

Endless Knight

Problem

In the game of chess, there is a piece called the knight. A knight is special -- instead of moving in a straight line like other pieces, it jumps in an "L" shape. Specifically, a knight can jump from square $(r1, c1)$ to $(r2, c2)$ if and only if $(r1 - r2)^2 + (c1 - c2)^2 = 5$.

In this problem, one of our knights is going to undertake a chivalrous quest of moving from the top-left corner (the $(1, 1)$ square) to the bottom-right corner (the (H, W) square) on a gigantic board. The chessboard is of height H and width W .

Here are some restrictions you need to know.

- The knight is so straightforward and ardent that he is only willing to move towards the right *and* the bottom. In other words, in each step he only moves to a square with a bigger row number and a bigger column number. Note that, this might mean that there is no way to achieve his goal, for example, on a 3 by 10 board.
- There are R squares on the chessboard that contain rocks with evil power. Your knight may not land on any of such squares, although flying over them during a jump is allowed.

Your task is to find the number of unique ways for the knight to move from the top-left corner to the bottom-right corner, under the above restrictions. It should be clear that sometimes the answer is huge. You are asked to output the remainder of the answer when divided by 10007, a prime number.

Input

Input begins with a line containing a single integer, N . N test cases follow.

The first line of each test case contains 3 integers, H , W , and R . The next R lines each contain 2 integers each, r and c , the row and column numbers of one rock. You may assume that $(1, 1)$ and (H, W) never contain rocks and that no two rocks are at the same position.

Output

For each test case, output a single line of output, prefixed by "Case # X : ", where X is the 1-based case number, followed by a single integer indicating the number of ways of reaching the goal, modulo 10007.

Limits

Time limit: 30 seconds per test set.

Memory limit: 1GB.

$1 \leq N \leq 100$

$0 \leq R \leq 10$

Small dataset (Test set 1 - Visible)

$1 \leq W \leq 100$

$1 \leq H \leq 100$

$1 \leq r \leq H$
 $1 \leq c \leq W$

Large dataset (Test set 2 - Hidden)

$1 \leq W \leq 10^8$
 $1 \leq H \leq 10^8$
 $1 \leq r \leq H$
 $1 \leq c \leq W$

Sample

| Sample Input | | | |
|--------------|----|---|--|
| 5 | | | |
| 1 | 1 | 0 | |
| 4 | 4 | 1 | |
| 2 | 1 | | |
| 3 | 3 | 0 | |
| 7 | 10 | 2 | |
| 1 | 2 | | |
| 7 | 1 | | |
| 4 | 4 | 1 | |
| 3 | 2 | | |

| Sample Output | |
|---------------|---|
| Case #1: | 1 |
| Case #2: | 2 |
| Case #3: | 0 |
| Case #4: | 5 |
| Case #5: | 1 |