// Include headers

#include<stdio.h>

#include<string.h>

// length of the generator polynomial

#define N strlen(gen\_poly)

// data to be transmitted and received

char data[28];

// CRC value

char check\_value[28];

// generator polynomial

char gen\_poly[10];

// variables

int data\_length,i,j;

// function that performs XOR operation

void XOR(){

// if both bits are the same, the output is 0

// if the bits are different the output is 1

for(j = 1;j < N; j++)

check\_value[j] = (( check\_value[j] == gen\_poly[j])?'0':'1');

}

// Function to check for errors on the receiver side

void receiver(){

// get the received data

printf("Enter the received data: ");

scanf("%s", data);

printf("\n-----------------------------\n");

printf("Data received: %s", data);

// Cyclic Redundancy Check

crc();

// Check if the remainder is zero to find the error

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(){

// initializing check\_value

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

check\_value[i]=data[i];

do{

// check if the first bit is 1 and calls XOR function

if(check\_value[0]=='1')

XOR();

// Move the bits by 1 position for the next computation

for(j=0;j<N-1;j++)

check\_value[j]=check\_value[j+1];

// appending a bit from data

check\_value[j]=data[i++];

}while(i<=data\_length+N-1);

// loop until the data ends

}

int main()

{

// get the data to be transmitted

printf("\nEnter data to be transmitted: ");

scanf("%s",data);

printf("\n Enter the Generating polynomial: ");

// get the generator polynomial

scanf("%s",gen\_poly);

// find the length of data

data\_length=strlen(data);

// appending n-1 zeros to the data

for(i=data\_length;i<data\_length+N-1;i++)

data[i]='0';

printf("\n----------------------------------------");

// print the data with padded zeros

printf("\n Data padded with n-1 zeros : %s",data);

printf("\n----------------------------------------");

// Cyclic Redundancy Check

crc();

// print the computed check value

printf("\nCRC or Check value is : %s",check\_value);

// Append data with check\_value(CRC)

for(i=data\_length;i<data\_length+N-1;i++)

data[i]=check\_value[i-data\_length];

printf("\n----------------------------------------");

// printing the final data to be sent

printf("\n Final data to be sent : %s",data);

printf("\n----------------------------------------\n");

// Calling the receiver function to check errors

receiver();

return 0;

}