

Problem 4—Portal Maze

It's amazing how quickly Jack can get from point A to point B in real time. I figure he must have portals that allow him to transport directly from one spot to another without hitting the spots in between. Imagine we have portals in a maze. Going from a square with an entry portal to a square with the corresponding exit portal takes only one move! Portals work in one direction only. You can't move directly from an exit portal to an entry portal. Additionally, you are not obliged to use a portal if you are in a square with one.

INPUT SPECIFICATION. You will be given a set of input cases, each of which will begin with two unsigned decimal integers (representing the row size and column size of the maze, each no larger than 20) separated by one space followed by <EOLN>. Then will follow the rows of the maze. Empty squares in the maze are represented by spaces, blocked squares are represented by *, entry portals by capital letters, and corresponding exit portals by the corresponding lowercase letter. The entry portals and exit portals will be in one-to-one correspondence; each letter will never be used more than once in each maze. The entry point of the maze is *always* the upper-left corner. The exit point is *always* the lower-right. Both of these squares will be unblocked. You can move horizontally, vertically, but not diagonally through the maze (other than via a portal). Each row is followed by <EOLN>. The last input case will be followed by “0 0<EOLN>”.

OUTPUT SPECIFICATION. The output cases should appear in the same order as the input cases. Each output case will be of the form “Case *c*: The maze can be solved in *m* moves(s).” (where *c* is the number of the input case and *m* is the SMALLEST number of moves necessary to solve the maze) followed by <EOLN>. Each maze is guaranteed to have a solution.

SAMPLE INPUT.

```
1 10<EOLN>
A.....a<EOLN>
1 10<EOLN>
A*****a<EOLN>
1 10<EOLN>
a.....A<EOLN>
0 0<EOLN>
<EOF>
```

SAMPLE OUTPUT.

```
Case 1: The maze can be solved in 1 move(s).<EOLN>
Case 2: The maze can be solved in 1 move(s).<EOLN>
Case 3: The maze can be solved in 9 move(s).<EOLN>
<EOF>
```