

#### 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."); }}

```