### Q.2 Summation of N odd numbers

1. Sum of N Odd Number (Recursion):

```
- 0
CS 552 - Week2/src/OddRecursion.java - Eclipse IDE
 File Edit Source Refactor Navigate Search Project Run Window Help

    Package Explorer 
    Package Explorer
                                                                                                                                                                                                                                                                                     ② Coin.java ☑ ImplChinese... ☑ Fibonacci.java ☑ *OddRecursio... ※ ② OddIterativ...
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1 ▼ | 1 % | $ | 2 | 3 □ | 4 □ | 4 □
                                                                                                                                                                                                                                       1 public class OddRecursion {
    > 📂 Fibonacci
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    All Activate...
                                                                                                                                                                                                                                     30 static int countOdd(int n) {
             > ■ JRE System Library [JavaSE-1.8]

✓ 

src

✓ 

(default package)
                                                                                                                                                                                                                                                                                       }
else {
    if(n % 2 == 0) {
        n--;

    OddIterative.java
    OddRecursion.java

                                                                                                                                                                                                                                                                                                      n--;
}
return n + countOdd(n - 2);
}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Se Outline ≅ P E P₂ X X • X · · · □
                                                                                                                                                                                                                                                               public static void main(String args[]) {

▼ OddRecursion

                                                                                                                                                                                                                                                                                     long startTime = System.nanoTime();
int sum = countOdd(9999);
long endTime = System.nanoTime();
long totalTime = endTime - startTime;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            • s main(String[]) : void
                                                                                                                                                                                                                                                                                         System.out.println("Sum is: "+ sum);
System.out.println("Time taken: " + totalTime);
                                                                                                                                                                                                                            **Tribulents** Javabuck & Decision | Consoleration | Consol
                                     O Type here to search
```

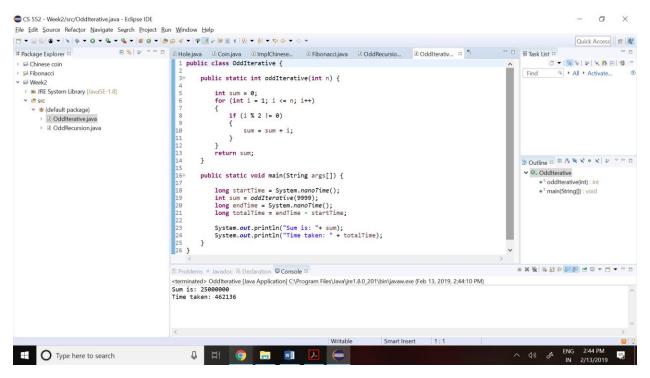
# Code:

```
}
```

## **Result:**

Sum is: 25000000 Time taken: 1439356

# 2. Sum of N Odd Number (Iterative):



#### Code:

```
public class OddIterative {
```

```
public static int oddIterative(int n) {
    int sum = 0;
    for (int i = 1; i <= n; i++)
    {
        if (i % 2 != 0)
        {
            sum = sum + i;
        }
     }
    return sum;
}</pre>
```

```
public static void main(String args[]) {
                long startTime = System.nanoTime();
                int sum = oddIterative(9999);
                long endTime = System.nanoTime();
                long totalTime = endTime - startTime;
                System.out.println("Sum is: "+ sum);
                System.out.println("Time taken: " + totalTime);
        }
}
Result:
Sum is: 25000000
Time taken: 462136
Q.3 Calculate Factorization
Java program space complexity (method and static variable) _
public class Test
                                                    4 byte
  static int x = 11;
  private int y = 33;
                                                    4 byte (Total: 8 byte)
  public void method1(int x)
                                                    4 byte (Total: 12 byte)
    Test t = new Test();
    this.x = 22;
    y = 44;
    System.out.println("Test.x: " + Test.x);
    System.out.println("t.x: " + t.x);
    System.out.println("t.y: " + t.y);
    System.out.println("y: " + y);
  }
  public static void main(String args[])
    Test t = new Test();
    t.method1(5);
  }
}
```

Maximum byte Used by the program: 12 byte

# Q.4 C Program space complexity

```
int i =2;
                                  4 byte
                                  4 byte (Total: 8 byte)
void f(int j) {
j = i + 2;
                                  (Total: 4 byte ) // Scope End for J
}
void main()
                                  4 byte (Total: 8 byte)
 int k = 3;
 static c = '4';
                                  1 byte (Total: 9 byte)
 {
                                  4 byte (Total: 13 byte)
   int m = i;
 f(k);
}
```

Maximum byte Used by the program: 13 byte