Village Building

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

After the light was born, people came to see it not just as something that illuminated their surroundings, but as a power that could permeate their lives and spaces.

They dreamed of a new village where the light could reach everyone. To fulfill that vision, they carefully chose land where the light could seep into every corner.

Trace back the land they chose, and reconnect the scattered fragments.

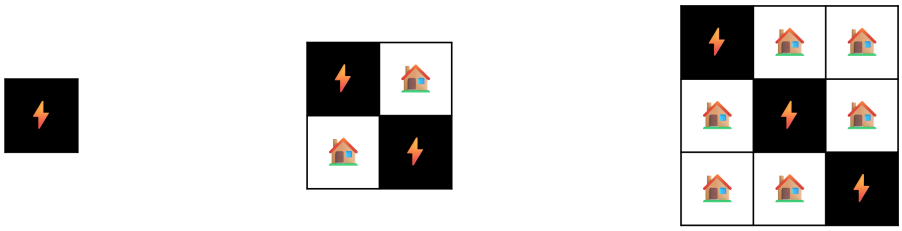
On the ancient island, there was a land shaped as a grid with N rows and M columns. The cell at the r-th row from the top and c-th column from the left is denoted as (r, c).

Light could not pass through hardened soil — instead, it seeped gently through soft and transparent ground. To build their village, the people distinguished between land that light could pass through and land where houses could be constructed.

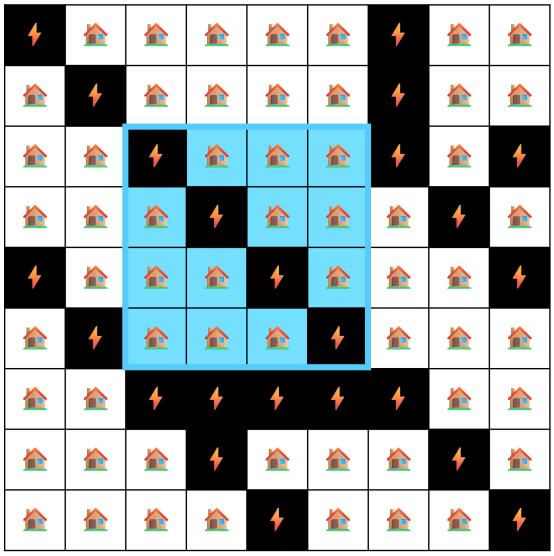
They decided to build the village in regions of the land that satisfied the following conditions:

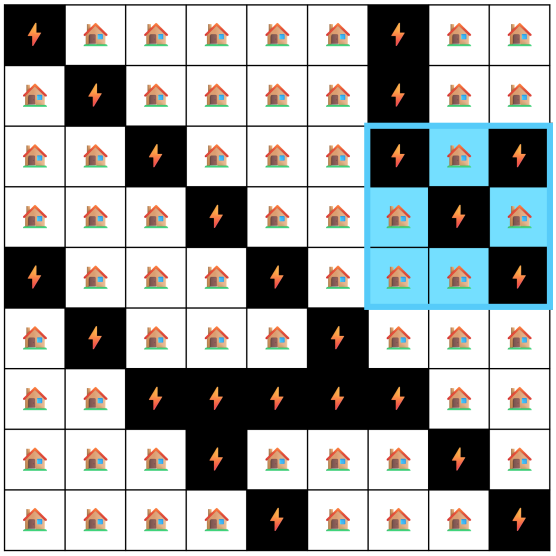
- The region must form a perfect square.
- The cells along the main diagonal must allow light to flow. (The main diagonal runs from the top-left to the bottom-right of the square.)
- All other cells not on the main diagonal must be suitable for building houses.

Below are examples of valid $K \times K$ regions for $K = 1, 2, 3$. In the image below, the black cells are light-flowable cells, and the white cells are house-buildable cells.



In the examples below, the 4×4 region denoted on the left is a valid area to build a village. However, the region denoted on the right is invalid because not all non-diagonal cells are house-buildable.





Your task is to find the number of square regions, for each size, where a village can be built.

Input

The first line contains two space-separated integers N and M, representing the size of the land.

Each of the next N lines contains M characters $A_{i1}, A_{i2}, \cdots, A_{iM}$ indicating the type of land on cells $(i, 1), (i, 2), \cdots, (i, M)$. If A_{ij} is `'X'`, it means a cell that light can flow; if A_{ij} is `'.'`, it means a cell suitable for building houses.

- $2 \leq N \leq 2000$
- $2 \leq M \leq 2000$
- A_{ij} is either `'X'` or `'.'`. $(1 \leq i \leq N, 1 \leq j \leq M)$

Output

For each integer K from 1 to $\min(N, M)$, output the number of valid $K \times K$ square regions where a village can be built in order, one per line.

Scoring

- Subtask 1 (4 points): $A_{ij} =$ 'X' $(1 \leq i \leq N, 1 \leq j \leq M)$
- Subtask 2 (11 points): $N = 2$
- Subtask 3 (27 points): $N \leq 80, M \leq 80$
- Subtask 4 (25 points): $N \leq 400, M \leq 400$
- Subtask 5 (33 points): No additional constraints.

Examples

standard input	standard output
4 4 X..X .X.. ..X. X..X	6 3 2 0
2 6 XXX..X .X.X..	6 1
4 5 XXXXX XXXXX XXXXX XXXXX	20 0 0 0
9 9 X.....X.. .X....X.. ..X...X.X ...X...X. X...X...X .X...X... ..XXXXX.. ...X...X. ....X...X	23 12 6 3 0 0 0 0 0