Problem C: Fruit Walk

Filename: `fruit`

Time l imit: `5 seconds`

Your mother wants you to eat all of your fruit, but you don't want to. To entice you, she's created a video game, similar to the old Pac Man Video Game where you walk through a grid to get your fruit. You always start at the top left corner and exit at the bottom right corner. Each open location in the grid is marked with a '.' character and each location that stores a fruit is marked with a lowercase letter. Here is an example grid:

```
....s...
.b..p..a
........
......c.
```

Your mother insists that you eat _**every**_ fruit in the grid. Each step you take must be up, down, left or right in the grid and you can revisit squares that have fruit just to walk through them. It turns out that you don't like walking very much either. So, you'd like to minimize the number of steps that take you from the top left to the bottom right while getting to each fruit.

For example, if you were at 'b' and wanted to walk to 's' in the sample grid above, you could take 1 step up and 3 steps to the right for a total of 4 steps.

Problem
Given a grid with **N** rows and **M** columns showing the locations of all the fruit that you need to eat, calculate the fewest steps you can take to travel from the top left of the grid to the bottom right while visiting each square that has fruit (and eating that fruit!)

Input
The first line will contain a single integer **T**, the number of test cases.

The first line of each test case will contain two integers **N** and **M** denoting the number of rows and columns in the grid, respectively.

N lines follow, each consisting of exactly **M** characters, either lowercase letters or the '.' character, indicating the contents of that grid location.

Output
For each input case on a line by itself, output a single integer: the fewest number of steps necessary to start from the top left of the grid, end at the bottom right, and visit each square that has fruit.

Input Bounds and Corresponding Credit

20 Points	80 Points
$1 \leq T \leq 10$ $1 \leq N, M \leq 10$ - There will be at most 2 fruits in the grid. - There will be no fruit at the top left or bottom right of the grid.	$1 \leq T \leq 10$ $1 \leq N, M \leq 100$ - There will be at most 10 fruits in the grid. - There will be no fruit at the top left or bottom right of the grid.

Samples

Input	Output
2	6
2 6 .a.... ..b...	14
4 8 ....s... .b..p..a ....c.	

Note: Only the first sample is valid for the 20 point input cases.