

Four

Input file: **standard input**
Output file: **standard output**
Time limit: 3 seconds
Memory limit: 256 megabytes

Peter has a sequence S , each element is a quadruple (a, b, c, d) . Initially, the sequence S is empty. Then Peter has several operations on the sequence:

- $+ k a b c d$: Peter inserts a quadruple (a, b, c, d) into the sequence S and after the insertion the quadruple (a, b, c, d) becomes k -th element of S .
- $? a b c d$: Peter wants to know how many k exist that after he performs the operation $+ k a b c d$, there are at least two integers i and j that $1 \leq i < k < j \leq |S|$ and $a \neq a_i, b \neq b_i, c \neq c_i, d \neq d_i$ and $a \neq a_j, b \neq b_j, c \neq c_j, d \neq d_j$.

Help Peter to implement those operations.

Input

The input contains multiple test cases. For each test case:

The first line contains an integer n ($1 \leq n \leq 200000$) – the number of operations.

Each of the next n lines begins with a character $type$ ($type \in \{+, ?\}$).

- if $type$ is $+$, there will be five more integers in the line: $k a b c d$ ($1 \leq k \leq |S| + 1, 1 \leq a, b, c, d \leq 2^4$).
- if $type$ is $?$, there will be four more integers in the line: $a b c d$ ($1 \leq a, b, c, d \leq 2^4$).

Note that the numbers (in the questions) are encoded. If the answer of the last question is $last$, then number x appears as $x \oplus last$. (Assume $last = 0$ at the beginning of each test case. “ \oplus ” denotes bitwise exclusive-or.) The limits of numbers described above are the limits after decoded.

The sum of values of n in all test cases doesn't exceed 200000.

Output

For second type of operations, print a line containing the answer.

Examples

standard input	standard output
3	0
+ 1 1 2 3 4	1
+ 1 1 2 3 4	2
? 1 2 3 3	
5	
+ 1 1 2 3 4	
+ 1 1 2 3 4	
? 4 3 2 1	
+ 0 0 3 2 5	
? 5 2 3 0	