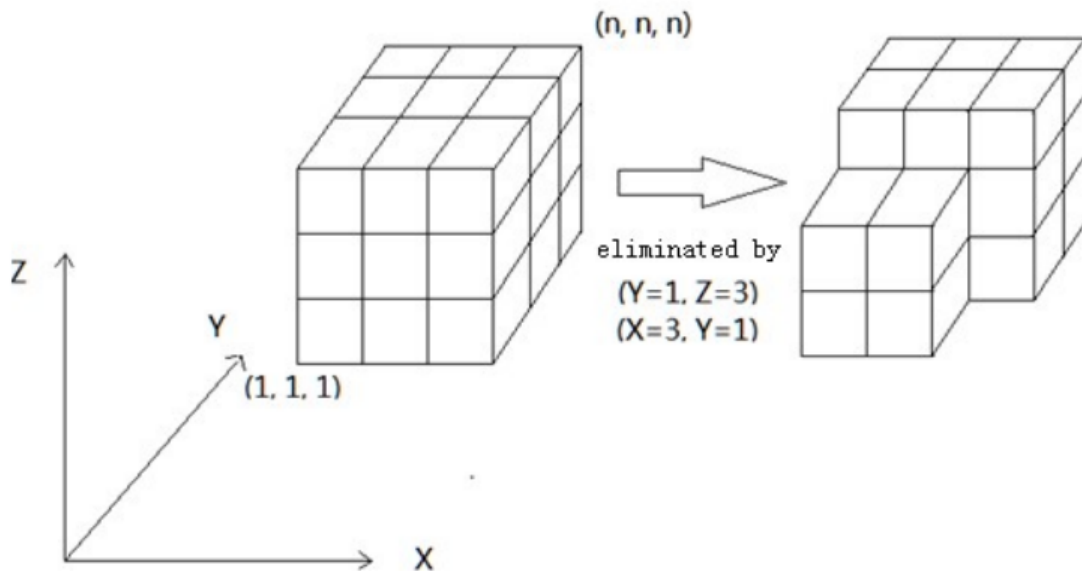


4835 To Be an Dream Architect

The “dream architect” is the key role in a team of “dream extractors” who enter other’s dreams to steal secrets. A dream architect is responsible for crafting the virtual world that the team and the target will dream into. To avoid the target noticing the world is artificial, a dream architect must have powerful 3D imagination.

Cobb uses a simple 3D imagination game to test whether a candidate has the potential to be an dream architect. He lets the candidate imagine a cube consisting of $n \times n \times n$ blocks in a 3D coordinate system as Figure 1. The block at bottom left front corner is marked $(1, 1, 1)$ and the diagonally opposite block is marked (n, n, n) . Then he tells the candidate that the blocks on a certain line are eliminated. The line is always parallel to an axis. After m such block eliminations, the candidate is asked to tell how many blocks are eliminated. Note that one block can only be eliminated once even if it is on multiple lines.

Here is a sample graph according to the first test case in the sample input:



Input

The first line is the number of test cases.

In each test case, the first line contains two integers n and m ($1 \leq n \leq 1000, 0 \leq m \leq 1000$) meaning that the cube is $n \times n \times n$ and there are m eliminations.

Each of the following m lines represents an elimination in the following format:

$axis_1=a, axis_2=b$

where $axis_i$ ($i = 1, 2$) is ‘X’ or ‘Y’, or ‘Z’ and $axis_1$ is not equal to $axis_2$. a and b are 32-bit signed integers.

Output

For each test case output the number of eliminated blocks.

Sample Input

```
2
3 2
Y=1,Z=3
X=3,Y=1
10 2
X=3,Y=3
Y=3,Z=3
```

Sample Output

```
5
19
```