) Define complete binary tree. Give example.

g) When does a graph become tree?

h) Prove that the number of odd degree vertices in a connected graph should be the even.

i) What is sorting? How is sorting essential for database applications?

j) Give the worst case and best case time complexity of binary search.

Section - B

Note : Attempt any 5 questions from this section.

(5×10=50)

2. What is recursion? Write a recursive program to find sum of digits of the given number. Also calculate the time complexity. [Ex: 259 = 16 = 7(Answer)].

3. Solve the following :
   a) ((A – (B + C) * D) / (E + F)) [Infix to postfix]
   b) (A + B) + *C – (D – E) ^ F [Infix to prefix]
   c) 7 5 2 + * 4 1 5 – / – [Evaluate the given postfix expression]

4. Write a C program to implement the array representation of circular queue.

5. Write a C program to implement binary tree insertion, deletion with example.

6. Write the C program for various traversing techniques of binary tree with neat example.

7. What is quick sort? Sort the given values using quick sort; present all steps/iterations :
   38, 81, 22, 48, 13, 69, 93, 14, 45, 58, 79, 72

8. Illustrate the importance of various traversing techniques in graph along with its application.

9. Compare and contrast the difference between B+ tree index files and B tree index files with an example.

Section - C

Note : Attempt any 2 questions from this section.

(2×15=30)

10. What is meant by circular linked list? Write the functions to perform the following operations in a doubly linked list.
    a) Creation of list of nodes.
    b) Insertion after a specified node.
    c) Delete the node at a given position.
    d) Sort the list according to descending order
    e) Display from the beginning to end.

11. Define AVL Trees. Explain its rotation operations with example. Construct an AVL tree with the values 10 to 1 numbers into an initially empty tree.

12. Discuss Prim's and Kruskal's algorithm. Construct minimum spanning tree for the below given graph using Prim's algorithm (Source node = a).

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