13. Write a program for error detecting code using CRC

```java
import java.util.Scanner;
import java.util.Arrays;

class Program {
static String xor (String a, String b)
{
    String result = " ";
    int n = b.length();
    for (int i = 1; i < n; i++)
    {
        result = (a.charAt(i) == b.charAt(i))
                 ? 0 : 1;
    }
    return result;
}

static String Div (String data, String key)
{   int pick = key.length();
    String tmp = data.Substring (0, pick);
    int n = data.length();
    while (pick < n)
    {   if (temp.charAt(0) == '1')
            tmp = xor [ data, temp ) +
        data.charAt (pick);
    else tmp = xor (new String (new char
    [pick]).replace ("10", "0"), temp )+
    return temp;
}

static void Encode (String data,
String key)
{ int key = key.length();
```

```
String append_data = (data + new String
(new char [key - 1]). replace ("\0", '0'));
String remainder = Mod2Div (appended_data,
                                    key);

String codeword = data + remainder;
System.out.println ("Remainder: " + remainder);
System.out.println (" Encoded Data
        (Data + Remainder): " + codeword + "\n");
public static void main (String [] args)
{       Scanner s = new Scanner (System.in);
System.out.println (" enter dataword and
                    key");
String data = s.next ();
    String key = s.next ();
    encodeData (data, key);
}

}
```

Output

```
Enter dataword : 1100 101011100|001
Calculated CRC : 1110100101|1001
```

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```
C:\Users\Admin\Desktop\1BM21CS047\ADA\CRC16\bin\Debug\CRC16.exe                              —    □    ×

Enter the dataword
1 0 1 1 0 0 1 1 1 1 0 0 1 0 1 1 1
Enter dividend
1 0 0 0 1 0 0 0 0 0 0 1 0 0 0 1 1
Codeword: 10110011110010111000000000011011
At receiver end
Codeword: 10110011110010111000000000000000
Process returned 1 (0x1)    execution time : 49.507 s
Press any key to continue.
```