

Contest Duration: 2025-06-14(Sat) 22:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250614T2100&p1=248>) - 2025-06-14(Sat) 23:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250614T2240&p1=248>) (local time) (100 minutes)

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## F - Balanced Rectangles

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Time Limit: 3 sec / Memory Limit: 1024 MiB

Score : 525 points

### Problem Statement

You are given an  $H \times W$  grid, where each cell contains # or ..

The information about the symbols written in each cell is given as  $H$  strings  $S_1, S_2, \dots, S_H$  of length  $W$ , where the cell in the  $i$ -th row from the top and  $j$ -th column from the left contains the same symbol as the  $j$ -th character of  $S_i$ .

Find the number of rectangular regions in this grid that satisfy all of the following conditions:

- The number of cells containing # and the number of cells containing . in the rectangular region are equal.

Formally, find the number of quadruples of integers  $(u, d, l, r)$  that satisfy all of the following conditions:

- $1 \leq u \leq d \leq H$
- $1 \leq l \leq r \leq W$
- When extracting the part of the grid from the  $u$ -th through  $d$ -th rows from the top and from the  $l$ -th through  $r$ -th columns from the left, the number of cells containing # and the number of cells containing . in the extracted part are equal.

You are given  $T$  test cases. Find the answer for each of them.

## Constraints

- $1 \leq T \leq 25000$
- $1 \leq H, W$
- The sum of  $H \times W$  over all test cases in one input does not exceed  $3 \times 10^5$ .
- $S_i$  is a string of length  $W$  consisting of # and ..

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## Input

The input is given from Standard Input in the following format:

```
T  
case1  
case2  
:  
caseT
```

case<sub>i</sub> represents the  $i$ -th test case. Each test case is given in the following format:

```
H W  
S1  
S2  
:  
SH
```

## Output

Output  $T$  lines. The  $i$ -th line should contain the answer for the  $i$ -th test case.

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## Sample Input 1

CopyCopy

3  
3 2  
##  
#. .  
..  
6 6  
. # ...  
. # .. #  
#. #. #.  
. #### ..  
##### #  
. #### ..  
15 50  
.....#.....###.###.###.###  
.....#..#..#.....#.#. #...#.#..  
.....#...#####...#....###.#.#.###.###  
.....#..##.##..#....#...#. #. #....#  
.....#####....###.###.###.###  
.....#....#.....#  
.###....#....#....#..#.#.###.###.###. #  
#..#....#....#....#..#.#....#....#..#  
#..#....#....#....#..#.#....#....#..#  
#....##...##...##..#....#..#.#....#....#..#  
#....#..#.#..#..#..#..#....#....#....#....#..#  
#....#..#.#..#..#..#..#....#....#....#....#....#..#  
#....#..#.#..#..#..#..#....#....#....#....#....#....#..#  
#....#..#.#..#..#..#..#....#....#....#....#....#....#....#..#  
#....#..#.#..#..#..#..#....#....#....#....#....#....#....#....#..#

## Sample Output 1

Copy

Copy

4  
79  
4032

This input contains 3 test cases.

For the 1st case, the following 4 rectangular regions satisfy the conditions in the problem statement:

- From the 1st to 2nd rows from the top, from the 2nd to 2nd columns from the left
  - From the 2nd to 3rd rows from the top, from the 1st to 1st columns from the left
  - From the 2nd to 2nd rows from the top, from the 1st to 2nd columns from the left
  - From the 1st to 3rd rows from the top, from the 1st to 2nd columns from the left

/#telegram  
æ#url=https%3A%2F%2Fatcoder.jp%2Fcontests%2Fabc410%2Ftasks%2Fabc410\_f%3Flang%3Den&title=F%  
:s)

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