

12/8/23

CYCLE -2

write a Program for error detecting code using CRC
CCITT (16-bits)

$$2^{16} + 2^{12} + 2^5 + 2^0 \rightarrow \text{Generator}$$

```
#include <stdio.h>
#include <string.h>
#define N strlen(divisor)
char data[30];
char rem[30];
char divisor[10];
int dlength, i, j;
void xor()
{
    for (j=1; j<N; j++)
        rem[j] = ((rem[j] == divisor[j]) ? '0' : '1');
}
void crc()
{
    for (i=0; i<N; i++)
        rem[i] = data[i];
    do {
        if (rem[0] == '1') xor();
        for (j=0; j<N+1; j++) rem[j] = rem[j+1];
        rem[j] = data[i++];
    } while (i <= dlength + 16);
}
void receiver()
{
    printf("Enter the data to be received: ");
    scanf("%s", data);
    printf("Data received: %s", data);
    crc();
    for (i=0; (i<N-1) && (rem[i] != '1'); i++);
    { if (i<N-1) printf("\n Error detected in data\n");
      else printf("\n No error detected in data\n");
    }
}
```

```

int main()
{
    int i = 0;
    printf("\n Enter data to be transmitted: ");
    scanf("%s", data);
    printf("\n Enter the Divisor: ");
    scanf("%s", divisor);
    dlength = strlen(data);
    for (i = dlength; i < dlength + 16; i++)
    {
        data[i] = '0';
    }
    printf("\n Data padded with 1616 zeros: %s", data);
    crc();
    printf("\n The remainder of CRC is: %s", rem);
    for (i = dlength; i < dlength + 16; i++)
    {
        data[i] = rem[i - dlength];
    }
    printf("\n Final data being sent: %s", data);
    receiver();
    return 0;
}

```

OUTPUT:

1) Enter data to be transmitted: 1001101
 Enter the Divisor: 1011
 Data padded with ~~16~~¹⁶ zeros: 100110100000000000000000
 The remainder of CRC is: 101
 Final data being sent: 100110100000000000000000101
 Enter the data being received: 100110100000000000000000111
 Data received: 100110100000000000000000111
 No error detected in data

2) Enter data to be transmitted: 1001101
 Enter the Divisor: 1011
 Data padded with ~~16~~¹⁶ zeros: 100110100000000000000000
 The remainder of CRC is: 101
 Final data being sent: 100110100000000000000000111
 Enter the data being received: 100110100000000000000000111
 Data received: 100110100000000000000000111
 Error detected in data

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```

1 #include<stdio.h>
2 #include<string.h>
3 #define N strlen(divisor)
4 char data[28];
5 char rem[28];
6 char divisor[10];
7 int dlength,i,j;
8 void XOR(){
9     for(j = 1;j < N; j++)
10         rem[j] = (( rem[j] == divisor[j])?'0':'1');
11 }
12
13
14 void receiver(){
15
16     printf("Enter the received data: ");
17     scanf("%s", data);
18     printf("\n\n");
19     printf("Data received: %s", data);
20
21     crc();
22
23     for(i=0;(i<N-1) && (rem[i]!='1');i++);
24     if(i<N-1)
25         printf("\nError detected\n\n");
26     else
27         printf("\nNo error detected\n\n");
28 }
29
30 void crc(){
31
32     for(i=0;i<N;i++)
33         rem[i]=data[i];
34     do{
35
36         if(rem[0]=='1')
37             XOR();
38
39         for(j=0;j<N-1;j++)
40             rem[j]=rem[j+1];
41
42         rem[j]=data[i++];
43     }
44     while(i<=dlength+16);
45 }
46
47
48 int main()
49 { int c=0;
50
51     printf("\nEnter data to be transmitted: ");
52     scanf("%s",data);
53     printf("\n Enter the Divisor: ");
54     scanf("%s",divisor);
55     dlength=strlen(data);
56     for(i=dlength;i<dlength+16;i++)
57         data[i]='0';
58     printf("\n");
59     printf("\n Data padded with 16 zeros : %s",data);
60     printf("\n");
61     crc();
62     printf("\nCRC or Check value is : %s",rem);
63     printf("\n rem strlen is : %d ", strlen(rem));
64     for(i=dlength+13;i<dlength+16;i++)
65     { //printf("\n %s",data);
66         data[i]= rem[c++];
67     }
68     printf("\n");
69
70     printf("\n Final data to be sent : %s",data);
71     printf("\n\n");
72
73     receiver();
74     return 0;
75 }

```

Enter data to be transmitted: 1001101

Enter the Divisor: 1011

Data padded with 16 zeros : 100110100000000000000000

CRC or Check value is : 111

Final data to be sent : 10011010000000000000111

Enter the received data: 10011010000000000000111

Data received: 10011010000000000000111

No error detected

Enter data to be transmitted: 1001101

Enter the Divisor: 1011

Data padded with 16 zeros : 100110100000000000000000

CRC or Check value is : 111

Final data to be sent : 100110100000000000000111

Enter the received data: 100110000000000000000111

Data received: 100110000000000000000111

Error detected