COCI '14 Contest 5 #2 Zmija

Time limit: 0.6s **Memory limit:** 32M

Mirko is making a clone of the popular computer game "Snake". In the game, you control the movement of a snake on a screen with dimensions of $R \cdot S$ pixels. The objective of the game is to collect all the apples.

Unfortunately, Mirko's implementation isn't that great and the gameplay is different than the original. Here is a description of Mirko's game:

- unlike the original, the apples don't appear randomly on the screen, but instead you know the positions of all apples at the beginning of the game
- at the beginning of the game, the snake is located in the lower left pixel of the screen and is facing right
- there are two buttons in the game, denoted with `A` and `B`
- when you press the button `A`, the snake moves forward by 1 pixel in the direction which it is currently facing. If that move would cause the snake to go off screen, nothing happens.
- when you press the button `B`, the snake moves up by 1 pixel and changes the direction it's facing by 180°
- when the snake moves to a pixel containing an apple, it eats the apple but doesn't grow like in the original game

You have the following task: for given positions of apples at the beginning of the game, determine the **smallest number of button presses** it takes for the snake to collect **all the apples.**

Input

The first line of input contains the integers R and S $(2 \leq R, S \leq 1\,000)$, the height and width of the screen.

Each of the following R lines contains exactly S characters. These characters represent the content of the screen. Pixels with apples on them are denoted with `J` and empty pixels are denoted with `.`.

The lower left corner contains the character `Z` that represents the snake in its initial position.

Output

The first and only line of output must contain the required minimal number of button presses.

Sample Input 1

```
5 5
...J.
.....
J..J.
J....
Z....
```

Sample Output 1

```
7
```

Explanation for Sample Output 1

The shortest sequence of button presses needed for the snake to collect all the apples is `BBAAABB`.

Sample Input 2

```
5 5
.....
J...J
.J.J.
.JJJ.
Z....
```

Sample Output 2

```
15
```

Sample Input 3

```
3 4
...J
....
Z...
```

Sample Output 3

```
5
```