**DataStructure Introduction assignments**

Mandatory

1. Refer the code below and estimate the time complexity.

a.

for(i= n ; i > 0; i++){

for(j = 0; j<n;j\*2){

cout<<i;

}

}

Ans. The outer loop runs i from n down to 1, so it iterates n times.

The inner loop starts j from 0 and increments by multiplying j by 2 after each iteration.

o However, since j = 0 initially, it will never satisfy j < n, and the inner loop does not run even once.

**Time Complexity**:

· The inner loop runs 0 times for each iteration of the outer loop.

· Thus, the total complexity is O(n) for the outer loop, but no operations are performed inside.

· Final time complexity: O(n).

b.

for(i= n ; i > 0; i++){

//some operation here

}

//m > n

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

//some operation here

}

Ans. **Analysis:**

The first loop runs i from n down to 1, so it iterates n times.

o Each iteration performs a constant-time operation, so this contributes O(n).

The second loop runs j from 0 to m-1, so it iterates m times.

o Each iteration performs a constant-time operation, so this contributes O(m).

**Time Complexity:**

· The two loops are independent, so the total complexity is the sum of the complexities of the loops.

· **Final time complexity: O(n + m).**