XOR Query

You are given an array of size 10^8. The ith element in the array is the XOR of natural numbers from 1 to i. You have Q operations to perform and in each operation, you are given 2 integers L and R.

Write a program to find the sum of the elements in the range [L, R].

Input format:

The first line consists of an integer Q.

Then Q lines follow where each line has 2 integers L and R.

Output format:

For each operation, print in a new line the sum from L to R.

Constraints:

$1 <= Q <= 10^5$

$1 <= L <= R <= 10^8$

Sample input:

2

1 3

2 5

Sample output:

4

8

Explanation:

First 5 elements of the array are 1, 3, 0, 4, 1

Sum from 1 to 3 is 4 and sum from 2 to 5 is 8