

Maze

Given a maze, you can move through empty squares in 4 directions. Your task is to find the length of the optimal path between two marked squares.

Input

The first line contains two numbers r and c ($1 \leq r, c \leq 1000$).

Next, there are r lines, each containing c symbols. A dot represents an empty square, a hash symbol represents a wall (impassable square), and the letters S and F represent squares between which you need to find the path. It is guaranteed that there is exactly one S and F on the input.

Output

The output should contain a single number: the length of the shortest path between the marked squares. If there is no path, print -1 .

Example

input

```
5 5
..S.#
###..
.F#..
.##..
.....
```

output

```
11
```