

25 Years – Solution Booklet

This is the solution booklet for my test 25 Years. It contains the solutions and particular sticking points to the puzzles that I've found, as well as brief commentary on each genre and the puzzles within.

While the idea of this contest (a celebration for my 25th birthday) has brewed in my mind since several months ago and most of the genres already picked by around September, all puzzles were only written around 3 weeks before the contest. (Because I'm a terrible procrastinator.) I thought I could write each puzzle in approximately 1-2 hours; turns out it took around 4-6 hours each. Between around 7 days before the start of the test until 3 days prior, I mainly worked on this, crunching puzzle after puzzle every time I manage to think of something. I got them all done, and I hope the puzzles were enjoyable, but a lesson for me to give myself more time in the future.

You might have also been surprised with puzzle titles in the PB. I hope it was a nice touch.

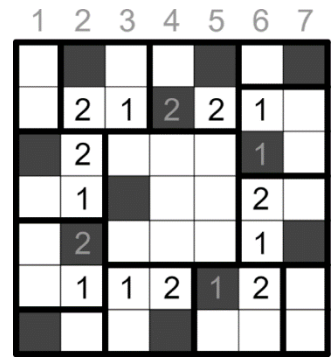
Answer keys:

No.	Genre	Pts	Puzzle title	Answer key
1	Surveyors Heyawake	70	"Square Ring"	2413251
2		180	"Square Tiling"	23231423131
3	Tetromino Slitherlink	60	"Windmill"	31, 111
4		200	"Three Squared Squares"	122, 211
5	Short Yajilin	30	"Just a Simple Loop"	1111, 221
6		100	"We Only Count up to Two"	1111, 1121
7	Linked Signals	70	"Little Link"	21, 1
8		160	"Colossal Correspondence"	211, 121
9	Poset Futoshiki	30	"Odds and Evens"	14352, 21543
10		140	"Ups and Downs"	1623574, 2431567
11	Maximal Archipelago	90	"The Void"	31252126
12		160	"No Internal Clues?!"	4232052320
13	Abacus Kurotto	60	"Cyclones"	22212, 21114
14		200	"Straight-forward"	161112, 131121111
15	All-3 Skyscrapers	50	"25 Years"	52314, 25134
16		200	"25 Years Too"	6534712, 3425167
17	Mysterious Fillomino	80	"Tiny Teaser"	21122, 1412
18		200	"Enormous Enigma"	21322, 334
19	Almost-Unique Heteromino	40	"The Flight"	1212, 21211 *or* 1221, 21112
20		60	"The Canyon"	22312, 2323 *or* 3232, 21322
21	Greener Grasses	50	"Mowed Lawn"	12211, 12211
22		100	"Their Tic-Tac-Toe is Greener"	11112111, 212121
23	No-Touch Nurikabe	30	"To the Next Quarter-Century"	2141, 3212
24		140	"We Take the Path Forward"	1121141, 11324
25	Short Answer	25	-	1995

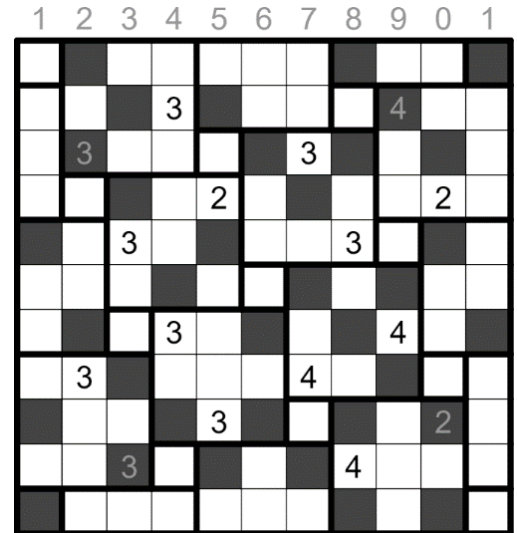
Surveyors Heyawake

1 "Square Ring": A Minesweeper clue in a 2x2 region must count all cells in the region. The break-in is noticing R2-3C6-7 region implies R2C5 is white.

2 "Square Tiling": A 3x3 area having 4 black cells cannot have any black cell on the edge squares. The break-in is the room R6-8C7-9, then a contradiction if R7C9 is Minesweeper, then another contradiction if R10C8 is Minesweeper.



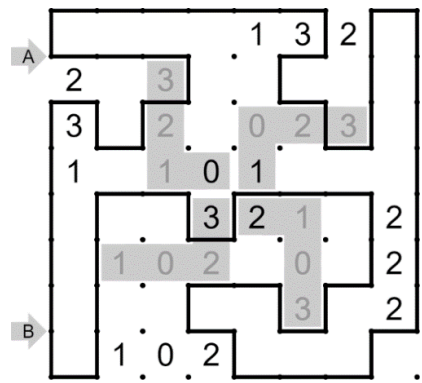
The small puzzle was one of the earliest puzzles written, and the rules of Surveyors Heyawake then allowed non-rectangular rooms (Heyawacky). I then decided to just make them all rectangular. The large puzzle had the room layout fixed first; on retrospect I think a different room layout might have been better, but I'm satisfied enough.



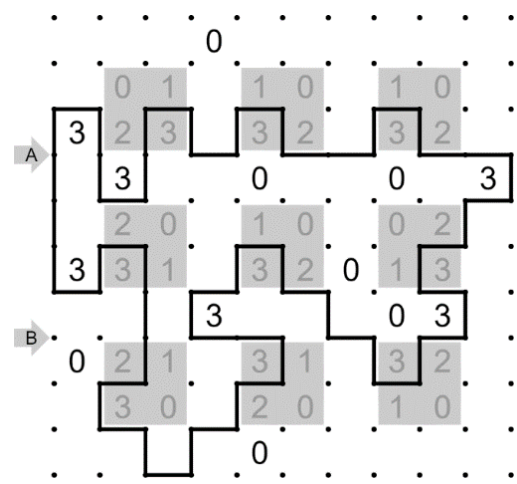
Tetromino Slitherlink

3 "Windmill": No special deduction to note here. Break-in is in lower-left; after drawing a segment up to R6C3 lower-right corner, if the segment goes left, there is no 0 in the lower-left tetromino.

4 "Three Squared Squares": Analyze all possible ways the loop can go through a square tetromino; there are 4 such ways up to rotation/reflection. The abundance of 0s and 3s also suggests to find out where 0s and 3s can be placed on each possible way. The solve starts on top-left; only one way supports the diagonal 3s, and due to the 0 on top-right, one orientation is blocked.



The small puzzle's layout was a throwback to my very first puzzle written, also a 8x8 Slitherlink with given positions forming a 4-fold rotational symmetry. For the large puzzle, I fixated on setting the squares first and had trouble filling the puzzle before I decided to investigate all the ways to fill the square.

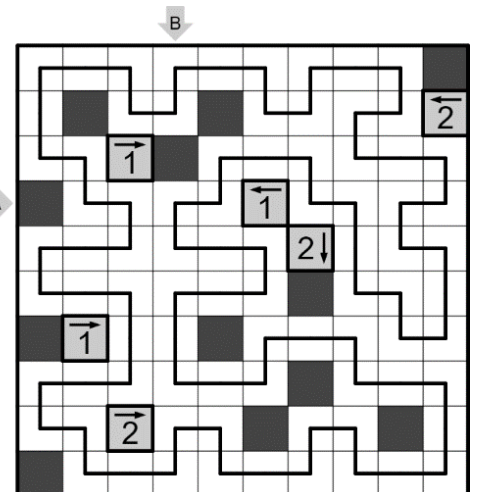
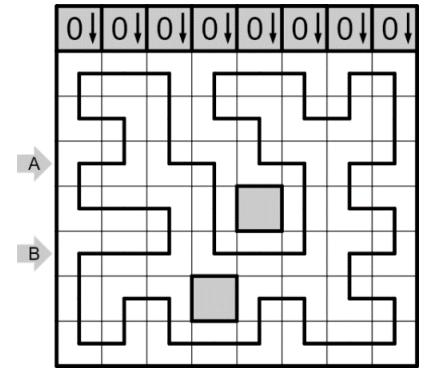


Short Yajilin

5 "Just a Simple Loop": Introduction to basic deductions in "short" loops by having no black cells to be concerned about. Opening starts from the bottom gray cell.

6 "We Only Count up to Two": One sticking point will be near top-middle when you try to connect a separate loop portion from the right half over to the top and left parts. The trick is that two strands cannot go through a strip of width 3 for too long. In particular, R3C6 is a straight that turns down on before and after the straight.

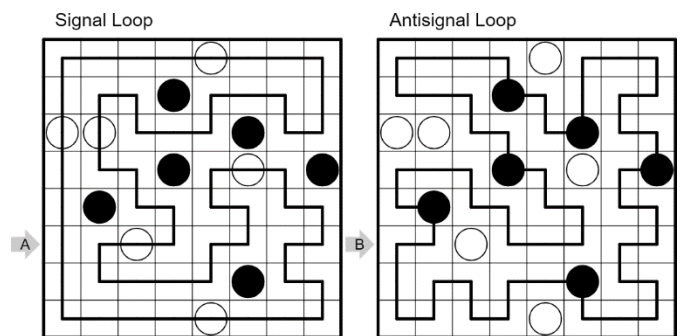
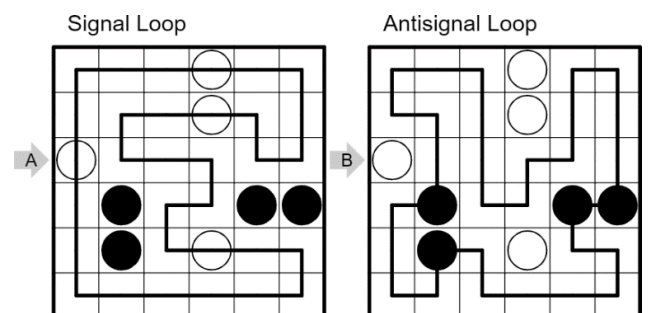
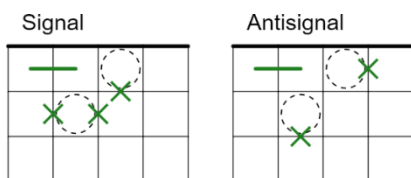
I gave up making Yajilin puzzles that had symmetric givens. The break-in for the large puzzle is bottom-left, which doesn't use the numbers at all, just the positions of the gray cells; if I wanted symmetric givens, I would have the same break-in twice, which sounded inelegant. On the other hand, after constructing the two puzzles in the set, the "short" variant of loop puzzles looks fascinating and it might worth it to try it in other loop genres.



Linked Signals

7 "Little Link": There is only one way to color the circles in bottom-right to allow both loops to traverse it; the general idea is if R4C6 was white, the other two circles would be forced to be white, leaving not enough exits for Antisignal Loop.

8 "Colossal Correspondence": The pattern appearing on R1-2C4-5 and R7-8C5-6 gives a segment in each loop and several crosses, as shown below. The break-in starts with top-right of Antisignal Loop using this.



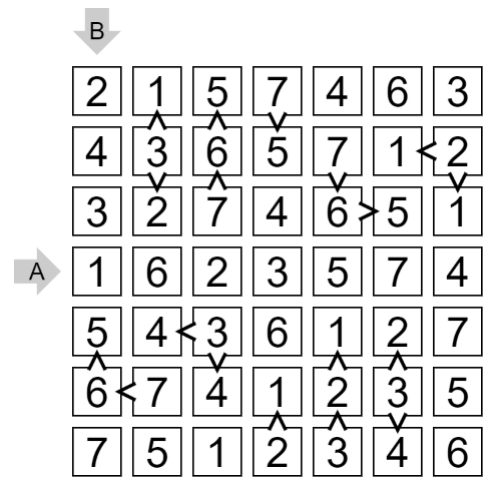
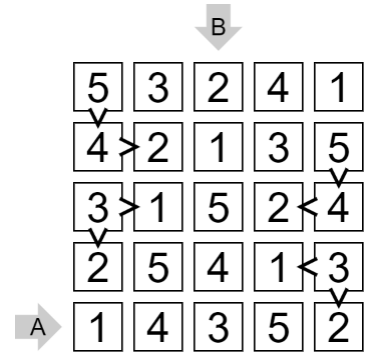
As mentioned in the IB, Linked Signals is a brand new genre that tries to capture the difficulty of setting a puzzle that works under two rulesets. Even the construction of *these* puzzles was rather difficult; it's not easy at all to just add new givens, as the lack of a given is meaningful too. The above result was really the only one I managed to derive and use; after using it in the large puzzle, putting it twice to try to call attention to it, I had trouble figuring out what I wanted to do for the small one. Also, as the grids themselves don't specifically have any theme, the puzzle titles were simply an alliterative "adjective noun" to describe the size and something "link-y".

Poset Futoshiki

9 "Odds and Evens": All 5s can be placed without much problem. Then all other $X < Y$ imply that X is 1 or 2, and Y is 3 or 4. Tracing R3C2-R3C4-R4C4-R4C1, we get that R3C2 and R4C1 are 1 and 2 in some order; this implies R3C1 is 3.

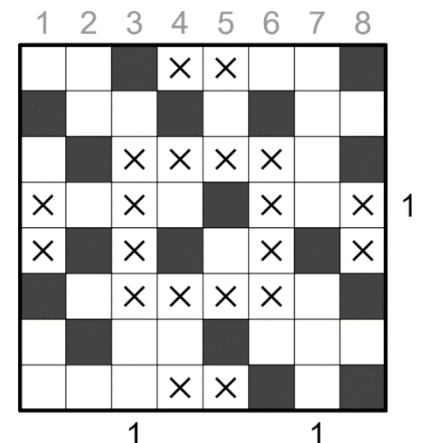
10 "Ups and Downs": Mark cells whether they are high (3 or 7), medium (2, 4, 6), or low (1 or 5). The break-in is that R2C2 is high; medium numbers are only larger than one other number, but R2C2 is larger than two (as R1C2 and R3C2 are different). Therefore R2C6-7 chain is a low < medium.

When I construct Poset Futoshiki puzzles, I usually start with the poset, just picking something that looks fun and is not auto-isomorphic; that is, every number is distinguishable solely from the relationships. (As an example where this is not the case, consider a diagram of 3 numbers with $1 < 2$ and $1 < 3$ as the only relationships. Now 2 and 3 cannot be distinguished.)



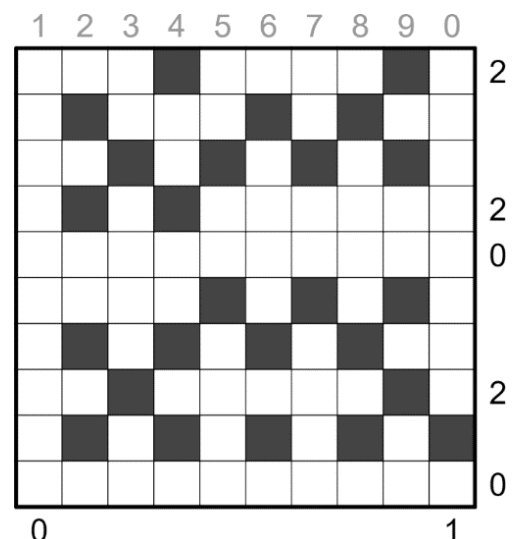
Maximal Archipelago

11 "The Void": If a cell is white and there is a mass of cells that connects neighbors of the cell, at least one cell in that mass is black (otherwise the cell can be shaded). Using this, the middle 2x2 has two black cells and so R4C7 is white; in turn, apply to R4C6 to deduce R4C5 is black (otherwise R3C7 and R5C7 need to both be black), and keep progressing by either finding such masses around a known white cell, or a mass of white cells around an unknown cell.



12 "No Internal Clues?!": The idea is, a mass of diagonally connected black cells has a "parity". If two masses of different parities are both close to the border, in general they must actually touch the border.

Maximal Archipelago is a very tricky genre with very unfamiliar deductions. This test brings up two of them, one local (the small puzzle) and one global (the large puzzle). Admittedly I'm not actually very confident in the details of the global argument, and in a sense I'm somewhat lucky that the assumptions I need do apply for the large puzzle.



Mysterious Fillomino

17 "Tiny Teaser": The variant is Sentry Fillomino (same numbers in a row/column belong to the same region). The main deduction is to count "lines covered" by regions; for example, a 4 making a 2x2 region covers 4 lines, and any other shape for the 4 covers 5 lines. The break-in is that the 4's form 4 regions; there are 16 lines in the grid, so all 4's form 2x2 regions. A similar approach follows for the 3's.

18 "Enormous Enigma": The variant is Anti-Even/Odd Fillomino (regions of same parity are not adjacent; it's not Checkerboard, since the bottom-left of example could have become a 6). It's very useful to color the cells with the two parities, better than simply drawing connecting lines for cells belonging in the same region like in standard Fillomino. The break-in is at top-left with the 3 and 2.

Sentry was chosen because I remembered seeing it in Palmer's pack, which in turn was from Anderson Wang. At first Sentry was supposed to be the large puzzle, but I decided counting lines might be quite hard for a larger grid so I put it as the smaller grid. The other variant was initially Checkerboard, but to put something harder for the large puzzle I went with Anti-Even/Odd, partially to trick careless solvers (as Anti-Even/Odd also satisfies Checkerboard).

Almost-Unique Heteromino

19 "The Flight": The top-left only has two exits. The symmetric way to resolve it leads to touching r-shaped regions, so we need to resolve it in an asymmetric way, leading to the two solutions.

20 "The Canyon": If the middle was resolved like 7-L, the diagonal would be resolved with touching regions. We cannot do two horizontal triminoes, so we need to resolve the middle asymmetrically.

I knew "almost-unique" variants actually wouldn't lead to particularly difficult puzzles, but I figured it wouldn't be a problem; giving an easier large puzzle to bite into would be appreciated by solvers. The main reason I picked Heteromino was because I wanted a region division puzzle, but also because it was used in Something is Off, as well as one of my favorite underused genres.

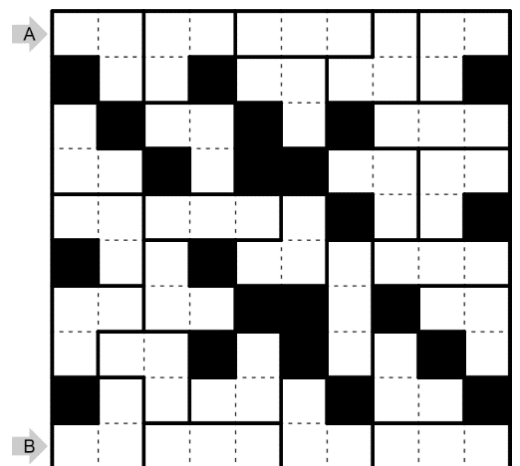
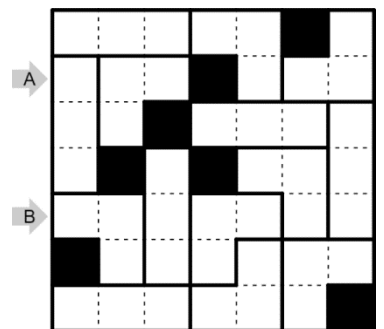
B

3	6	4	4	2	2	1	7	
3	6	4	4	1	7	7	7	
3	6	6	6	4	4	7	1	
1	3	3	6	4	4	7	2	
4	4	3	1	6	6	7	2	
4	4	2	2	6	3	3	3	
A	5	5	1	3	6	6	4	4
5	5	5	3	3	6	4	4	

A

B

5	5	5	5	4	4	3	3	2	5	
2	2	5	4	4	1	4	3	2	5	
3	3	2	3	3	4	4	4	5	5	
18	3	2	3	4	5	5	5	8	5	
A	18	18	1	4	4	4	5	5	8	8
B	18	18	18	3	3	3	8	8	8	8
18	18	18	18	18	18	3	3	3	8	
5	5	5	18	18	1	4	4	4	7	
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5	4	4	3	3	18	18	7	7	7	

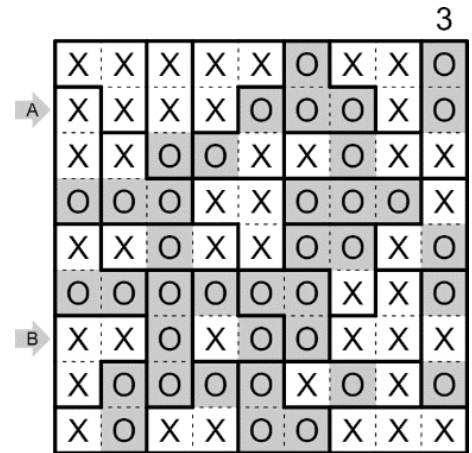
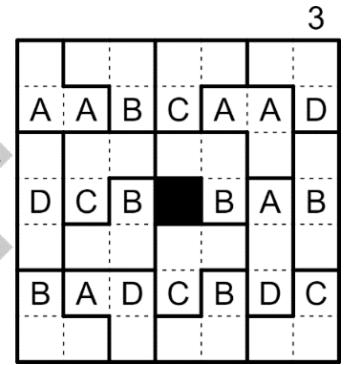


Greener Grasses

21 "Mowed Lawn": If R1C1 doesn't connect to R2C1 and R2C2, the R1C1 region only contains an A, adjacent to the R2C2 region also containing an A. After placing two regions in top-left, a similar technique is used in R1C4 with R2C5-6.

22 "Their Tic-Tac-Toe is Greener": We can simplify the constraint into "no two adjacent regions contain the same number of O's". R1C1-2 definitely belong to a region with no O's; after that, many X's nearby belong to regions of at most one O, and often trying to merge them leads to them having no O's instead.

I decided to give Greener Grasses another try, and I'm pretty happy with the results. It's interesting that all of the example, preview, and test puzzles end up being regions of 3; I think this might be the optimal region size, with 2 being too small and restricted and 4 being too open. Either way, I hope other people pick up this genre; I think there are very satisfying puzzles waiting to be discovered.

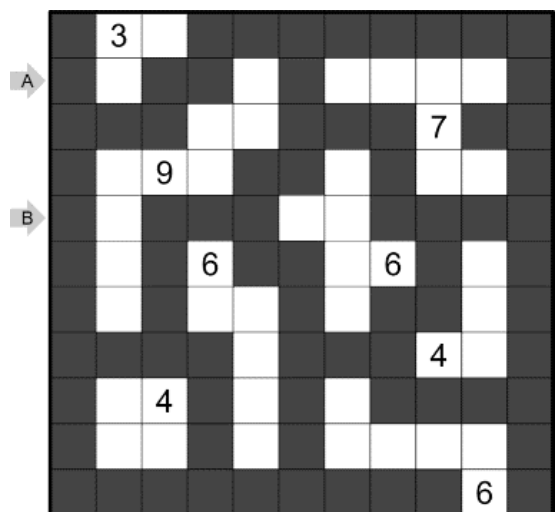
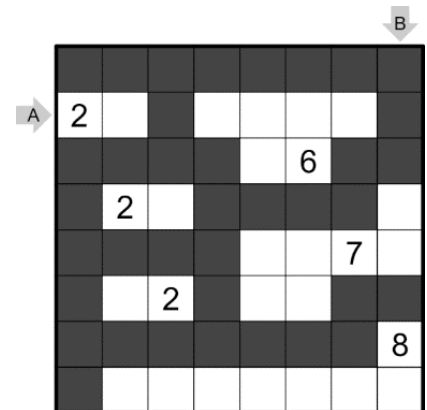


No-Touch Nurikabe

23 "To the Next Quarter-Century": No intersection counting argument needed; R8C2 needed something reaching it.

24 "We Take the Path Forward": Use intersection counting argument. There are 106 provided by the islands; internal vertices use 100 and border clues use 4, so there are 2 slack covers. But the 4 in R9C3 must form a 2x2, costing one slack. Therefore the entire border is closed off except for potentially one square adjacent to each border clue. This pulls the shape of the 6 in R11C10, and in turn fills in pretty much the other islands.

The first draft of the large puzzle had a count with 1 slack, used to form a 2x2 region for the 4. This was too intuit-able, so I incorporated that break-in into a more complicated argument.



25. Short Answer

Answer: 1995

The question might be simple, but it took me quite some convincing to reassure me the question would be fair even to non-native speakers (mostly checking that all the words are very simple words that any basic English speaker knows). The points assigned for this question are just fun points to get the point value to 2525; I've always treated the test as "everything else has 2500 points in total".