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Name:	Reg.No:	

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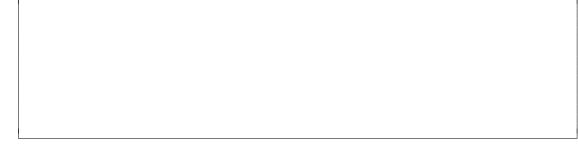
Time: 55 minutes CSE330 Design & Analysis of Algorithms

Quiz #2 Max. Marks: 20 Answer the questions in the spaces provided on the question sheet ½ point The young Hoare invented the algorithm while trying to sort the words of a Russian dictionary for a machine translation project from Russian to English. Says Hoare, "My first thought on how to do this was bubble sort and, by an amazing stroke of luck, my second thought was I have been very lucky. What a wonderful way to start a career in Computing, by discovering a new sorting algorithm!". 2. | 1 point | Write the expression for the length LCS in terms of prefixes of strings. 3. $\frac{1}{2}$ point List all possible parenthesization for a matrix chain of length 4. 4. 1 point Define the Edit Distance problem. Give a n instance of this. 5. | 1 point | Problems that exhibit optimal substructure property can easily be solved using greedy/dynamic programming strategy. Define optimal substructure property. 6. 2 points Solve 0/1 Knapsack: n = 4(# of items), W = 5 (max weight) Elements (weight, $\overline{\text{benefit}}$: (2,3), (3,4), (4,5), (5,6)

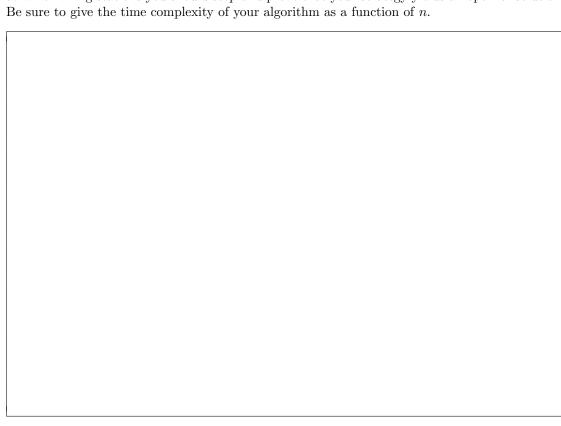
September 30, 2015 1 7. 2 points Suppose we want to make change for n paise, using the least number of coins of denominations 1,10, and 25 paisa coins. Consider the following greedy strategy:

the amount left to change is m; take the largest coin that is no more than m; subtract this coin's value from m, and repeat.

Either give a counter example, to prove that this algorithm can output a non-optimal solution, or prove that this algorithm always outputs an optimal solution.



8. 3 points Suppose you were to drive from Coimbatore to Chennai. Your fuel tank, when full, holds enough fuel to travel m miles, and you have a map that gives distances between fuel filling stations along the route. Let $d_1 < d_2 < \ldots < d_n$ be the locations of all the filling stations along the route where d_i is the distance from Coimbatore to the filling station. You can assume that the distance between neighboring gas stations is at most m miles. Your goal is to make as few filling stops as possible along the way. Give the most efficient algorithm you can find to determine at which filling stations you should stop and prove that your strategy yields an optimal solution. Be sure to give the time complexity of your algorithm as a function of n.

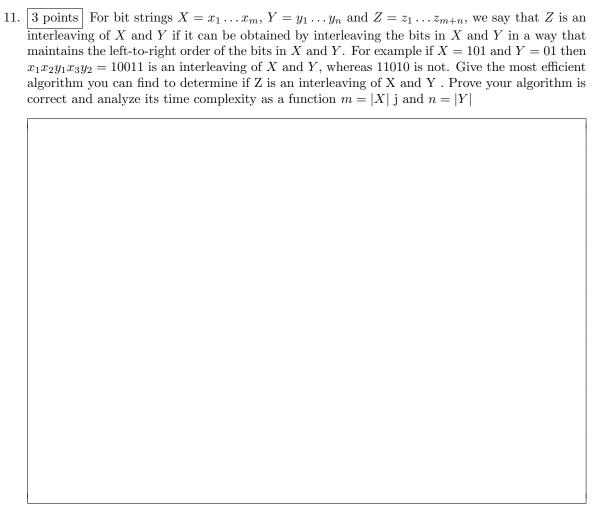


- 9. 3 points You are given a sequence of n songs where the i^{th} song is i minutes long. You want to place all of the songs on an ordered series of CDs (e.g. CD1, CD2, CD3... CDk) where each CD can hold m minutes. Furthermore,
 - 1. The songs must be recorded in the given order, song1, song2,...song n.
 - 2. All songs must be included.
 - 3. No song may be split across CDs.

September 30, 2015 2

from post = 5. You Your goal	t i to post j. These begin at trading p l is to minimize the Be sure to prove to	e fees are arbitrary post 1 and must en e rental cost. Give	r. For example it is ad at trading post the most efficien	In the fee $f_{i,j}$ for respectively. In the fee $f_{i,j}$ for respectively. In using rented can algorithm you can all solution and analysis.	= 10 and loes. In find for

September 30, 2015 3



Space for rough work

September 30, 2015 4