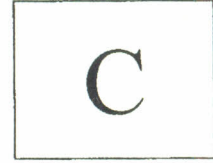


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MCA DEGREE III SEMESTER EXAMINATION NOVEMBER 2015

CAS 2301 COMPUTER ALGORITHMS
(Supplementary)

Time : 3 Hours

Maximum Marks : 50

PART A
(Answer *ALL* questions)

(15 × 2 = 30)

- I. (a) Explain asymptotic notations.
(b) How to implement disjoint set data structure?
(c) Give an application of Augmenting data structure.
- II. (a) Compare dynamic programming strategy and greedy strategy.
(b) Mention any one Back tracking algorithm.
(c) Find an optimal parenthesization of a matrix-chain product whose sequence of dimensions is $\langle 5; 10; 3; 12; 5; 50; 6 \rangle$.
- III. (a) Explain topological sort with one example.
(b) What are features of flow networks?
(c) Mention any one application of branch and bound algorithm.
- IV. (a) Give an algorithm for primality testing.
(b) How to perform integer factorization? Give one example.
(c) Prove that matrix Inversion is no harder than matrix multiplication.
- V. (a) What is the difference between NP hard and NP complete problem?
(b) Prove that the class NP of languages is closed under union, intersection, concatenation.
(c) Mention count sorting algorithm.

(P.T.O.)

PART B

(5 × 4 = 20)

VI. Solve the following recurrence equation $T(n) = T(n/3) + T(2n/3) + Cn$, where C is a constant.

OR

VII. Compute the connected components of a graph using disjoint set data structure.

VIII. Explain Knapsack problem with example.

OR

IX. Give an algorithm to create a Huffman code. Obtain its complexity.

X. Write an algorithm to find strongly connected component of a graph. Give one example.

OR

XI. Prove that for any vertex v other than the source or sink, total positive flow entering v must equal the total positive flow leaving v .

XII. Explain primality testing algorithm with one example.

OR

XIII. Explain integer factorization algorithm with one example.

XIV. Derive average time complexity of quick sort.

OR

XV. Show that the problem of determining whether a boolean formula is a tautology is complete for Co NP.
