STAMFORD UNIVERSITY BANGLADESH

Department of Computer Science and Engineering
Assignment, Spring 2021 Trimester
CSI 231: Algorithm
CT: Mashiwat Tabassum Waishy
Date and Time: 24/04/2020

Batch: CSE-S-71-A **Platform:** Edmodo
Full Marks: 15

(You have to answer all of them. Figures in the right margin indicate marks.)

1. (a) Suppose, two sequences are given <RAHMANI> and <JAHANGIR> for Longest Common Subsequence. [3]
Prove that LCS algorithm is a dynamic approach with all proper reasoning.
You have to compute the LCS and its length.

(b) Show all the backtracking steps to find a possible solution of 7-queens problem. [2]

(c) Define Greedy algorithm. What properties can be added to a greedy knapsack problem to find it's dynamic solution? [2]
Find an optimal solution to the given Knapsack instances:
M = 26, $(\boldsymbol{P}, \boldsymbol{Q}, \boldsymbol{R}, \boldsymbol{S}, \boldsymbol{T}, \boldsymbol{U}, \boldsymbol{V}, \boldsymbol{W}, \boldsymbol{X}) = (\mathbf{5}, \mathbf{46}, \mathbf{15}, \mathbf{10}, \mathbf{20}, \mathbf{10}, \mathbf{55}, \mathbf{12.6}, \mathbf{32})$ and
$(\boldsymbol{w_P}, \boldsymbol{w_Q}, \boldsymbol{w_R}, \boldsymbol{w_S}, \boldsymbol{w_T}, \boldsymbol{w_U}, \boldsymbol{w_V}, \boldsymbol{w_W}, \boldsymbol{w_X})$
$= (\mathbf{1}, \mathbf{10}, \mathbf{2}, \mathbf{2}, \mathbf{3.6}, \mathbf{1.2}, \mathbf{5.6}, \mathbf{7}, \mathbf{4})$.
Then using this example show how can you find its dynamic solution, justify your answer.

(d) Do you think Backtracking approach is sometimes more effective than Greedy and Dynamic approach? Justify your answer with your own proper reasons. [1]

2. (a) Consider a file of 250,000 characters with these following frequencies: [2]

Q= 25000; R=68000; S=3000; T=13000; U=1000; V=76000; W=15000, X=5000; Y=18000, Z=26000.

Find the Huffman codes for each of these characters.

(b) Write down the difference between Divide & Conquer technique and Dynamic approach with proper individual example. [2]
You have to show the differences in according to the example.

(c) Write down the algorithm used for Matrix chain Multiplication. [2]

(d) Why don't we use greedy approach in TSP problem? Justify your answer with proper reasoning and a proper example. [1]

==== GOOD LUCK ====