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M. Tech 1st Semester Examination

Data Structures and Algorithm Analysis in C

CSE1-514/MT-104

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, select one question from each section A, B, C and D. Section E is compulsory

SECTION - A

1. Write a program in C language to calculate matrix multiplication. Discuss its complexity? **(20)**

2. What is algorithm? Write the various performance analysis techniques of algorithm. Discuss advantages and disadvantages of each. **(20)**

SECTION - B

3. Among Merge sort, Insertion sort and Bubble sort which sorting technique is the best in worst case? Support your arguments with an example and analysis. **(20)**

4. Write an algorithm that deletes the first element of a linked list and adds same element at the end of linked list. **(20)**

SECTION - C

5. Define AVL tree. Write a algorithm for insertion and deletion in AVL tree. **(20)**

6. Write Warshall's algorithm. Give its example too. **(20)**

SECTION - D

7. Describe the Dynamic Programming algorithm for computing the minimum cost order of multiplying a string of n matrices M1 × M2 × M3.....× Mn. **(20)**

8. What is Greedy Method? State and write algorithm for Knapsack problem. **(20)**

SECTION - E

9. (i) Define asymptotic notation.

   (ii) What is the time complexity of Merge Sort?

   (iii) What is re-entrant program?

   (iv) Define recursion. Which data structure is used to implement recursion?

   (v) Define a minimum spanning tree.

   (vi) What is the purpose of AVL Tree?

   (vii) Give an example of Dynamic Programming Approach.

   (viii) What are the conditions under which backtracking can be used?

   (ix) Define Eulers Graph.

   (x) What is the complexity of selection sort and why?

(2×10=20)