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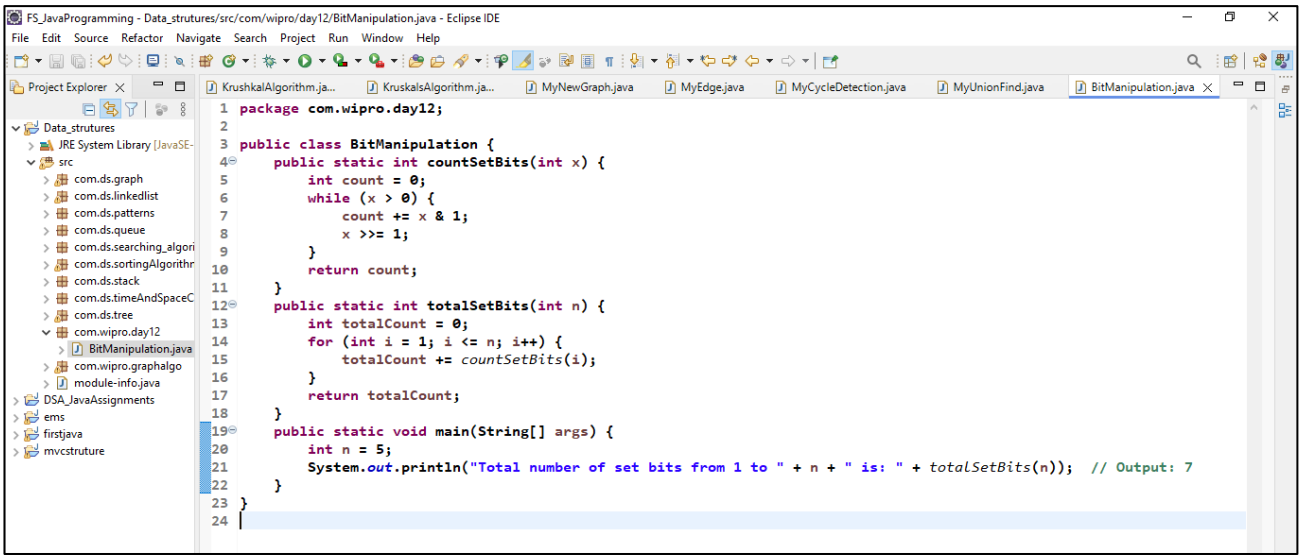
DAY 12 : Assignments

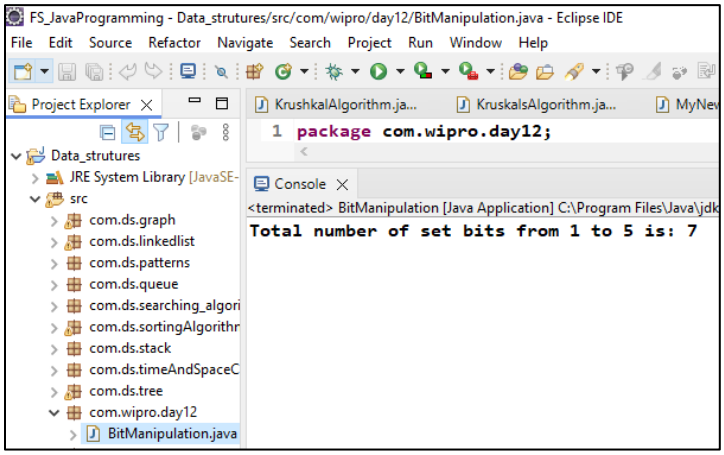
Task 1: Bit Manipulation Basics

Create a function that counts the number of set bits (1s) in the binary representation of an integer. Extend this to count the total number of set bits in all integers from 1 to n.

Ans: Source code



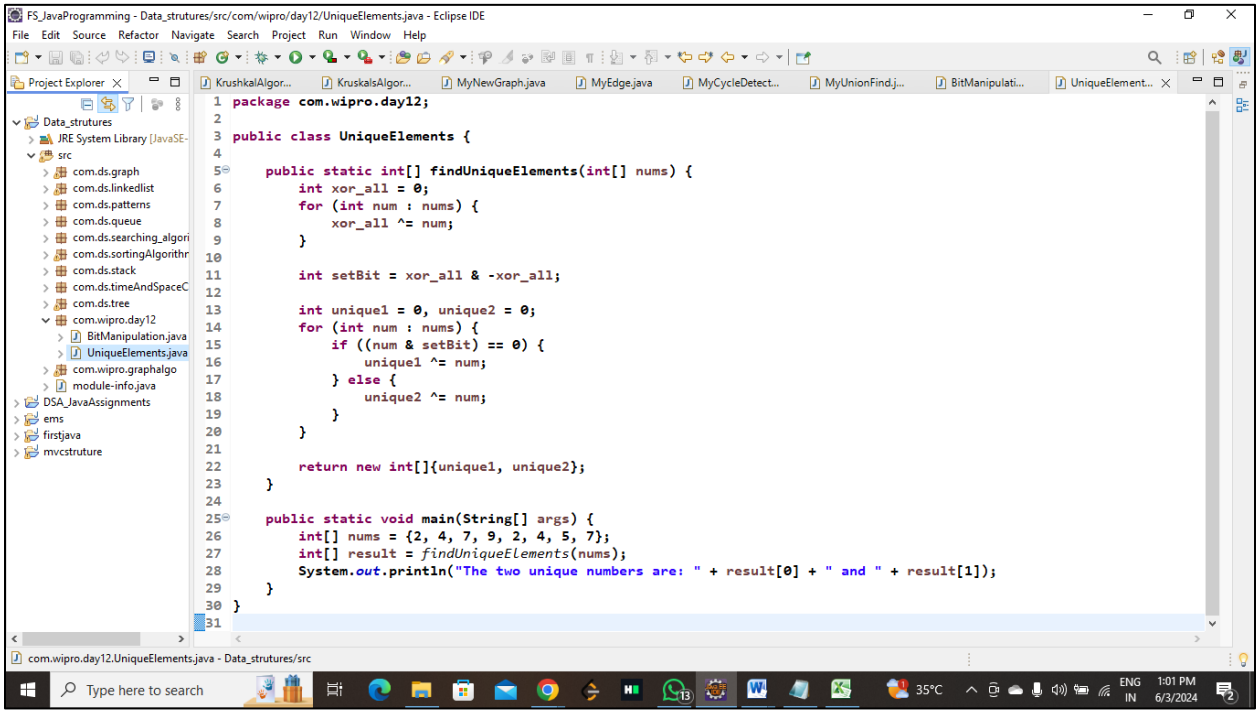
Output:



Task 2: Unique Elements Identification

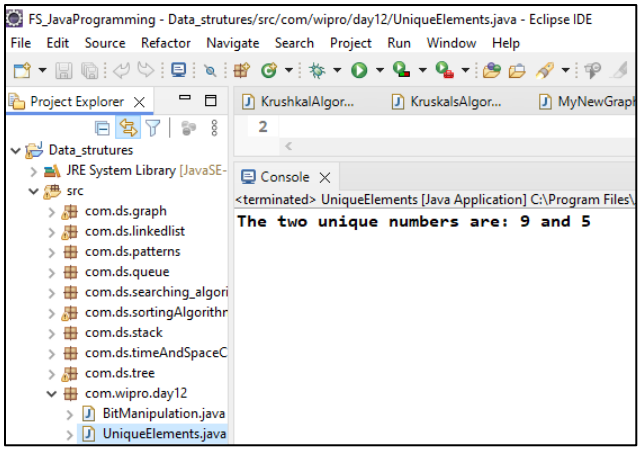
Given an array of integers where every element appears twice except for two, write a function that efficiently finds these two non-repeating elements using bitwise XOR operations.

Ans: Source code



```java
package com.wipro.day12;

public class UniqueElements {

    public static int[] findUniqueElements(int[] nums) {
        int xor_all = 0;
        for (int num : nums) {
            xor_all ^= num;
        }

        int setBit = xor_all & -xor_all;

        int unique1 = 0, unique2 = 0;
        for (int num : nums) {
            if ((num & setBit) == 0) {
                unique1 ^= num;
            } else {
                unique2 ^= num;
            }
        }

        return new int[]{unique1, unique2};
    }

    public static void main(String[] args) {
        int[] nums = {2, 4, 7, 9, 2, 4, 5, 7};
        int[] result = findUniqueElements(nums);
        System.out.println("The two unique numbers are: " + result[0] + " and " + result[1]);
    }
}
```

Output:



```
The two unique numbers are: 9 and 5
```