BRAC University (Department of Computer Science and Engineering)

A

CSE 220 (Data Structures) for Fall 2024 Semester

Quiz 1

Student ID:
Section: **Full Marks: 20**

Name: **Duration: 25 minutes**

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1. Alice uses the following code to reverse an array. After reviewing it, Bob claims he can write a more efficient version that uses less space. Identify Bob's approach, explain the main difference between the two methods, and provide pseudocode for Bob's approach. Mark: 8

```
1.  FUNCTION reverse_out_of_place(arr)
2.      arr2 = create_array(size of arr)
3.      i = 0
4.      j = size of arr - 1
5.      WHILE i <= size of arr - 1
6.          arr2[i] = arr[j]
7.          i = i + 1
8.          j = j - 1
9.      END WHILE
10.     RETURN arr2
11. END FUNCTION
```

2. Suppose you are given a multi-dimensional array with dimension 5x4x3. What is the multidimensional index for the linear index 25? Mark: 4

3. Joey is not that good at programming. He wants to write a program that takes a matrix of integers with m rows and n columns as input and prints the sum of each column after transposing the matrix as output. Write pseudo code/ python/ java code to help Joey to write a program to get his desired output. Mark: 8

Input Matrix $m \times n$	Transposed Matrix $n \times m$	Output (Column Sums of Transposed Matrix)
$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$	$\begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$	[6, 15, 24]
$\begin{bmatrix} 10 & 20 \\ 30 & 40 \\ 50 & 60 \end{bmatrix}$	$\begin{bmatrix} 10 & 30 & 50 \\ 20 & 40 & 60 \end{bmatrix}$	[30, 70, 110]