

Assignment

Time and Space Complexity

Q1. What is the time, and space complexity of the following code snippet?

```
int a = 0, b = 0;
for (i = 0; i < N; i++) {
    a = a + i;
}
for (j = 0; j < M; j++) {
    b = b + j;
}
```

Answer: $O(N + M)$ time, $O(1)$ space

Q2. What is the time complexity of the following code snippet?

```
int a = 0;
for (i = 0; i < N; i++) {
    for (j = N; j > i; j--) {
        a = a + i + j;
    }
}
```

Answer: $O(N*N)$

Q3. What is the time complexity of the following code snippet?

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

Answer: $O(n \log n)$

Q4. What is the time complexity of the following code snippet?

```
int a = 0, i = N;  
while (i > 0) {  
    a += i;  
    i /= 2;  
}
```

Answer: $O(\log N)$

Q5. What will be the time complexity of the following code snippet?

```
for(int i=1;i<n;i++){  
    i*=k  
}
```

Answer: $O(\log_k n)$