

**BRAC University (Department of Computer Science and Engineering)**  
**CSE 221 (Algorithm) for Fall 2024 Semester**

**Quiz 5**  
**Set A**

**Student ID:**

**Section:**

**Name:**

**Full Marks: 20**

**Duration: 40 minutes**

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1. Wye is a CSE BracU Student. The pre-advising week is approaching, and he is trying to find the most suitable course combination for next semester. As per his previous academic results, his credit limit has been set to 9. Different courses have different credits. He came up with values for these courses by consulting with students who have already taken them. He wants to select the most valued courses. Courses, credits and values are provided below:

Course	Phy112	CSE330	CSE331	CSE370	CSE499
Credit	1	2	3	4	5
Value	9	7	15	12	16

- a. Wye wants to try all possible combinations to find the best one. Help him by simulating a suitable dynamic programming approach. Show your work in detail, then write down the selected courses. 5
- b. Zed, a friend of Wye, adopted a slightly different approach and considered the courses based on their per-credit value. Determine whether Zed could select more valued courses than Wye. Note that, selecting a course still means taking the whole, with full credits. 5

2. Make two strings S1, S2 as follows:  
S1: <Right-most five digits of your ID>  
S2: "02112"

For example, if your ID is 20211978, then S1 is "11978".

a. Now show a simulation of the dynamic programming algorithm to find the **Length of LCS** of these two strings.

Use memory table fillup method. 5

b. Explain the reason for taking an extra row and an extra column in the memory table. 2

c. The space complexity of this algorithm is  $O(N * M)$  where  $N$  and  $M$  are the lengths of the two strings.

Explain the time complexity of the algorithm. 3