Path Finder

Time limit: 1.0s **Memory limit:** 512M
Java 8: 2.0s
PyPy 2: 2.0s
PyPy 3: 2.0s

You are given an $N \times M$ grid with K blocked squares and the others open. From an open square, you may move to any other open square that shares an **edge** with your current square. Please find out whether there is a path from $(1, 1)$ to (N, M).

Constraints

For all subtasks:

$2 \leq N, M \leq 5 \times 10^5$

$0 \leq K \leq \min(5 \times 10^5, N \times M - 2)$

$1 \leq r_i \leq N$

$1 \leq c_i \leq M$

Each given blocked square is unique, and the squares $(1, 1)$ and (N, M) will not be blocked.

Subtask 1 [15%]

$2 \leq N, M \leq 2 \times 10^3$

Subtask 2 [85%]

No additional constraints.

Input Specification

The first line will contain 3 integers N, M, and K.

The next K lines will each contain 2 integers r_i and c_i, representing that square (r_i, c_i) is blocked.

Output Specification

Output one line containing `YES` if it is possible to reach (N, M) from $(1, 1)$, or `NO` otherwise.

Sample Input 1

```
5 5 11
2 2
4 2
3 2
2 3
5 2
3 1
1 5
3 5
2 5
4 5
4 4
```

Sample Output 1

```
YES
```

Explanation for Sample 1

The following is a diagram for the grid given in Sample 1 (`.` marks open squares, while `#` marks blocked squares):

```
....#
.##.#
##..#
.#.##
.#...
```

It can be shown that there is a path from $(1, 1)$ to $(5, 5)$ in the grid above.

Sample Input 2

```
5 5 9
5 1
1 2
1 5
3 2
2 3
5 3
3 3
3 5
4 4
```

Sample Output 2

```
NO
```

Explanation for Sample 2

The following is a diagram for the grid given in Sample 2 (`.` marks open squares, while `#` marks blocked squares):

```
.#..#
..#..
.##.#
...#.
#.#..
```

It can be shown that there are no paths from $(1, 1)$ to $(5, 5)$ in the grid above.