The Stepping-Stone maze
A "self-wiring" multi-state maze

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The Stepping-stone mazes are based on a maze rule first proposed by Robert Abbott (www.logicmazes.com) in June 2011.

RULE:
Take three distinct steps
on three connected matching stones
then change to a non-matching stone
and repeat

This rule performs extremely well on simple square grids, so much so that the mazes almost appear to wire themselves. The main reason for this is a natural tendency for the state-diagram to form a *Strongly Connected Digraph*, where all states are both reachable and escapable. This maximises use of the available space, while at the same time eliminating undesirable properties such as black-holes. The three-step rule provides just the right type of connectivity to ensure consistent results and a high-yield of good mazes, without the need for software to hunt down the better grids.

The basic design process for these mazes is to take a small square grid (5x5 is ideal) and fill it will polyomino shaped groups of stones, such that all groups of stones contain at least four matching stones AND all stones have at least one non-matching neighbour. Extra care is requiring at the corners and edges to ensure these constraints are met. These two constraints in effect guarantee that any possible chosen state is immediately escapable. However an unexpected bonus is all states are also commonly reachable (from any other state) thus yielding the elusive strongly connected digraph.

On the next page you can explore three of these mazes as paper and pencil puzzles. Alternatively visit *www.clickmazes.com* and try these mazes in interactive form.

INSTRUCTIONS

Begin on the stone marked with an entry-arrow and use the stepping stones to reach the stone marked with an exit-arrow. You may only step between adjacent stones, along the black lines. Also, you may not make U-turns, that is, you can't go back to the stone you just came from.

So far, this is pretty simple, but here's where things get tricky. You must follow this rule: Step on three matching stones of the same pattern, then switch to a new pattern. Step on three stones of that new pattern, then switch again. Keep repeating this rule, visiting exactly three matching stones and then changing.

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Three sample mazes