Roll No ..0X 27 CA 20D0 11

MCADD-601

M.C.A. (Integrated) VI Semester

Examination, May 2023

Analysis Design and Algorithm

Time : Three Hours

Maximum Marks : 70

te: i) Attempt any five questions.

ii) All questions carry equal marks.

a) What do you mean by Asymptotic Notations? Explain different asymptotic notations used in algorithms.

b) What are the rules of manipulate Big-Oh expressions and about the typical growth rates of algorithm?

a) Define Floyd Warshall Algorithm for all pair shortest path and apply the same on following graph:
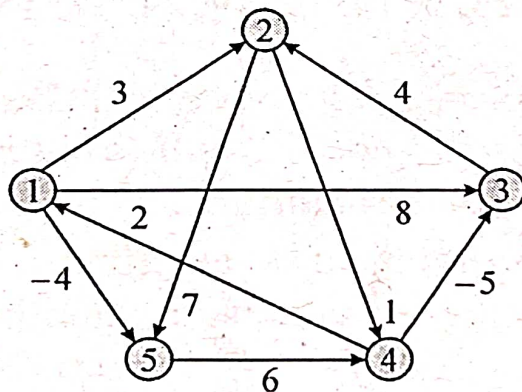
b) Discuss the Breath First Search and Depth First Search Traversal algorithm with example.

a) What is Knapsack problem? Solve Fractional knapsack problem using greedy programming for the following four items with their weights w = {3, 5, 9, 5} and values P = {45, 30, 45, 10} with knapsack capacity is 16.

b) Discuss LCS algorithm to compute Longest Common Subsequence of two given strings and time complexity analysis

4. a) Define principal of optimality. When and how dynamic programming is applicable?

b) Explain eight queen's problem and apply back tracking to solve this problem.

5. a) Explain and Write the Knuth-Morris-Pratt algorithm for pattern matching also write its time complexity.

b) Solve the Subset sum problem using Backtracking where n=4, m=18, w[4]={5,10,8,13}

6. a) Solve the recurrence:
   i) $T(n) = 3T(n/4) + cn^2$ using recursion tree method.
   ii) $T(n) = n + 2T(n/2)$ using Iteration method.
   (Given T(1)=1)

b) Construct B tree of order 5 for the list of elements. 2, 8, 5, 6, 13, 9, 14, 12, 19, 24, 18, 15, 5, 16, 20, 21.

7. a) What do you mean by Convex hull? Describe an algorithm that solves the convex hull problem. Find the time complexity of the algorithm.

b) What is Approximation algorithm? Explain set cover problem using approximation algorithm.

8. Write short notes on:
   a) Master's theorem
   b) Perfect matching in bipartite graphs
   c) Subset sort problem
   d) Graph coloring problem

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