

Problem 157: ASCII Squares

Difficulty: Hard

Author: Louis Ronat, Denver, Colorado, United States

Originally Published: Code Quest 2021

Problem Background

Issac, a clever tile setter, has decided to charge his customers in a different way from his competitors in the hope of making some additional money off clients who don't notice a slight difference in the wording of his contracts.

Issac's competitors all charge based on the number of tiles laid down, but Issac plans to charge based on the number of *squares* laid down. He hopes most clients will think this is the same thing, since each tile is a square, but Issac also intends to charge them based on the larger squares formed by multiple tiles. In order to determine how much to charge, Issac has asked you to write a program to calculate the number of squares in a given tile layout. He's provided you with ASCII-art "sketches" of the tile layouts he's been hired to build.

Problem Description

Issac's tile layouts consist of pipes (|), underscores (_), and spaces. Your job is to count the number of "squares" formed in the layout.

A single tile, which constitutes a 1x1 square, looks like this:

```
|_|
```

A 2x2 square must have a perimeter like the one shown below. The contents of the square may be empty (which occurs if there is a "hole" within the layout, surrounded by other tiles) or may contain some smaller squares.

```
|_|_|  
|_|_|
```

Similarly, for larger squares, an NxN square must have N underscores across the top and bottom, with each underscore separated by a space or a pipe. It must also have N pipes on both the left and right sides. Pipes and underscores may also appear within the shape.

Your program must count the number of squares - of any size - in the provided image. Note that non-square rectangles of any size are not counted.

Sample Input

The first line of your program's input, **received from the standard input channel**, will contain a positive integer representing the number of test cases. Each test case will include:

- A line containing a positive integer, **X**, representing the number of lines in the tile layout.
- **X** lines consisting of pipes, underscores, and spaces, representing the tile layout. Lines will not contain any trailing whitespace, and as such may not all be the same length, even within the same test case.

25

4

Sample Output

For each test case, your program must print a single line containing an integer representing the total number of squares of any size present in the provided tile layout.

30
21