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.

```java
package Day12;

public class BitManipulation {


        // Function to count the number of set bits in an integer
        public static int countSetBits(int num) {
            int count = 0;
            while (num > 0) {
                count += num & 1; // Add the least significant bit to the count
                num >>= 1; // Right shift the number to check the next bit
            }
            return count;
        }

        // Function to count the total number of set bits in all integers from 1 to n
        public static int countTotalSetBits(int n) {
            int totalCount = 0;
            for (int i = 1; i <= n; i++) {
                totalCount += countSetBits(i);
            }
            return totalCount;
        }

        public static void main(String[] args) {
            int num = 25; // Example input
            System.out.println("Number of set bits in " + num + ": " +
countSetBits(num));

            int n = 10; // Example input
            System.out.println("Total number of set bits from 1 to " + n + ": " +
countTotalSetBits(n));
        }
    }

}
```

```
6        // Function to count the number of set bits in an integer
7        public static int countSetBits(int num) {
8            int count = 0;
9            while (num > 0) {
10               count += num & 1; // Add the least significant bit to the count
11               num >>= 1; // Right shift the number to check the next bit
12           }
13           return count;
14       }
15
16       // Function to count the total number of set bits in all integers from 1 to n
17       public static int countTotalSetBits(int n) {
18           int totalCount = 0;
19           for (int i = 1; i <= n; i++) {
20               totalCount += countSetBits(i);
21           }
22           return totalCount;
23       }
24
25       public static void main(String[] args) {
26           int num = 25; // Example input
27           System.out.println("Number of set bits in " + num + ": " + countSetBits(num));
28
29           int n = 10; // Example input
30           System.out.println("Total number of set bits from 1 to " + n + ": " + countTotalSetBits(n))
31       }
32   }
33
34
```

Outline ⋈

Day12
⌄ BitManipulation
    countSetBits(int) : int
    countTotalSetBits(int) : int
    main(String[]) : void

Markers Properties Terminal Console ⋈ Coverage

```
<terminated> BitManipulation [Java Application] C:\Users\Nikita\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_16.0.2.v20210721-1149\jre\bin\javaw.exe  (Jun 5, 2024, 12:16:51 PM -
Number of set bits in 25: 3
Total number of set bits from 1 to 10: 17
```