Problem: Mascots

Time limit: 2 seconds
Memory limit: 256 MB

Problem Statement

JOI and his friends were playing with mascots. After play time, his friends have gone home and and he needs to clean up.

JOI has a total of $R \times C$ mascots and needs to arrange them into a grid of R rows and C columns with 1 mascot in each grid cell. We represent the cell in the A-th row from the top and B-th column from the left by (A, B). Initially, N of the mascots have already been placed in the gird before the cleaning starts. It is guaranteed that at least 1 mascot has already been placed before the cleaning starts.

JOI now places the mascots into the squares one by one. After placing each mascot, if all the cells that already have mascots form a rectangle then JOI feels happy. This excludes the case where the cells with the initially placed mascots form a rectangle. For the cells to form a rectangle, there must exist 4 integers r_1, r_2, c_1, c_2 such that for all $r_1 \leq i \leq r_2$ and $c_1 \leq j \leq c_2$, the cell (i, j) has a mascot placed in it and all other cells do not have mascots placed in them. The more times JOI feels happy, the better he can sleep and thus he wants to maximise the number of times he feels happy.

All the mascots are indistinguishable so only the order in which the mascots are placed in the cells matter. JOI wants to know how many ways are there to place the mascots one by one such that the number of times he feels happy is maximised.

Input

The input consists of the following:

- The first line of input contains 2 integers, R and C representing the number of rows and columns of the grid

- The second line of input contains an integer N, the number of mascots placed initially

- The next N lines of input each contain two integers, A_i, B_i representing the cells where there are mascots placed initially. It is guaranteed that $1 \leq A_i \leq R$ and $1 \leq B_i \leq C$. No coordinate will appear more than once.

Output

Output a single integer, representing the number of ways to place the mascots such that the number of times he feels happy is maximised, modulo $10^9 + 7$

Subtasks

Subtask	Score	R, C
1	10	$1 \leq R, C \leq 3$
2	30	$1 \leq R, C \leq 50$
3	60	$1 \leq R, C \leq 3000$

For all test cases, $1 \leq N \leq min(RC, 100000)$

Sample Input 1

```
2 3
2
1 2
2 2
```

Sample Output 1

```
8
```

Sample Explanation

The mascots placed beforehand are shown as triangles. The maximum number of times JOI can feel happy is 2 and there are a total of 8 ways to do it as shown below. The numbers show the order in which the mascots are placed.

1	△	3
2	△	4

1	△	4
2	△	3

2	△	3
1	△	4

2	△	4
1	△	3

3	△	1
4	△	2

3	△	2
4	△	1

4	△	1
3	△	2

4	△	2
3	△	1

After placing 2 mascots, they will form a 2×2 rectangle and after placing all the remaining mascots, they will form a 2×3 rectangle, making JOI feel happy twice.

Sample Input 2

```
3 3
2
1 1
3 3
```

Sample Output 2

```
5040
```

Sample Explanation

Regardless of how the mascots are placed, JOI will only feel happy once at the end after everything is placed.