

EIUCOUNTROOM

Given a map which is described by characters . (floor), # (wall), S (start), or E (end). You can walk left, right, up and down on the floor (dot character). Write a program to find a path from start to end.

Input

The first line has two integers n and m, the height and width of the map ($1 \leq n, m \leq 1000$)

The next n lines are the map. There is one start and end point in the map.

Output

If there is a path, then print the length of the shortest path. If there is no path, print "-1"

Sample

Input	Output
5 8 ##### #.A#...# ###.#B# #.....# #####	YES 9