Xor-sequence

An array, A, is defined as follows:

- $A_0 = 0$
- $A_x = A_{x-1} \oplus x$ for $x > 0$, where $\oplus$ 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 $A_{L_i} \oplus A_{L_i+1} \oplus \ldots \oplus A_{R_i-1} \oplus A_{R_i}$ (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

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

Subtasks

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

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 0

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

Sample Output 0

```
7
9
15
```

Explanation 0

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

Test Case 0:

$3 \oplus 0 \oplus 4 = 7$

Test Case 1:

$3 \oplus 0 \oplus 4 \oplus 1 \oplus 7 \oplus 0 \oplus 8 = 9$

Test Case 2:

$1 \oplus 7 \oplus 0 \oplus 8 \oplus 1 = 15$