



A or B

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Problem

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Consider four numbers: A , B , C , and K . You must change *at most* K bits in A and B to form the numbers A' and B' satisfying the equation $A' | B' = C$. Here, the $|$ symbol denotes the *bitwise OR* operation.

Given Q sets of the numbers defined above, find and print the respective values of A' and B' on new lines; if no such value exists, print -1 instead. If there are multiple solutions, make A' as small as possible; if there are still multiple solutions, make B' as small as possible.

Notes:

- A , B , and C are given in [Hexadecimal \(base 16\)](#), and K is given in decimal (base 10).
- If the number of bits changed in A is k_a and the number of bits changed in B is k_b , then $k_a + k_b$ must be $\leq K$.

Input Format

The first line contains an integer, Q , denoting the number of queries. The subsequent lines describe each respective query as follows:

- The first line contains a single integer denoting the value of K .
- Each of the next **3** lines contains a [Hexadecimal \(base 16\)](#) number describing the respective values of A , B , and C .

Constraints

- $1 \leq Q \leq 5$
- $0 \leq K \leq 5 \times 10^5$
- $0 < A, B, C < 16^{5 \times 10^4}$

Output Format

Print two lines of output for each query:

- The first line should contain a [Hexadecimal \(base 16\)](#) number denoting the value of A' .
- The second line must contain a [Hexadecimal \(base 16\)](#) number denoting the value of B' .

If no valid answer exists, you must instead print one line of output with the integer -1 .

Note: The letters in Hexadecimal numbers must be in uppercase.

Sample Input

```
3
8
2B
9F
58
5
B9
40
5A
2
```

91
BE
A8

Sample Output

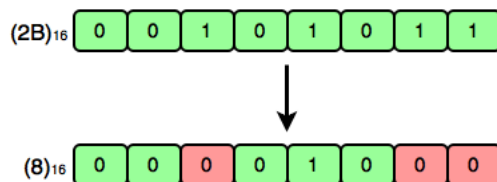
8
58
18
42
-1

Explanation

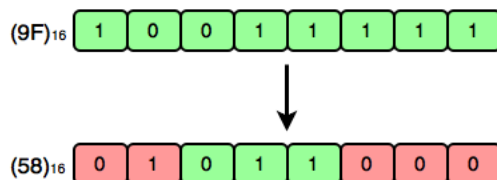
Query 0:

In this query, $K = 8$.

Change $A = (2B)_{16}$ to $A' = (8)_{16}$. 3 bits are changed.



Change $B = (9F)_{16}$ to $B' = (58)_{16}$. 5 bits are changed.



$$A' \mid B' = (8)_{16} \mid (58)_{16} = (58)_{16} = C$$

Query 1:

In this query, $K = 5$.

Change $A = (B9)_{16}$ to $A' = (18)_{16}$. 3 bits are changed.

Change $B = (40)_{16}$ to $B' = (42)_{16}$. Only 1 bit is changed.

$$A' \mid B' = (18)_{16} \mid (42)_{16} = (5A)_{16} = C$$

Query 2:

There is no valid answer, so we print -1 .

f t in

Submissions: 811


Max Score: 50

Difficulty: Medium

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☆☆☆☆☆

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Current Buffer (saved locally, editable)  

Java 7



```
1 import java.io.*;
2 import java.util.*;
3 import java.text.*;
4 import java.math.*;
5 import java.util.regex.*;
6
7 public class Solution {
```

```
8  
9 public static void main(String[] args) {  
10     /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */  
11 }  
12 }
```

Line: 1 Col: 1

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Test against custom input

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