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

PAPER ID : 1072 Roll No. | | | | | | | | | | |

B.Tech.

FOURTH SEMESTER EXAMINATION, 2005-2006

DATA STRUCTURE USING C

Time : 3 Hours *Total Marks : 100*

Note : *(i) Attempt **ALL** questions.*

(ii) All questions carry equal marks.

(iii) In case of numerical problems assume data wherever not provided.

(iv) Be precise in your answer.

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

(a) (i) What do you understand by the term algorithm ? Describe the characteristics of an algorithm.

(ii) Discuss the parameters on which efficiency of an algorithm is defined.

(b) Write an algorithm to implement stack of size N using an array. The elements in the stack are to be integers. The operations to be supported are PUSH, POP and DISPLAY. Take into account the exceptions of stack overflow and underflow.

(c) (i) Write an algorithm to convert a valid arithmetic infix expression into its equivalent postfix expression. Trace your algorithm for following postfix expression.

A + B * C – D/F

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

(a) (i) Explain the merits and demerits of static and dynamic memory allocation techniques.

(ii) Explain the queue data structure.

(b) Write a program in C to create, insert and traverse a doubly linked list.

(c) (i) Write an algorithm for searching an element in a singly linked list. Use your algorithm to develop a function in C.

(ii) Explain the term Garbage collection and compaction.

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

(a) What is a binary tree data structure ? How it is represented in computer memory ?

(b) What is the significance of binary tree in Huffman algorithm ? Explain.

(c) Discuss the threaded binary tree.

(d) What are the different traversing techniques used in tree ? Explain each giving suitable example.

(e) Write a program in C for Binary search.

(f) What do you understand by hashing ? Explain the collision resolution strategies used in hashing.

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

(a) Write heapesort algorithm. Analyze the running time of your algorithm.

(b) How the choice of pivot element affect the running time of quick sort algorithm ?

(c) Write a function in C to perform bubble sort. Also find out its worst case time complexity.

(d) Write a pseudo code for deleting an element from a binary search tree.

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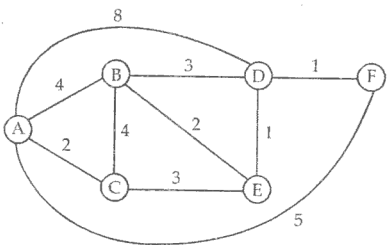
(e) Describe a AVL tree. Compare it with binary search tree.

(f) Show the results of inserting the keys F, S, Q, K, C, L, H, T, V, W, M, R, N, P, A, B in order into an empty B - Tree of order 5.

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

(a) Draw the minimum cost spanning tree for the graph given below.



(b) Describe Dijkstra's algorithm for finding shortest path with the help of suitable example.

(c) Explain the different traversing techniques used in Graphs.

(d) How are deletion of records handled in an indexed sequential file ?

(e) Write a program in C to copy the content of a given file to another file.

(f) Write short notes on any two :

(i) Kruskal algorithm

(ii) Sequential file

(iii) B-tree indexed files.

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