

Xor on a Set

Task

We have a dynamic multiset A of non-negative integers. A multiset is a set that can contain duplicates. Also, **assume that 0 belongs to the set A .**

Your task is to perform the following operations on this set:

+ x : add the number x to A

- x : remove one occurrence of the number x from A . It is guaranteed that at this moment, there is at least one occurrence of the number x in A .

? x : find the largest number c such that $c = x \text{ xor } y$, where y is any number from A .

Input

The first line contains an integer $1 \leq n \leq 10^5$ – the number of operations.

This is followed by n lines, each describing one operation. For the numbers x in the operations, it holds $1 \leq x \leq 2^{30} - 1$.

Output

For each operation of the type ? x , print the corresponding c .

Example

input	output
10	11
+ 8	10
+ 9	14
+ 11	13
+ 6	
+ 1	
? 3	
- 8	
? 3	
? 8	
? 11	