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SF-6543

B. E. - II (Sem. - IV) (I.T) Examination

May/June – 2011

Algorithms 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. - 2 (SEM. - 4) (I.T)

Name of the Subject :

☛ ALGORITHMS ANALYSIS & DESIGN

☛ Subject Code No. : 6 5 4 3 ☛ Section No. (1, 2,.....) : 1&2

Seat No. :

Student's Signature

(2) Answer to both the sections must be written in separate answer books.

(3) Figures to the extreme right indicate maximum marks.

(4) Assume suitable data, if necessary.

(5) Support your answer with neat and clean diagram wherever necessary.

SECTION - I

Q. 1(a) **Do as directed:** **[10]**

(1) Define Algorithm

(2) Define "Omega" Notation

(3) Define "Theta" Notation"

(4) Sort the array given with help of Merge Sort

3,1,4,1,5,9,2,6,5,3,5,8,9

(5) Check whether the equalities are correct or not.

(1) $9n^2 + 7n = \Omega(n^2)$

(2) $n^2 + 4n = \Omega(n^3)$

Q. 1(b) **Answer the following :-** **[10]**

(1) Explain the Recursion tree method for solving recurrences and solve the following

$T(n) = 3T(n/4) + \Theta(n^2)$

(2) Write the Control Abstraction for Greedy Method and explain it in detail.

Q.2 (a) Develop algorithm for finding Maximum and Minimum number from an array with n elements using Divide & Conquer method . Also trace the following using this algorithm. **[08]**

22, 13, -5, -8, 15, 60, 17, 31, 47

OR

Q.2 (a) Discuss Optimal Merge Patterns. Find optimal merge pattern for files (x1,x2,x3,x4,x5) with sizes (20,30,10,5,30). **[08]**

Q.2 (b) Explain Quick Sort and write algorithm for Quick sort with suitable example **[07]**

Q.3 (a) Explain Dijkstra's algorithm to find single source shortest path of a weighted directed graph G = (V,E). **[08]**

OR

Q.3 (a) Explain 0/1 Knapsack problem using dynamic programming **[08]**

Q.3 (b) Explain Traveling Salesperson problem with respect to dynamic programming & also write its algorithm. **[07]**

SECTION - II

Q-4 (a) Attempt following **(08)**

1. Define: Static Tree, Dynamic Tree
2. Define: Solution states, Answer states
3. Define: 0/1 Knapsack problem for Branch and bound
4. True/False: a) Only Decision problem can be NP Complete problem
   b) Two problems L1 and L2 are said to be polynomially equivalent iff both is reducible to each other

Q-4 (b) Attempt any two **(16)**

1. Explain Recursive backtrack method with algorithm
2. Explain difference between Backtrack and Branch and Bound
3. Explain Decision problem

Q-5 Attempt any two **(16)**

1. Explain Hamiltonian cycle problem with backtracking
2. Explain LC search with example and control abstraction for it
3. Explain Theory of completeness

Q-6 Attempt any two **(16)**

1. Explain Graph coloring problem with backtracking
2. Define and discuss 15 puzzle problems with state space tree.
3. Explain Non Deterministic algorithm with example.