Problem: Tom, Jerry, and a Maze

Tom has a maze, which is a grid of $H \times W$ squares with H horizontal rows and W vertical columns. The square at the i-th row from the top and the j-th column from the left is an *obstactle* square if S_{ij}, is #, and a *free* square if S_{ij} is .

From a free square, you can move to a horizontally or vertically adjacent free square.

Jerry cannot move out of the maze, move to an obstacle square, or move diagonally.

Tom will choose an **origin** square and a **target** square, which can be any free square, and give the maze to Jerry.

Jerry will then travel from the origin square to the target square, in the minimum number of moves required.

Naturally, Tom wants to force Jerry to walk as much as possible. In this situation, find the maximum possible number of moves Jerry has to make given that Tom can choose any origin and target square.

Constraints

- $1 \leq H, W \leq 20$
- S_{ij}, is . Or #.
- S contains at least two occurrences of .
- Any free square can be reached from any free square in zero or more moves.

Input

Input is given from Standard Input in the following format:

```
H  W

S₁₁...S₁W

.
```

$S_{H1}...S_{HW}$

Output

Print the maximum possible number of moves Jerry has to make.

Sample Input 1

```
3 3
...
...
...
```

Sample Output 1

```
4
```

If Tom chooses the top-left square as the origin square and the bottom-right square as the target square, Jerry has to make four moves.

Sample Input 2

```
3 5
...#.
.#.#.
.#...
```

Sample Output 2

```
10
```

If Tom chooses the bottom-left square as the origin square and the top-right square as the target square, Jerry has to make ten moves.

TEST CASES

Test case 1

20 20
```
....................
##################.
..................
.##################
##################.
..................
.##################
..................
##################.
..................
.##################
..................
##################.
..................
.##################
..................
##################.
..................
.##################
```

Output: 209

Test case 2

20 20
```
....................
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
.################.
....................
```

Output: 38

Test case 3

```
20 20
#...................
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
.#################.
...................
```

Output: 74

Test case 4

```
1 2
..
```

Output: 1

Test case 5

```
1 20
....................
```

Output: 19

Test case 6

```
14 12
############
###......###
###.####.###
###.####.###
#....#.....#
#.##.#.....#
#.##.#######
#.##.#.....#
#....#.....#
##.#####.###
##.#####.###
##.#####.###
##.#####.###
##.......###
```

Output: 40

Test case 7

```
20 19
...#...#...#...#...
.#.#.#.#.#.#.#.#.#.
.#...#...#...#...#.
.################.
.#...#...#...#...#.
.#.#.#.#.#.#.#.#.#.
...#...#.#.#...#...
########.#.########
...#...#.#.#...#...
.#.#.#.###.#.#.#.#.
.#...#...#...#...#.
.################.
.#...#...#...#...#.
.#.#.#.#.#.#.#.#.#.
...#...#.#.#...#...
########.#.########
.........#.........
.################.
.#...#...#...#...#.
...#...#...#...#...
```

Output: 208

Test case 8

```
20 1
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
.
```

Output: 19