Problem B: Boulevard Blueprint

A newly planned urban area in Hanoi city has a beautiful layout. The urban area is in the shape of a rectangle with dimensions $w \cdot h$. The bottom-left corner of the urban area is at point $(0, 0)$, and the top-right corner is at point (w, h). This urban area has $w + 1$ vertical boulevards that run evenly spaced at $x = 0, x = 1, x = 2, \ldots, x = w$. It also has $h + 1$ horizontal boulevards that run evenly spaced at $y = 0, y = 1, y = 2, \ldots, y = h$.

The management of the urban area wants to assign directions to nearly all boulevards, allowing **at most one** to remain two-way to help reduce congestion. Vertical boulevards should either go from North to South or South to North, and horizontal boulevards should either go from West to East or East to West.

There are n prioritized movement requests between two locations (u_j, v_j) and (p_j, q_j) $(1 \leq j \leq n)$. A prioritized movement request between two locations (u_j, v_j) and (p_j, q_j) is considered satisfied if **both conditions** below are met:

- It is possible to move from (u_j, v_j) to (p_j, q_j) with **at most one *turn***.
- It is possible to move from (p_j, q_j) to (u_j, v_j) with **at most one *turn***.

A *turn* is a change in travel direction from a vertical boulevard to a horizontal boulevard, or from a horizontal boulevard to a vertical boulevard.

You need to count the number of ways to set the directions of the boulevards to satisfy all the movement requests, while keeping **at most one** boulevard two-way. Two configurations are considered different if there exists at least one boulevard that is assigned a different direction. As the result may be large, you only need to find its remainder after dividing $998\,244\,353$.

Input

The first line contains a single positive integer t ($t \leq 10^5$) representing the number of test cases. The description of the test cases follows.

The first line contains three positive integers w, h and n ($1 \leq w, h \leq 2 \cdot 10^5$, $1 \leq n \leq 10^5$) – the width of the urban area, the height of the urban area, and the number of priority requests, respectively.

The j-th line of the next n lines contains four integers u_j, v_j, p_j, q_j ($0 \leq u_j, p_j \leq w$, $0 \leq v_j, q_j \leq h$) – the j-th prioritized movement request.

It is guaranteed that:

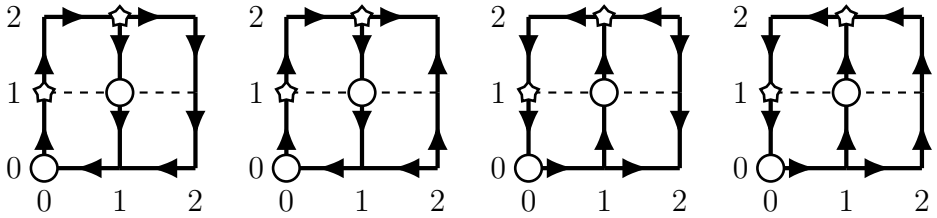
- the sum of w over all test cases does not exceed $2 \cdot 10^5$,
- the sum of h over all test cases does not exceed $2 \cdot 10^5$, and
- the sum of n over all test cases does not exceed 10^5.

Output

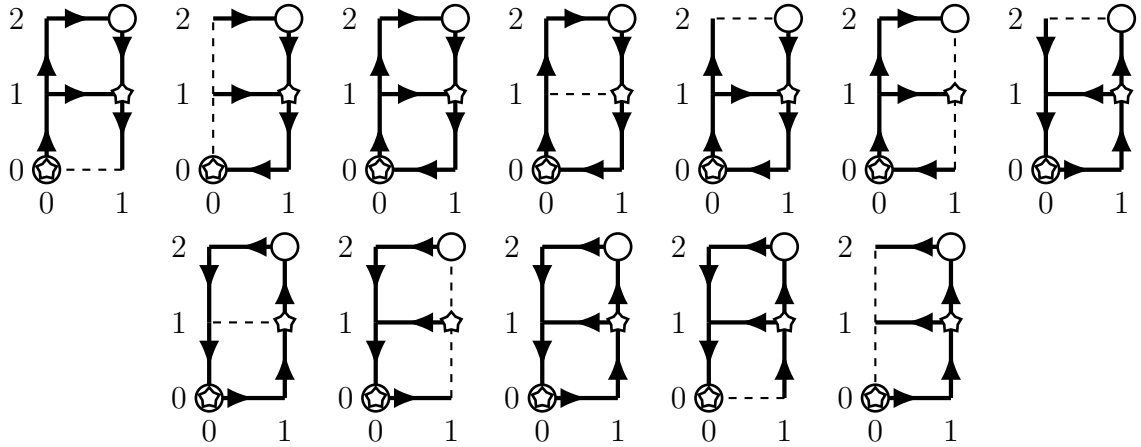
For each test case, print the number of ways to set the direction of boulevards. As the result may be large, you only need to print its remainder after dividing $998\,244\,353$.

Sample Explanation

Below are illustrations for all possible configurations of the test cases. The dashed lines represent the **two-way** boulevards. Locations with the same shape represent the pair of locations with prioritized movement requests.



All possible configurations in the first test case



All possible configurations in the second test case

Sample Input 1	Sample Output 1
4 2 2 2 0 0 1 1 0 1 1 2 1 2 2 0 0 1 2 0 0 1 1 2 2 2 0 0 1 1 1 1 2 2 2 2 3 0 0 1 1 0 0 2 2 1 1 2 2	4 12 14 0