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MCA/D-17
DESIGN AND ANALYSIS OF ALGORITHMS
Paper: MCA-14-33

Time: Three Hours   Maximum Marks: 80

Note: Attempt five questions in all. Unit 1 is compulsory. Attempt four more questions by selecting one question from each unit. All questions carry equal marks

UNIT-I.

(Compulsory Questions)

1. Attempt all the questions in brief :

    (a) Define Principles of Optimality.

    (b) Feasible Solution.

    (c) Define Profiling

    (d) Define Space Complexity.

    (e) Define Bounding Function.

    (f) Distinguish between Merge sort and Quick sort.

    (g) Distinguish different characteristics of an Algorithm.

    (h) Write Control abstraction of Greedy method.

UNIT-II

2. Give the algorithm for matrix multiplication and find the time complexity of the algorithm using step-count method.

3. Write Divide and Conquer Recursive Merge sort algorithm and derive the time complexity of this algorithm.

UNIT-III

4. What is principle's of optimality? Explain how traveling sales person problem uses the dynamic programming technique with example.

5. Using Warshall's algorithm. Obtain the transitive closure of the matrix given below :

$$
\begin{matrix}
0 & 1 & 0 & 0 \\
0 & 0 & 0 & 1 \\
0 & 0 & 0 & 0 \\
1 & 0 & 1 & 0
\end{matrix}
$$

UNIT-IV

6. What is All Pair Shortest Path Problem? Discuss the Floyd's All Pair Shortest Path Algorithm and discuss the analysis of this algorithm.

7. Discuss the Dijkstra's single source shortest path algorithm and derive the time complexity of this algorithm.

UNIT-V

8. Describe how polynomial-time reductions are used to prove that a problem is NP complete.

9. Describe in detail Knuth-Morris-Pratt string matching algorithm.