

Problem 4: Stockbear 3+4 Points

Problem ID: chess

Rank: 2+2



Introduction

Big Ben has decided to avenge [Garry Kasparov](#), and to do that he's decided to make a computer that will beat [Deep Blue](#)! First, though, he has to teach a computer to play chess. [Which can't be that hard.](#) Surely.

Problem Statement

You are given a chess board of size N by M with a number of pieces K on it. Each piece will be one of the following:

- Queen (Q): moves horizontally, vertically, and diagonally.
- Rook (R): only moves horizontally and vertically.
- Bishop (B): only moves diagonally.

Further movement details [here](#).

For each piece P_i and its respective coordinates on the board P_{ix} and P_{iy} , determine how many distinct pairs of pieces P_a, P_b exist such that P_a is “attacking” P_b . A piece is “attacking” another piece if the piece can move to the other piece's square without passing through another piece. If two pieces P_a and P_b are both “attacking” each other, then (P_a, P_b) and (P_b, P_a) are considered two distinct instances. It may be the case that a piece can attack multiple pieces, or be attacked by multiple pieces, or both.

The bottom left of the board is given by the coordinates $(1, 1)$.

Input Format

The first line of the input contains a single integer T denoting the number of test cases that follow.

For each test case:

- The first line contains two space-separated integers N and M representing the size of the board.
- The second line contains a single integer denoting the number of pieces on the board, K .
- For each of the next K lines, the i th line contains three space-separated values P_{it} , P_{ix} , P_{iy} , where:
 - P_{it} is a character containing either Q, R, or B, denoting the type of piece i .
 - P_{ix} and P_{iy} are integers denoting the location (P_{ix}, P_{iy}) of the piece.

Output Format

For each test case, output the number of instances of a piece “attacking” another piece.

Constraints

$$1 \leq T \leq 100$$

$$1 \leq N, M \leq 10^9$$

$$1 \leq P_{iy} \leq N, 1 \leq P_{ix} \leq M$$

Main Test Set

$$2 \leq K \leq 500$$

Bonus Test Set

$$2 \leq K \leq 2 \cdot 10^5$$

Sample Test Cases

Main Sample Input

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```
5
5 5
4
R 3 1
Q 2 4
R 5 5
B 4 3
6 4
4
Q 1 2
R 5 1
Q 6 3
B 2 4
4 7
6
R 1 5
B 4 2
Q 2 1
R 4 7
Q 4 5
R 2 6
562 723
5
B 539 615
R 359 615
B 359 436
Q 256 332
B 91 497
1 45692
3
B 1 22562
Q 1 11235
R 1 45690
```

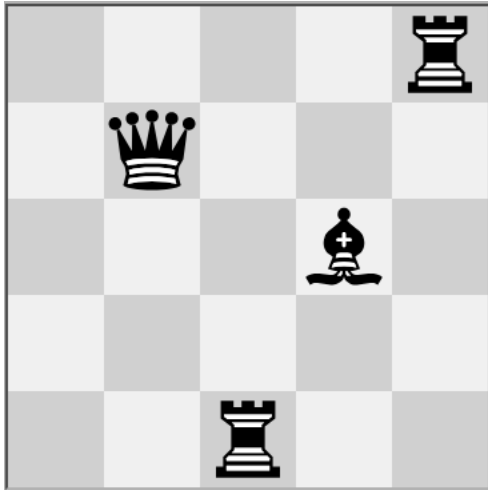
Main Sample Output

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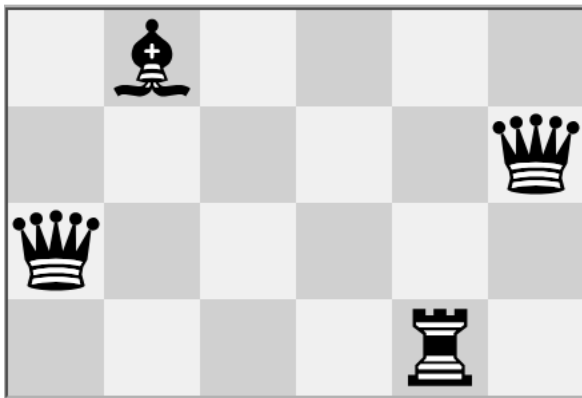
```
0
1
8
6
2
```

Main Sample Explanations

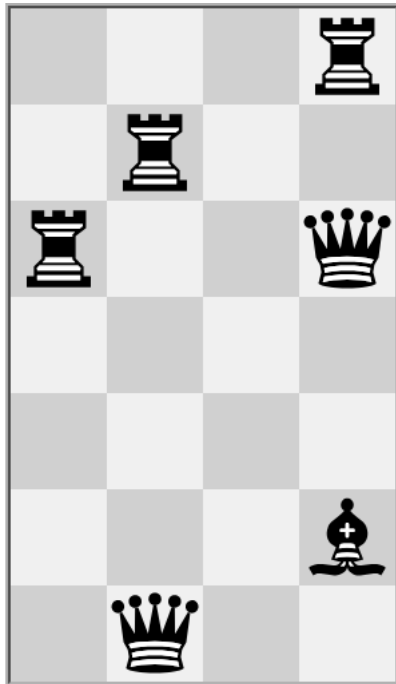
For test case #1, no piece can attack any other piece.



For test case #2, the bishop at (2, 4) can attack the rook at (5, 1), but not vice versa.



For test case #3, the rook at (2, 6) and the queen at (2, 1) can attack each other, the rook at (1, 5) and the queen at (4, 5) can attack each other, the rook at (4, 7) and the queen at (4, 5) can attack each other, the queen at (4, 5) can attack the bishop at (4, 2), and the bishop at (4, 2) can attack the rook at (1, 5).



For test case #4, the queen at (256, 332) and the bishop at (539, 615) can attack each other, the queen at (256, 332) and the bishop at (91, 497) can attack each other, and the rook at (359, 615) can attack the bishops at (359, 436) and (539, 615).

For test case #5, the queen at (1, 11235) can attack the bishop at (1, 22562), and the rook at (1, 45690) can attack the bishop as well. The rook and queen cannot attack each other because the bishop is in between them.