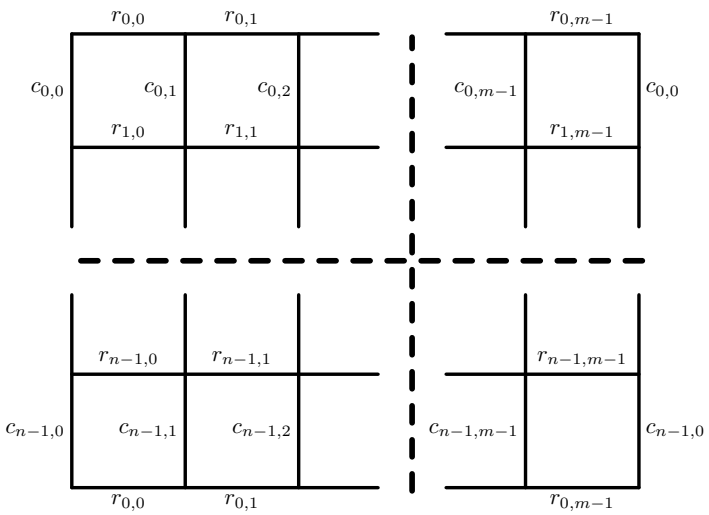
Problem A. God of Winds

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	512 megabytes

During his famous journey, Odysseus visited Aeoli island which was ruled by Aeolus, the keeper of the winds. Odysseus spent a month there, resting and telling Aelous intriguing twists of his story. One evening Odysseus asked Aeoli if he was able to set up an arbitrary wind circulation over a toroidal map of a certain size.

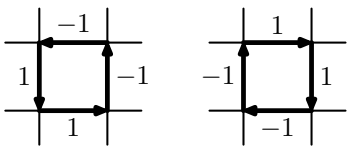
Formally, consider an $n \times m$ rectangular grid. The grid is toroidal which means that the topmost horizontal grid edges are identified with the bottommost grid edges, as are the leftmost vertical grid edges and the rightmost vertical edges. Hence, there are $2nm$ distinct grid edges in total. We denote the j-th from the left cell of the i-th from the top row as cell (i, j) (both indices are 0-based).

Define *wind* as an arbitrary assignment of integers to each of the grid edges. These numbers are denoted as given on the picture below, i.e. $r_{i,j}$ is an integer assigned to the top edge of the grid cell (i, j), and $c_{i,j}$ is an integer assigned to the left edge of the grid cell (i, j). Note that there are no dedicated values $r_{n,j}$ and $c_{i,m}$ since the grid is toroidal, but for the sake of simplicity we will define $r_{n,j}$ equal to $r_{0,j}$, and $c_{i,m}$ equal to $c_{i,0}$.



A positive value of $r_{i,j}$ corresponds to the wind flowing from left to right, a negative value of $r_{i,j}$ corresponds to the wind flowing from right to left. The absolute value of $r_{i,j}$ defines the wind flow. Similarly, positive $c_{i,j}$ corresponds to the wind flowing from top to bottom, and negative $c_{i,j}$ corresponds to the wind flowing from bottom to top.

Aeolus is capable of creating unit *cyclons* and *anticyclons*. Adding a unit *cyclon* around a grid cell (i, j) increases $r_{i+1,j}$ and $c_{i,j}$ by 1, and decreases $r_{i,j}$ and $c_{i,j+1}$ by 1; informally, this means that we add a unit of wind flow around the cell (i, j) in counter-clockwise direction. Adding a unit *anticyclone* results in completely the opposite: $r_{i+1,j}$ and $c_{i,j}$ are decreased by 1, $r_{i,j}$ and $c_{i,j+1}$ are increased by 1. As one can notice, adding one cyclon and one anticyclon to the same cell does not change anything.



Cyclone and anticyclone

Odysseus challenged Aeolus claiming that he would not be able to obtain a given wind by creating several cyclons and anticyclones starting from zero wind (i.e. wind with all edge values equal to zero). Write a program that determines if this is possible or not.

Input

The first line contains two integers n and m ($2 \leq n, m \leq 500$) — the dimensions of the grid size.

The following n lines define the desired wind. In the i-th of the following lines there are $2m$ integers $r_{i,0}, c_{i,0}, r_{i,1}, c_{i,1}, \ldots, r_{i,m-1}, c_{i,m-1}$ ($-10^7 \leq r_{i,j}, c_{i,j} \leq 10^7$).

Output

If it is possible to obtain the given wind by creating several cyclones and anticyclones, print "`Yes`" (without quotes). Otherwise, print "`No`" (without quotes).

Examples

standard input	standard output
2 3 -1 -2 0 0 -3 2 1 0 0 1 3 -1	Yes
2 2 0 0 0 1 1 0 -1 -1	No

Note

One of the possible ways to obtain the wind from the first sample is to take two cyclones around the cell $(0, 2)$, one anticyclone around the cell $(1, 2)$, and one anticyclone around the cell $(1, 0)$.