## 23.1 TomTom

Insert a number from 1 to N into each cell in the N by N grid so that no number repeats in any row or column. Also, the number in the upper-left corner of each bold cage indicates the value of a mathematical operation (addition, subtraction, multiplication, division) applied successively to all numbers in the cage, starting with the largest number for subtraction and division (e.g. 1,2,4 with subtraction is a 1- clue as 4-2-1 = 1). The operation may or may not be given in the cage, but at least one of the four operations must apply. Numbers can repeat within a cage.

{1–6}

| 30		5		30	
	15		16		
	15			10	
8					48
		2			

23.2 Cross Sums

Enter a single digit from 1 to 9 into each white cell so that the sum of digits in each Across entry equals the value given to the left of the entry, and the sum of digits in each Down entry equals the value given above the entry. No digit may be repeated within a single entry (i.e., group of cells connected horizontally or vertically without any black cells between).
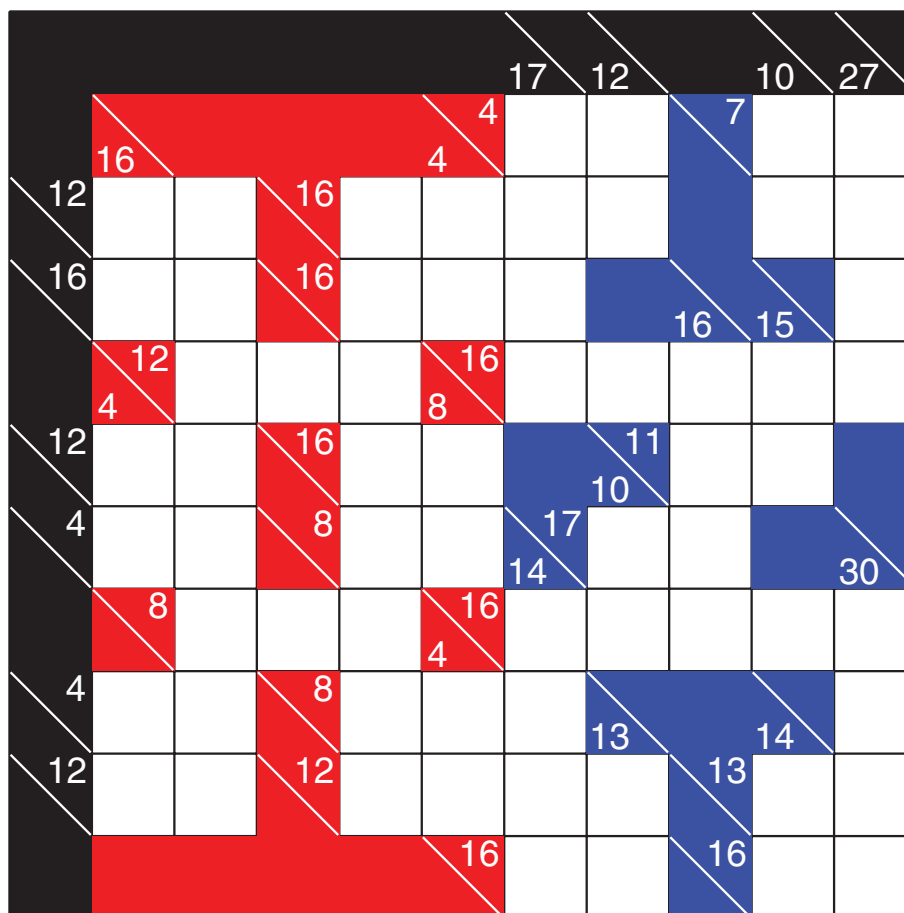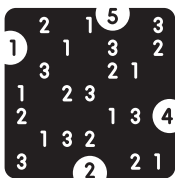
23.3 Skyscrapers (Gap)

Insert numbers into some cells of the grid so that each row and column of the grid contains the numbers from 1 to 5 once each and one gap. Each number in the grid represents the height of a building and each clue outside the grid indicates how many buildings can be "seen" while looking from that direction. Taller buildings block the view of smaller buildings.
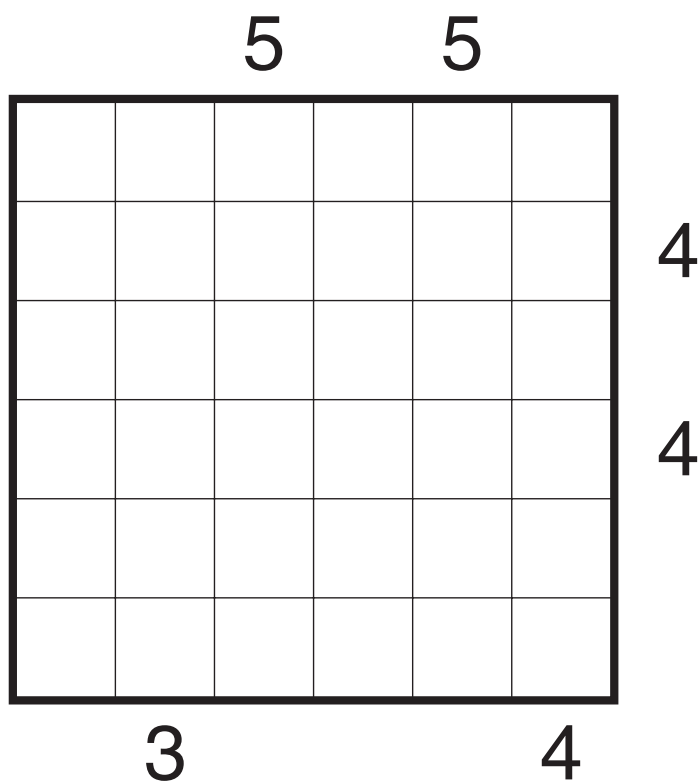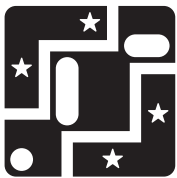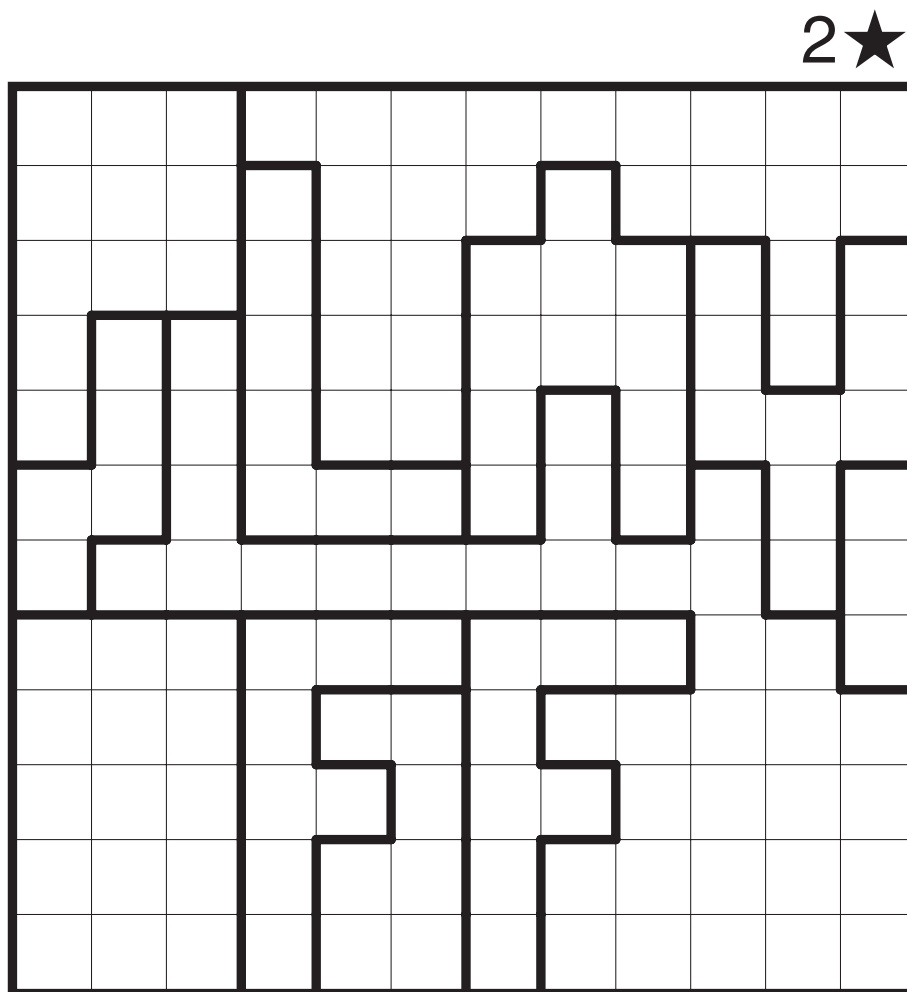
23.1 Star Battle

Fill some cells with stars so that each row, column, and bold region contains the indicated number of stars. Stars cannot be placed in adjacent cells that share an edge or corner.

2★

23.2 Battleships

Locate the indicated fleet in the grid. Each segment of a ship occupies a single cell. Ships can be rotated. Different ships cannot be placed in adjacent cells that share an edge or corner. Some ship segments, or sea cells without any ship segments, are given in the grid. The numbers on the right and bottom edges of the grid reveal the number of ship segments in that row or column.
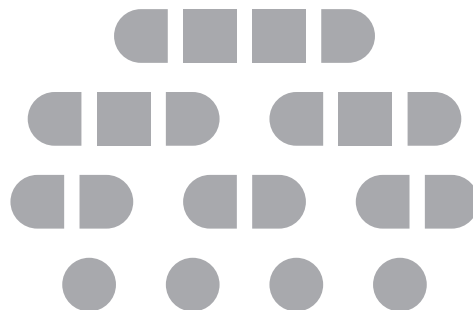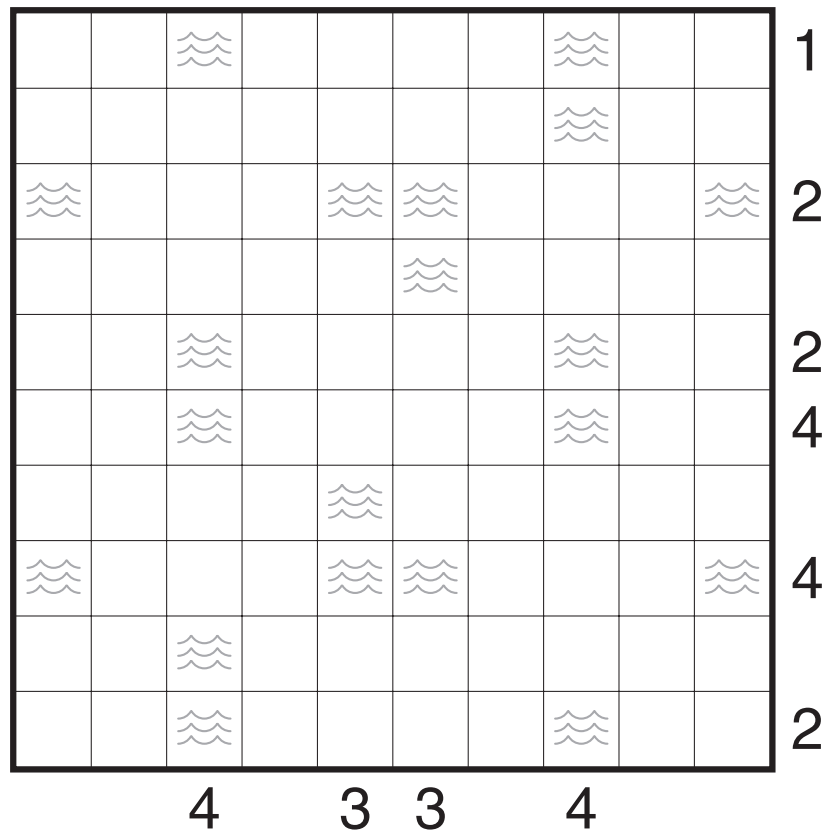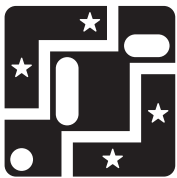
23.3 Statue Park

A bank of shapes is given with the grid. Place each of the shapes exactly once into the grid, with rotations and reflections allowed. No two shapes can overlap or be orthogonally adjacent, and all of the space not occupied by shapes must be connected. Black circles in the grid represent spaces that must be contained in one of the shapes, and white circles represent spaces that may not be contained in a shape.
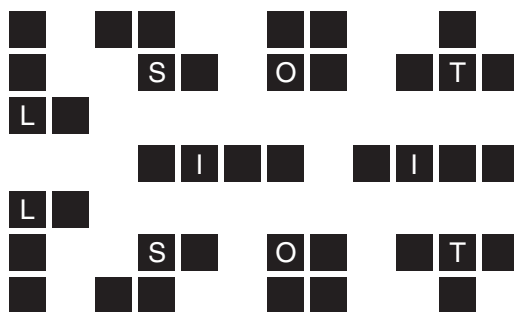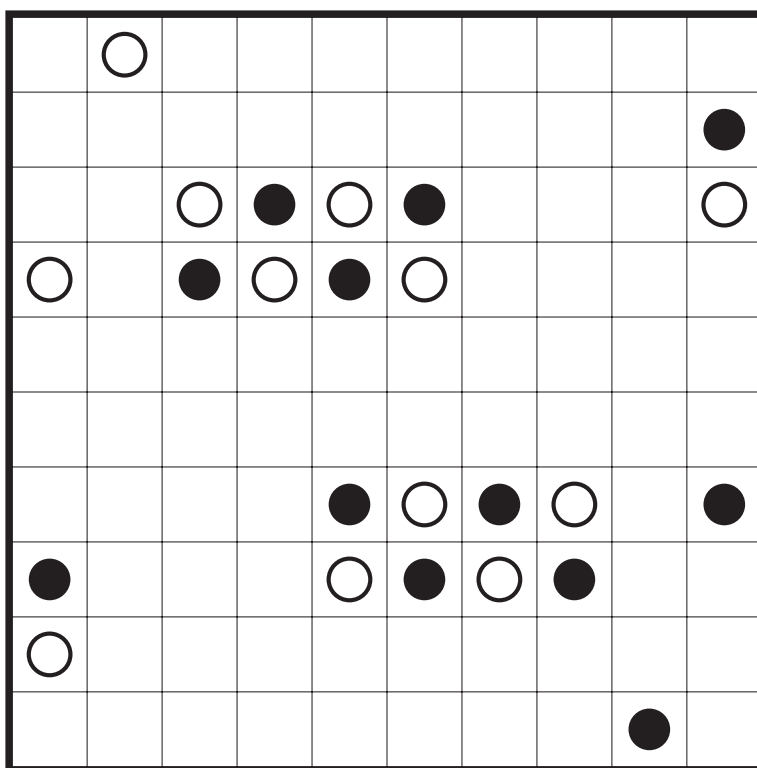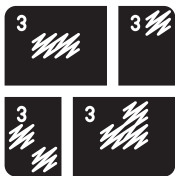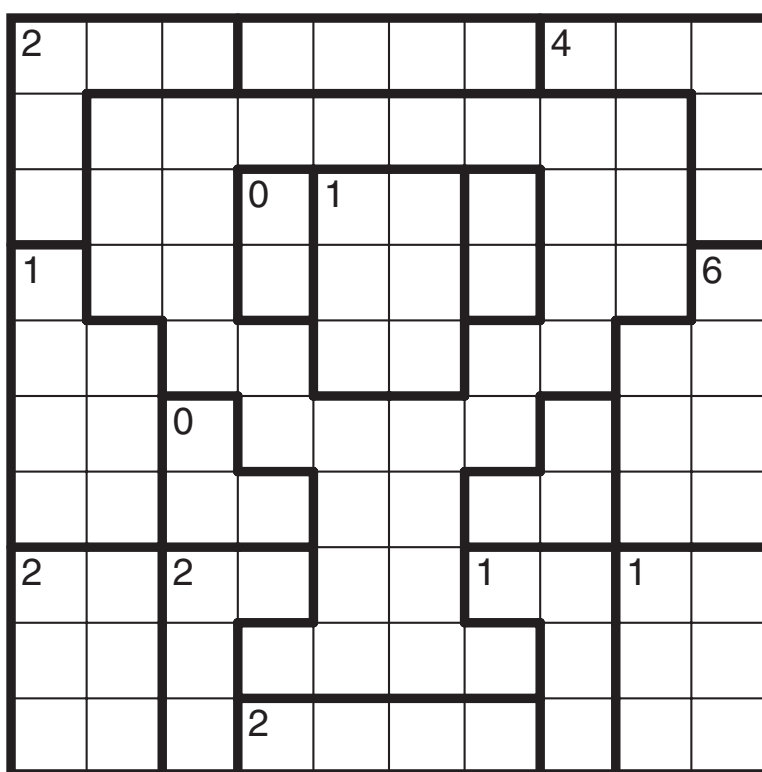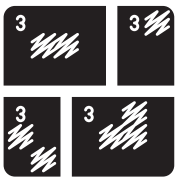
23.1 Aqre

Shade some cells so that all shaded cells form one connected group. Regions with numbers must contain the indicated count of shaded cells, and it is allowed to shade over the numbered cells. There may not exist a run of four or more consecutive shaded or unshaded cells horizontally or vertically anywhere in the grid.

23.2 Tapa

Shade some empty cells black to create a single connected wall. Numbers in a cell indicate the length of consecutive shaded blocks in the neighboring cells. If there is more than one number in a cell, then there must be at least one white (unshaded) cell between the black cell groups. Cells with numbers cannot be shaded, and the shaded cells cannot form a 2×2 square anywhere in the grid.
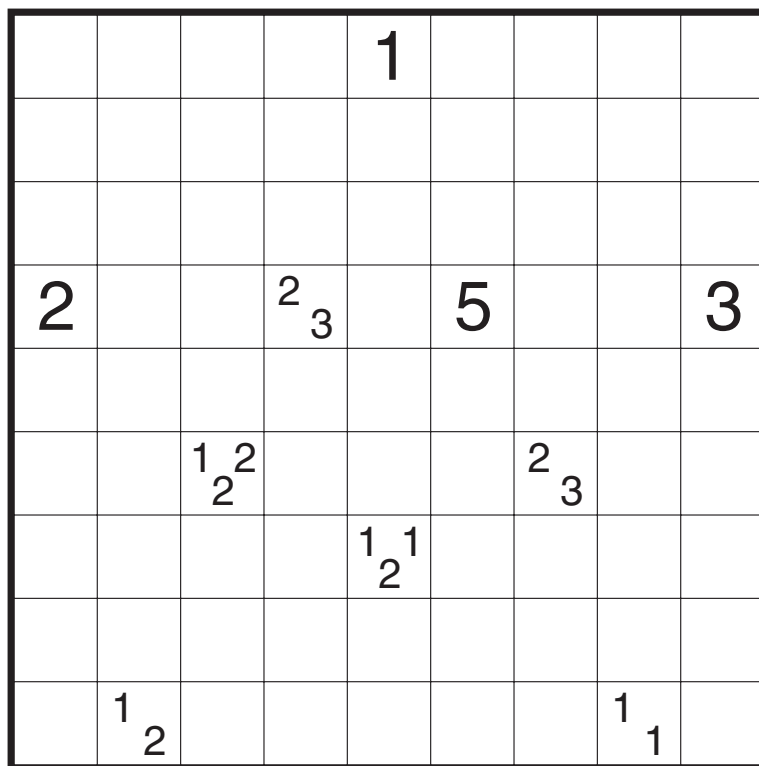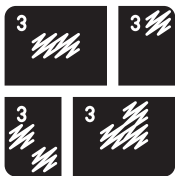
23.3 LITS

Shade exactly four connected cells in each outlined region, to form an L, I, T, or S tetromino, so that the following conditions are true: (1) All shaded cells are connected with each other; (2) No 2×2 group of cells can be entirely shaded black; (3) When two tetrominoes in adjacent regions share an edge, they must not be of the same type (L, I, T, or S), regardless of rotations or reflections.

23.1 Castle Wall
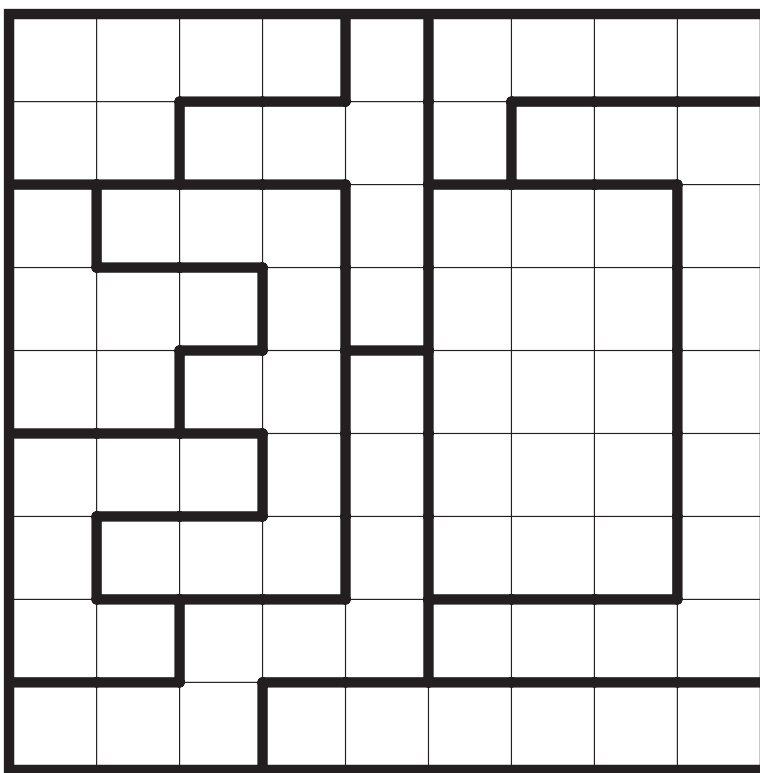
Draw a single closed loop (without intersections or crossings) passing through some empty cells in the grid. The grid contains some bordered or colored cells that cannot be part of the loop. Black cells must be outside the loop; white cells (with heavy borders) must be inside the loop. Numbers and arrows refer to the total sum of the lengths of loop segments in the given direction. (An equivalent way to understand these values is to count the number of cell borders crossed by the loop in that direction.)
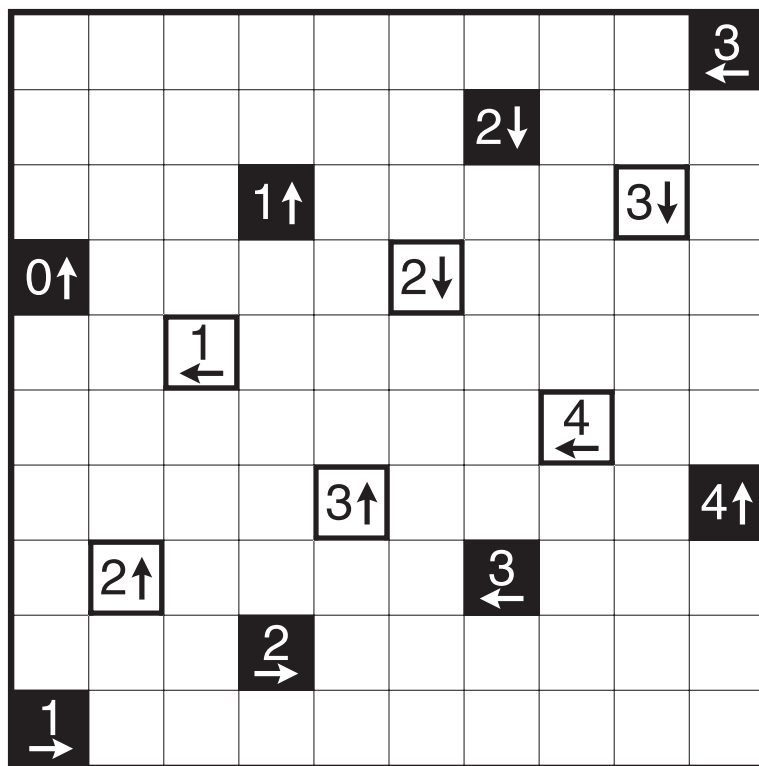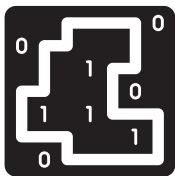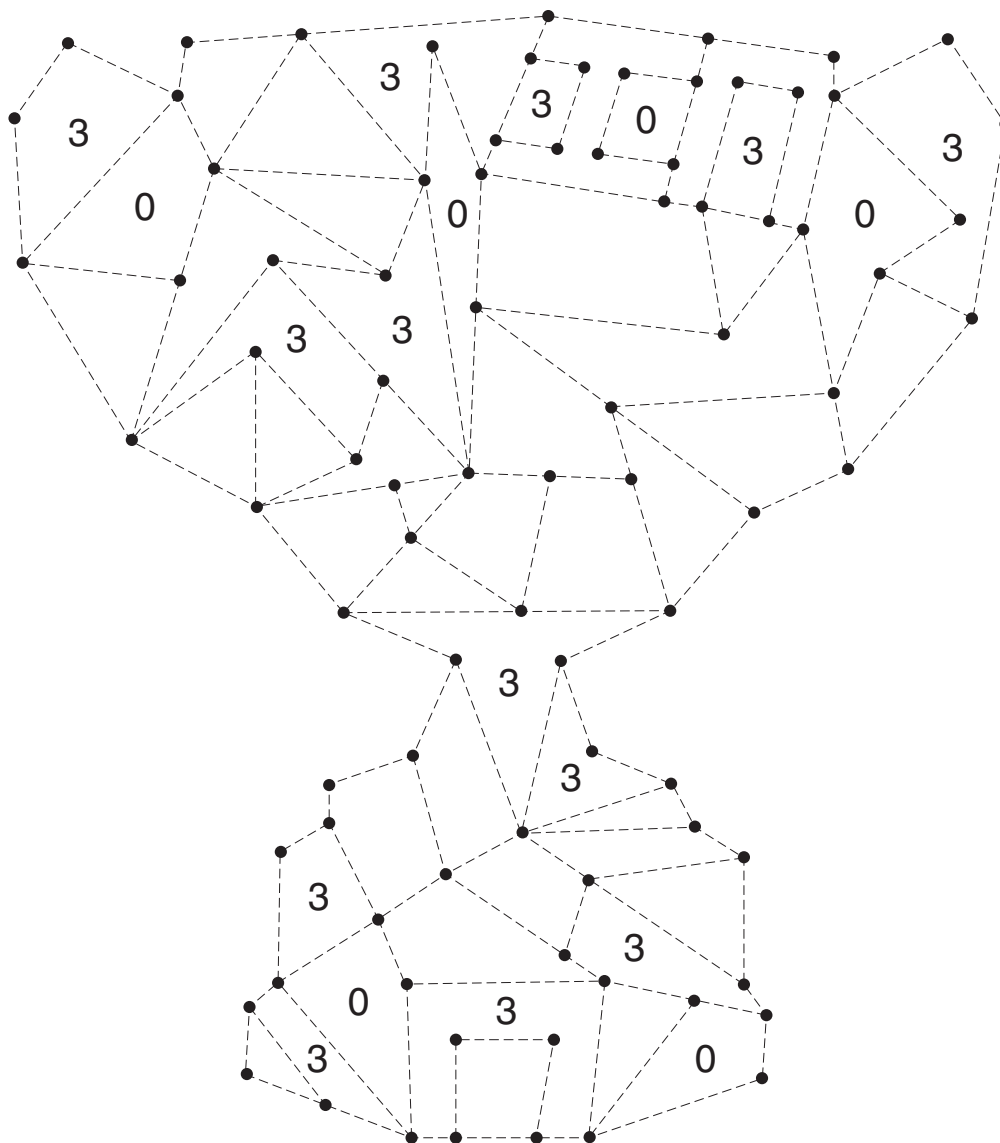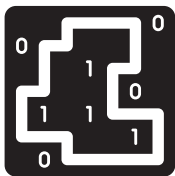
23.2 Slitherlink

Draw a single, non-intersecting loop on an irregular grid that can only follow the lines between the dots. Numbers inside a cell indicate how many of the edges of that cell are part of the loop.

23.3 Cross Border Parity Loop

Draw a single, non-intersecting loop that has two states, which are white and black. The puzzle grid has heavily shaded borders, which define areas in the grid. Whenever the loop crosses a border (including borders inside an area), it changes state from white to black or from black to white. A black circled clue provides the number of cells in each area that the loop traverses in the black state, and a white circled clue provides the number of cells in each area that the loop traverses in the white state. Each "?" represents an unknown integer, zero or larger.
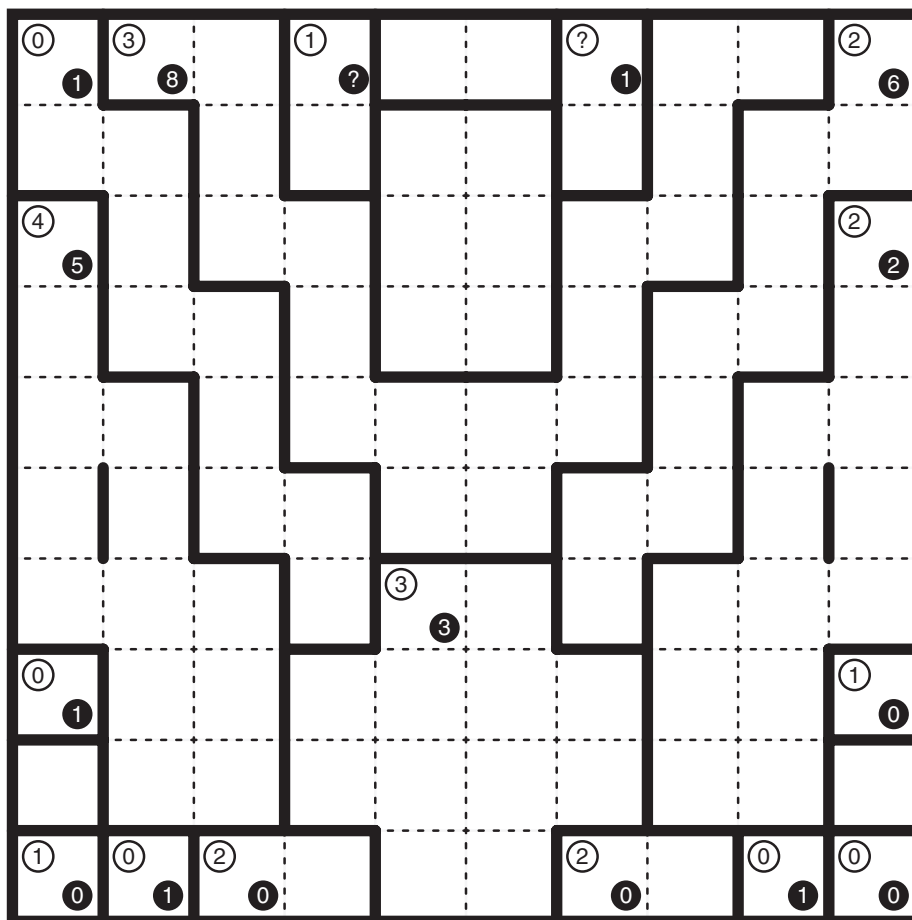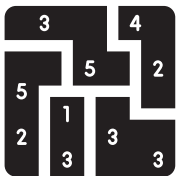
23.1 Cave

Shade some cells to leave behind a single connected group — the cave — with no enclosed, shaded cells. In other words, all shaded cells must be connected by other shaded cells to an edge of the grid. All numbered cells must be a part of the cave, with each number indicating the total count of cells connected vertically and horizontally to the numbered cell **including the cell itself**.

5								11
	2		2			4		
	3			3				
					4			
4					5			
	5						6	
		6						
			7			6		
	9			8		9		
11								10
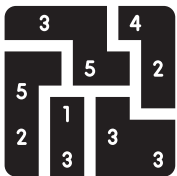
23.2 Araf

Divide the grid into some regions formed of edge-adjacent squares. Each cell is part of one region, and each region should contain exactly two given numbers. Each region must have an area that is strictly between those numbers. (This means, for two number clues A and B with A < B, the area C fulfills A < C < B.)

23.3 Pentominous
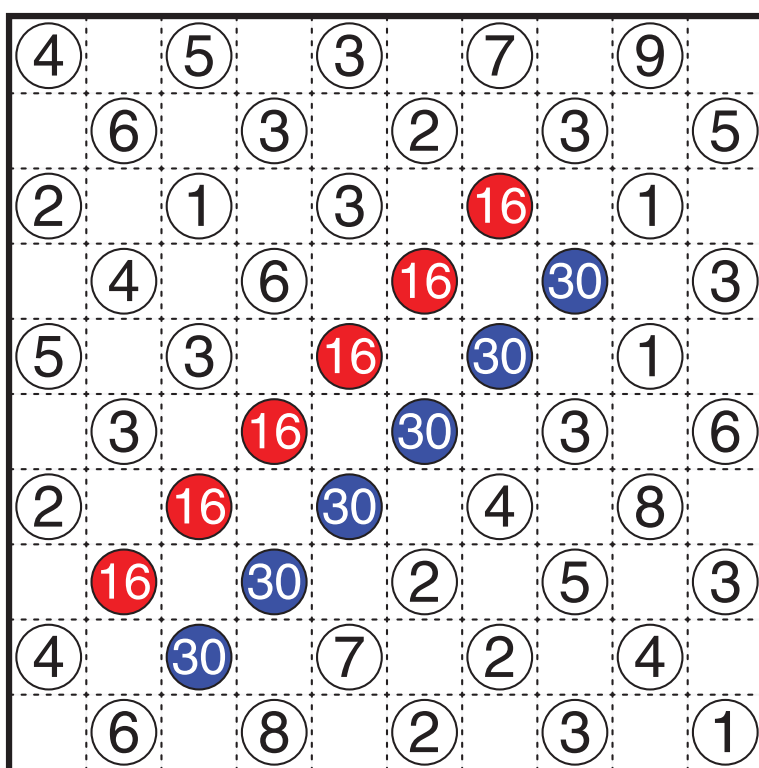
Divide the grid into pentominoes (five-cell regions) so that no two pentominoes of the same shape (including rotations/reflections) share an edge. A cell with a letter in it must be part of the pentomino shape normally associated with that letter. An inventory of pentominoes is given below the puzzle but not all shapes must be used.

Note: There is no need to have letters in your solution, only markings so that the regions of the pentominoes are all clear.