Problem E
Xordition Robot

You have a robot that contains N modules, numbered from 1 to N. Each module accepts an integer and outputs an integer. The output of module i becomes the input of module $i+1$ (for $1 \leq i \leq N-1$).

The specification of module i is either:

- `+ k`: given an integer x ($0 \leq x < 16$), the module outputs $(x + k) \bmod 16$; or
- `x k`: given an integer x ($0 \leq x < 16$), the module outputs $x \oplus k$, where $\oplus$ represents the bitwise XOR operator.

There are Q replacements, and the j-th is of the form:

- `i t k`: replace module i to a module with specification `t k`, where t is either `+` or `x`.

Each time a replacement is done, find the output of module N when module 1 is given an input 0.

Input

The first line contains two integers N and Q ($1 \leq N, Q \leq 200\ 000$). Each of the next N lines contains a character of either `+` or `x` followed by an integer k ($0 \leq k < 16$) representing the module.

The next Q lines contains an integer i ($1 \leq i \leq N$), followed by a character `+` or `x`, and finally an integer k ($0 \leq k < 16$), meaning that you have to replace module i to the specified module.

Output

Output Q lines, each containing the output of module N, after each replacement, when given an input 0 to module 1.

Sample Input 1	Sample Output 1
4 2 + 3 x 5 x 9 + 15 2 + 8 1 x 10	1 10

Explanation of Sample 1: After the first replacement, the modules are: `+ 3`, `+ 8`, `x 9`, `+ 15`

The output of module N is then $(((0 + 3) + 8) \oplus 9) + 15)$ is 1.

After the second replacement, the modules are: `x 10`, `+ 8`, `x 9`, `+ 15`

The output of module N is then $(((0 \oplus 10) + 8) \oplus 9) + 15)$ is 10.

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