D - Takahashi the Wall Breaker

Editorial (/contests/abc400/tasks/abc400_d/editorial)

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 400 points

Problem Statement

Takahashi is about to go buy eel at a fish shop.

The town where he lives is divided into a grid of H rows and W columns. Each cell is either a road or a wall.
Let us denote the cell at the i-th row from the top $(1 \leq i \leq H)$ and the j-th column from the left $(1 \leq j \leq W)$ as cell (i, j).
Information about each cell is given by H strings $S_1, S_2, \ldots, S_H$, each of length W.
Specifically, if the j-th character of S_i $(1 \leq i \leq H, 1 \leq j \leq W)$ is ., cell (i, j) is a road; if it is #, cell (i, j) is a wall.

He can repeatedly perform the following two types of actions in any order:

- Move to an adjacent cell (up, down, left, or right) that is within the town and is a road.
- Choose one of the four directions (up, down, left, or right) and perform a **front kick** in that direction.
  When he performs a front kick, for each of the cells at most 2 steps away in that direction from the cell he is currently in, if that cell is a wall, it becomes a road.
  If some of the cells at most 2 steps away are outside the town, a front kick can still be performed, but anything outside the town does not change.

He starts in cell (A, B), and he wants to move to the fish shop in cell (C, D).
It is guaranteed that both the cell where he starts and the cell with the fish shop are roads.
Find the minimum **number of front kicks** he needs in order to reach the fish shop.

Constraints

- $1 \leq H \leq 1000$
- $1 \leq W \leq 1000$
- Each S_i is a string of length W consisting of `.` and `#`.
- $1 \leq A, C \leq H$
- $1 \leq B, D \leq W$
- $(A, B) \neq (C, D)$
- H, W, A, B, C, and D are integers.
- The cell where Takahashi starts and the cell with the fish shop are roads.

Input

The input is given from Standard Input in the following format:

$$
\begin{aligned}
&H \quad W \\
&S_1 \\
&S_2 \\
&\vdots \\
&S_H \\
&A \quad B \quad C \quad D
\end{aligned}
$$

Output

Print the minimum number of front kicks needed for Takahashi to reach the fish shop.

Sample Input 1 Copy

Copy

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```
10 10
..........
#########.
#.......#.
#..####.#.
##....#.#.
#####.#.#.
.##.#.#.#.
###.#.#.#.
###.#.#.#.
#.....#...
1 1 7 1
```

Sample Output 1 Copy

```
1
```
Copy

Takahashi starts in cell $(1, 1)$.
By repeatedly moving to adjacent road cells, he can reach cell $(7, 4)$.
If he performs a front kick to the left from cell $(7, 4)$, cells $(7, 3)$ and $(7, 2)$ turn from walls to roads.
Then, by continuing to move through road cells (including those that have become roads), he can reach the fish shop in cell $(7, 1)$.

In this case, the number of front kicks performed is 1, and it is impossible to reach the fish shop without performing any front kicks, so print 1.

Sample Input 2 Copy

```
2 2
.#
#.
1 1 2 2
```
Copy

Sample Output 2 Copy

```
1
```
Copy

Takahashi starts in cell $(1, 1)$.
When he performs a front kick to the right, cell $(1, 2)$ turns from a wall to a road.
The cell two steps to the right of $(1, 1)$ is outside the town, so it does not change.
Then, he can move to cell $(1, 2)$ and then to the fish shop in cell $(2, 2)$.

In this case, the number of front kicks performed is 1, and it is impossible to reach the fish shop without performing any front kicks, so print 1.

Sample Input 3 Copy

```
1 3
.#.
1 1 1 3
```

Sample Output 3 Copy

```
1
```

When performing a front kick, it is fine if the fish shop's cell is within the cells that could be turned into a road. Specifically, the fish shop's cell is a road from the beginning, so it remains unchanged; particularly, the shop is not destroyed by the front kick.

Sample Input 4 Copy

```
20 20
####################
##...##....###...###
#.....#.....#.....##
#..#..#..#..#..#..##
#..#..#....##..#####
#.....#.....#..#####
#.....#..#..#..#..##
#..#..#.....#.....##
#..#..#....###...###
####################
####################
##..#..##...###...##
##..#..#.....#.....#
##..#..#..#..#..#..#
##..#..#..#..#..#..#
##.....#..#..#..#..#
###....#..#..#..#..#
#####..#.....#.....#
#####..##...###...##
####################
3 3 18 18
```

Sample Output 4 Copy

2026-01-02 (Fri)
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Copy

3

#telegram)

url=https%3A%2F%2Fatcoder.jp%2Fcontests%2Fabc400%2Ftasks%2Fabc400_d%3Flang%3Den&title=D%20-
Breaker)

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