Assignment No : 1

**Write a program non-recursive and recursive program to calculate Fibonacci numbers and analyze their time and space complexity**.

Public class FibonacciIterative {

public static int fibonacciIterative(int n) {

if (n <= 0) return 0;

else if (n == 1) return 1;

int a = 0, b = 1;

for (int i = 2; i <= n; i++) {

int temp = b;

b = a + b;

a = temp;

}

return b;

}

public static void main(String[] args) {

int n = 10;

System.out.println("Fibonacci(" + n + ") = " + fibonacciIterative(n));

}

}

**OUTPUT**:  
Fibonacci(10) = 55

**The Time and Space complexity:**

**Time Complexity**: O(n)

* The loop runs n−1 times, resulting in linear time complexity.

**Space Complexity**: O(1)

* The space used is constant since only a fixed number of variables are used (a, b, and temp).