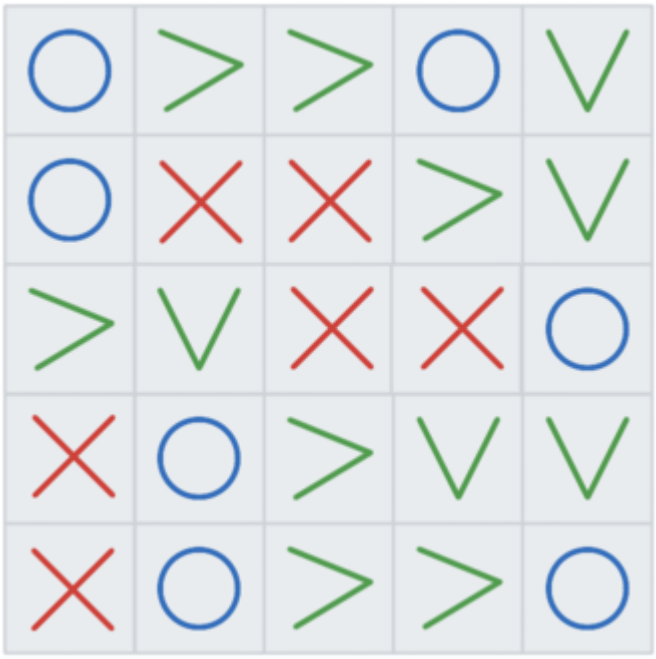
Hockeygrid

Firdavs found an ancient game of hockeygrid consisting of N rows and N columns. He found that each cell of the grid is of one of four types:

- **Right arrow:** If a player is inside that cell, he directly moves to the neighboring cell to its right
- **Down Arrow:** If the player is inside this cell, he moves to the neighboring cell to the bottom
- **Circle:** If the player is inside this cell, he can choose to move to the right neighboring cell or the bottom neighboring cell
- **Cross:** If a player is inside this cell, he loses



Hockeygrid of the sample.

Initially the player is in cell $(1, 1)$. To win the game, he must reach the destination cell (N, N) by following the above rules and staying within the grid.

Firdavs then decided to analyze this grid thoroughly. He found out some important observations about this grid:

- From the starting cell $(1, 1)$, one can reach every circle cell
- From each circle cell, you can reach the destination cell (N, N)
- The starting cell and the destination cell are guaranteed to be the circle cells

After that, Firdavs got bored. So he decided to make Q plans for himself. In each plan, Firdavs chooses some set of **circular** cells that he wants to visit in one pass. Note that each plan is considered independently, and he can visit these cells in any order.

Answer Firdavs for each of his plans, is there a path going through all the cells he has chosen.

Input

The first line contains a single integer T — the number of test cases.

For each test case:

The first line contains two integers N and Q — the size of the grid and the number of plans.
Then N lines follow, each consisting of N characters. In the i-th row and j columns will be the type of the cell (i, j):

- `>` Right Arrow
- `v` Down Arrow
- `o` Circle
- `x` Cross

Each of the next Q lines contains one integer k and $2 \cdot k$ integers $x_1\ y_1\ x_2\ y_2\ \ldots\ x_k\ y_k$. The cells (x_i, y_i), which should be visited during this plan.

Output

For each plan print, on a new line, `Yes` if it is possible to visit all important cells, otherwise `No`.

Constraints

Let $\sum N^2$ be the sum of N^2 over all test cases, and $\sum k$ the sum of k over all test cases and plans.

- $1 \le T \le 5 \times 10^4$
- $1 \le \sum N^2 \le 5 \times 10^5$
- $1 \le \sum k \le 5 \times 10^5$

Subtasks

1. (11 points) Grid fully consists of circle cells
2. (26 points) Number of the circle cells is at most 60
3. (63 points) No additional constraints

Examples

Example 1

Input

```
1
5 2
o>>ov
oxx>v
>vxxo
xo>vv
xo>>o
2 1 4 3 5
4 2 1 4 2 5 2 1 4
```

Output

```
Yes
No
```

Explanation for the first test case: We can use the following route to pass through the cells $(1, 4)$ and $(3, 5)$