Super Vector Mario!

Graph connectivity.
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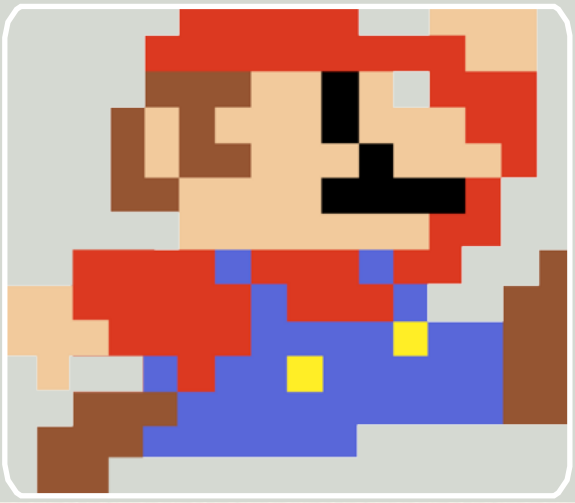
Vers. 1.00

Rules

This games is a variant of *Racetrack* or *Vector Rally* that you may have played in school. It's played on a grid, and the object is to get Mario (a jumping plumber) from a grid position marked "S" (for start) to a grid position marked "F" (for finish), in as few moves as possible. You move by jumping from one position to another, and you may never land on a position marked "O" (for off-road).

Mario moves by jumping from one square to another. At any given time, he as a velocity (Δx, Δy) in x- and y-directions. In the beginning, he stands still, so his initial velocity is (0,0). Each turn, Mario moves from his current location (x,y) to the new location (x+Δx, y+Δy), provided the new position is not off-road. In addition, Mario can increase or decrease his velocity in either direction by 1. For example, after the first step, Mario's velocity might be any of (-1,-1), (-1,0), (-1,1), (0,-1), (0,0), (0,1), (1,-1), (1,0), or (1,1). The goal is to get from any of the Ss to any of the Fs in as few moves as possible.

The output is the minimum number of steps (including the first) Mario needs until he reaches a grid position marked "F" (no matter the velocity).

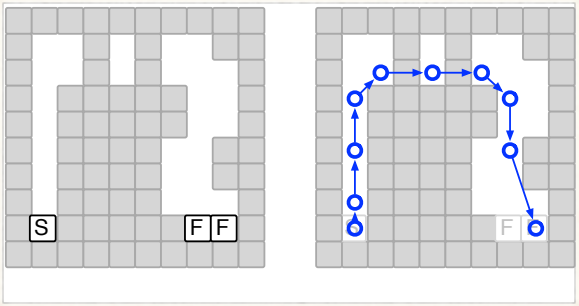


Example

To the left is an input instance. The object is to get from the S square to any of the F squares (it does not matter which). The offroad squares are grey. Note that unlike what you may have played at school, the "car" (Mario) is allowed to "jump". (This is because otherwise the exercises becomes much more difficult, because you'd have to calculate when "arrows" touch corners, and then it's suddenly an exercise in geometry, not graph algorithms)

Tips

Yes, this is a graph connectivity exercise, and it can be solved with few lines of code. The main difficulty is to find out what the graph is (what are the vertices, and how are they connected). Solving an instance like "twice.in" by hand is probably helpful.



You can read about the normal pen-and-pencil version of Vector Rally (with cars, not jumping plumbers) at en.wikipedia.org/wiki/Racetrack_(game)

Input	*Output*
3 3 OOO S F OOO	3

Input format:
Number of rows
Number of colums
Row 1
Row 2
etc.