OTHS Coding Competition 2 P4 - Magic Barrier

Time limit: 3.0s **Memory limit:** 512M

Frieren is analyzing a magic barrier, whose strength at specific points can be represented as a 2D grid, a, with N rows, M columns, and unique values. Specifically, the strength of the barrier on the r^{th} row and c^{th} column is $a_{r,c}$. She asks you Q questions in the form of (k, r_1, c_1, r_2, c_2) and your task for each of them is to determine whether k exists in the inclusive rectangle formed by a_{r_1,c_1} and a_{r_2,c_2}.

Note: Fast input is highly recommended for this problem. Also, Python users should submit with PyPy as it is significantly faster.

Constraints

All values of $a_{r,c}$ are unique.

$1 \leq k, a_{r,c} \leq 10^9$

$1 \leq r_1 \leq r_2 \leq N$

$1 \leq c_1 \leq c_2 \leq M$

Subtask 1 [15%]

$1 \leq N, M, Q \leq 10$

Subtask 2 [85%]

$1 \leq N, M \leq 1000$

$1 \leq Q \leq 2 \times 10^5$

Input Specification

The first line contains 3 integers, N, M, and Q.

The next N lines contain M integers each, representing the barrier strength $a_{r,c}$.

The next Q lines contain 5 integers each, k, r_1, c_1, r_2, c_2.

Output Specification

For each question, output `yes` if the k for that question exists in the given rectangle and `no` otherwise.

Sample Input 1

```
3 3 3
1 7 11
10 5 9
4 3 2
10 1 1 1 2
3 2 2 3 3
100 2 2 3 3
```

Sample Output 1

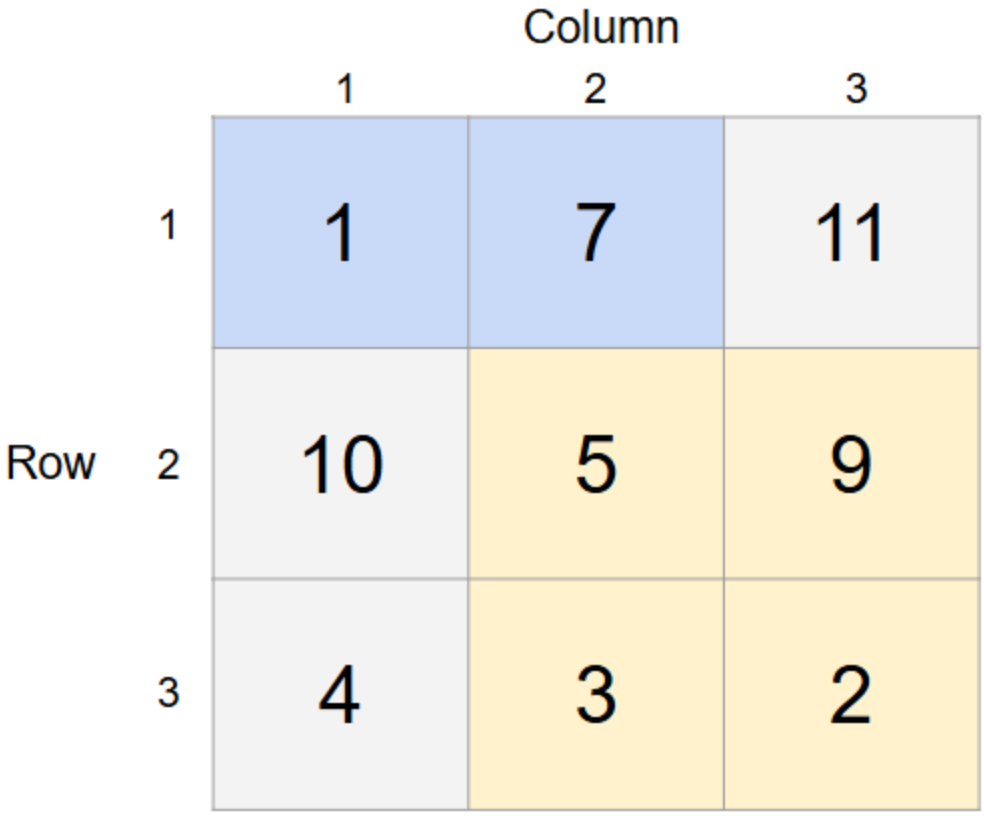
```
no
yes
no
```

Explanation for Sample Output 1

The rectangle for the first question is shown in blue. 10 **is not** inside it.

The rectangle for the second question is shown in yellow. 3 **is** inside it.

The rectangle for the third question is shown in yellow. 100 **is not** inside it (it's not even in the grid).



Sample Input 2

```
2 3 2
1 2 3
4 5 6
1 1 1 1 1
1 2 2 2 3
```

Sample Output 2

```
yes
no
```