Problem K: Kooky Tic-Tac-Toe

Time limit: 6s, memory limit: 1GB.

Every player in "Tic-Tac-Toe" sooner or later realises that there exists a simple strategy to guarantee a draw, which makes this game a bit uninteresting. In this problem, instead of making the optimal moves in the classic game of "Tic-Tac-Toe", we will consider its more general variant and solve the reversed problem: for a given state of the board, is it possible that this is the state in which some correct game ended?

For the purpose of this problem, we will assume that the game is played on a board $n \times n$, consisting of (initially empty) unit squares. Players alternate to make moves, placing their symbol with each move (for one of the players it is a circle, for the other a cross) into the selected empty field. **The first move can be made by any player.** After a player has performed their move, if a sequence of identical symbols has appeared on k consequtive sequares in one of the four possible directions (horizontally, vertically, diagonally, or antidiagonally [1]), the corresponding player wins and the game is over. Finally, if neither player wins and the entire board is full, the game is declared a draw.

The input contains a board with some circles, crosses and free squares. Decide if there exists a valid game that could end with the given board. Note that in this hypothetical game, players do not have to play optimally, they just need to follow the game rules described above.

Input

The first line of input contains the number of test cases z ($1 \leqslant z \leqslant 10\,000$). The descriptions of the test cases follow.

The first line of each test case contains two integers n, k ($3 \leqslant n \leqslant 6$, $2 \leqslant k \leqslant n$) – the board size and the number of adjacent symbols needed to win.

Each of the following n lines contains n characters, describing the board. Possible signs in the board description are `.` (blank space), `x` (cross), and `o` (circle).

Output

For each test case, output `TAK` on the first line if the given board can be a final correct position in Tic-Tac-Toe, or `NIE` otherwise.

If the answer is affirmative, output the description of an example game in the following lines, giving the possible order of filling the fields. In the i-th line of the game description, output two integers x_i, y_i ($1 \leqslant x_i, y_i \leqslant n$), meaning that the field in the x_i-th row (counting from the top) and the y_i-th column (counting from the left) was filled in the i-th move.

If there are multiple correct answers, you can output any of them.

[1] The "diagonal" direction means the oblique direction to the right and down, and "antidiagonal" direction means the oblique direction to the left and down.

Example

For an example input:	A possible correct output is:
7 3 3 x.o xxx o.o 4 3 xx.x ...o ..o. .o.. 3 3 xoo oxx xoo 3 2 xoo oxx xoo 3 3 xox .o. xox 3 2 xo. ..x xo. 3 3 x.. .x. ..x	TAK 2 2 1 3 1 1 3 3 2 1 3 1 2 3 TAK 1 1 3 3 1 2 4 2 1 4 2 4 TAK 1 2 1 1 1 3 3 1 2 1 2 2 3 2 2 3 3 3 NIE NIE NIE NIE

Explanation

Test 1: The game was won by cross.

Test 2: Circle won, taking three consecutive squares in the antidiagonal direction.

Test 3: The game ended in a draw.

Test 4: Any sequence of moves leading to this board would have resulted in a win for one of the players earlier than in the ninth move.

Test 5: Cross had to make the last move, which contradicts the fact that circle won.

Test 6: The board is in a valid state, but the game is not finished.

Test 7: Cross made three moves while the circle made none.