Bloomberg CODECON

Memory Limit: 1350 MB
Time Limit: 5 s

The Bedlam in the Pantry (400 points)

Introduction

Fenwick works at Bloomberg. At lunchtime, Bloomberg offices provide soups & salads. There are usually several spots where the food is distributed, but the pantry is crowded by other people also trying to get free lunch.

Fenwick is not the type of person that waits in line. He wants to know the shortest distance he'd have to cross to sneak up to where the food is distributed.

Input Specifications

First line: N and M, the dimensions of the pantry (4 <= N <= 10000, 4 <= M <= 10000).

Other lines: N lines of M characters, representing the top-down map of Bloomberg's pantry. 'X' represents an obstacle, '.' represents free space, '*' represents Fenwick, 'S' represents lunch foods.

The outer perimeter of the pantry will always consist of obstacles, representing people closing-in onto the food.

Fenwick can only move up, down, left or right, because he bought a faulty hoverboard.

Output Specifications

A single integer, telling the length of the shortest path to any food. Output -1 if no foods are reacheable.

Sample Input/Output

Input

```
6 11
XXXXXXXXXXX
X.S.X.....X
X.XX...*..X
X....XXXX.X
XS....S...X
XXXXXXXXXXX
```

Output

```
7
```

Explanation

There are two paths of length 7 that lead to bottom-right food. The other foods are further away.

Input

```
6 11
```

```
XXXXXXXXXXX
X.S.X.....X
X.XX...*..X
X...XXXXXXX
XS....S...X
XXXXXXXXXXX
```

Output

```
-1
```

Explanation

No foods are reacheable without queueing.