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SE-8270

B. E. - III (Sem. V) (Comp. Engineering) Examination

May / June – 2011

Design & Analysis of Algorithm

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) (COMP. ENGINEERING)

Name of the Subject :

☛ Design & Analysis of Algorithm

☛ Subject Code No. : 8 2 7 0 ☛ Section No. (1, 2,.....) : NIL

Seat No. :

Student's Signature

1. *Figures to the extreme right indicate maximum marks.*
2. *Assume suitable data, if necessary.*
3. *Support your answer with neat & clean diagram wherever necessary.*

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

(1) Define "Omega" Notation

(2) Define "Theta" Notation

(3) Define Algorithm and List out various criteria that must be satisfied by an algorithm.

(4) Sort the array given with help of Quick Sort.
3,1,4,1,5,9,2,6,5,3,5,8,9

(5) Define Feasible solution

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

(1) Explain in detail Time Complexity & Space Complexity with suitable examples

(2) Explaing NP – Hard and NP – complete problems.

Q.2 (a) Write the algorithm for Recursive Binary Search & Iterative Binary Search. And also discuss the complexities in both cases. **[08]**

OR

Q.2 (a) Explain the Problem of multiplying large integers. How can you solve the problem of Multiplying Large Integers with Divide & Conquer Strategy? **[08]**

Q.2 (b) Explain Merge Sort and write algorithm for merge sort **[07]**

Q.3 (a) Find Optimal Solution to the following Knapsack instance: **[08]**
n =5; m =60
$(p_1, p_2, p_3, p_4, p_5) = (30, 20, 100, 90, 160)$
$(w_1, w_2, w_3, w_4, w_5) = (5, 10, 20, 30, 40)$

OR

Q.3 (a) Explain Job Scheduling with deadlines problem with algorithm and trace algorithm using following data. [08]
n = 4, profit = (50, 10, 15, 30), Deadline = (2, 1, 2, 1)

Q.3 (b) Explain Kruskal's algorithm with its application. [07]

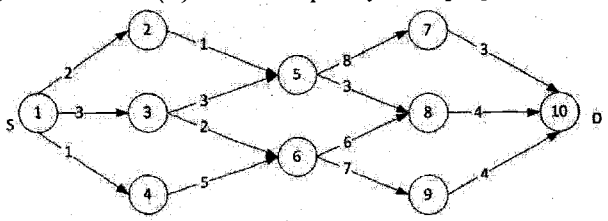
Q.4 (a) Answer the following. [10]

1) Define Hamiltonian cycle.
2) Comment on validity of statement: "Bounding functions are used to kill live nodes without generating all their children".
3) Explain Weighted graph with example.
4) Define Dead Node.
5) Enlist the problems which can be solved by Dynamic Programming.

Q.4 (B) (Any Two) [10]

1) Explain Principle of Optimality with Example
2) Discuss and Differentiate Dynamic Programming Approach and Divide and Conquer Approach
3) Explain string matching with Finite Automata

Q.5 (a) Consider the following multistage graph and calculate the minimum cost from Source (S) to Destination (D) with the help of dynamic programming approach. [08]



(b) Explain the 0/1 knapsack problem with dynamic programming technique. (Detailed algorithm is not required) [07]

OR

(b) Find the minimal cost of travelling sales person problem with dynamic programming for fallowing graph G (V,E) : [07]

$$\begin{bmatrix} 0 & 5 & 7 & 8 \\ 2 & 0 & 3 & 5 \\ 8 & 9 & 0 & 10 \\ 12 & 13 & 11 & 0 \end{bmatrix}$$

Q.6 (a) Discuss difference between DFS and BFS with help of suitable example [08]

(b) Give control abstraction of Least cost Search technique. [07]

OR

(b) Explain recursive and iterative backtracking algorithm for n-queen problem. [07]