

# XOR

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**Time limit:** 1.0s    **Memory limit:** 64M

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Given two integers  $S$  and  $F$ , what is the XOR (exclusive-or) of all numbers between  $S$  and  $F$  (inclusive)?

## Input Specification

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The first line of input is the integer  $T$ , which is the number of test cases ( $1 \leq T \leq 1000$ ).  
 $T$  lines follow, with each line containing two integers  $S$  and  $F$  ( $1 \leq S \leq F \leq 1\,000\,000\,000$ ).

## Output Specification

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For each test case, output the (decimal) value of the XOR of all numbers between  $S$  and  $F$ , inclusive.

## Sample Input

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```
5
3 10
5 5
13 42
666 1337
1234567 89101112
```

## Output for Sample Input

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```
8
5
39
0
89998783
```