Section: B

Quiz 3

Roll number: 58

Q1. What is the time complexity of the following code: *[1]*

```
int value = 0;

for(int  i=0; i<n; i++)

  for(int j=0; j<i; j++)

      value += 1;
```

a) aO(N)
b) O(N/2)
c) [✓ O(N^2)]
d) O(log N)

Q2. Which of the following does NOT belong to the family of notations? *[1]*

a) Big (O)
b) Big (Ω)
c) Big (θ)
d) [✓ Big (⋈)]

Q3. What is the time complexity of the following code: *[1]*

```
int a = 0, i = N;

while (i > 0) {

  a += i;

  i /= 2;

}
```

a) [✓ O(N)]
b) O(Sqrt(N))
c) O(N / 2)
d) O(log N)

Q4: In which of the following cases does time complexity become linear? [1]

a) [✓ Iterating through each element of an array once]
b) Performing a nested loop with both loops running up to n
c) Using a divide and conquer strategy that splits the problem in half each time
d) Using binary search to find an element in a sorted array

Q5. What is the time complexity of the following code: *[1]*

```
for(int i=0;i<n;i++)

  for(int j=0;j<m;j++)

    temp = j
```

Ans: $O(n^2)$.

Data Structures and Algorithms

SE200TB-Fall 2024

27th Aug 2024

Section: B **Quiz 3** **Roll number:** ______________

Q6. What is the time complexity of the following code: **[1]**

```
int i, j, k = 0;
for (i = n / 2; i <= n; i++) {
    for (j = 2; j <= n; j = j * 2) {
        k = k + n / 2;
    }
}
```

Ans:

Q7.* Compare Two Algorithms, *Write the time complexities and Explain your reasoning for each of them? [4]

Code A:

```
int sum = 0;
for (int i = 0; i < n; i++) {
    for (int j = 0; j < n; j++) {
        sum += 1;
    }
}
```

Code B:

```
int sum = 0;
for (int i = 0; i < n; i++) {
    for (int j = 0; j < i; j++) {
        sum += 1;
    }
}
```