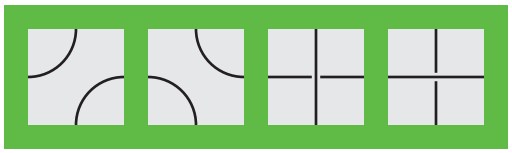
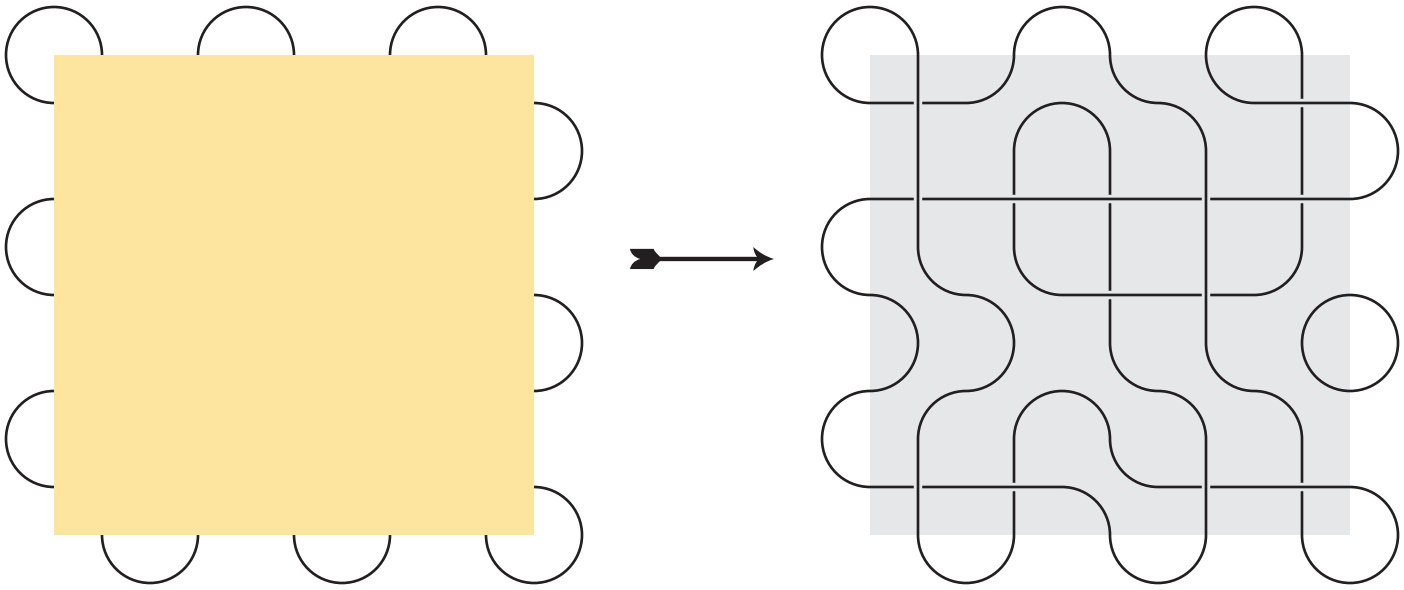
Tozier's Truchet Tasks:

a difficult genetic programming challenge



To create a test case:
Tile the large square below with a random arrangement of the four tiles at left, to produce a set of curves like the example shown below.



The **input** to your function can either be the graphic itself (in some format), or a matrix listing the four tile shapes (numbered 1, 2, 3 and 4 respectively) where they occur in each row and column. In addition to the 5x5 arrangement shown here, you should expect there to be 7x7, 13x13 and 29x41 arrangements in the test cases!

Your evolved function(s) should *accurately* **return**:

1. the number of closed loops in the diagram
2. for each loop, whether it is a knot or an unknot
3. for each loop, whether it is linked to another or not
4. the total number of linkages in the entire diagram
5. for any given tile position, whether replacing it with a different tile number (1..4) would *change* any of the preceding...

Your solution should be as *parsimonious* and *human-readable* as possible, given your choice of representation.