

UCF Local Contest — August 31, 2013

Knightmare

filename: knightmare

Probably the night before this contest you had a great sense of anticipation. While sleeping, you had a horrible nightmare about an impossibly difficult chess problem. Well, here it is!

The Problem:

Given a large number of knights on an infinite chessboard, determine the number of squares each of which is currently being threatened by k or more knights. Unfortunately for you, these are not normal knights! They can move in the following way. Each knight has two values, a and b . For any two integers, i ($1 \leq i \leq a$) and j ($1 \leq j \leq b$), the knight can move to any of the following squares relative to its current location: (i, j) , $(-i, j)$, $(i, -j)$, $(-i, -j)$, $(-j, -i)$, $(-j, i)$, $(j, -i)$, (j, i) . Any of these squares are considered threatened.

The Input:

The first line of the input contains a single positive integer, n , representing the number of boards to analyze. Each board starts with a new line containing two integers, p ($1 \leq p \leq 10^5$) and k ($1 \leq k \leq 10$), representing the number of knights and the value k from above, respectively. This is followed by p lines representing each knight. Each of these p lines contains four integers, r , c , a and b ($0 \leq r \leq 10^9$; $0 \leq c \leq 10^9$; $1 \leq a \leq 10^9$; $1 \leq b \leq 10^9$), representing the row and column the knight occupies as well as its a and b values (from above).

The Output:

For each board, output the number of squares each of which threatened by k or more knights.

Sample Input:

```
3
2 10
10 10 2 1
10 10 1 2
1 1
10 10 2 1
2 2
10 10 2 2
13 10 2 2
```

Sample Output:

```
0
12
8
```