Xor-sequence

An array, A, is defined as follows:

- $A_0=0$
- $A_x=A_{x-1} ⊕ x$ for $x>0$, where $⊕$ is the symbol for XOR

You must answer Q questions. Each i^{th} question, is in the form $L_i \ R_i$, and the answer is $A_{L_i}⊕A_{L_i+1}⊕...⊕A_{R_i-1}⊕A_{R_i}$ (the *Xor-Sum* of segment $[L_i,R_i]$).

Print the answer to each question.

Input Format

The first line contains Q (the number of questions).
The Q subsequent lines each contain two space separated integers, L and R, respectively. Line contains L_i and R_i.

Constraints
$1 \le Q \le 10^5$
$1 \le L_i \le R_i \le 10^{15}$

Subtasks
For 50% score: $1 \le L_i \le R_i \le 10^5$

Output Format

On a new line for each test case i, print the *exclusive-or* of A's elements in the inclusive range between indices L_i and R_i.

Sample Input

```
3
2 4
2 8
5 9
```

Sample Output

```
7
9
15
```

Explanation

The beginning of our array looks like this: $A=[0,1,3,0,4,1,7,0,8,1,11,\ldots]$

Test Case 0:

$3⊕0⊕4=7$

Test Case 1:

$3⊕0⊕4⊕1⊕7⊕0⊕8=9$

Test Case 2:

$1⊕7⊕0⊕8⊕1=15$