2. Implementation of CRC polynomials, CRC 12, CRC 16 and CRC CCIP.

**Aim : A program to implement CRC PROGRAM (Transmitter and Receiver)**

**#include<stdio.h>**

**#include<stdlib.h>**

**int print(int \*a,int n)**

**{**

**int i;**

**for(i=0;i<n;i++)**

**{**

**printf("%d",a[i]);**

**}**

**printf("\n");**

**return (0);**

**}**

**int crc(int \*g,int \*q,int \*r,int ng,int nq)**

**{**

**int i,j,k;**

**k = 0;**

**for(i=0;i<nq;i++)**

**{**

**if(r[i]==0)**

**{**

**for(j=i;j<(i+ng);j++)**

**{**

**r[j]=r[j]^0;**

**}**

**q[i]=0;**

**}**

**else**

**{**

**for(j=i;j<(i+ng);j++)**

**{**

**r[j]=r[j]^g[k];**

**k++;**

**}**

**q[i]=1;**

**k=0;**

**}**

**}**

**return (0);**

**}**

**void main()**

**{**

**int \*gx,\*tx,\*q,\*r;**

**int i,j,nt,ng,nq,n,flag=1;**

**printf("\n Enter no. of bits in message to be transmitted:");**

**scanf("%d",&nt);**

**printf("\n Enter no. of bits in G(x) :");**

**scanf("%d",&ng);**

**n=nt+ng-1;**

**nq=nt;**

**gx=malloc(sizeof(int)\*ng);**

**tx=malloc(sizeof(int)\*n);**

**r=malloc(sizeof(int)\*n);**

**q=calloc(nq,sizeof(int));**

**printf("\n Enter message :");**

**for(i=0;i<nt;i++)**

**{**

**scanf("%d",&tx[i]);**

**r[i]=tx[i];**

**}**

**for(;i<n;i++)**

**{**

**r[i]=0;**

**}**

**printf("\n Enter G(x) :");**

**for(i=0;i<ng;i++)**

**{**

**scanf("%d",&gx[i]);**

**}**

**/\* \*\*\*\*\*AT TRANSMITTER\*\*\*\*\* \*/**

**printf("\n CRC at transmitter :");**

**printf("\n Message to be transmitted :");**

**print(tx,nt);**

**printf("\n G(x)=");**

**print(gx,ng);**

**printf("\n Message with '0' appended :");**

**print(r,n);**

**crc(gx,q,r,ng,nq);**

**printf("\n Quotient at transmitter:");**

**print(q,nq);**

**printf("\n Remainder at transmitter :");**

**print(r,n);**

**for(i=0;i<nt;i++)**

**{**

**r[i]=tx[i];**

**}**

**printf("\n Transmitted message :");**

**print(r,n);**

**/\* \*\*\*\*\* AT RECEIVER\*\*\*\*\* \*/**

**printf("\n CRC at receiver :");**

**printf("\n Message received :");**

**print(r,n);**

**printf("\n G(x)=");**

**print(gx,ng);**

**crc(gx,q,r,ng,nq);**

**printf("\n Quotient at receiver :");**

**print(q,nq);**

**printf("\n Remainder at receiver :");**

**print(r,n);**

**for(i=0;i<n;i++)**

**{**

**if(r[i]!=0)**

**{**

**flag=0;**

**break;**

**}**

**}**

**if(flag)**

**printf("\n No error detected -->CRC algorithm implemented successfully.");**

**else**

**printf("\n Error detected.");**

**getchar();**

**}**

**Sample Input and Output**

Enter no. of bits in message to be transmitted:8

Enter no. of bits in G(x) :6

Enter message :10110111

Enter G(x) :110011

Quotient at transmitter:11010111

Remainder at transmitter :0000000001001

Transmitted message :1011011101001

CRC at receiver :

Message received :1011011101001

G(x)=110011

Quotient at receiver :11010111

Remainder at receiver :0000000000000

No error detected -->CRC algorithm implemented successfully.

...Program finished with exit code 0