

The Only Way to the Destination

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 512 megabytes

There is a maze that can be represented as $n \times m$ grids. For convenience, we define (x, y) as the grid in the x -th row and y -th column.

Initially, every grid is empty. Alice wants to design this maze. So she will place k walls in the grids. Each wall is represented as x_1, x_2, y , where it means that $\forall x_1 \leq i \leq x_2$, (i, y) will become a part of this wall and cannot be passed by. Except wall grids, all of the other grids are empty. Alice ensures that after placing k walls, all empty grids remain connected and the maze has at least one empty grid. And it is guaranteed that different walls have no common grids.

Now, Alice wants to know, does any pair of empty grids have only one simple path connecting them?

If you are not familiar with the definition of “simple path”, here is it:

A simple path connecting empty grids (x_s, y_s) and (x_d, y_d) is defined as a sequence of grid positions $S = \{(x_1, y_1), (x_2, y_2) \cdots (x_{len}, y_{len})\}$, ($len \geq 2$) that satisfies the following conditions:

- $(x_1, y_1) = (x_s, y_s), (x_{len}, y_{len}) = (x_d, y_d)$
- $\forall 1 \leq i \leq len, 1 \leq x_i \leq n, 1 \leq y_i \leq m$
- $\forall 1 \leq i \leq len, (x_i, y_i)$ is an empty grid
- $\forall 1 \leq i \leq len - 1, |x_i - x_{i+1}| + |y_i - y_{i+1}| = 1$
- $\forall 1 \leq i < j \leq len, (x_i, y_i) \neq (x_j, y_j)$

If any two different empty grids $(x_s, y_s), (x_d, y_d), \{(x_s, y_s) \neq (x_d, y_d)\}$ have exactly one simple path connecting them, output “YES”. Otherwise, output “NO”.

Input

The first line contains three integers n, m, k ($1 \leq n, m \leq 10^9, 1 \leq k \leq 10^5$), indicating the number of rows, the number of columns, and the number of walls.

For the next k lines, each line contains three integers x_1, x_2, y ($1 \leq x_1 \leq x_2 \leq n, 1 \leq y \leq m$) indicating a wall placed in the maze.

It is guaranteed that each pair of empty grids has at least one simple path connecting them.

Output

Output a string to represent the answer, “YES” or “NO”.

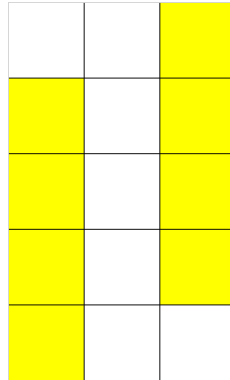
Examples

standard input	standard output
5 3 2 2 5 1 1 4 3	YES
5 3 1 2 4 2	NO
2 4 2 2 2 1 1 1 4	NO

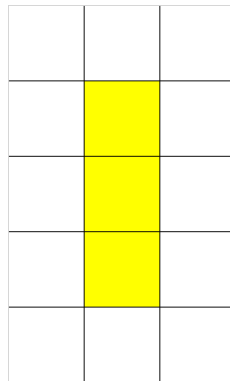
Note

Sample explanations contains Alice's maze, with yellow squares representing walls and white squares representing empty grids.

1. In the first example, we can observe that regardless of the choice of starting and ending grid, there is only one simple path.



2. In the second example, choose (1,1) as the starting grid and (5,1) as the destination grid. $S_1 = \{(1,1), (2,1), (3,1), (4,1), (5,1)\}$ and $S_2 = \{(1,1), (1,2), (1,3), (2,3), (3,3), (4,3), (5,3), (5,2), (5,1)\}$ are two different simple paths.



3. In the third example, choose (1,2) as the starting grid and (2,3) as the destination grid. $S_1 = \{(1,2), (1,3), (2,3)\}$ and $S_2 = \{(1,2), (2,2), (2,3)\}$ are two different simple paths.

