Bit Combinations

Time limit: 1.0s **Memory limit:** 256M

Let X represent a non-negative integer strictly less than 2^{60}.

You are given a list of N constraints on X.

Each constraint is a bitwise operator followed by two numbers: the second input and the output of the bitwise operation.

Any of the following bitwise operators may appear in a given constraint: `AND`, `OR`, `NAND`, `NOR`.

For example, a constraint could be `AND 7 3`, meaning that $X \wedge 7 = 3$.

How many solutions for X satisfy all N constraints?

Input Specification

The first line contains an integer N $(1 \leq N \leq 100)$.

The next N lines each contain the name of the bitwise operator followed by two integers Y and Z $(0 \leq Y, Z < 2^{60})$.

Output Specification

Output the number of solutions for X that satisfy all N constraints.

Sample Input 1

```
1
AND 0 1
```

Sample Output 1

```
0
```

Sample Input 2

```
4
AND 1 1
OR 12287 16383
NAND 6 1152921504606846975
NOR 1152921504606844927 0
```

Sample Output 2

```
512
```