Printed Pages—3   TCS—302

B.Tech.

THIRD SEMESTER EXAMINATION, 2006 - 07

DATA STRUCTURES USING C

Time : 3 Hours   *Total Marks : 100*

Note : (i)   *Attempt ALL questions.*

(ii) *All questions carry equal marks.*

(iii) *Be precise in your answer.*

1.   Attempt *any four* parts of the following :   (5x4=20)

(a)   Distinguish between static memory allocation and dynamic memory allocation.

(b)   What do you understand by time complexity of an algorithm ? Explain BIG Oh notation with an example.

(c)   Derive the formula to find physical address of an element of three dimensional array stored in row major order.

(d)   Translate the following infix expression into its equivalent postfix expression.

$$(a + b) \big| d \uparrow ((e - f) + g)$$

(e) Write an algorithm to evaluate a post fix expression.

(f) What are sparse matrices ? Describe with the help of a suitable example.

2. Attempt *any two* parts of the following : **(10x2=20)**

(a) What is a Circular Queue ? Explain briefly and implement a queue with the help of doubly linked list.

(b) Suppose a singly linked list L is in memory. Write an algorithm which deletes the last node from L.

(c) Discuss how list data structure is useful to represent a polynomial and performing various operations upon a polynomial.

3. Attempt *any two* parts of the following : **(10x2=20)**

(a) What is Binary tree and complete Binary tree ? Write a function that finds height of a binary tree. How many binary trees are possible with four nodes ?

(b) Consider the binary tree given below.
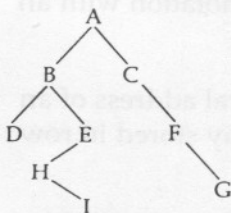
Traverse the given tree using Preorder and Post order traversal.

(c) Write a complete 'C' program to implement binary search algorithm.

4. Attempt **any two** parts of the following : (10x2=20)

(a) Write the Quick Sort algorithm and illustrate the steps of the algorithm for the following key values :

65, 43, 54, 26, 38, 48, 50

(b) Write a 'C' program for sorting 100 integer numbers using bubble sort procedures. Discuss the worst case time complexity of the algorithm.

(c) Define Binary Search tree, AVL tree and B-tree. What are the differences among them. Explain your answer with suitable examples wherever required.

5. Attempt **any two** parts of the following : (10x2=20)

(a) Write an algorithm for Breadth first traversal of a graph.

(b) What is Spanning tree ? Draw the minimum cost spanning tree for the graph given below and also find its cost.
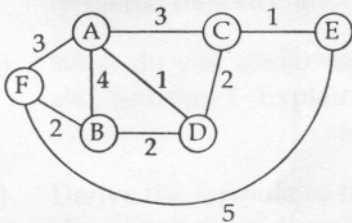
(c) Write short notes on following :

(i) Hashing Technique

(ii) File organisation

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