

D. Vasiliy's Multiset

time limit per test: 4 seconds

memory limit per test: 256 megabytes

input: standard input

output: standard output

Author has gone out of the stories about Vasiliy, so here is just a formal task description.

You are given q queries and a multiset A , initially containing only integer 0. There are three types of queries:

1. "+ x " — add integer x to multiset A .
2. "- x " — erase one occurrence of integer x from multiset A . It's guaranteed that at least one x is present in the multiset A before this query.
3. "? x " — you are given integer x and need to compute the value , i.e. the maximum value of bitwise exclusive OR (also known as XOR) of integer x and some integer y from the multiset A .

Multiset is a set, where equal elements are allowed.

Input

The first line of the input contains a single integer q ($1 \leq q \leq 200\,000$) — the number of queries Vasiliy has to perform.

Each of the following q lines of the input contains one of three characters '+', '-' or '?' and an integer x_i ($1 \leq x_i \leq 10^9$). It's guaranteed that there is at least one query of the third type.

Note, that the integer 0 will always be present in the set A .

Output

For each query of the type '?' print one integer — the maximum value of bitwise exclusive OR (XOR) of integer x_i and some integer from the multiset A .

Example

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

Note

After first five operations multiset A contains integers 0, 8, 9, 11, 6 and 1.

The answer for the sixth query is integer — maximum among integers , , , and .