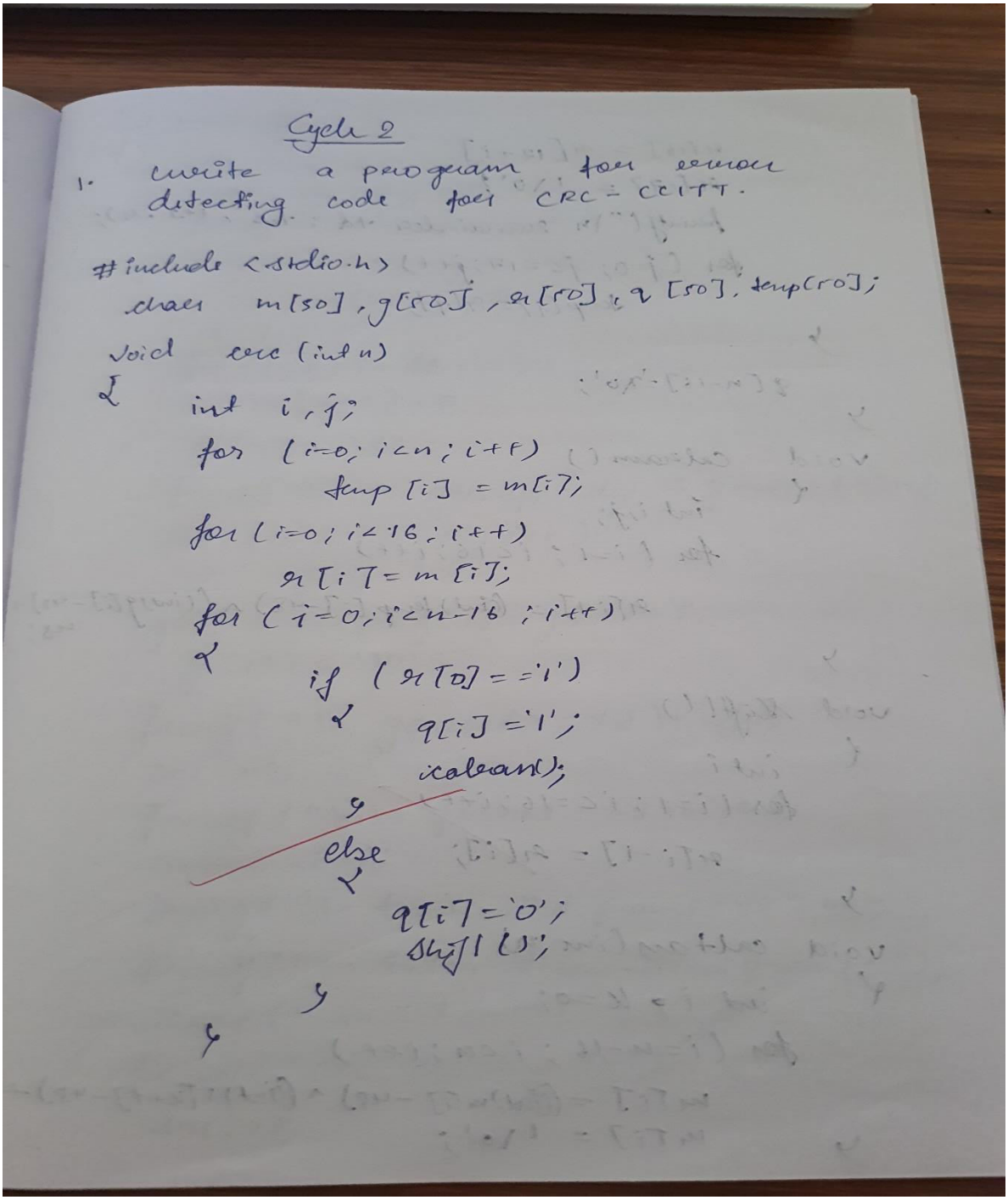
CN LAB 13

AIM: Write a program for error detecting code using CRCCCITT (16-bits).

OBSERVATION:



Cycle 2

1. Write a program for error detecting code for CRC - CCITT.

```
#include <stdio.h>
char m[50], g[50], r[50], q[50], temp[50];
void crc(int n)
{
    int i, j;
    for (i=0; i<n; i++)
        temp[i] = m[i];
    for (i=0; i<16; i++)
        r[i] = m[i];
    for (i=0; i<n-16; i++)
    {
        if (r[0] == '1')
        {
            q[i] = '1';
            xoream();
        }
        else
        {
            q[i] = '0';
            shift();
        }
    }
}
```

```
        s[16] = m[17+i]
        s[17] = '\0';
        printf("\n remainder %d : %s", i+1, s);
        for (j=0; j<=17; j++)
            temp[j] = s[j];
    }
    q[n-16] = '\0';
}
void calcam()
{
    int i,j;
    for (i=1; i<16; i++)
        s[i-1] = ((int)temp[i]-48) ^ ((int)q[i]-48)+
                 48;
}
void shift()
{
    int i
    for (i=1; i<=16; i++)
        s[i-1] = s[i];
}
void caltans(int n)
{
    int i, k=0;
    for (i=n-16; i<n; i++)
        m[i] = ((int)m[i] -48) ^ ((int)s[k++]-48) +48;
    m[i] = '\0';
}
```

```
int main()
{
    int n, i=0;
    char ch, flag=0;
    printf("enter frame bits:");
    while((ch=getc(stdin))!='\n')
        m[i++]=ch;
    n=i;
    for(i=0; i<16; i++)
        m[n++]='0';
    m[n]='\0';
    printf("Message after appending 16 zeros: %s", m);
    for(i=0; i<=16; i++)
        g[i]='0';
    g[0]=g[4]=g[11]=g[16]='1';
    g[17]='\0';
    printf("\n generator: %s\n", g);
    crc(n);
    printf("\n\n quotient: %s\n", a);
    checktrans(n);
    printf("\n transmitted frame: %s", m);
    printf("\n Enter transmitted frame:");
    scanf("\n %s", m);
    printf("CRC checking\n");
    crc(n);
```

```
printf("\n\n last remainder : %s", a);
for(i=0; i<16; i++)
    if(a[i]=='0')
        flag=1;
    else
        continue;
if(flag==1)
    printf("Error during transmission");
else
    printf("Recieved frame is correct");
}
```

Output

Enter frame bits : 1011

Message after appending 16 zeroes:

1011 0000 0000 0000 0000

generator : 1000 1000 0001 00001

quotient : 1011

transmitted : 1011 1011 0010110 1011

Enter transmitted frame

: 1011 1011 0001 0110 1011

last remainder : 0000 0000 0000 0000

Recieved frame is correct.

CODE:

```
 #include<stdio.h>
#include<string.h>
#define N strlen(gen_poly)
char data[28];
char check_value[28];
char gen_poly[10];
int data_length,i,j;
void XOR(){
for(j = 1;j < N; j++)
check_value[j] = (( check_value[j] == gen_poly[j])?'0':'1');
}
void receiver(){
printf("Enter the received data: "); scanf("%s", data);
printf("\n \n"); printf("Data received: %s", data); crc();
for(i=0;(i<N-1) && (check_value[i]!='1');i++); if(i<N-1)
printf("\nError detected\n\n"); else
printf("\nNo error detected\n\n");
}
void crc(){ for(i=0;i<N;i++)
check_value[i]=data[i];
do{
if(check_value[0]=='1') XOR();
for(j=0;j<N-1;j++) check_value[j]=check_value[j+1];
check_value[j]=data[i++];
}while(i<=data_length+N-1);
}
int main()
```

```
{
printf("\nEnter data to be transmitted: ");
 scanf("%s",data);
printf("\n Enter the Generating polynomial: ");
scanf("%s",gen_poly);
data_length=strlen(data);
for(i=data_length;i<data_length+N-1;i++)
data[i]='0';
printf("\n ");
printf("\n Data padded with n-1 zeros : %s",data);
printf("\n ");
crc();
printf("\nCRC or Check value is : %s",check_value);
 for(i=data_length;i<data_length+N-1;i++)
data[i]=check_value[i-data_length];
printf("\n ");
 printf("\n Final data to be sent : %s",data);
printf("\n \n");
receiver();
return 0;
}
```

OUTPUT

```
Enter data to be transmitted: 101101

 Enter the Generating polynomial: 1011010011

----------------------------------------
 Data padded with n-1 zeros : 101101000000000
----------------------------------------
CRC or Check value is : 001100000
----------------------------------------
 Final data to be sent : 101101001100000
----------------------------------------
Enter the received data: 101101001100000

----------------------------
Data received: 101101001100000
No error detected


Process returned 0 (0x0)   execution time : 25.115 s
Press any key to continue.
```

```
Enter data to be transmitted: 101101

 Enter the Generating polynomial: 1011010011

----------------------------------------
 Data padded with n-1 zeros : 101101000000000
----------------------------------------
CRC or Check value is : 001100000
----------------------------------------
 Final data to be sent : 101101001100000
----------------------------------------
Enter the received data: 101101010011100

----------------------------
Data received: 101101010011100
Error detected


Process returned 0 (0x0)   execution time : 197.443 s
Press any key to continue.
```