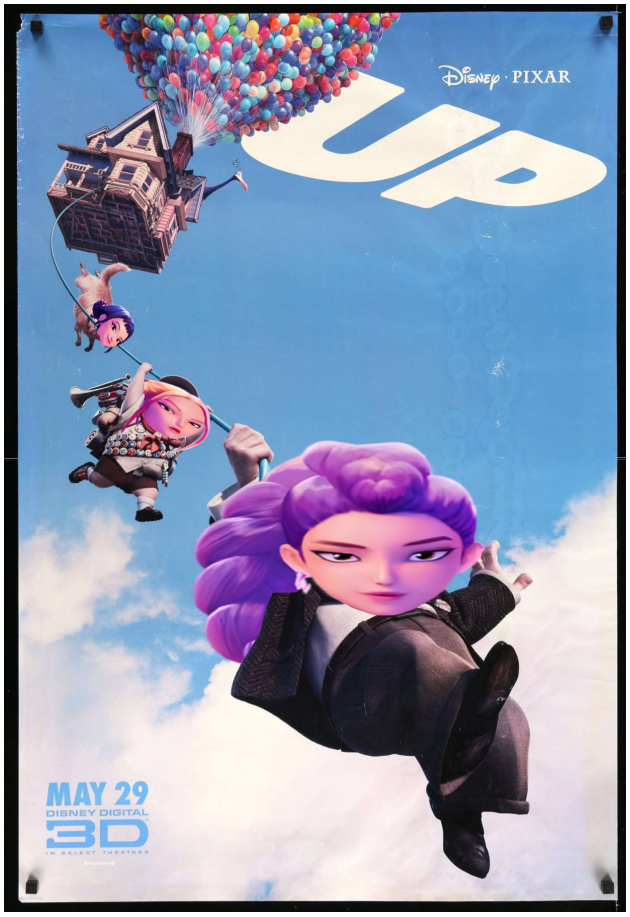
Problem 3: GOLDEN Bears
5 Points

Problem ID: `up`
Rank: `1`

Introduction

The characters from KPop Demon Hunters (Iwk don't know their names) have gone up up up so high that they crash from below into the floating house from the movie Up (with enough force to create a hole in the floor)! Carl has just renovated the house and is very sad that his beautiful new tiled floor has been destroyed, and wants to know how much of it he needs to replace.



Problem Statement

You are given an $\mathbf{N}$ by $\mathbf{M}$ side view of a character. Empty spots are denoted by a `.` (period), and non-empty spots are denoted by a numerical value representing the depth $\mathbf{D}$. Find the area of the floor that will be destroyed—in other words, the minimum area of the top view of the figure.

*Note: Templates are available for this problem—and **all other problems in this contest**—in Python, Java, and C++! Find them in the contest.zip provided at the start of the contest. Templates handle input and output for you, so you can just fill out a single function!*

Input Format

The first line of the input contains a single integer $\mathbf{T}$ denoting the number of test cases that follow.

For each test case:

- The first line contains two numbers $\mathbf{N}$ and $\mathbf{M}$ representing the dimensions of the side view of the character.
- Each of the next $\mathbf{N}$ lines contains a string of length $\mathbf{M}$. These strings combine to form an image of the side view of the character.

Output Format

For each test case, output the minimum area of the floor that will be destroyed by the character.

Constraints

$1 \leq \mathbf{T} \leq 10$
$1 \leq \mathbf{N} \leq \mathbf{M} \leq 100$
$1 \leq \mathbf{D} \leq 9$

Sample Test Cases

Sample Input Download

```
4
7 7
.......
.11111.
.1.....
.11111.
.1...1.
.11111.
.......
7 7
.......
.11131.
.....1.
....1..
...1...
..2....
.......
9 14
..............
...33333333...
..4........4..
..4..8..8..4..
..4........4..
..4.2....2.4..
..4..2222..4..
..4........4..
...11111111...
2 2
..
..
```

Sample Output Download

```
5
8
42
0
```

Sample Explanations

Test case #1:

(a) Side View (b) Top View

Figure 1: As shown the smallest area of flooring that will be destroyed is `5`

Test case #2:

(a) Side View (b) Top View

Figure 2: As shown the smallest area of flooring that will be destroyed is `8`

Test case #3:

(a) Side View (b) Top View

Figure 3: As shown the smallest area of flooring that will be destroyed is `42`