Downhill Marble Labyrinth (prob7)

The Problem

Marble labyrinth is a handheld dexterity game that consists of a maze with holes sitting on top of a box and a small marble. The objective is to guide the marble through the maze without letting it fall into any of the holes. Consider a variation of the game where we have a landscape instead of the maze and the marble is only allowed to move to an adjacent position either horizontally or vertically that is lower in elevation.

The landscape is represented in the form of a 2 dimensional grid with m rows and n columns. The number in each grid is a non-negative integer that gives the elevation of the grid. Please count the total number of valid paths for the marble to go from the top left position to the bottom right. For example, there are two paths for the landscape given by:

7	**6**	**5**
9	**4**	**3**
1	**8**	**2**

Input

The first line of input contains the total number of test cases. The next several lines describe each of these test cases. Each test case contains m and n on the first line, where $1 \leq m, n \leq 1000$. The following m lines contain exactly n non-negative unique integers, each in the range [1, 1000000000] that represent elevations.

Output

For each of the test cases, please return the total number of valid paths from the top left to the bottom right positions. All results should be modulo 1000.

Sample Input

```
2
3 3
7 6 5
9 4 3
1 8 2
2 2
4 3
2 1
```

Sample Output

```
2
2
```