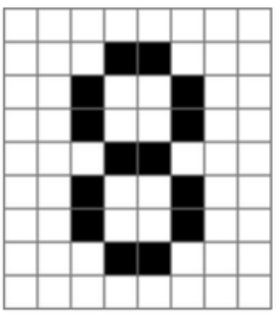
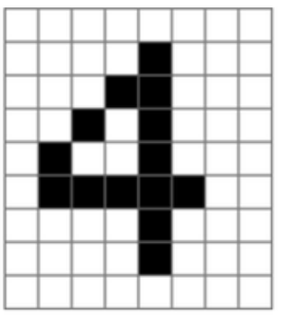
That's So Characteristically Euler!

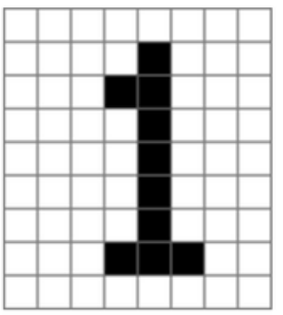
Problem Statement

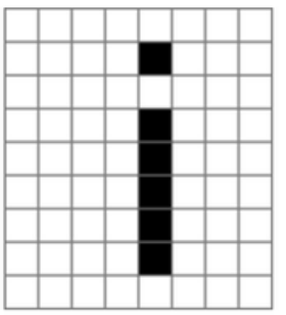
Topology is a branch of mathematics that examines the shapes and structures of objects. The *Euler characteristic* is a topological label that we can determine for an item or collection of items. For a group of two dimensional objects, one way to define the Euler characteristic is the number of connected objects minus the number of holes in the objects.

The Euler characteristic has useful applications in 2D image recognition and classification. Consider the following black and white representations of three digits and a letter and their corresponding Euler characteristics.


1 connected region
2 holes
Euler characteristic = -1


1 connected region
1 hole
Euler characteristic = 0


1 connected region
0 holes
Euler characteristic = 1


2 connected regions
0 holes
Euler characteristic = 2

As you can see, the Euler characteristic can give a lot of information about what a given image might or might not represent. Note that, in this problem, we consider filled-in regions that touch diagonally to be part of the same connected region; however, holes that only touch diagonally are considered to be separate. Your task is to compute the Euler characteristic (connected regions minus holes) for a black and white image similar to those above.

Input Format

Each input contains multiple test cases. The first line of input contains an integer t, $1 <= t <= 10$.

Following this line are t test cases, each with the following format:

- The first line of the test case contains an integer n, giving the height of the image.
- The second line of the test case contains an integer m, giving the width of the image.
- The rest of the test case contains n lines of text. These n lines of text contain m characters, each of which is either the letter 'X' or the letter 'O'. An 'X' represents a black pixel, and an 'O' represents a white pixel.
- The possible ranges for n and m are $1 <= n <= 1{,}000$ and $1 <= m <= 1{,}000$. The input will always be correctly formatted.

Output Format

The correct output for each input is a single integer per test case (each integer on its own line) which gives

the Euler characteristic for each input image.

Sample Input

```
1
4
4
OOOO
OXXO
OXXO
OOOO
```

Sample Output

```
1
```

Explanation

The sample input contains a single image. The image contains a single connected square region surrounded by empty space.

Thus, 1 region - 0 holes = 1.