Problem P7

You are given a rectangular field, bounded on the outside edge by an impenetrable wall. In this field there is a designated **Start** position where a robot is placed. There is another designated **Finish** position where the robot must end up. The robot can move to any of its four neighboring squares (UP, DOWN, LEFT or RIGHT) provided that square does not contain a wall. The goal is to identify the length of the **shortest** path from Start to Finish (you can assume that the path always exists). A wall is represented by the “*” character, the start position by an “S”, the finish position by an “F” and an empty spot is represented by a space (“ ”). In the maze below, the robot needs 18 steps to get from “S” to “F”:

```
*************
*           *
* S   **    *
*       *   *
*       *   *
*       * F *
*************
```

```
*************
*           *
* S   **    *
*       *   *
*       *   *
*     .   . *
*     .   . *
*************
```

**Input Format**

Your program will read from standard input. The first line will contain two positive integer W and H separated by a space, where $3 \leq W \leq 15$ and $3 \leq H \leq 15$. The remaining H lines of input each contain W characters and represent the maze using character “*” to represent a wall, the space (“ ”) character is an empty room, the “S” character is the start position and the “F” character is the end position. There will only be a single “S” and “F” character in the input and you can be assured that there is indeed a path (moving only UP, DOWN, LEFT and RIGHT) from the Start position to the Finish position.

**Output Format**

Your program will write to standard output a single integer on a line by itself to represent the number of steps it takes the robot to go from Start to Finish.

**Sample Input and Corresponding Sample Output**

<table>
<thead>
<tr>
<th>Sample Input</th>
<th>Sample Output</th>
</tr>
</thead>
</table>
| 13 8  
*************
*           *
* S   **    *
*       *   *
*       *   *
*       * F *
************* | 18 |

<table>
<thead>
<tr>
<th>Sample Input</th>
<th>Sample Output</th>
</tr>
</thead>
</table>
| 3 4  
***  
*S*  
*F*  
*** | 1 |

<table>
<thead>
<tr>
<th>Sample Input</th>
<th>Sample Output</th>
</tr>
</thead>
</table>
| 7 5  
*******  
*S   *  
*   *  
*   F*  
******* | 6 |

<table>
<thead>
<tr>
<th>Sample Input</th>
<th>Sample Output</th>
</tr>
</thead>
</table>
| 9 3  
*******  
*S F*  
******* | 2 |