//client

import java.io.\*;

import java.net.\*;

import java.util.\*;

public class Bclient{

public static void main(String argv[])

{

Scanner scaninput = new Scanner(System.in);

try{

Socket socketClient = new Socket("localhost",5555);

System.out.println("Client : " + "Connection Established");

BufferedReader reader = new BufferedReader(new InputStreamReader(socketClient.getInputStream()));

BufferedWriter writer = new BufferedWriter(new OutputStreamWriter(socketClient.getOutputStream()));

String serverMsg;

System.out.println("enter the multiplicand in decimal ");

int num1= scaninput.nextInt();

System.out.println("opposite number in decimal ");

int num2= scaninput.nextInt();

writer.write("" + num1+ "\r\n");

writer.write("" + num2+ "\r\n");

writer.flush();

while((serverMsg = reader.readLine()) != null)

{

System.out.println("Client :"+ serverMsg);

}

}

catch(Exception e)

{

e.printStackTrace();

}

}

}

//client ends

import java.io.\*;

import java.net.\*;

import java.util.Scanner;

public class Bserver

{

public static Scanner s = new Scanner(System.in);

public int BoothsMultiplier(int n1, int n2)

{

int[] m = binary(n1);

int[] m1= binary(-n1);

int[] r = binary(n2);

int[] A = new int[9];

int[] S = new int[9];

int[] P = new int[9];

for(int i = 0;i < 4;i++)

{

A[i] = m[i];

S[i] =m1[i];

P[i + 4] = r[i];

}

display(A,'A');

display(S,'S');

display(P,'P');

System.out.println();

for(int i = 0;i < 4;i++)

{

if(P[7] == 0 && P[8] == 0);

else if(P[7] == 1 && P[8] == 0)

add(P, S);

else if(P[7] == 0 && P[8] == 1)

add(P, A);

else if(P[7] == 1 && P[8] == 1);

rightShift(P);

display(P, 'P');

}

return getDecimal(P);

}

public int getDecimal(int[] B)

{

int p = 0;

int t = 1;

for(int i = 7; i >= 0; i--, t \*= 2)

p += (B[i] \* t);

if(p > 64)

p= -(256 - p);

return p;

}

public void rightShift(int[] A)

{

for(int i = 8;i >= 1;i--)

A[i] = A[i - 1];

}

public void add(int[] A, int[] B)

{

int carry = 0;

for(int i = 8;i >= 0;i--)

{

int temp = A[i] + B[i] + carry;

A[i] = temp % 2;

carry =temp / 2;

}

}

public int[] binary(int n)

{

int[] bin= new int[4];

int ctr=3;

int num=n;

if(n < 0)

num= 16 + n;

while(num != 0)

{

bin[ctr--] = num % 2;

num /= 2;

}

return bin;

}

public void display(int[] P,char ch)

{

System.out.print("\n" + ch+ ":");

for(int i =0;i < P.length;i++)

{

if(i == 4)

System.out.print(" ");

if(i == 8)

System.out.print(" ");

System.out.print(P[i]);

}

}

public static void main(String argv[])throws Exception

{

Bserver boothserver = new Bserver();

System.out.println("Server is running ");

ServerSocket mysocket = new ServerSocket(5555);

while(true)

{

Socket connectionSocket = mysocket.accept();

BufferedReader reader = new BufferedReader(new InputStreamReader(connectionSocket.getInputStream()));

BufferedWriter writer = new BufferedWriter(new OutputStreamWriter(connectionSocket.getOutputStream()));

writer.write("Booth Algorithm Assignment\n");

writer.flush();

String data1 = reader.readLine().trim();

writer.flush();

String data2 = reader.readLine().trim();

int somenum1 = Integer.parseInt(data1);

int somenum2 = Integer.parseInt(data2);

int result = boothserver.BoothsMultiplier(somenum1,somenum2);

System.out.println("\nBooth is done Displaying Result in decimal at client side ");

writer.write("\r\n === Result is : "+result);

writer.flush();

connectionSocket.close();

}

}

}