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RN-6761

B. E. III (Sem. V) (CO) Examination

May / June – 2010

Algo - Analysis & Design

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 3 (Sem. 5) (CO)**

Name of the Subject :

☛ **Algo - Analysis & Design**

☛ Subject Code No. : **6 7 6 1** ☛ Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Make and state **necessary** assumptions.
(3) Figures to the **right** indicate **full** marks.
(4) All question are **compulsory**.

SECTION – I

1 (a) Do as directed :
- (i) Why do we study algorithms ? **2**
- (ii) Define complete binary tree. **2**
- (iii) What is ordering paradigm ? **2**
- (iv) What is stable sorting method ? Give examples of stable sorting method. **2**
- (v) Explain why the statement "The running time of algorithm A is at least $O(n^2)$" is meaning less". **2**

(b) Solve the following recurrence. **5**
$T(n)=2T(n^{1/2}) + \log n$.

(c) Explain asymptotic upper bound with graphical representation. **5**

2 (a) Explain Strassen's matrix multiplication. Analyze the complexity. Determine when this method is outperforms the classical one. **7**

(b) Discuss the problem of single-source shortest path. **8**

OR

(b) Discuss the problem of multi stage graph. **8**

3 Attempt any **three** : **15**
(a) Explain control abstraction of greedy method.
(b) Discuss Huffman coding problem.
(c) Explain optimal storage on tapes problem.

(d) Explain time Complexity Vs. Space complexity.
(e) Explain posteriori and priori analysis of algorithm.

SECTION – II

4 (a) Do as directed :
(i) In branch and bound terminology, BFS like state space search will be called FIFO. (State True or False)
(ii) Worst case time for backtracking algorithm will be $O(p(n^2)n!)$. If n! Is solution space and p(n) is polynomial in n. (state True or False)
(iii) Dynamic programming is used for optimization problems, especially ones that would otherwise take exponential time. (State True or False)
(iv) The time complexity of traveling salesperson problem with dynamic programming approach is $O(2^n)$. (State True or False)
(v) Corresponding to all pair shortest path and using (i,j) to represent the length of a shortest path from i to j going through no vertex of index greater than K, $A^k(i,j)$=_____.

(b) Define following terms : **5**
Chromatic number, Permutation tree, Solution states, Answer states, BFS.

(c) Show step by step graphical solution and tree of the 4 queen's problem and 2 equivalent solutions of 4 queen problems. **5**

(d) Define and discuss 15 puzzle problems with state space tree. **5**

5 (a) Explain travelling salesperson problem with LCBB. **8**

OR

(a) Discuss sum of subset problem with algorithm. **8**

(b) Explain 0/1 knapsack problem with branch and bound strategy. **7**

6 (a) Find the optimal binary search tree for the given values : **8**
Given n=4 identifiers i.e. (a1, a2, a3, a4) = (do, if, int, while), successful search probability is p(1, 2, 3, 4) = (3, 3, 1, 1) and unsuccessful search probability is q(0, 1, 2, 3, 4) =(2, 3, 1, 1, 1) (Note : w(i,i) = q(i), c(i,i)=0 and r(i,i)=0).

OR

(a) Explain all path shortest path with respect to dynamic programming with example. **8**

(b) Explain multistage graph problem with example. **7**