#include<stdio.h>

#include<string.h>

#define N strlen(g)

char t[28],cs[28],g[]="10001000000100001";

int a,e,c;

void xor(){

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

cs[c] = (( cs[c] == g[c])?'0':'1');

}

void crc(){

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

cs[e]=t[e];

do{

if(cs[0]=='1')

xor();

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

cs[c]=cs[c+1];

cs[c]=t[e++];

}while(e<=a+N-1);

}

int main()

{

printf("\nEnter data : ");

scanf("%s",t);

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

printf("\nGeneratng polynomial : %s",g);

a=strlen(t);

for(e=a;e<a+N-1;e++)

t[e]='0';

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

printf("\nModified data is : %s",t);

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

crc();

printf("\nChecksum is : %s",cs);

for(e=a;e<a+N-1;e++)

t[e]=cs[e-a];

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

printf("\nFinal codeword is : %s",t);

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

printf("\nTest error detection 0(yes) 1(no)? : ");

scanf("%d",&e);

if(e==0)

{

do{

printf("\nEnter the position where error is to be inserted : ");

scanf("%d",&e);

}while(e==0 || e>a+N-1);

t[e-1]=(t[e-1]=='0')?'1':'0';

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

printf("\nErroneous data : %s\n",t);

}

crc();

for(e=0;(e<N-1) && (cs[e]!='1');e++);

if(e<N-1)

printf("\nError detected\n\n");

else

printf("\nNo error detected\n\n");

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

return 0;

}