ICPC PACNW 2016 F - Illumination

Time limit: 0.6s **Memory limit:** 256M

You inherited a haunted house. Its floor plan is an n-by-n square grid with l lamps in fixed locations and no interior walls. Each lamp can either illuminate its row or its column, but not both simultaneously. The illumination of each lamp extends by r squares in both directions, so a lamp unobstructed by an exterior wall of the house can illuminate as many as $2r + 1$ squares.

If a square is illuminated by more than one lamp in its row, or by more than one lamp in its column, the resulting bright spot will scare away ghosts forever, diminishing the value of your property. Is it possible for all lamps to illuminate a row or column, without scaring any ghosts? Note that a square illuminated by two lamps, one in its row and the other in its column, will not scare away the ghosts.

Input

The first line of input contains three positive integers, n, r and l $(1 \leq n, r, l \leq 1000)$.

Each of the next l lines contains two positive integers r_i and c_i $(1 \leq r_i, c_i \leq n)$, indicating that there is a lamp in row r_i and column c_i.

It is guaranteed that all lamps are in distinct locations.

Output

Print, on a single line, `YES` if it is possible to illuminate all lamps as stated above; otherwise, print `NO`.

Sample Input 1

```
3 2 5
1 1
1 3
3 1
3 3
2 2
```

Sample Output 1

```
YES
```

Sample Input 2

```
3 2 6
1 1
1 2
1 3
3 1
3 2
3 3
```

Sample Output 2

```
NO
```