TCS-303 1213 Printed Pages : 4

Paper Code & Roll No. to be filled in your Answer Book

Roll No. | | | | | | | | | | |

B. Tech. II year (III Sem.)

Odd Semester Examination-2015

DATA STRUCTURE

Time : 3 Hours] *[Maximum Marks :100*

Unit I

Attempt **any Four** (4X5=20)

1. What is a data structure ? Difference between primitive data structure and non- primitive structure.

2. What is a stack? Write the basic operations performed on a stack.

3. Explain the Tower of Hanoi problem and write a recursive algorithm to solve it.

4. Each element of an array X[20][50] require 4 bytes of storage. Base address of X is 2000, determine the location of X[10][10] when array is stored as

   i) Row major

   ii) Column major

5. Convert the given infix expression to postfix expression using stack and show the details of stack at each step of conversion.

A+(B*C-(D/E-F)*G)*H

Unit II

Attempt **any Four** (4X5=20)

1. Write an algorithm to insert a number in the linked list at the following positions

   a) In the beginning of the list

   b) At the end of the list

2. Write a C program for deleting a node from the specified position in the linked list.

3. Write an algorithm to search an item from a sorted linked list.

4. Write an algorithm to insert a node in a queue and to delete a node from a queue.

5. What is doubly linked list? Write an algorithm for insertion of an element in a doubly linked list.

Unit III

Attempt **any Two** (2X10=20)

1. What is binary tree ? Mention the properties of a binary tree. Suppose the following values are inserted into a binary tree, in the order given below :
   13, 8, 10, 11, 23, 25, 31, 17, 2, 16, 21. Draw a diagram of the resulting binary tree.

2. Define the following :
   i) Binary search tree
   ii) Complete Binary tree
   iii) Depth of a tree
   iv) Leaf of a tree

3 (i) Discuss Huffman algorithm with the help of suitable example.

(ii) Write 'C' program to search an element in a sorted set of integers using binary search algorithm.

Unit IV

Attempt **any Two** (2X10=20)

1. Write an algorithm for quick sort. Trace your algorithm on the following list : 45, 26, 77, 14, 68, 61, 97, 39, 99, 90.

How the choice of the pivot element effect the efficienctof the algorithm.

2. Write a 'c' program for sorting 100 integers numbers using bubble sort procedures. Discuss the worst case time complexity of the algorithm.

3. Describe the concept of binary search techniques and also write its algorithm. Is it efficient than sequential search.

Unit V

Attempt **any Two** (2X10=20)

1. Write the characteristics of B-tree.Construct a B-tree on the following sequence of inputs:
   1, 5, 6, 2, 8, 11, 13, 18, 20, 7, 9. Assume that the order of B tree is 4.

2. What is direct file organization? Write the Pseudo-code routine for the deletion of a record from a direct file.

3. Define hash function. State different types of hash function. Give their algorithm and explain them with suitable diagram.

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