**4. Develop 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);

**//Input Data Stream**

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)+"");

**//Calculation of CRC**

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];

}

**//Display CRC**

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();

**//Check for input CRC code**

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)+"");

**//Calculation of remainder**

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];

}

**//Display validity of data**

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.");

}

}