#include<bits/stdc++.h>

#include<iostream>

#include<math.h>

using namespace std;

char flip(char c){return(c=='0')?'1':'0';}

void addTwoBinaryNumbers()

{

long bn1,bn2;

int i=0,r=0;

int sum[20];

cout<<"Additionoftwobinarynumbers:\n";

cout<<"Enterthe1stbinarynumber:";

cin>>bn1;

cout<<"Enterthe2ndbinarynumber:";

cin>>bn2;

while(bn1!=0||bn2!=0)

{

sum[i++]=(int)((bn1%10+bn2%10+r)%2);

r=(int)((bn1%10+bn2%10+r)/2);

bn1=bn1/10;

bn2=bn2/10;

}

if(r!=0){

sum[i++]=r;

}

--i;

cout<<"Thesumoftwobinarynumbersis:";

while(i>=0){

cout<<(sum[i--]);

}

cout<<("\n");

cout<<"\n\n";

}

void printOneAndTwosComplement()

{

string bin;

cout<<"EnterABinaryNumber:"<<endl;

cin>>bin;

int n=bin.length();

int i;

string ones,twos;

ones=twos="";

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

ones+=flip(bin[i]);

twos=ones;

for(i=n-1;i>=0;i--)

{

if(ones[i]=='1')

twos[i]='0';

else

{

twos[i]='1';

break;

}

}

if(i==-1)

twos='1'+twos;

cout<<"1'scomplement:"<<ones<<endl;

cout<<"2'scomplement:"<<twos<<endl;

cout<<"\n\n";

}

int main()

{

int ch;

while(true)

{

cout<<"1.AdditionOfTwoBinaryNumbers.\n";

cout<<"2.OnesAndTwosComplementOfABinaryNumber.\n";

cout<<"3.Exit.\n";

cout<<"EnterYourChoice:"<<endl;

cin>>ch;

switch(ch)

{

case 1:

addTwoBinaryNumbers();

break;

case 2:

printOneAndTwosComplement();

break;

case 3:

exit(0);

default:

cout<<"PleaseEnterAValidInput!";

}

}

return 0;

}