MYSTERY HUNT  PUZZLE CLUB

Instruction Booklet

Logic Puzzle Open

April 6, 2024 • 10 AM – 5:15 PM • Room 45-102

10:00 AM – 10:50 AM	**Round 1: "Pop Culture"** *Sudoku, Scrabble, Numberlink, Battleships, Wordle Bank*
11:00 AM – 11:50 AM	**Round 2: Made in America** *Square Jam, Aquapelago, Castle Wall, Isowatari, Pentominous (Borders)*
12:00 PM – 12:50 PM	Lunch Break
1:00 PM – 1:50 PM	**Round 3: Powerhouses** *Star Battle, Masyu, LITS, Double Choco, Kakuro*
2:00 PM – 2:50 PM	**Round 4: Curated Treats** *Shakashaka, Japanese Sums, Barns, Fillomino (Blokus), Mintonette*
3:10 PM – 4:00 PM	***Round 5: Team Round***
4:00 PM – 4:50 PM	Contestant Social
5:00 PM – 5:15 PM	Awards

Competition Rules

You can have pens, pencils, sharpeners, erasers, rulers, blank papers, and a copy of this instruction booklet. We'll have extras for all of these, but don't rely on them. We won't print a copy of the full booklet for everyone, but we will print a copy of pages 16–17.

Puzzle booklets will have the rules but not example puzzles.

Notation

Each section of this instruction booklet has five puzzle types. Each puzzle type comes with the rules, an example puzzle, and the solution to the example.

We'll use standard notation for example solutions, but **you can use whatever notation you want**, as long as you are consistent throughout a solution, and it is clear to us what you mean.

If multiple marks are in the same cell, we'll consider the largest such mark. This is to let you make small notes on the corners or edges of the cells without having to erase them. If we're not sure what the intended final mark is, we'll consider that cell blank.

Scoring

Each individual round is worth 100 points and has 15 puzzles. Puzzles that took testsolvers longer to solve are worth more points.

You'll be given full points for a correctly solved puzzle. You may get 80% partial credit for a solution with a minor error (e.g. 1 missing shaded cell), at our discretion.

If you finish early, say "Finished", and a proctor will collect your booklet. If all puzzles are solved correctly or with at most two minor errors, you'll receive 2 bonus points per saved minute. After finishing, you can leave the room, but make sure not to disturb anyone.

Divisions and Prizes

We have two divisions: Advanced and Beginner. Each division has different puzzles: for each genre, the Advanced division has a harder puzzle, while the Beginner division has an easier puzzle.

We have prizes for the top 5 solvers in each division, plus the next 5 MIT students. We might also have *special* awards, at our discretion.

The team round won't have prizes (other than bragging rights); just solve for fun!

Credits

Most instructions are copied from **Eric Fox**'s puzzle rules document.

Puzzles were constructed by **djmathman**, **ft029**, **jkittykitkat**, **mstang,** and **Rever**.

Testsolvers were **lumia, Walker, Rubrica, Tjm,** and **CJ.**

Tools used include **Penpa+**, **puzz.link,** and **Inkscape**.

Round 1: “Pop Culture”

These puzzle types have all broken into the mainstream in some way.

1.1–1.3 Sudoku

Place a number from 1 to N into each empty cell so that each row, column, and bold region contains every number from that range with no repeats, where N is the side length of the grid.

	1			6	
3					4
		5			
			6		
2					5
	4			3	

4	1	2	5	6	3
3	5	6	1	2	4
6	2	5	3	4	1
1	3	4	6	5	2
2	6	3	4	1	5
5	4	1	2	3	6

1.4–1.6 Scrabble

Place a letter into some cells of the grid so that all letters form one orthogonally connected area. Every run of two or more letters in consecutive cells in a row or column forms a word read from left to right or from the top down. All words are given outside the grid and must each appear exactly once.

P					
					T

MIT

LOGIC

PUZZLE

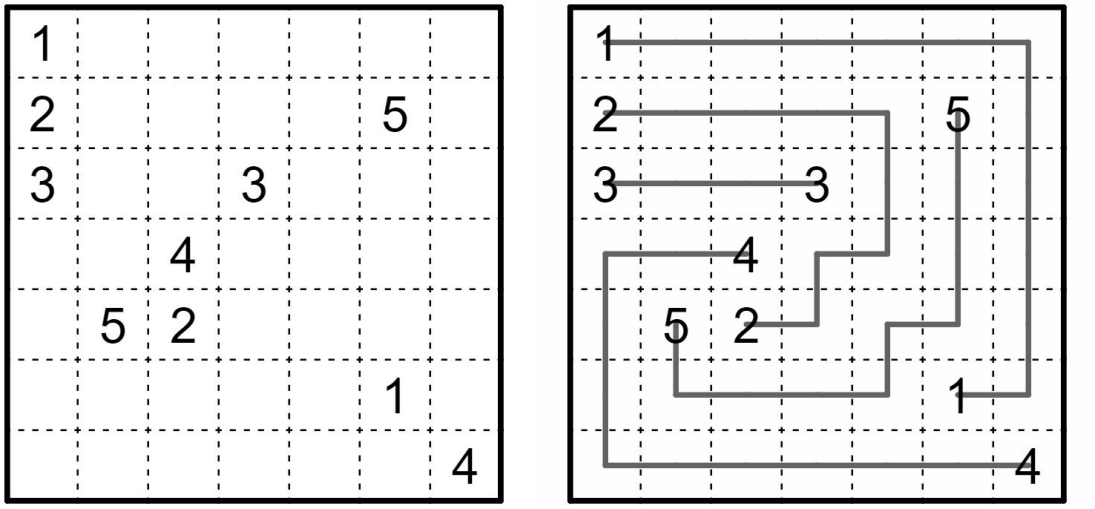
OPEN

O					
P	U	Z	Z	L	E
E				O	
N				G	
			M	I	T
				C	

1.7–1.9 Numberlink (*a.k.a. Flow Free®*)

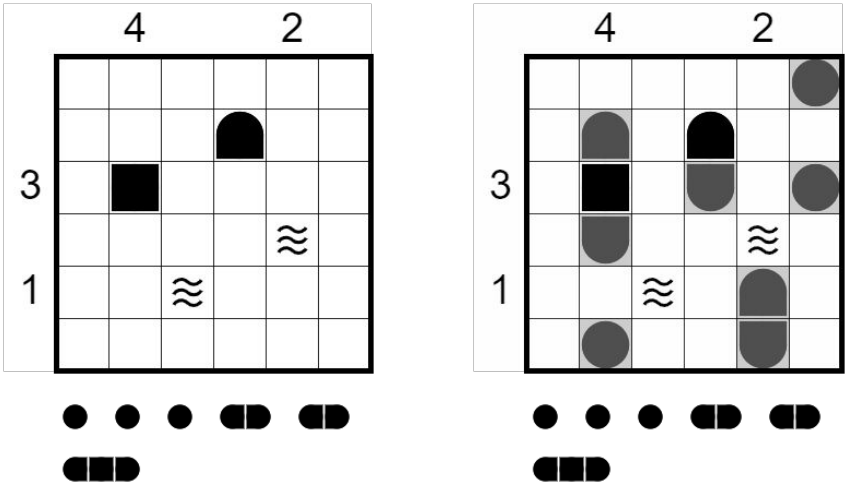
Draw non-intersecting paths through the centers of some cells, each connecting one clue to its equal counterpart.

Note: In these puzzles, every cell will be used by some path. Feel free to use this to your advantage.



1.10–1.12 Battleships

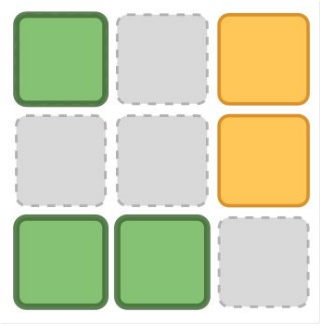
Place the given fleet of ships into the grid so that no two ships are touching, not even diagonally. Rotating ships is permitted. A clue outside the grid indicates the number of cells in the corresponding row or column that are occupied by ships. Cells with waves cannot be occupied by a ship. A given ship segment must be used as the part of a ship that its shape represents.

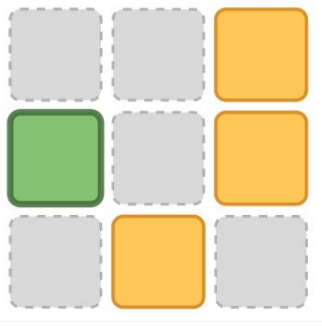


1.13–1.15 Wordle Bank

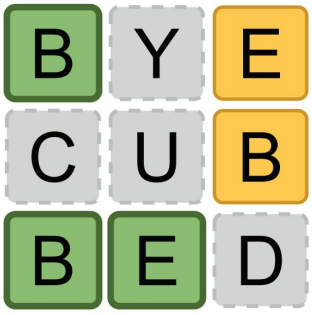
A Wordle game challenges the player to discover what the answer word is, by making successive guesses, of an unknown word. After each guess, a row of tiles gives information about how accurate the guess was: a green tile indicates the letter is in the answer and in the correct spot; a yellow tile indicates the letter is in the answer but in the wrong spot; a gray tile indicates the letter is not in the answer in any spot.

One or more Wordle games have been played and information about the first few guesses of each game is given. All guesses are also given collectively, in alphabetical order. Match each guess to its row. *Guesses or answer words do not contain repeated letters.* The answers to the Wordle games need not be valid English words. It is not your task to find the answer for each game, just to identify the order of all the guesses from the given information.





A C T B E D B Y E
C U B P I T S A D



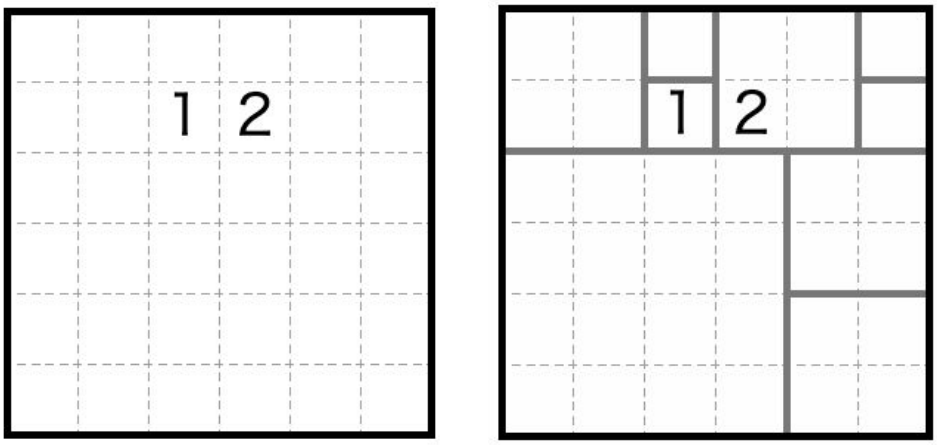
Round 2: Made in America

These puzzle types were invented in the United States.

2.1–2.3 Square Jam

Genre Inventor: Eric Fox

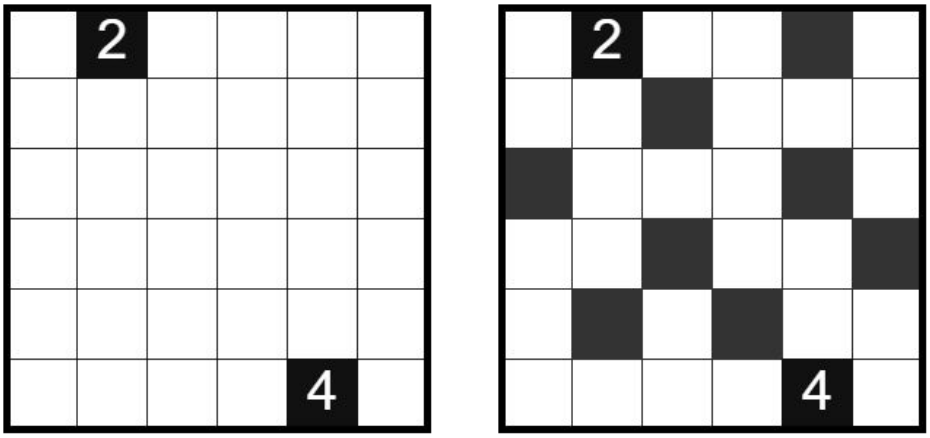
Divide the grid into square regions of orthogonally connected cells. A number indicates the side length of the square it's in. Region borders may not form any four-way intersections.



2.4–2.6 Aquapelago

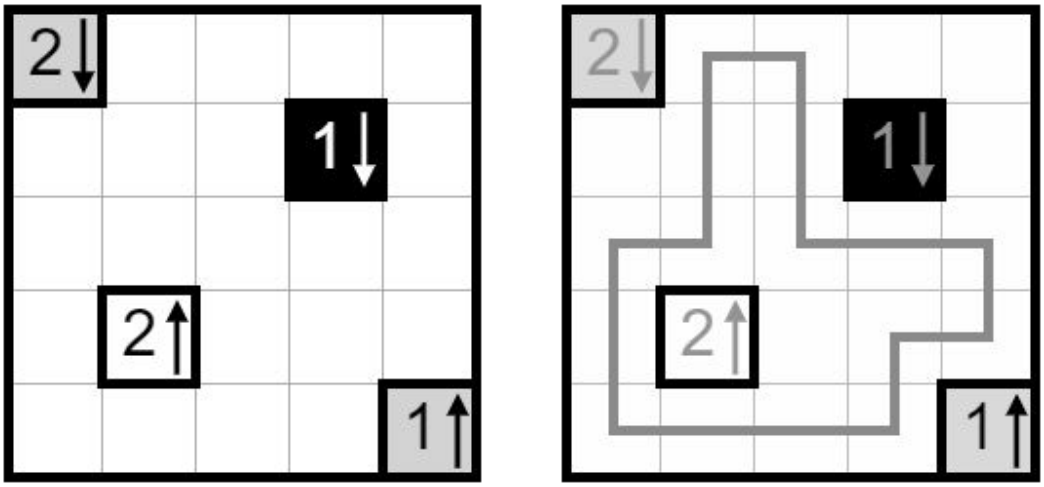
Genre Inventor: Walker Anderson

Shade some cells so that no two shaded cells are orthogonally adjacent and the remaining unshaded cells form one orthogonally connected area. No 2x2 area may be entirely unshaded. Clued cells must be shaded, and indicate the number of shaded cells in the diagonally connected group they belong to.



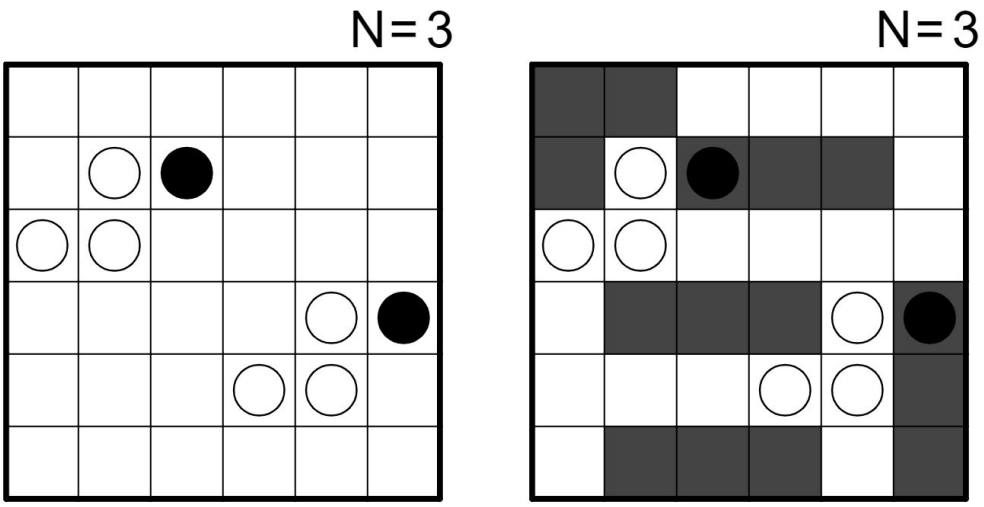
2.7–2.9 Castle Wall *Genre Inventor: Palmer Mebane*

Draw a non-intersecting loop through the centers of some cells. The loop may not enter outlined cells or cells containing clues. White cells with outlines must lie inside the loop, while black cells with outlines must lie outside the loop. Grey cells may either be inside or outside the loop. A number represents the sum of the lengths of loop segments in the indicated direction.



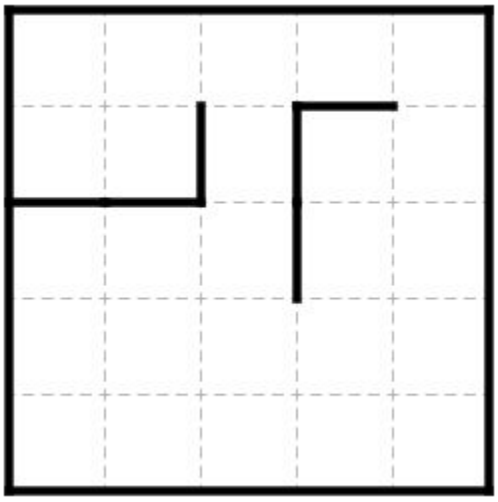
2.10–2.12 Isowatari *Genre Inventor: Jeffrey Bardon*

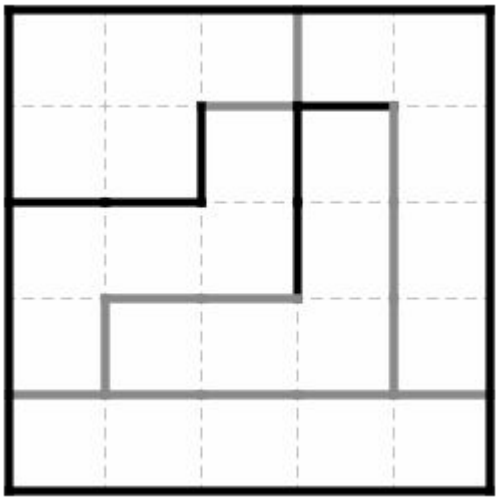
Shade some cells such that all shaded groups are of size N. The value of N is given outside the grid. Black circles must be shaded, and white circles must be unshaded. All unshaded cells must be orthogonally connected. No 2x2 region may be entirely unshaded.



2.13–2.15 Pentominous (Borders) *Genre Inventor: Grant Fikes*

Divide the grid into regions of five orthogonally connected cells so that no regions of the same shape share an edge, counting rotations and reflections as the same. Borders must separate two different regions.



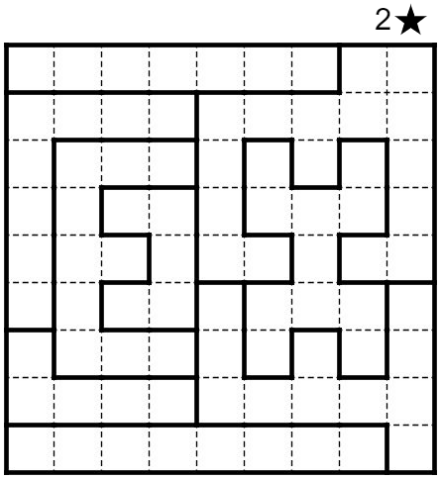


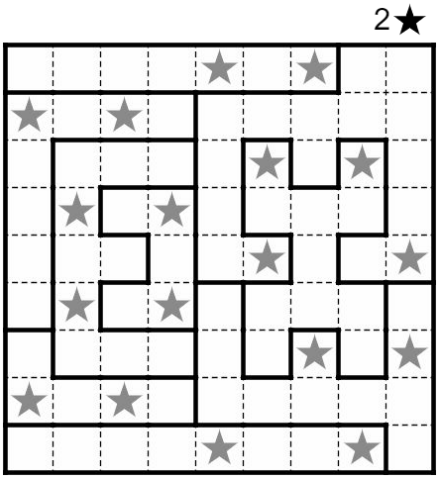
Round 3: Powerhouses

These puzzle types are ubiquitous within logic puzzle circles.

3.1–3.3 Star Battle

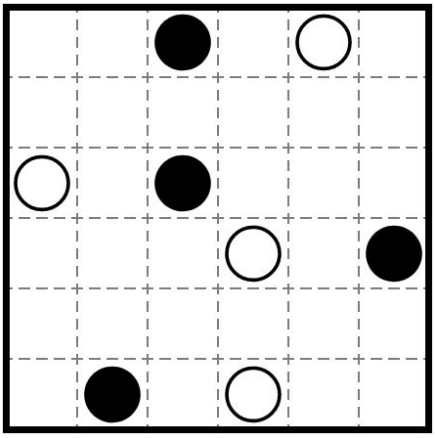
Place stars into some cells such that each row, column, and outlined region contains exactly N stars. The value of N is given outside the grid. Stars may not touch one another, not even diagonally.

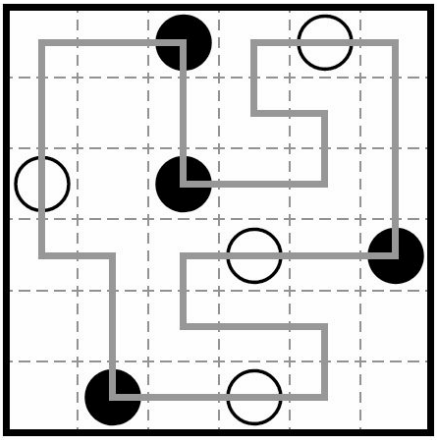




3.4–3.6 Masyu

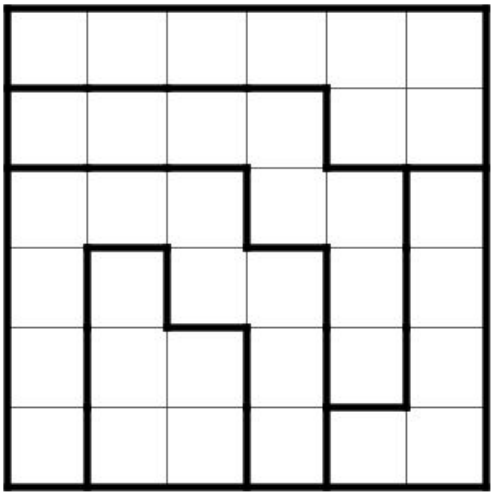
Draw a non-intersecting loop through the centers of some cells that passes through every circle. The loop must turn on black circles and travel straight through the cells on either side. The loop must go straight through white circles, and turn in at least one of the cells on either side.

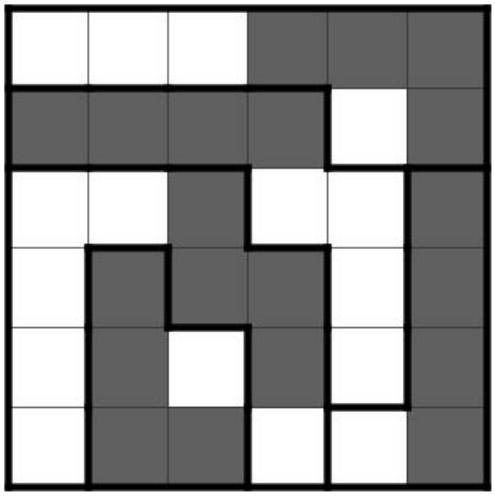




3.7–3.9 LITS

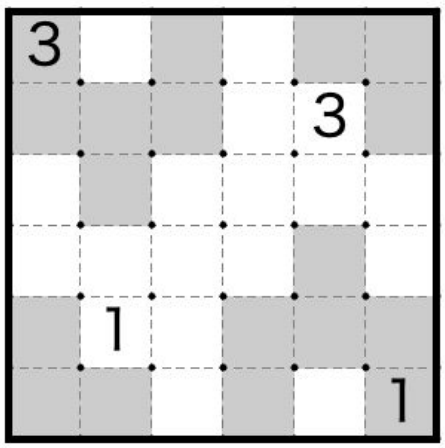
Shade one tetromino of cells in each region so that all shaded cells form one orthogonally connected area. Two tetrominoes of the same shape may not touch orthogonally, counting rotations and reflections as the same. No 2x2 region may be entirely shaded.

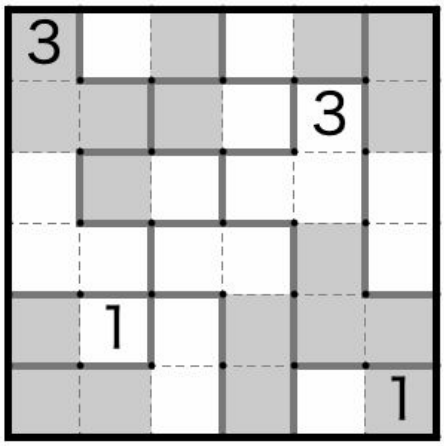




3.10–3.12 Double Choco

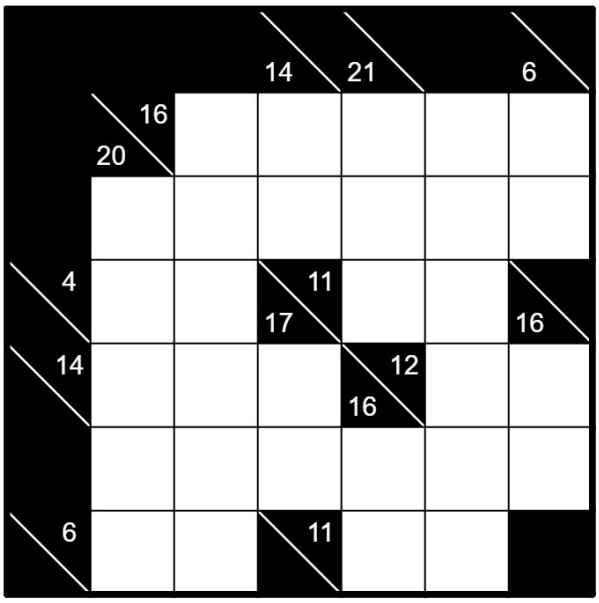
Divide the grid into regions of orthogonally connected cells, each containing a connected group of white cells and a connected group of grey cells, with the property that the shape of the white cells is identical to the shape of the grey cells, allowing rotations and reflections. Clued cells must belong to a region containing the indicated number of white cells and the indicated number of grey cells.

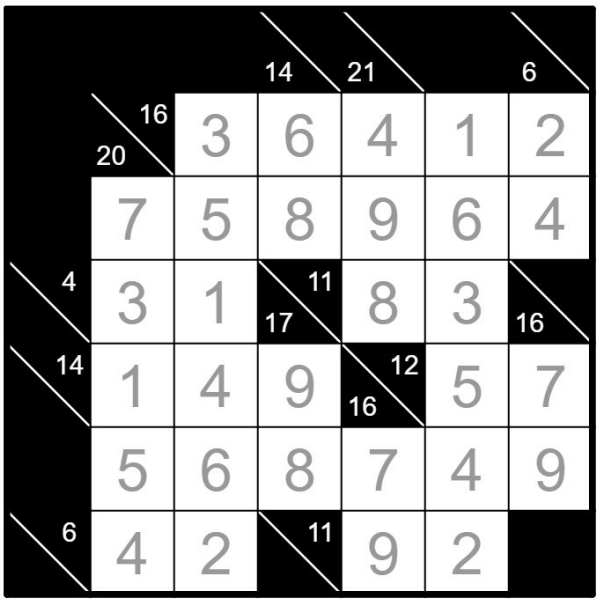




3.13–3.15 Kakuro

Place a number from 1 to 9 into each empty cell so that no number is repeated in any unobstructed horizontal or vertical line. A clue on the bottom of a blocked cell represents the sum of the numbers in the vertical line below it. A clue on the right side of a blocked cell represents the sum of the numbers in the horizontal line to its right. Clues cannot see numbers through other blocked cells.





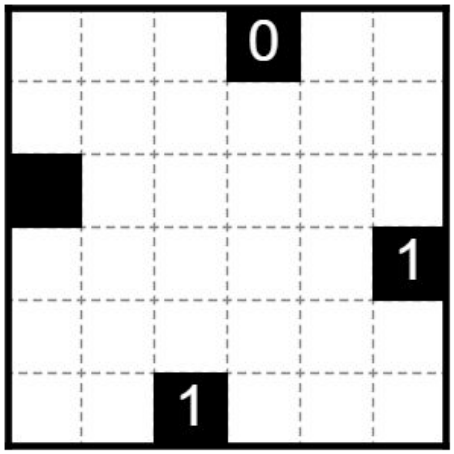
Round 4: Curated Treats

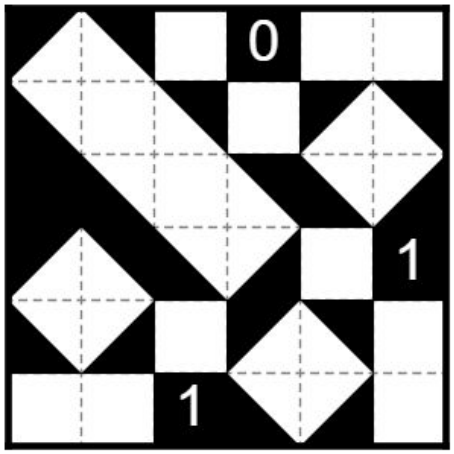
Each author handpicked a genre to showcase in this round.

4.1–4.3 Shakashaka

Author: ft029

Shade a right triangle in some empty cells, each of which occupies exactly half the cell it's in. Each unshaded area must be rectangular in shape. A number in a cell represents how many of the (up to) four cells orthogonally adjacent to the clue contain triangles.





4.4–4.6 Japanese Sums

Author: djmathman

Place a number from the given range into some cells so that no number is repeated in any row or column. Numbers outside the grid indicate the sums of the numbers in groups of consecutive numbered cells in the corresponding row or column, in order. Sums must be separated by at least one empty cell.

			2		?
			3		1
1	5				
2	3				
	1				
	?				

{1–3}

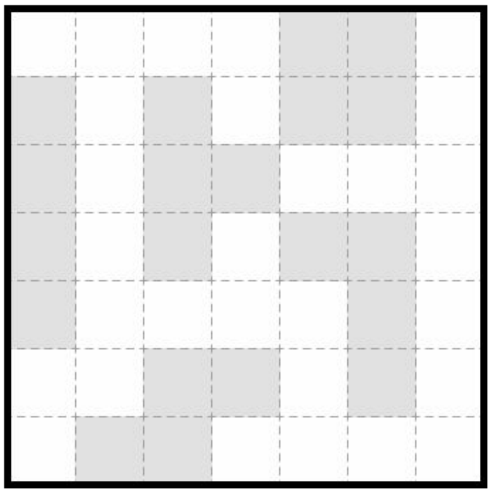
			2		?
			3		1
1	5	1		3	2
2	3		2		3
	1			1	
	?		3	2	1

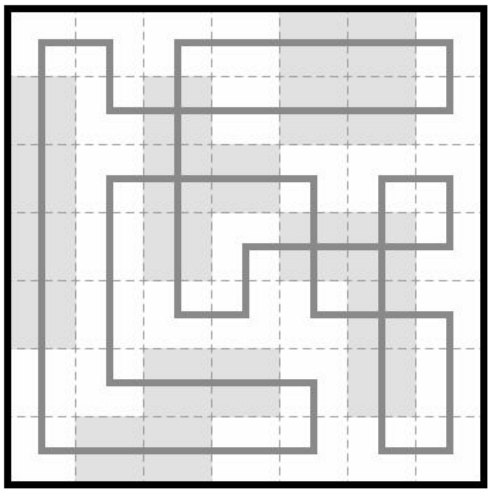
{1–3}

4.7–4.9 Barns

Author: jkittykitkat

Draw a loop through the centers of all cells, which may not pass through bold borders. Two perpendicular line segments may intersect each other only on icy cells, but they may not turn at their intersection or otherwise overlap. The loop may not turn on icy cells.



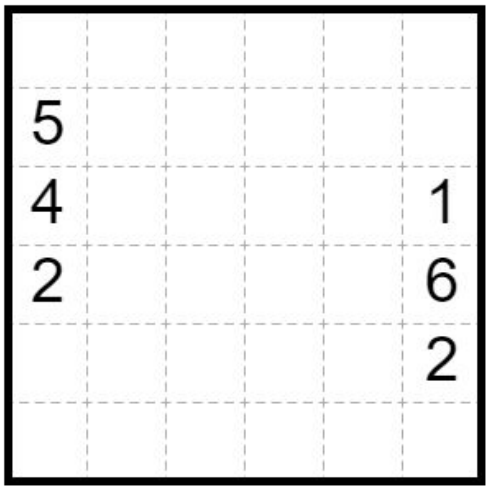


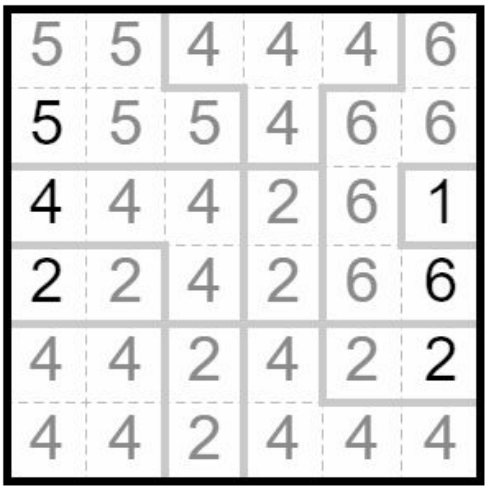
4.10–4.12 Fillomino (Blokus)

Author: mstang

Divide the grid into regions of orthogonally connected cells. Two regions of the same size may not share an edge. Clued cells must belong to a region containing the indicated number of cells. Additionally, all regions of the same size must be diagonally connected.

Note: It's enough to divide into regions; you don't need to place numbers in all the cells.

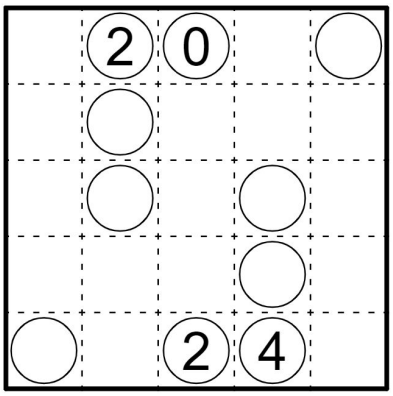


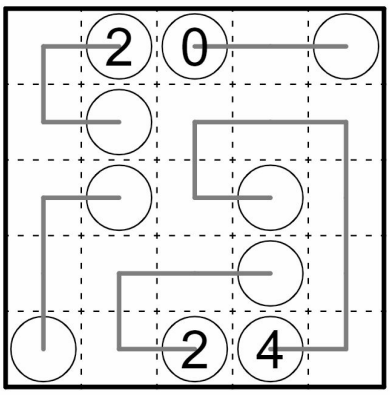


4.13–4.15 Mintonette

Author: Rever

Draw paths through the centers of cells connecting each circle to exactly one other. Paths may not cross each other or themselves, and every cell must be used by a path. A circle with a number indicates how many times the connecting path turns.





Round 5: Team Round

During the team round, teams will receive grid halves with partial rulesets, match them, and solve the completed puzzles. One set of grid halves will contain a "local" rule, and the other set will contain a "global" rule. When matched correctly, each full grid will be solvable with both the local and global constraints. There are ~~three~~ **four** phases to the team round with their own sets of grids, and each phase has an additional general rule that pertains to all grids in the phase.

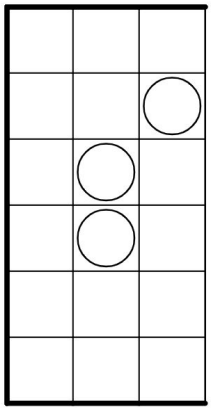
Teams can consist of up to 6 people, though we recommend 3-4 people per team. Once your team believes they have matched all the grids and solved the puzzles, one person should turn the puzzles in to receive the next set.

If you have any questions during the round about semantics, feel free to ask.

Here's an example set of puzzles and its solution. The general rule is to draw (non-intersecting) paths between pairs of circles.

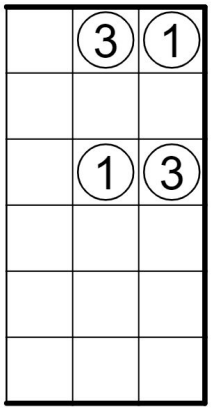
First segment length

A circle with a number tells the length of the first segment of the path connecting to the circle.



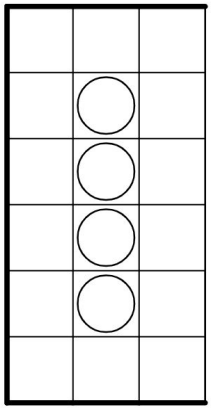
All cells used

All cells in the grid must be used by a path.



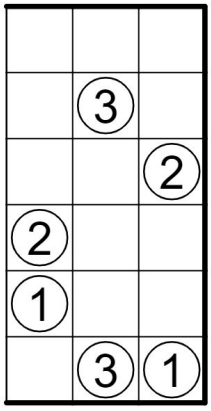
# of turns

A circle with a number tells how many turns are made by the path connecting to the circle.

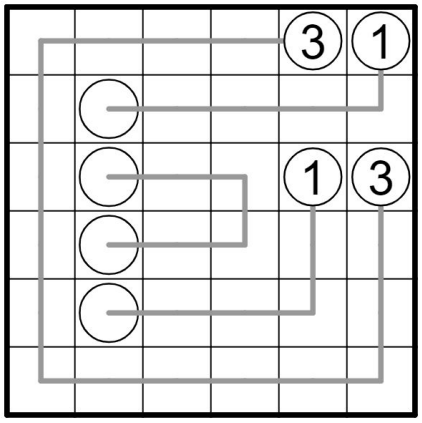


Cross on empty circles

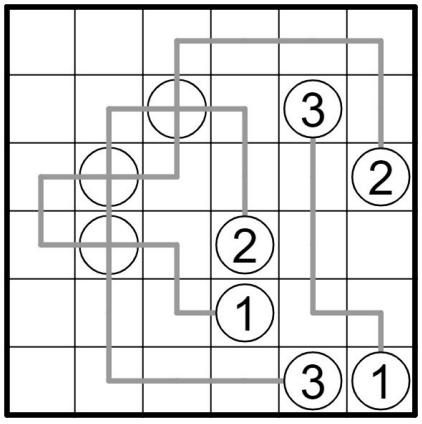
Empty circles are no longer endpoints of paths, but must be crossed through. Paths can't cross outside of empty circles.



# of turns and **All cells used**



First segment length and **Cross on empty circles**



Round 1: "Pop Culture"

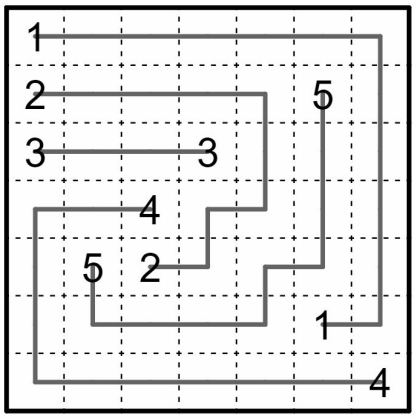
Sudoku

4	1	2	5	6	3
3	5	6	1	2	4
6	2	5	3	4	1
1	3	4	6	5	2
2	6	3	4	1	5
5	4	1	2	3	6

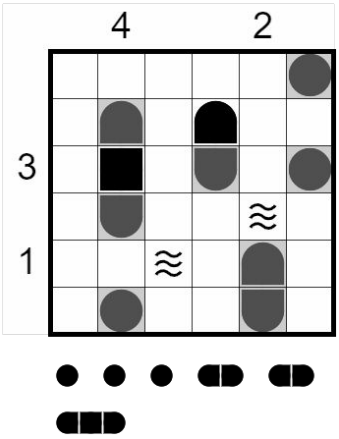
Scrabble

O					
P	U	Z	Z	L	E
E				O	
N				G	
			M	I	T
				C	

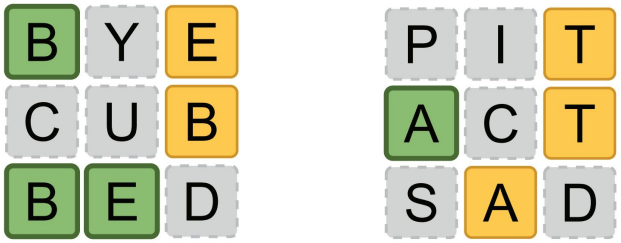
Numberlink



Battleships

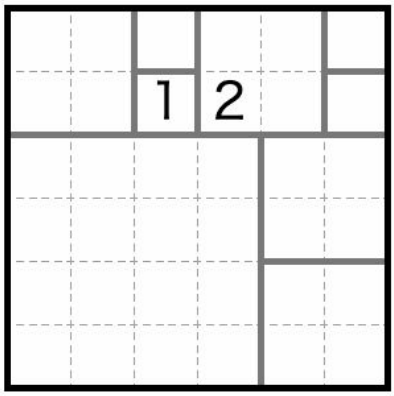


Wordle Bank

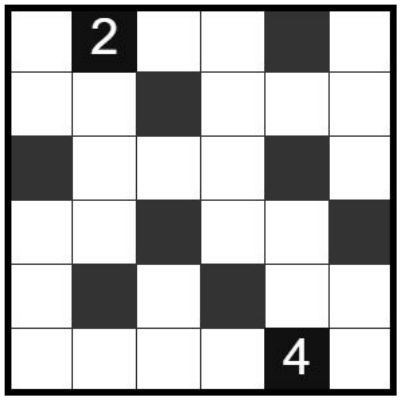


A C T B E D B Y E
C U B P I T S A D

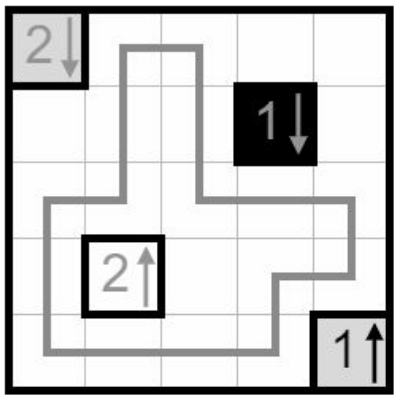
Square Jam



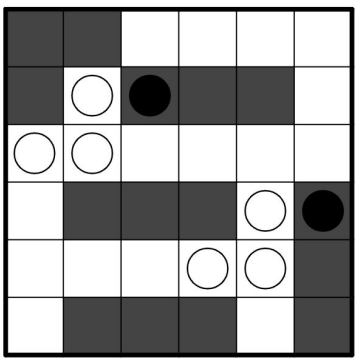
Aquapelago



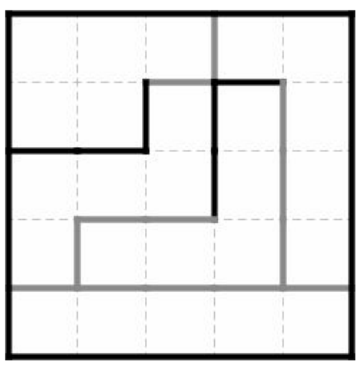
Castle Wall



Isowatari



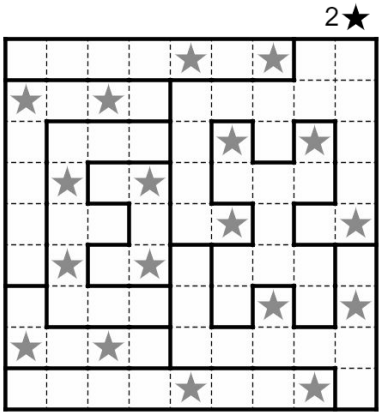
Pentominous (Borders)



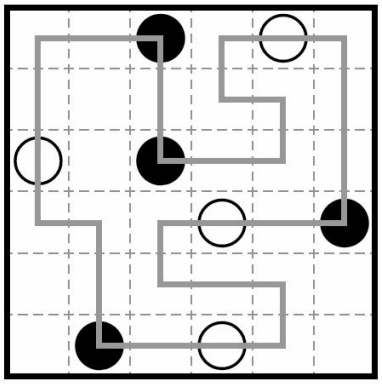
Round 2: Made in America

Round 3: Powerhouses

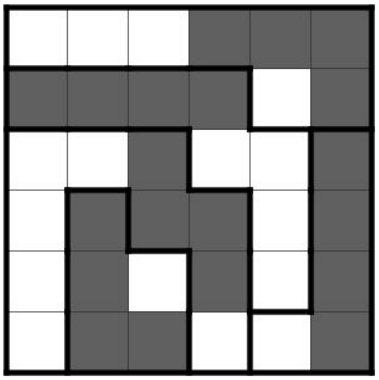
Star Battle



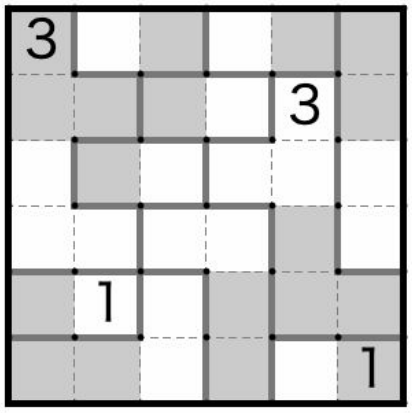
Masyu



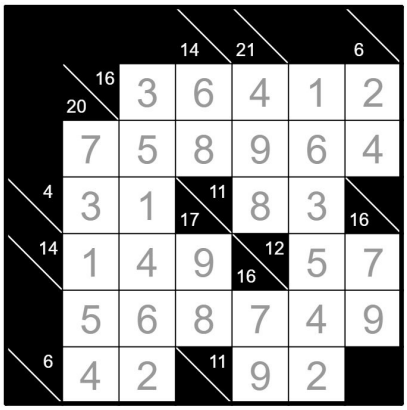
LITS



Double Choco

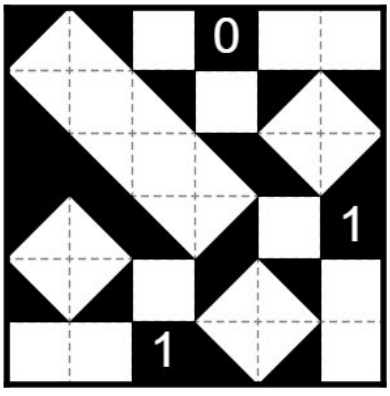


Kakuro



Round 4: Curated Treats

Shakashaka

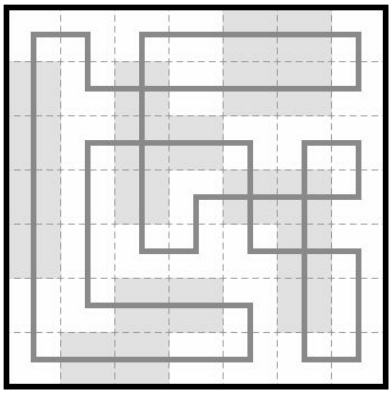


Japanese Sums

			2 3		? 1
1	5	1		3	2
2	3		2		3
	1			1	
	?		3	2	1

{1–3}

Barns



Fillomino (Blokus)

5	5	4	4	4	6
5	5	5	4	6	6
4	4	4	2	6	1
2	2	4	2	6	6
4	4	2	4	2	2
4	4	2	4	4	4

Mintonette