#include <iostream>

using namespace std;

int main()

{

int i,j,k,l;

//Get Frame

int fs;

cout<<"\n Enter the size of the Message: ";

cin>>fs;

int f[20];

cout<<"\n Enter the Bits of the Message:";

for(i=0;i<fs;i++)

{

cin>>f[i];

}

//Get Generator

int gs;

cout<<"\n Enter Generator size: ";

cin>>gs;

int g[20];

cout<<"\n Enter Generator Bits:";

for(i=0;i<gs;i++)

{

cin>>g[i];

}

cout<<"\n Sender Side:";

cout<<"\n Message:: ";

for(i=0;i<fs;i++)

{

cout<<f[i];

}

cout<<"\n Generator :";

for(i=0;i<gs;i++)

{

cout<<g[i];

}

//Append 0's

int rs=gs-1;

cout<<"\n Number of 0's to be appended: "<<rs;

for (i=fs;i<fs+rs;i++)

{

f[i]=0;

}

int temp[20];

for(i=0;i<20;i++)

{

temp[i]=f[i];

}

cout<<"\n Message after appending 0's :";

for(i=0; i<fs+rs;i++)

{

cout<<temp[i];

}

//Division

for(i=0;i<fs;i++)

{

j=0;

k=i;

//checks that whether it is divisible or not

if (temp[k]>=g[j])

{

for(j=0,k=i;j<gs;j++,k++)

{

if((temp[k]==1 && g[j]==1) || (temp[k]==0 && g[j]==0))

{

temp[k]=0;

}

else

{

temp[k]=1;

}

}

}

}

//CRC Calculation

int crc[15];

for(i=0,j=fs;i<rs;i++,j++)

{

crc[i]=temp[j];

}

cout<<"\n CRC bits: ";

for(i=0;i<rs;i++)

{

cout<<crc[i];

}

cout<<"\n Transmitted DATA: ";

int tf[15];

for(i=0;i<fs;i++)

{

tf[i]=f[i];

}

for(i=fs,j=0;i<fs+rs;i++,j++)

{

tf[i]=crc[j];

}

for(i=0;i<fs+rs;i++)

{

cout<<tf[i];

if(i==fs-1)

cout<<" + ";

}

cout<<"\n Receiver side : ";

cout<<"\n Received DATA: ";

for(i=0;i<fs+rs;i++)

{

cout<<tf[i];

}

for(i=0;i<fs+rs;i++)

{

temp[i]=tf[i];

}

//Division

for(i=0;i<fs+rs;i++)

{

j=0;

k=i;

if (temp[k]>=g[j])

{

for(j=0,k=i;j<gs;j++,k++)

{

if((temp[k]==1 && g[j]==1) || (temp[k]==0 && g[j]==0))

{

temp[k]=0;

}

else

{

temp[k]=1;

}

}

}

}

cout<<"\n Reaminder: ";

int rrem[15];

for (i=fs,j=0;i<fs+rs;i++,j++)

{

rrem[j]= temp[i];

}

for(i=0;i<rs;i++)

{

cout<<rrem[i];

}

int flag=0;

for(i=0;i<rs;i++)

{

if(rrem[i]!=0)

{

flag=1;

}

}

cout<<endl<<"============================================================"<<endl;

if(flag==0)

{

cout<<"\n Since Remainder is 0 hence Message Transmitted From Sender To Receriver is Correct"<<endl;

}

else

{

cout<<"\n Since Remainder is Not 0 Hence Message Transmitted From Sender to Receriver Contains Error Bits"<<endl;

}

cout<<"=================================================================="<<endl;

return 0;

}

**\*\*\*OUTPUT\*\*\***

Enter the size of the Message: 11

Enter the Bits of the Message:1

1

1

1

0

0

1

1

0

1

0

Enter Generator size: 5

Enter Generator Bits:1

1

0

0

1

Sender Side:

Message:: 11110011010

Generator :11001

Number of 0's to be appended: 4

Message after appending 0's :111100110100000

CRC bits: 0110

Transmitted DATA: 11110011010 + 0110

Receiver side :

Received DATA: 111100110100110

Reaminder: 0000

========================================================================

Since Remainder is 0 hence Message Transmitted From Sender To Receriver is Correct

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