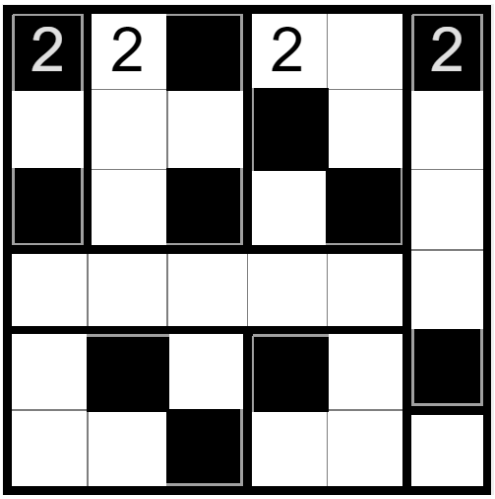
Heyawake

Heyawake rules:

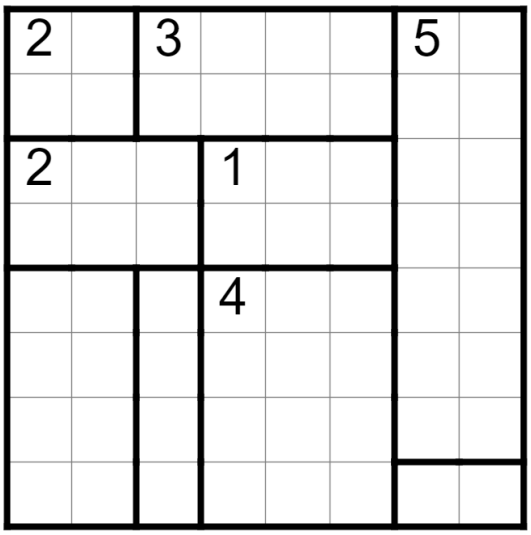
- Shade some cells on the grid.
- No two shaded cells are adjacent.
- All unshaded cells form a horizontally/vertically connected area.
- A number in a region tells how many shaded cells are in the region.
- (Border rule) There cannot be a horizontal or vertical line of unshaded cells that passes through 2+ borders.

Heyawake example

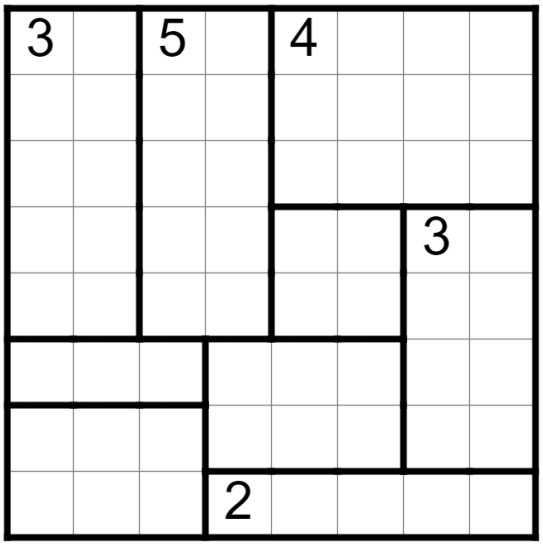
Note that numbers may be shaded.



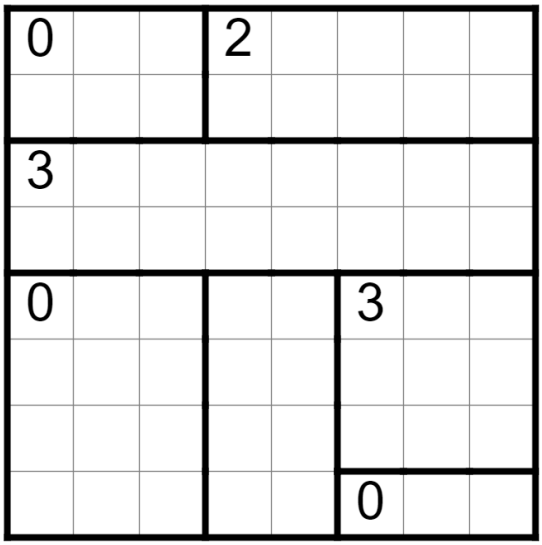
Puzzle 1 (by Kaz)



Puzzle 2 (by Kaz)



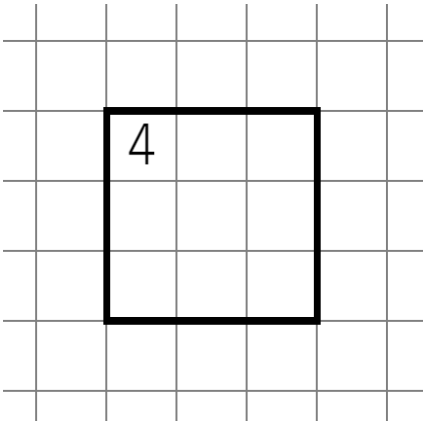
Puzzle 3 (by Kaz)

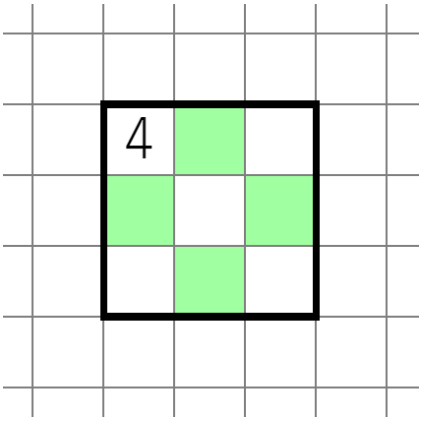


There are so, so many Heyawake techniques. For a comprehensive 100-page guide, see tinyurl.com/HeyawakeGuide (written by Teal). Here's the sparknotes version:

Commonalities

Out of all the different ways to resolve a region, mark all the cells that are always shaded or always unshaded. Example:

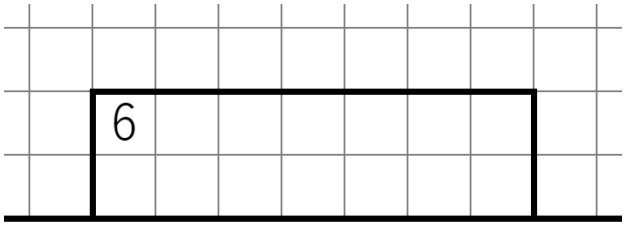


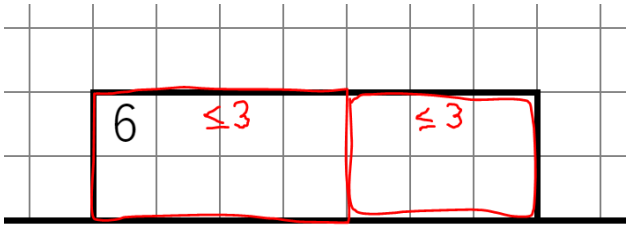


Subdivision

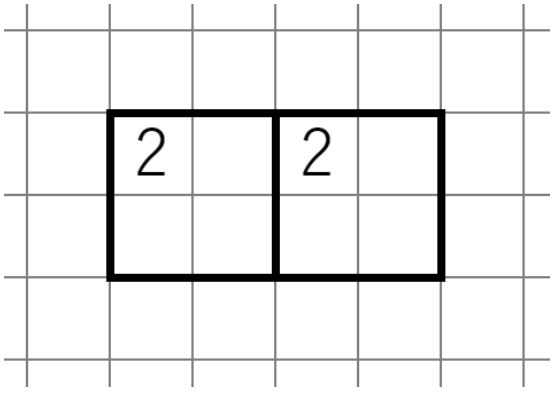
Given a large region, break it up into smaller pieces you can understand.

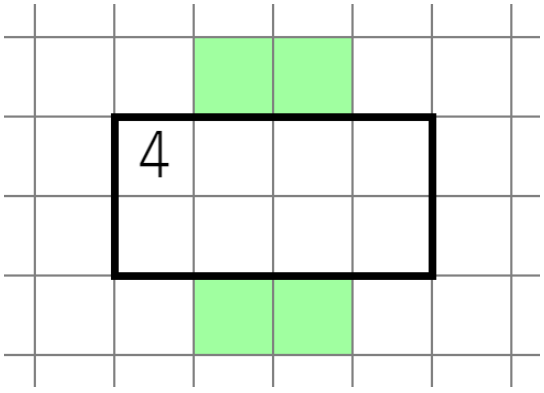
For example, here we can break up this region into a 2x4 on the edge (convince yourself this has ≤3 shaded cells) and a 2x3 on the edge (which also has ≤3 shaded cells).





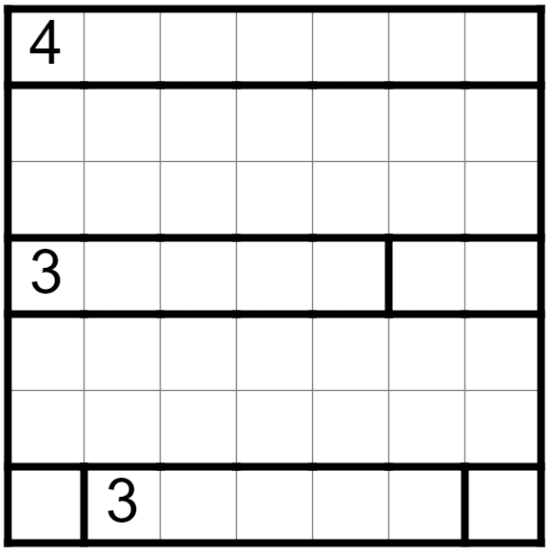
You can also do the opposite, and combine two smaller regions into a large region that's easier to understand.



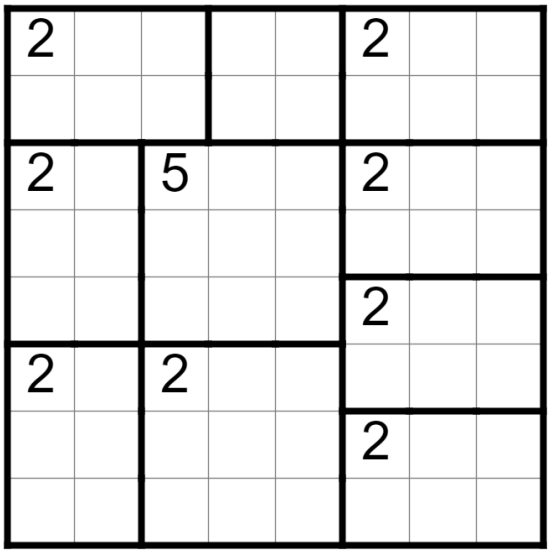


Now it's your turn! Try to complete 2 puzzles.

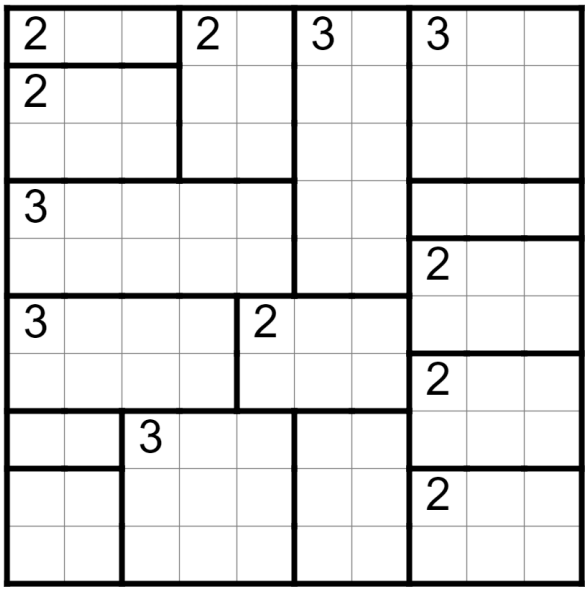
Puzzle 4 (by Kaz)



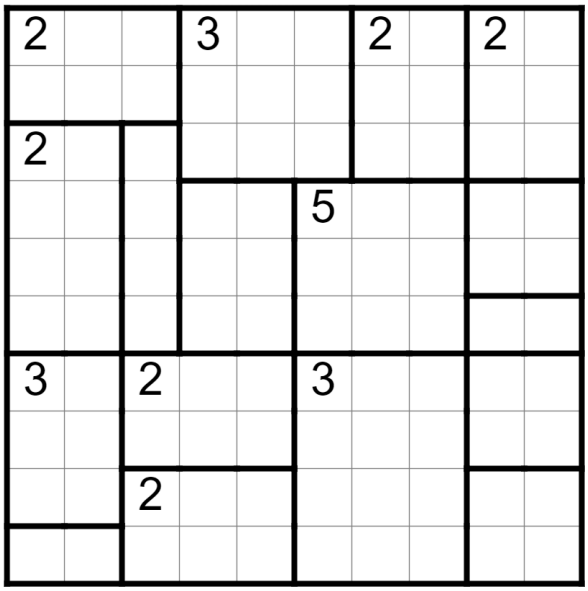
Puzzle 5 (by Kaz)



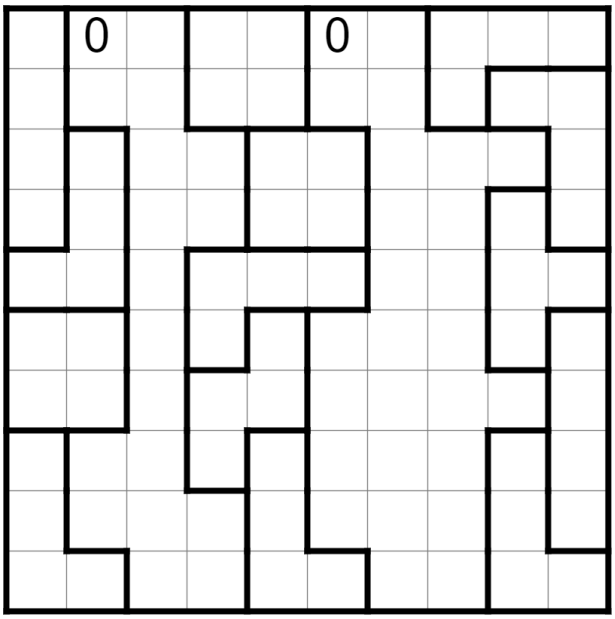
Puzzle 6 (by 3766th_prime)



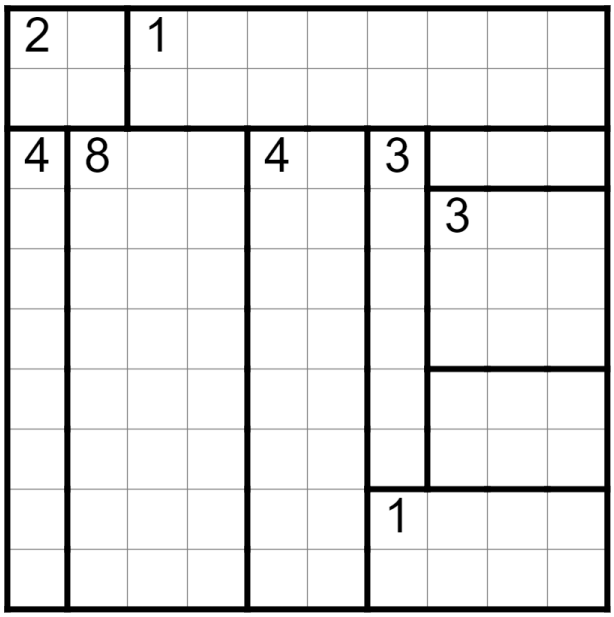
Puzzle 7 (by K.N.Y.)



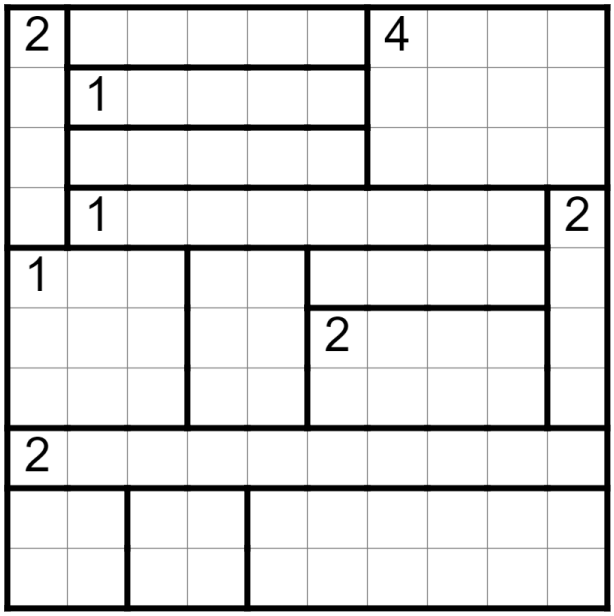
Puzzle 8 (by mlph) 🌶🌶🌶



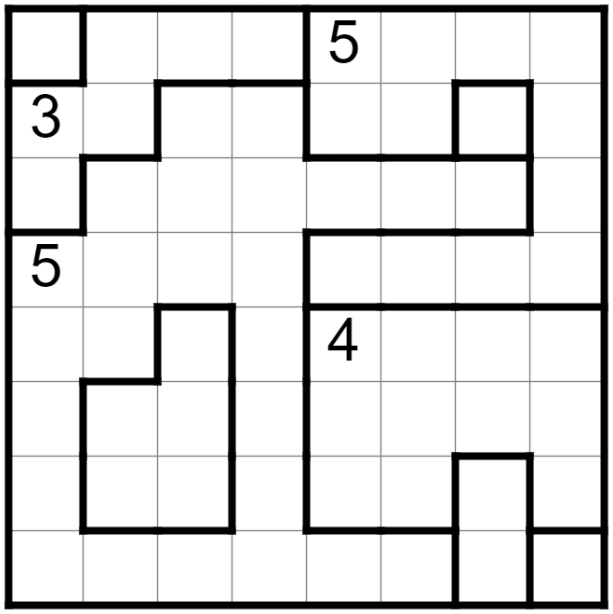
Puzzle 9 (by Teal) 🌶🌶🌶



Puzzle 10 (by Teal) 🌶🌶🌶🌶

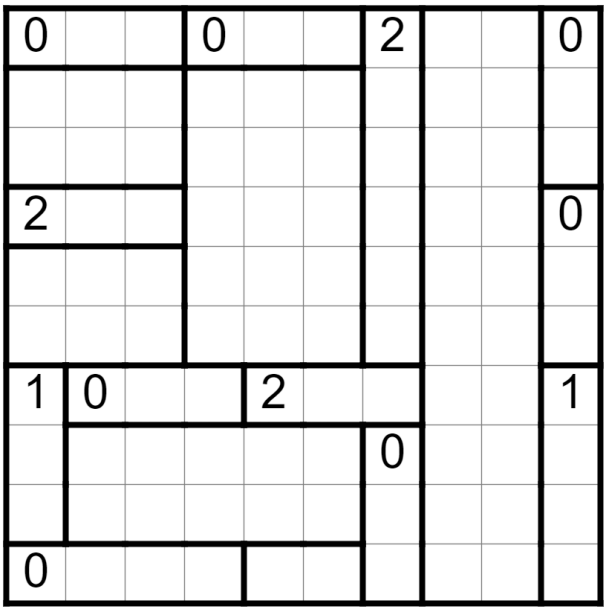


Puzzle 11 (by Teal) 🌶🌶🌶🌶🌶

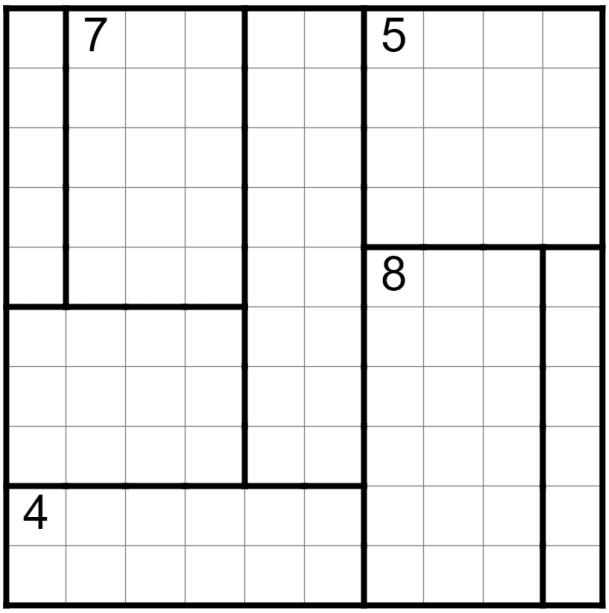


If it wasn't clear, I am a fan of Teal's puzzles.
Also a reminder that all puzzles on these handouts are solvable without trial and error- feel free to look back at the page of techniques if you're stuck.

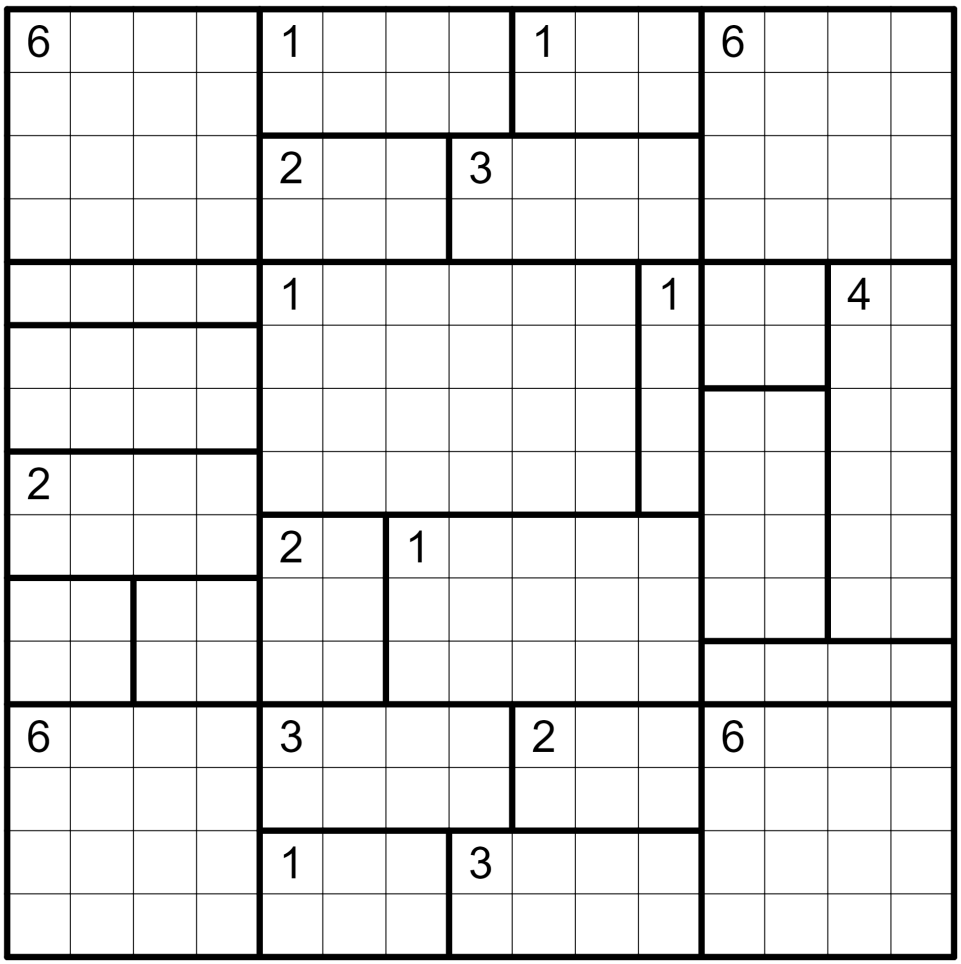
Puzzle 12 (by Quadrangle) 🌶🌶🌶🌶



Puzzle 13 (by Teal) 🌶🌶🌶🌶🌶



Puzzle 14 (by Sam Cappleman-Lynes) 🌶🌶🌶🌶🌶🌶



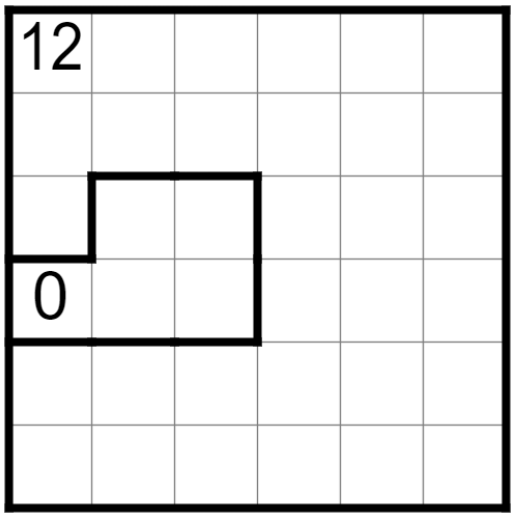
🌶🌶🌶🌶🌶 Cycle Counting ("Penalty Theory") Zone 🌶🌶🌶🌶🌶

Counting cycles of unshaded cells allows solving some impossible-seeming puzzles. For a much better tutorial, see tinyurl.com/HeyawakeGuide. Also, thanks to @agnomy, @chaotic_iak, greenturtle3141, tckmn, and redstonerodent for writing great explanations.

Formula: Optimal number of cycles is $(m-1)(n-1)+2\left\lceil\frac{m}{2}\right\rceil+2\left\lceil\frac{n}{2}\right\rceil$

where m, n are the side lengths of the grid. Divide this by 3 to get the maximum number of shaded cells you can place, assuming you shade all 4 corners, and put the maximum number of shaded cells possible on each edge of the grid.

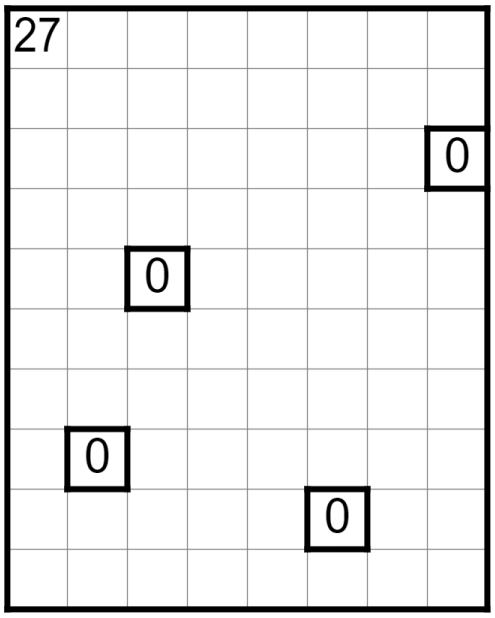
Puzzle 15 (by greenturtle3141) "🌶🌶🌶"



Optimal number of cycles is (5 * 5) + 6 + 6, which is 37. 37 - (12 * 3) = 1, so there is exactly 1 cycle of unshaded cells in the final solution. We can already see the cycle: it's the 2x2 of unshaded cells in the 0 region. Thus:

- There are no more cycles of unshaded cells
- All 4 corners are shaded
- The edges of the grid are filled with the maximum number of shaded cells possible.

Puzzle 16 (by redstonerodent) 🌶🌶🌶🌶



Puzzle 17 (by agnomy) 🌶🌶🌶🌶🌶