

4. Write a program for error detecting code using CRC -CCITT(16 bits).

```
import java.util.Scanner;  
  
import java.io.*;  
  
public class CRC1 {  
  
    public static void main(String args[]) {  
  
        Scanner sc = new Scanner(System.in);  
  
        System.out.print("Enter message bits: ");  
  
        String message = sc.nextLine();  
  
        System.out.print("Enter generator: ");  
  
        String generator = sc.nextLine();  
  
        int data[] = new int[message.length() + generator.length() - 1];  
  
        int divisor[] = new int[generator.length()];  
  
        for(int i=0;i<message.length();i++)  
  
            data[i] = Integer.parseInt(message.charAt(i)+"");  
  
        for(int i=0;i<generator.length();i++)  
  
            divisor[i] = Integer.parseInt(generator.charAt(i)+"");  
  
        for(int i=0;i<message.length();i++)  
  
        {  
  
            if(data[i]==1)  
  
                for(int j=0;j<divisor.length;j++)  
  
                    data[i+j] ^= divisor[j];  
  
        }  
  
        System.out.print("The checksum code is: ");  
  
        for(int i=0;i<message.length();i++)  
  
            data[i] = Integer.parseInt(message.charAt(i)+"");  
  
        for(int i=0;i<data.length;i++)  
  
            System.out.print(data[i]);  
  
        System.out.println();
```

```
System.out.print("Enter checksum code: ");

message = sc.nextLine();

System.out.print("Enter generator: ");

generator = sc.nextLine();

data = new int[message.length() + generator.length() - 1];

divisor = new int[generator.length()];

for(int i=0;i<message.length();i++)

    data[i] = Integer.parseInt(message.charAt(i)+"");

for(int i=0;i<generator.length();i++)

    divisor[i] = Integer.parseInt(generator.charAt(i)+"");

for(int i=0;i<message.length();i++) {

    if(data[i]==1)

        for(int j=0;j<divisor.length;j++)

            data[i+j] ^= divisor[j];

    }

    boolean valid = true;

    for(int i=0;i<data.length;i++)

        if(data[i]==1){

            valid = false;

            break;

        }

    if(valid==true)

        System.out.println("Data stream is valid");

    else

        System.out.println("Data stream is invalid. CRC error occurred."); }}
```