Tetris

Just one more level! Lea is on her way to finally beat Bea's highscore at Tetris. They play an advanced Tetris game with unusual types of pieces which is extremely hard to master. The pieces are a connected set of tiles which are of size 1×1. The pieces fall down from top of the screen until they hit another piece. The game is so fast that is is impossible to position pieces while they are falling down. Lea can just move and rotate them in the fraction of a second before they enter the board. Formally speaking, Lea can choose a horizontal offset and a rotation for her tile, then it is falling down until it shares a horizontal edge with another piece or the bottom of the board. The final position of the piece is legal if and only if the piece does not intersect with tiles already on the board and fits completely on the board. If a piece does not fit on the board the game is over: Lea keeps her score up to this piece.

If one line is fully filled with tiles it is erased and all tiles above fall down exactly one line. To make advanced strategic planning possible, the game shows the next few pieces to the player. Can you tell Lea how many lines she can fill up completely?

Input

The first line of the input contains an integer t. t test cases follow, each of them separated by a blank line.

Each test case starts with a line containing an integer n, the number of pieces that will be falling down. $n + 1$ blocks follow, the first one describing the board and the next n ones describing the pieces that will arrive in order.

Each block starts with two integers w and h, the block's width and height. h lines follow, containing w characters each. Each of these characters will be X for a used tile or a dot for an unused tile.

Output

For each test case, output one line containing "Case #i: y" where i is its number, starting at 1, and y is the maximum number of lines that Lea can eliminate.

Constraints

- $1 \le t \le 10$
- $1 \le n \le 4$
- $5 \le w \le 10$, $5 \le h \le 20$ for the board.
- $1 \le w \le 5$, $1 \le h \le 5$ for the pieces.
- All pieces will be connected and there will not be empty lines (horizontal or vertical) in the pieces falling down
- Initially, the board does not contain lines full of tiles.

Sample Input 1

```
3
1
5 5
.....
X....
XX...
XX...
XXX..
4 1
XXXX

1
5 5
.....
.....
.....
X...X
X.X.X
2 3
XX
.X
XX

3
7 10
.......
.......
.......
.......
X......
XX..XXX
XXX.XXX
XXX.XXX
XXXXXX.
.XXX.XX
3 2
XX.
.XX
2 3
.X
.X
XX
2 2
XX
XX
```

Sample Output 1

```
Case #1: 1
Case #2: 2
Case #3: 4
```

Sample Input 2

```
3
1
7 6
.......
.......
.......
.......
.......
..XXXXX
3 3
.XX
.XX
XXX

2
9 6
.........
.........
.........
.........
.........
X..X.X..X
3 2
.XX
XXX
5 2
..X.X
XXXXX

2
8 7
........
........
........
........
........
........
.X.XXXXX
4 4
XXXX
XXXX
XXXX
XX.X
5 4
..X.X
.XXXX
XXXX.
..XX.
```

Sample Output 2

```
Case #1: 1
Case #2: 0
Case #3: 1
```