Problem K. Spiral Matrix

Input file:	*standard input*
Output file:	*standard output*
Time limit:	5 seconds
Memory limit:	512 mebibytes

Define a *neighbouring* pair of cells in a matrix as a pair of cells (r_a, c_a) and (r_b, c_b) such that:

- either $r_a = r_b$ and $|c_a - c_b| = 1$,

- or $c_a = c_b$ and $|r_a - r_b| = 1$.

Define a *spiral matrix* as a matrix which satisfies the following conditions:

- The matrix contains only distinct positive integers.

- One can start from some cell (i, j) and arrange all other cells in a path, so that every two consecutive cells in the path are a neighbouring pair, and by following the path from (i, j) and considering the values in the matrix, we form a continuous integer interval $[l..r]$ in the order of visiting them.

Given is a matrix of size $n \times m$ consisting of distinct positive integers. We are also given q queries. Each query defines a submatrix with corners (r_1, c_1) and (r_2, c_2). For each query, determine whether this submatrix is spiral.

Input

The first line contains three integers n, m and q ($1 \le n, m \le 2000$, $1 \le q \le 10^6$), denoting the size of the matrix and the number of queries, respectively.

Each of the next n lines contains m integers. The j-th integer on the i-th of these lines denotes the element $a_{i,j}$ located in the i-th row and j-th column of the matrix ($1 \le a_{i,j} \le 10^9$). It is guaranteed that all elements are distinct.

Each of the next q lines contains four integers r_1, c_1, r_2, c_2 ($1 \le r_1 \le r_2 \le n$, $1 \le c_1 \le c_2 \le m$), denoting the corners of a submatrix.

Output

For each query, print the answer on a separate line. Print "YES" if the submatrix is spiral, or "NO" otherwise.

Example

standard input	standard output
5 7 10	NO
10 11 12 13 14 15 16	YES
9 2 3 32 31 30 17	NO
8 1 4 25 26 29 18	YES
7 6 5 24 27 28 19	YES
52 51 50 23 22 21 20	NO
1 1 5 7	YES
1 1 4 1	YES
2 2 5 3	YES
1 4 5 7	NO
1 1 4 3	
1 1 5 3	
2 2 2 2	
2 2 2 3	
3 4 5 7	
3 3 4 4	