

BRAC University (Department of Computer Science and Engineering)

CSE 221 (Algorithms) for Spring 2025 Semester

Quiz 1

Student ID:

Section:

Full Marks: 20

Name:

Duration: 20 minutes

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1. Write the time complexity of the following code snippet. Show your works/reasoning. (5 marks)

Code:

```
sum1 = 0;
for (k=1; k<=n; k++) —
    for (j=1; j<=k; j++)
        sum1++;
for (i=1; i<=n; i++)
    a[i] = i;
```

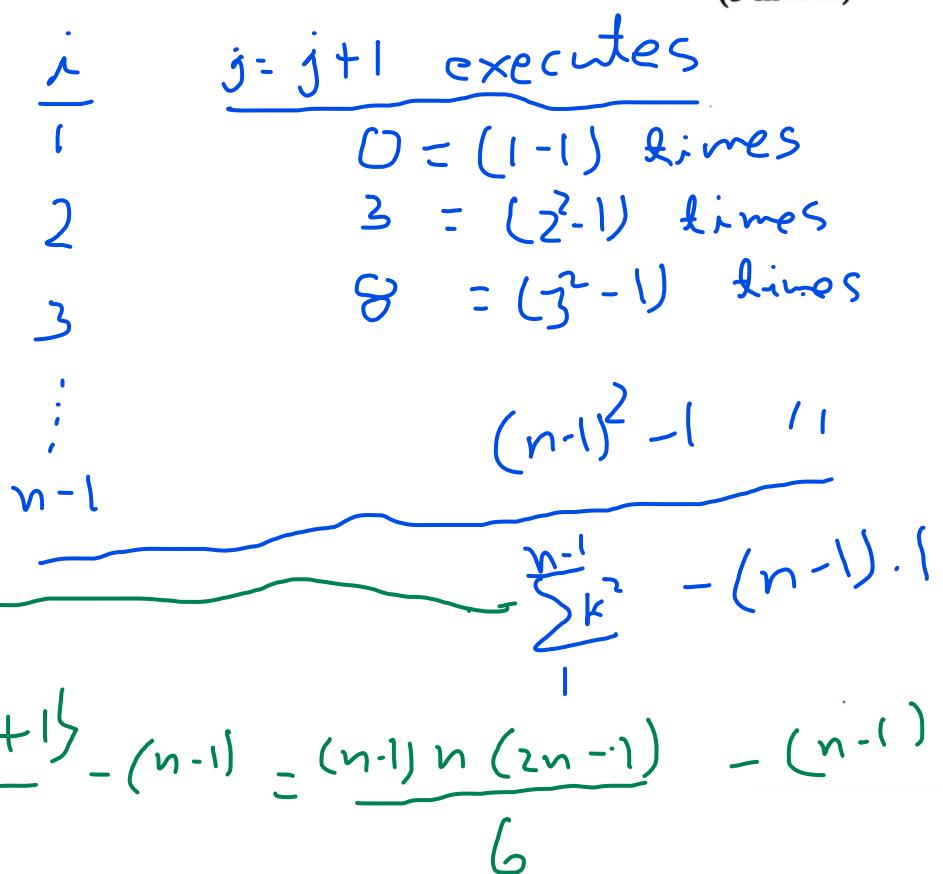
$\xrightarrow{\quad} O(n^2) \geq O(n^2)$

$\xrightarrow{\quad} O(n)$

2. Write the time complexity of the following code snippet. Show your works/reasoning.

(5 marks)

```
for i in range (1,n)
    j= 1
    while j < i*i
        j= j+1
```



$$O(n^3) \leftarrow = \frac{n^3}{3} - \frac{n^2}{2} - \frac{5n}{6} + 1$$

3. Consider an 2D sorted array with m rows and n columns. Your task is to check if an item is in the 2D array or not. Now, write an efficient pseudocode or program with time complexity $O(\log m + \log n)$ to find the row and column of an item in this 2D array. If the item is not in the 2D array the program should print -1. **10 marks**

similar to:

<https://www.geeksforgeeks.org/search-element-sorted-matrix/>