

## Problem Dungeons

Input file        `stdin`  
Output file      `stdout`

*Dungeon Crawl: Paper Soup* just became the most popular game, and you are about to give it a try. The game takes place on a rectangular field which consists of  $N$  rows and  $M$  columns, where each cell can be one of the following types:

- empty cell '.';
- wall '#';
- coin cell 'o';
- explosive mine cell 'X';
- starting cell 'S'.

It's guaranteed that the first and the last rows and columns contain only walls (take notice that the player cannot move through wall cells). The field will contain one or more starting cells. When the game starts, the player will be positioned at one of the starting cells, marked with an 'S'. Because the game takes place in a dungeon system with reduced visibility, the player can't see the entire map, only a  $3 \times 3$  square centered on his current position. Also, for the player the mines and starting cells appear as empty cells (they are invisible).

With each move, the player can only go to an adjacent cell to the north, south, east or west. If they enter a cell with a coin, the coin is collected and disappears. If they enter a cell with an explosive mine, the dungeon system collapses, the player loses all the coins they picked up and the game ends.

The good news is that you obtained the map of the dungeon by browsing multiple online guides. However, you won't know what your starting position will be – although it is guaranteed that you will begin at one of the starting cells. If you play optimally, what's the maximum number of coins you are guaranteed to obtain (again, without knowing where you start)?

### Input data

On the first line of the input there will be  $N$  and  $M$ , the number of rows and columns of the map where the game will take place. The next  $N$  rows contain the map, each row with  $M$  characters, using the representation described in the problem statement.

### Output data

The output should contain only one number, the maximum number of coins that can be obtained on the respective map without knowing the starting position.

### Restrictions

- Let  $S$  be the number of possible starting cells on the map.
- $N \leq 400$ ,  $M \leq 400$ ,  $S \leq 60$ .

#	Points	Restrictions
1	3	$S = 1$ . There are no mines. Outside of the first and last row or column there are no walls.
2	7	$N = 3$
3	12	$S = 1$
4	23	$S = 2$
5	41	$1 \leq N, M \leq 250$ , $1 \leq S \leq 12$
6	14	No further restrictions

## Examples

Input file	Output file
<pre>3 7 ##### #Soooo# #####</pre>	4
<pre>3 8 ##### #SoXooS# #####</pre>	1
<pre>7 18 ##### #.....# #...SX.....o.# #...X..X.....o.# #.....XS.....o.# #.....# #####</pre>	0
<pre>7 18 ##### #...#.....# #...SX.....o.# #...X..X.....o.# #.....XS.....o.# #.....#.....# #####</pre>	6
<pre>7 18 ##### #.....X..S....oo# ##### #..o..S.X.....o.# #####X##### #o.....S...X.....# #####</pre>	1

## Explanations

**Example 1** There is only one starting position, therefore we know the position that the player will start in. In this case the player can collect all the coins available in the dungeon.

**Example 2** There are two starting positions and the player can deduce where they are located based on what they see from the start (@ is the position of the player):

```
###    ###
#@o    o@#
###    ###
```

The maximum number of coins that can be collected if the player starts in the left starting position is 1, whereas in the right starting position it is 2. Therefore, in the worst case the we can collect 1 coin.

**Example 3** Regardless of the starting position, in the worst case the player will step on a mine and lose. The initial zone that the player sees is:

```
...
.@.
...
```

**Example 4** Based on the position of the wall (top left or bottom right) the player can figure out the starting position and safely collect all 6 coins. The view at the start of the game will be one of those 2:

```
#..    ...
.@.    .@.
...    ..#
```

**Example 5** The player moves 2 spaces to the left. If they see a coin, then they are on the fourth row, so they will obtain the coin.

Otherwise, the player still doesn't know if they are in the second or sixth row, so they will then move 4 spaces to the right. If the player sees an empty space in the top-right cell (mine cells will show as empty cells), then they are on the sixth row, so they will move left to pick up the coin.

If they won't see an empty cell in the top-right, then the player will move to the right to pick up the 2 coins, since they are on the second row. Therefore, the minimum amount of coins that can be collected is 1.

We can observe that going first to the right is dangerous, as the player may step on the mine from the middle row before getting any information from the nearby cells.