



There are two popular, essentially identical, iPhone games in the app store: *AMAZE!!!* and *Roller Splat!*. The goal of the puzzle is to reach every (white) square in the board—the catch is that you can only move in as-long-as-possible rook moves.

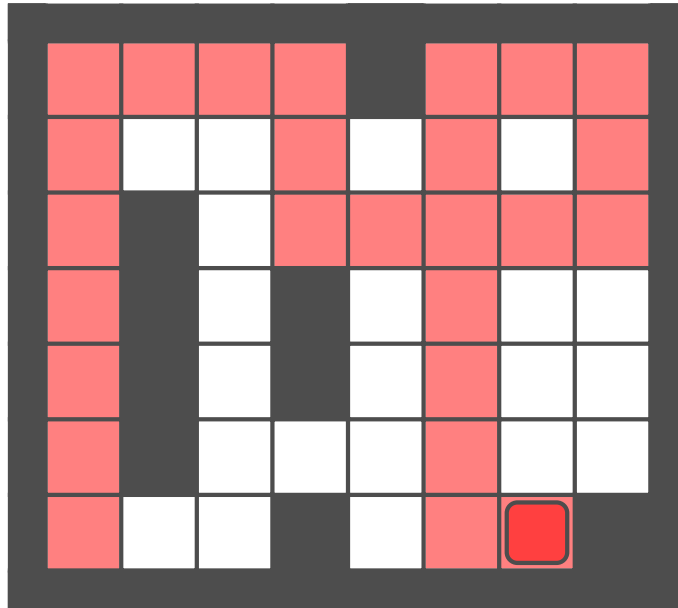


Figure 1: Starting from the lower right corner, the board can be filled using the following 25 moves:  
 $\uparrow \rightarrow \downarrow \rightarrow \uparrow \leftarrow \downarrow \rightarrow$   $\uparrow \downarrow \leftarrow \uparrow \leftarrow \rightarrow \downarrow \leftarrow \uparrow \downarrow \leftarrow$   
 illustrated above

**Question.** How many solvable puzzles exist on an  $n \times m$  board?

**Related.**

1. What if we only want to count “primitive” puzzles—those that cannot exist on a smaller board?
2. What if we count up to symmetries of the rectangle?
3. Which puzzle requires the greatest number of moves?
4. What if we do this on a torus? Möbius strip? More dimensions?
5. Given some configuration, what is an algorithm to figure out how to solve it?