LOGIC MASTERS Deutschland e.V.

www.logic-masters.de

World Puzzle Federation

Logic Masters 2017

Instructions

Round 1 – Carousel

Time: 30 minutes

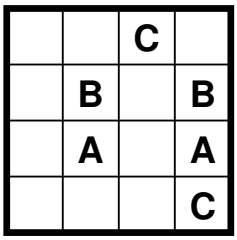
Total points: 105 points

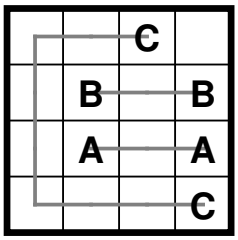
Bonus: 2 points for every 30 seconds remaining

The carousel contains 7 easy puzzles.

1.1 Arukone — 5 Punkte

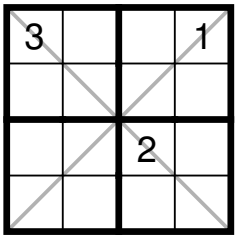
Connect pairs of identical letters with lines which connect the center of horizontally or vertically adjacent cells using every cell at most once.

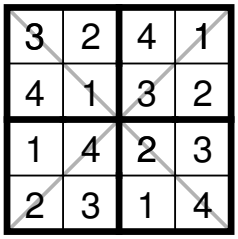




1.2 Diagonal Sudoku — 10 Punkte

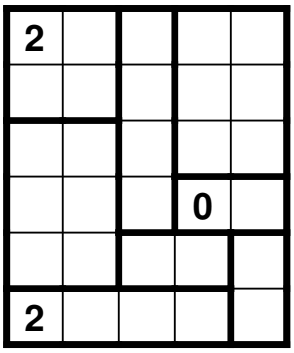
Write the given symbols into the grid such that in every row, column and region and in both main diagonals every symbol appears exactly once.
Symbols (example): 1, 2, 3, 4

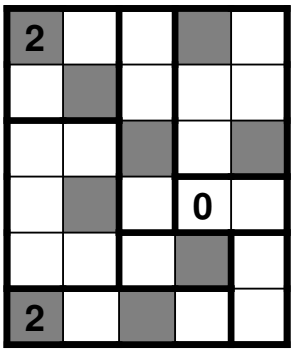




1.3 Heyawake — 15 Punkte

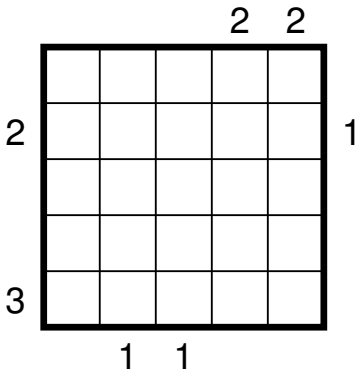
Blacken some cells, such that no two black cells share an edge and all white cells are connected. It is allowed to blacken cells containing numbers. There is no connected sequence of white cells in any row or column which extends to more that two regions. Numbers determine the number of black cells in the respective regions.

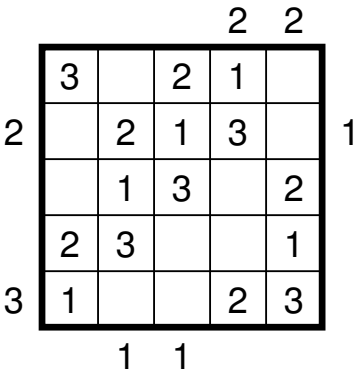




1.4 Skyscrapers with two Parks — 15 Punkte

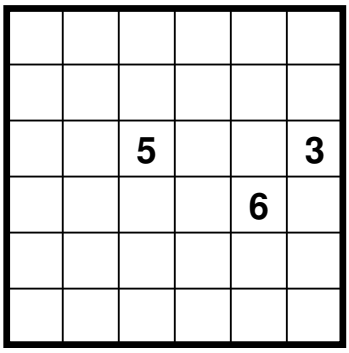
Write the numbers 1 to 4 (in the example 1 to 3), indicating the heights of skyscrapers, into the grid such that in every row and column every number appears exactly once. Two cells remain empty in every row and column. Numbers at the edge of the grid determine how many skyscrapers are visible in this direction. Higher skyscrapers hide lower skyscrapers.

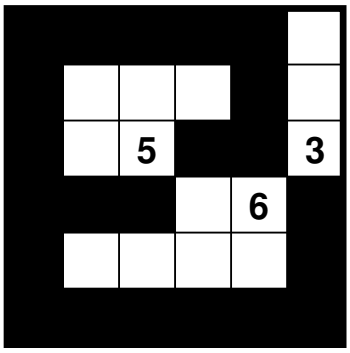




1.5 Nurikabe — 15 Punkte

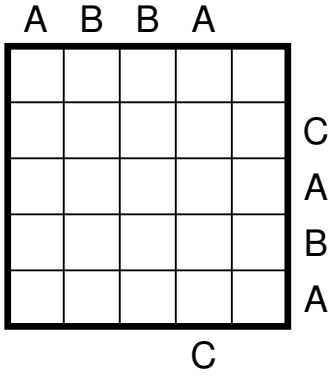
Blacken some empty cells such that all black cells are connected but no 2x2 area is blackened completely. Every white region contains exactly one of the given numbers. The number represents the size of the region.

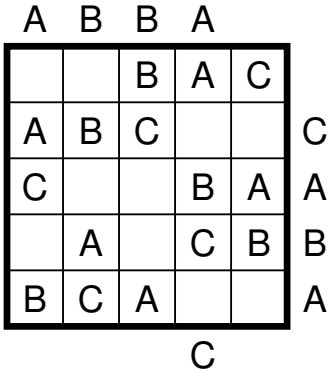




1.6 Easy as ABC — 20 Punkte

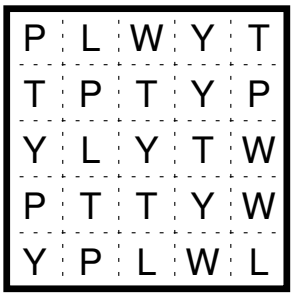
Put the letters A, B and C into the grid such that every letter appears in every row and column exactly once. Letters on the edge determine which letter comes first in the respective row or column.

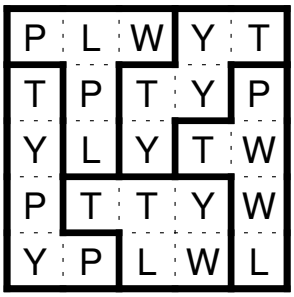


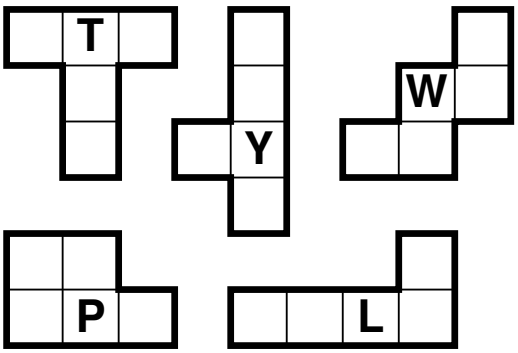


1.7 Anti Letter Pentominoes — 25 Punkte

Divide the grid into pentominoes such that each pentomino (in the example the pentominoes L, P, T, W, Y) occurs exactly once and no pentomino contains the letter naming its own shape. Pentominoes may be mirrored and rotated.







Round 2 – Loop

Time: 55 minutes

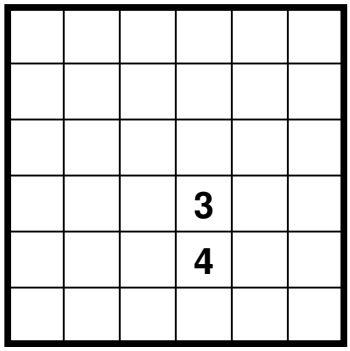
Total points: 265 points

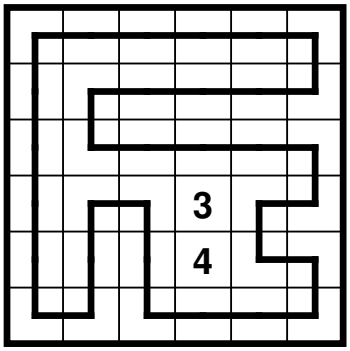
Bonus: 4 points for every minute remaining

10 fences and loop puzzles form this round.

2.1 Turning Loop — 5 Punkte

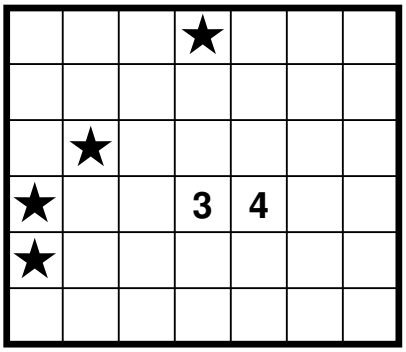
Draw a loop into the grid connecting the centers of horizontally or vertically adjacent cells using every white cell without number exactly once. Numbers indicate in how many of the eight adjacent cells the loop turns.

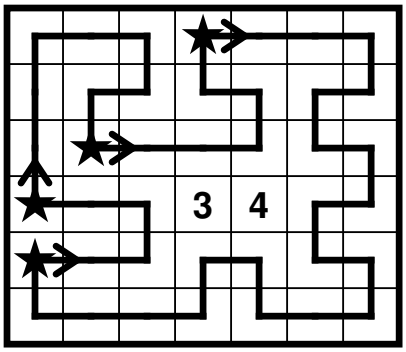




2.2 Milky Way — 5 Punkte

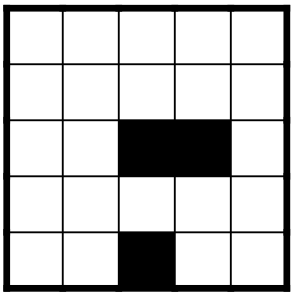
Draw a directed loop into the grid connecting the centers of horizontally or vertically adjacent cells using every white cell without number and every cell with a star exactly once. Numbers indicate how often the loop passes through the eight adjacent cells. In cells containing stars the loop turns and goes straight through the next cell along the loop.

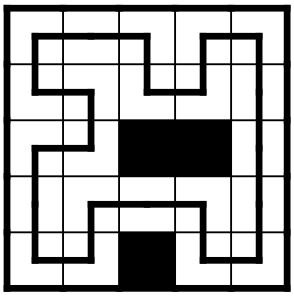




2.3 Simple Loop — 15 Punkte

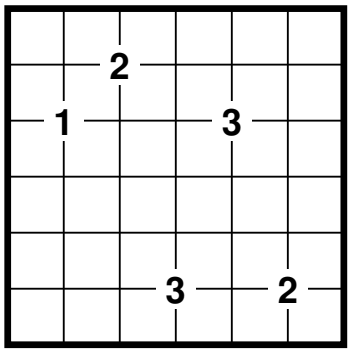
Draw a loop into the grid connecting the centers of horizontally or vertically adjacent cells using every white cell exactly once.

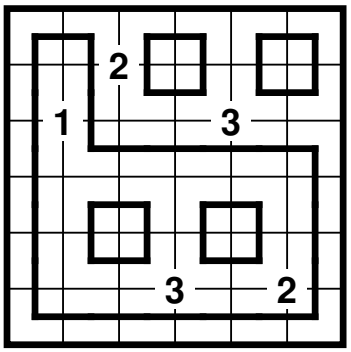




2.4 Transposed Multi Loop — 25 Punkte

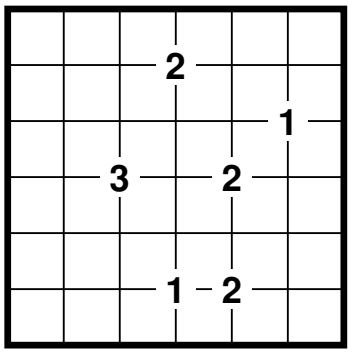
Draw one or more loops into the grid connecting the center of horizontally or vertically adjacent cells using every cell exactly once. Numbers appear on the intersections of the grid lines and determine how many different loops pass through the four adjacent cells.

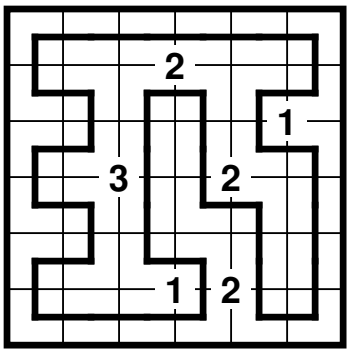




2.5 Touching Loop — 30 Punkte

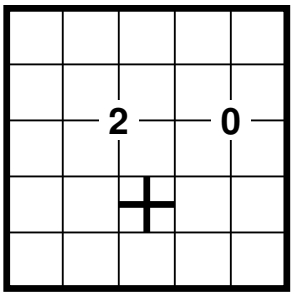
Draw a loop into the grid connecting the centers of horizontally or vertically adjacent cells using every cell exactly once. Numbers appear at the intersections of the grid lines and indicate how often the loop passes through the four adjacent cells.

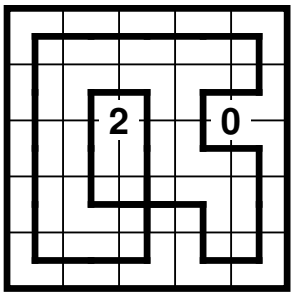




2.6 Crossing Loop — 35 Punkte

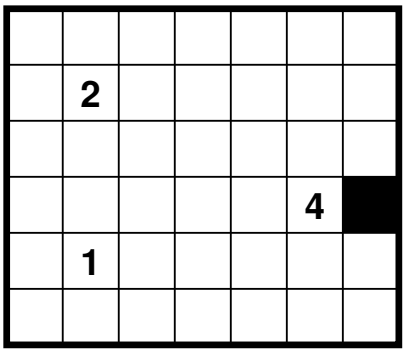
Draw a loop into the grid connecting the centers of horizontally or vertically adjacent cells using every empty cell exactly once, and crosses itself at the given intersections. Numbers appear at the intersections of the grid lines and determine how often the loop winds around this point.

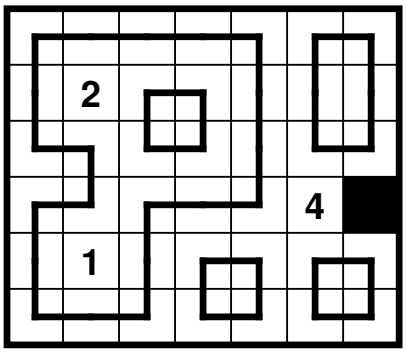




2.7 Multi Loop — 35 Punkte

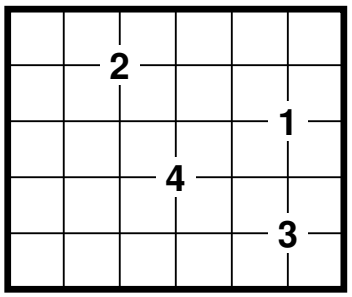
Draw one or more loops into the grid connecting the center of horizontally or vertically adjacent cells using every white cell without number exactly once. Numbers determine how many different loops pass through the eight adjacent cells.

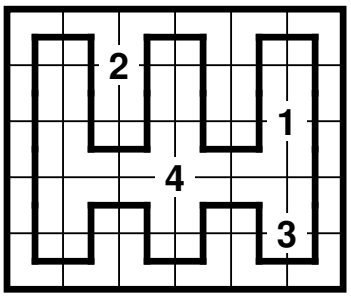




2.8 Transposed Turning Loop — 35 Punkte

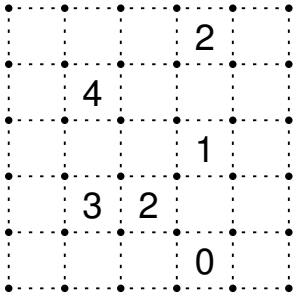
Draw a loop into the grid connecting the center of horizontally or vertically adjacent cells using every cell exactly once. Numbers appear on the intersections of the grid lines and indicate in how many of the adjacent four cells the loop turns.

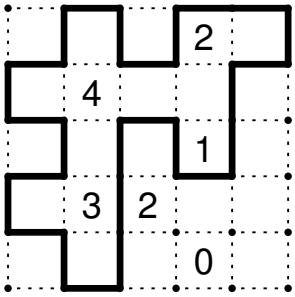




2.9 Touching Fences — 40 Punkte

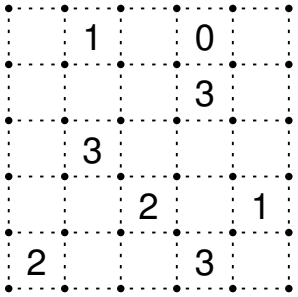
Draw a loop along the dotted lines using every point of the grid at most once. Numbers indicate how often the loop touches the respective cell.

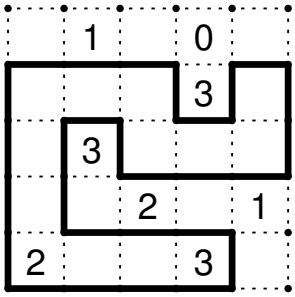




2.10 Fences — 40 Punkte

Draw a loop along the dotted lines using every point of the grid at most once. Numbers indicate how many edges of the cell are used by the loop.





Round 3 – Mixer

Time: 65 minutes

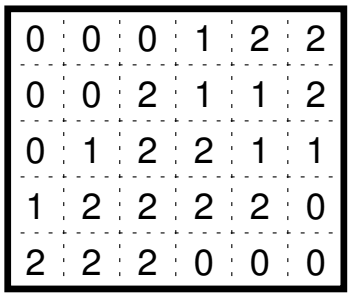
Total points: 310 points

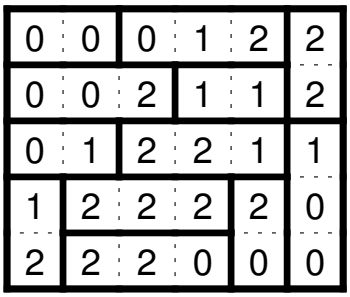
Bonus: 4 points for every minute remaining

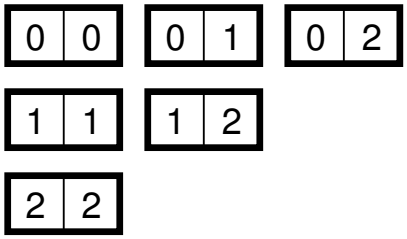
The mixer contains 6 puzzles that each combine the rules of two puzzle types.

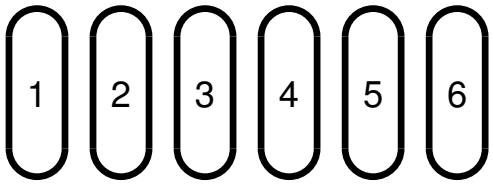
3.1 Domino Pills — 25 Punkte

Divide the grid into rectangular regions of sizes 2 and 3 such that all dominoes with the numbers 0 to 3 (0 to 2 in the example) and ten pills with all values from 0 to 9 (1 to 6) occur. Pills consists of 3 cells. The value of a pill equals the sum of all numbers inside the pill.



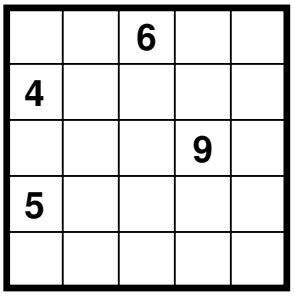


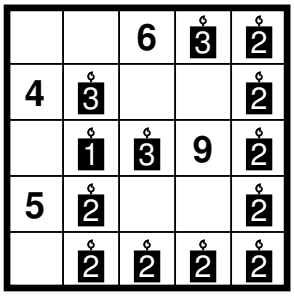




3.2 Candles Yin Yang — 35 Punkte

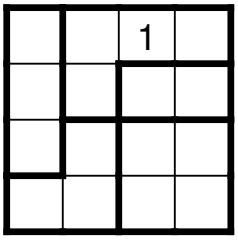
Write numbers from 1 to 4 in some empty cells, representing candles with the respective height. All cells with candles are connected as well as all cells without candles. Cells are connected if they share an edge. There is no 2x2 area completely filled with candles or completely free of candles. Given numbers indicate the total height of all candles in the eight adjacent cells. Candles without adjacent candles have height 4. As the heat of nearby candles melts wax, the height of a candle is reduced by 1 for each horizontally or vertically adjacent candle. Diagonally adjacent candles do not melt wax. There are no candles of height 0. A solution is considered correct if the position of the candles is correct. Inscribing the heights of the candles is optional.

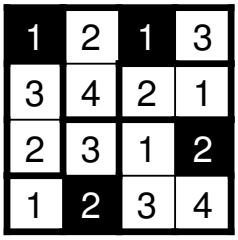




3.3 Hakyuu Hitori — 40 Punkte

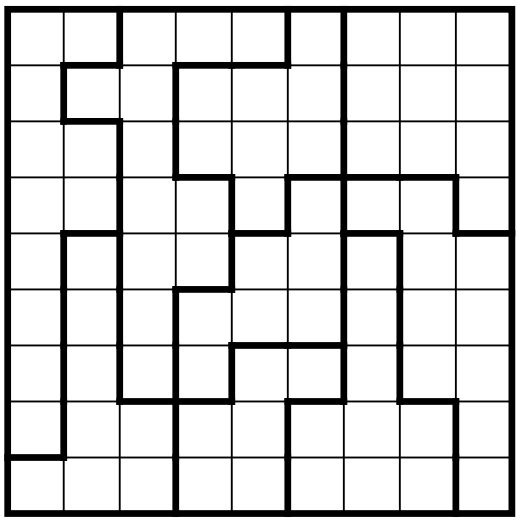
Fill the grid with numbers such that in every region every number between 1 and the size of the respective region occurs exactly once. If the same number occurs multiple times in one row or column, there must be at least as many cells with different numbers in between as the number indicates. Now blacken some cells such that the remaining cells do not contain two equal numbers in any row or column. All white cells are connected and black cells do not share an edge.

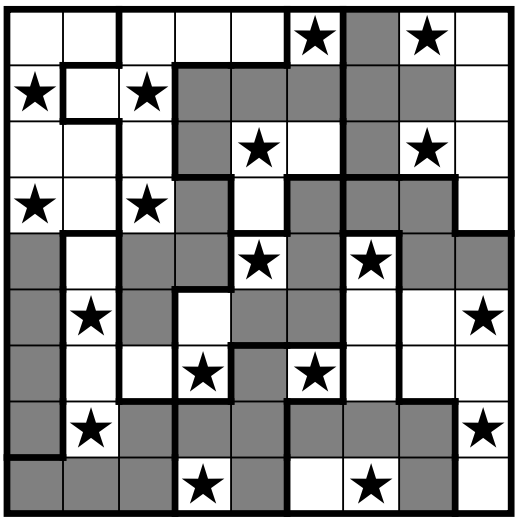




3.4 LITS Starbattle — 50 Punkte

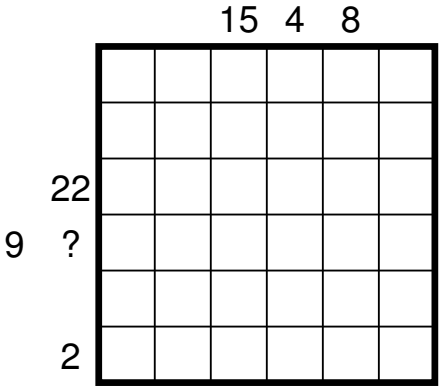
Place stars in some cells such that there are two stars in every row, column and region. Cells with stars do not touch, not even diagonally. Blacken some cells without stars such that in every region there are four connected black cells, forming a tetromino. Cells are connected if they share an edge. All black cells are connected but no 2x2 area is completely black. Equal tetrominoes do not share an edge. Mirrored or rotated tetrominoes are considered equal.

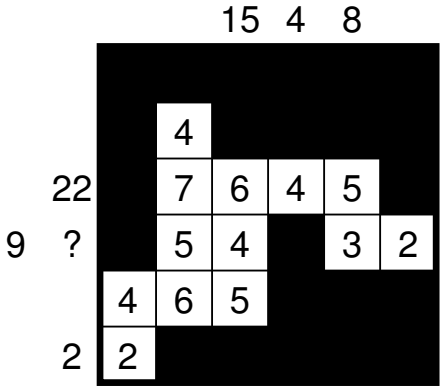




3.5 Japanese Sums Cave — 60 Punkte

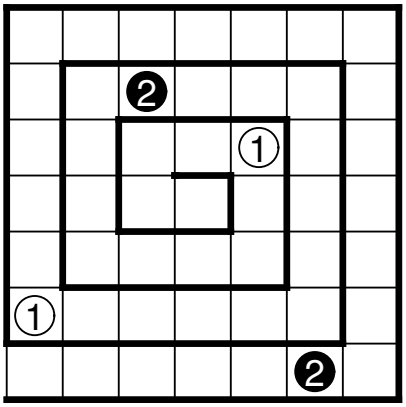
Blacken some cells and fill the remaining cells with number from 1 to 9 (1 to 7 in the example). All cells with numbers are connected. All black cells are connected to the edge of the grid. Numbers do not repeat in any row or column. Every number in the grid is a valid clue for the cave and indicate how many cells are visible in horizontally and vertical line from the respective cell, including the cell itself. Numbers at the edge of the grid determine the sums of numbers in consecutive cells in the correct order. Different sums are separated by at least one black cell. Some numbers are replaced by question marks. A question mark can stand for a one-digit number or a two-digit number greater than 0.

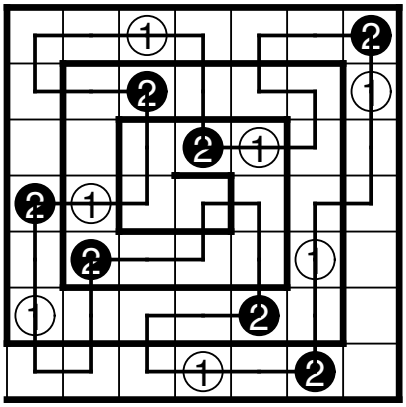




3.6 Masyu Magic Spiral — 100 Punkte

Write numbers from 1 to 3 (1 to 2 in the example) in some empty cells such that in every row and column every number appears exactly once. If one follows the spiral from the outside to the center, one can repeatedly read the sequence 1-2-3 (1-2 in the example), starting with 1. Draw a loop into the grid connecting the center of horizontally or vertically adjacent cells. The loop uses every cell with a number and visits every cell at most once. In cells with the number 1 or 3 the loop goes straight but turns in the next cell in at least one of the two directions. In cells with the number 2 the loop turns but goes straight in both neighboring cells along the loop.





Round 4 – Ferris Wheel

Time: 90 minutes

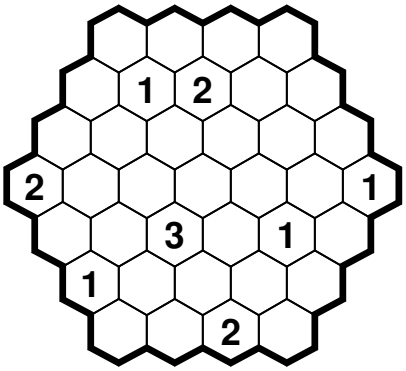
Total points: 665 points

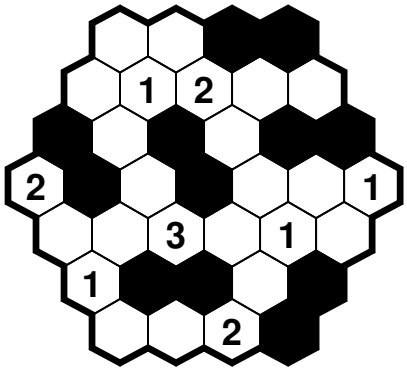
Bonus: 4 points for every minute remaining

The journey with the Ferris wheel consists of 22 mixed puzzles.

4.1 Hexamine — 10 Punkte

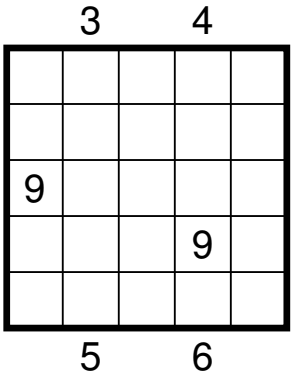
Place mines each consisting of two blackened cells in some of the empty cells. Numbers determine how many of the adjacent cells are black. Mines do not touch each other.

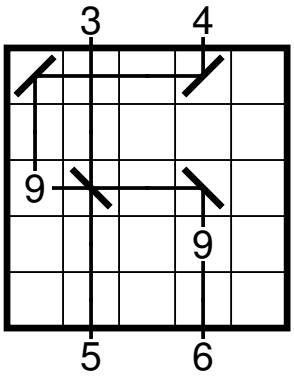




4.2 Kagami — 10 Punkte

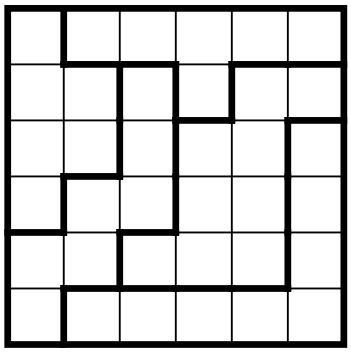
Numbers at the edge of the grid are lasers sending a ray of light into the grid orthogonally to the grid's border. Numbers in the grid mark the lasers' targets and indicate the sum of all lasers hitting this number. Rays may cross each other and end as soon as they hit a target. Place mirrors in some empty cells to direct the rays to the targets. Mirrors are placed diagonally in a cell and can be used from both sides. Cells with mirrors do not touch, not even diagonally. There are no unused mirrors.

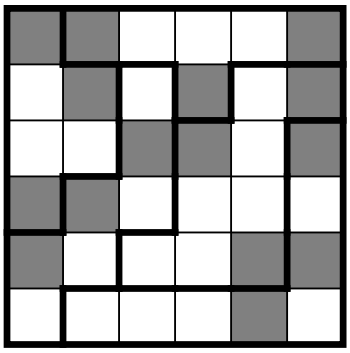




4.3 Trio Cut — 10 Punkte

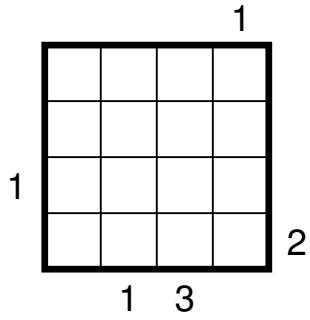
Blacken some cells to create trominos, each divided by two thick lines. Every tromino consists of three black cells. Different trominos do not share an edge, but may touch each other diagonally. Every region contains three black cells.

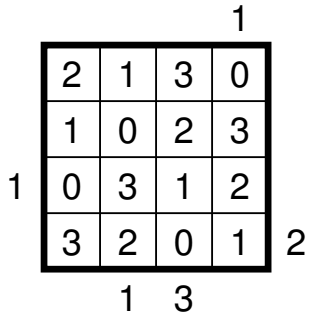




4.4 Skyscrapers with Pedestrians — 15 Punkte

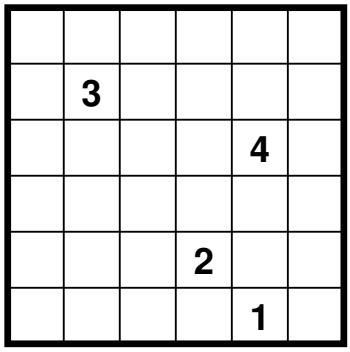
Write the numbers 1 to 4 (1 to 3 in the example), indicating the heights of skyscrapers, or 0, indicating a park, into the grid such that in every row and column every number appears exactly once. Numbers on the edge of the grid determine how many skyscrapers are visible for pedestrians walking in the park in the respective row or column who have that number behind them. Higher skycrapers hide lower skycrapers.

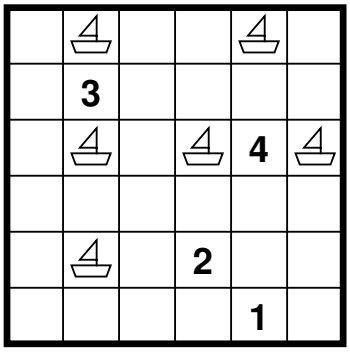




4.5 Lighthouses in the Water — 15 Punkte

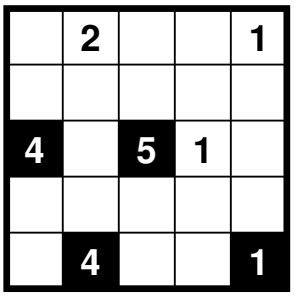
Place ships in some empty cells such that cells with a ship do not touch each other, not even diagonally. Numbers determine how many ships are visible from a lighthouse in this cell, looking straight in horizontal or vertical direction. Ships or lighthouses do not block the view of lighthouses. Every ship can be seen from at least one lighthouse. Cells with a ship may touch cells with a lighthouse.

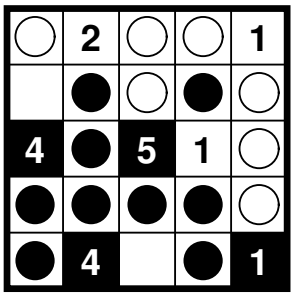




4.6 Antimatter — 20 Punkte

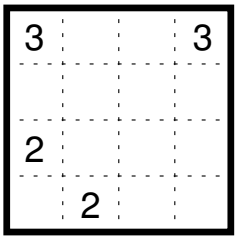
Put black or white circles in some empty cells such that no 2x2 area is filled completely with circles of the same color. Clues determine the difference of the number of black and white circles in the eight adjacent cells. The clue cell is white if there are more white than black circles in the adjacent cells and black if there are more black than white circles.

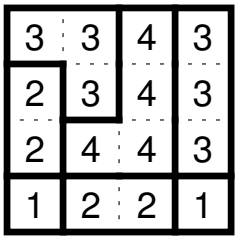




4.7 Fillomino — 20 Punkte

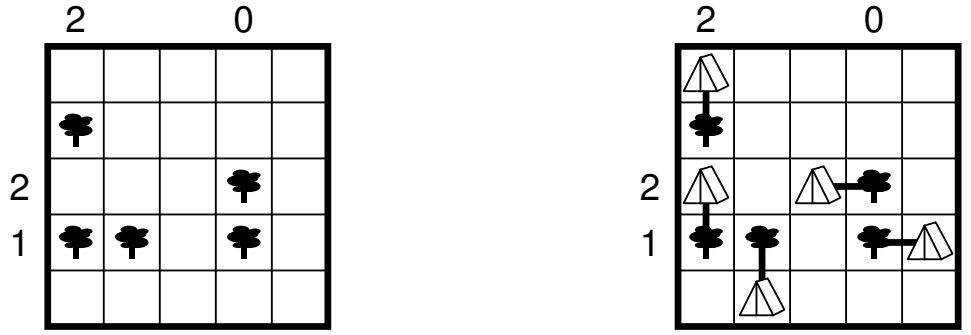
Divide the grid into regions and write a number into each cell, indicating the region's area. Regions of the same area do not share an edge. Given numbers may belong to the same region. There may be regions not containing any given number, even with numbers bigger than any given number.





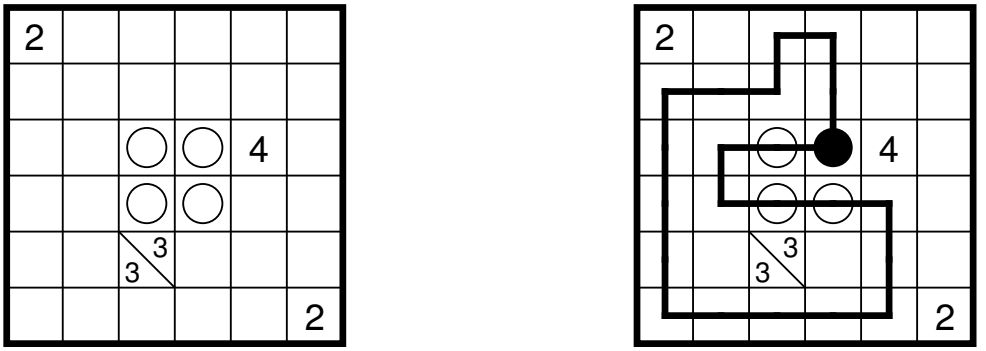
4.8 Tents — 20 Punkte

Place tents in some of the empty cells. Every tent belongs to a tree and is vertically or horizontally adjacent to this tree. Cells with tents do not touch each other, not even diagonally. Numbers at the edge of the grid detemine the number of tents in the respective row or column.



4.9 Variable Tapasyu — 25 Punkte

Draw a loop into the grid connecting the center of horizontally or vertically adjacent cells using every cell at most once. Cells with circles are used by the loop. Circles may be blackened. In cells with white circles the loop goes straight but turns in the next or preceeding cell. In cells with black circles the loop turns but goes straight through both neighboring cells along the loop. The loop does not go through cells with numbers. Numbers determine how many of the eight adjacent cells are used by the loop. Every number stands for a group of horizontally or vertically connected cells. The cells of a group don't need to form a consecutive part of the loop. Different groups around a clue cell are separated by at least one empty cell. The order of numbers in a clue cell is irrelevant.

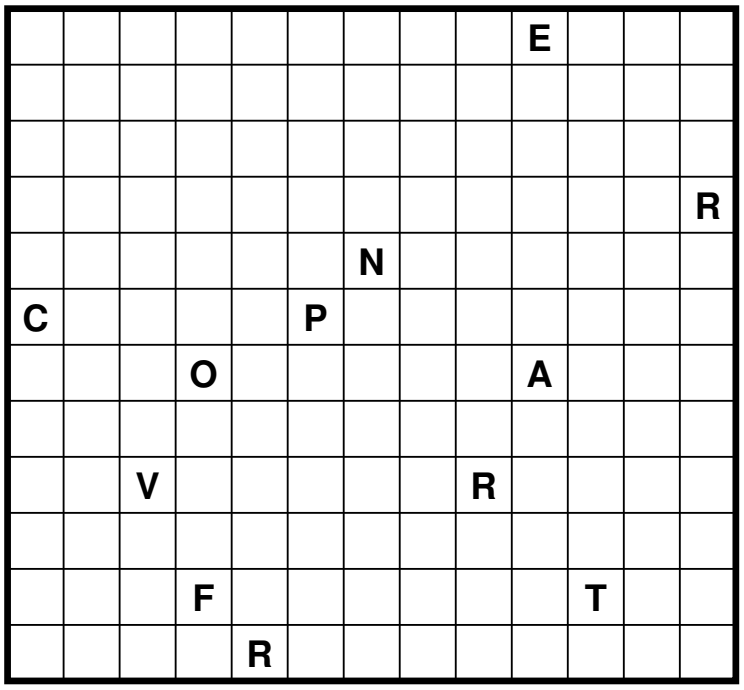


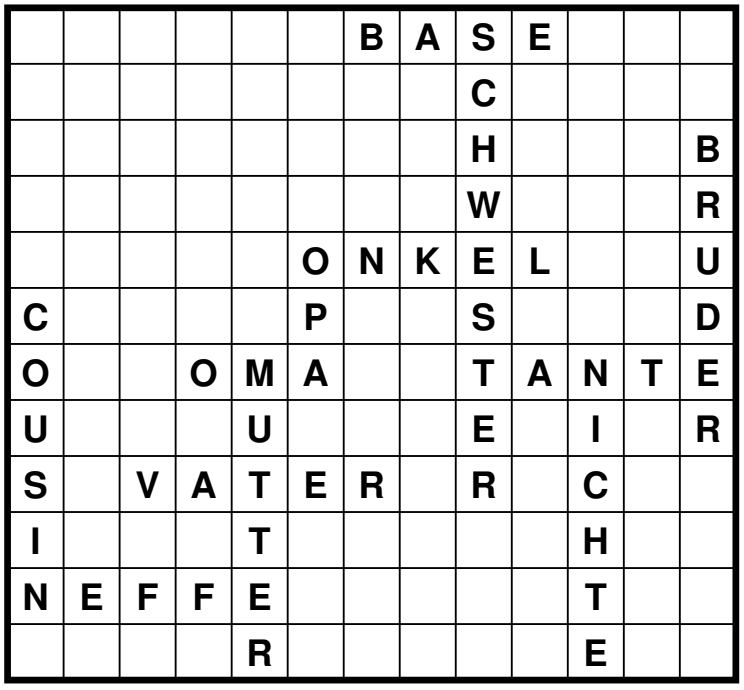
4.10 From 1 to 25 — 25 Punkte

Fill the grid with numbers from 1 to 25 (1 to 9 in the example) such that every arrow except the one next to the biggest number points at the next number.

4.11 Crossword Reconstruction — 30 Punkte

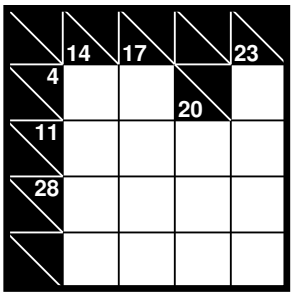
Write the given words in the grid to create a connected crossword puzzle. No other words, not even two-letter words, are allowed. Words are written left to right or top to bottom. Every cell contains at most one letter. Exactly one letter of each word is provided.
Words (example): BASE, BRUDER, COUSIN, MUTTER, NEFFE, NICHTE, OMA, ONKEL, OPA, SCHWESTER, TANTE, VATER

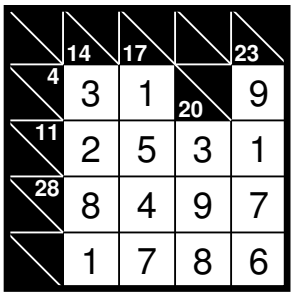




4.12 Kakuro – NED 30 Punkte

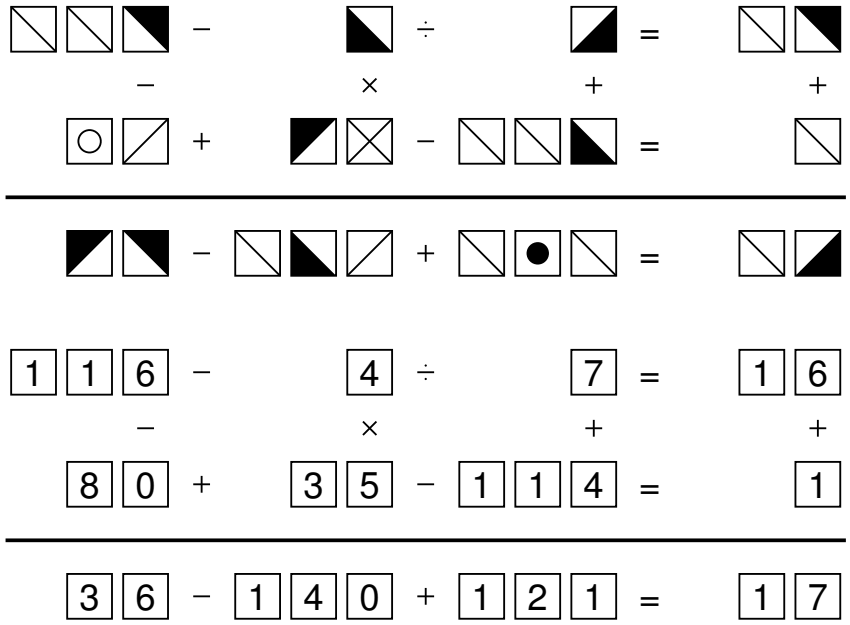
Fill the grid with numbers from 1 to 9. The clues determine the sum of all numbers to the next black cell or the edge of the grid. No number may be used multiple times in one sum. White cells containing the same number may not touch each other diagonally.

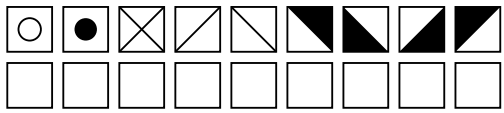


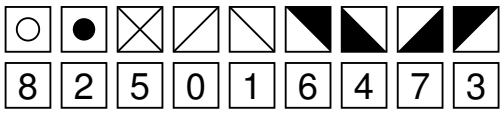


4.13 Symbol Puzzle 30 Punkte

Replace the symbols with numbers from 0 and 9 such that all horizontal and vertical equations hold true. Equal symbols are replaced by equal numbers and different symbols by different numbers. Multi-digit numbers must not have leading zeros. Operations are executed from left to right or top to bottom.

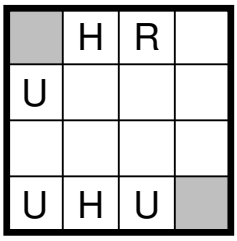


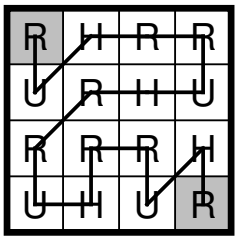




4.14 Zigzag Path — 30 Punkte

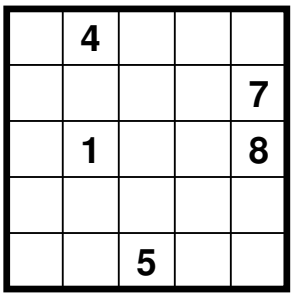
Write one of the letters of the given word into every empty cell. Then draw a path into the grid starting in the top left cell and ending in the bottom right cell using every cell exactly once, connecting the cells' centers horizontally, vertically or diagonally without intersecting itself. Along the path, the letters spell out the given word repeatedly.
Word (example): RUHR

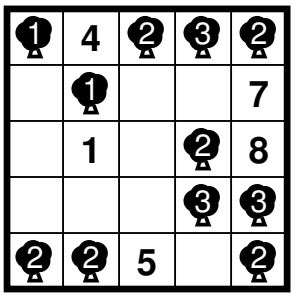




4.15 Trees — 35 Punkte

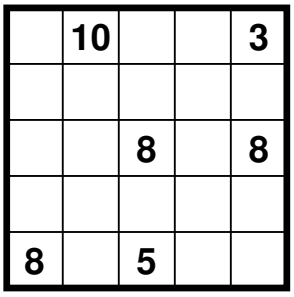
Put trees in some empty cells such that every number is the total height of all trees in the eight adjacent cells. Trees without adjacent trees have height 1. A tree grows by 1 for every horizontally or vertically adjacent tree. Diagonally adjacent trees have no influence. The maximum height of a tree is 5. A solution is considered correct if the position of the trees is correct. Inscribing the heights of the trees is optional.

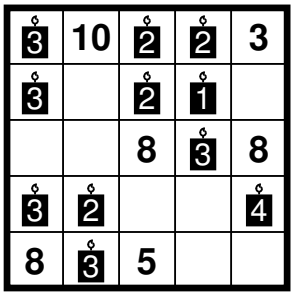




4.16 Candles — 35 Punkte

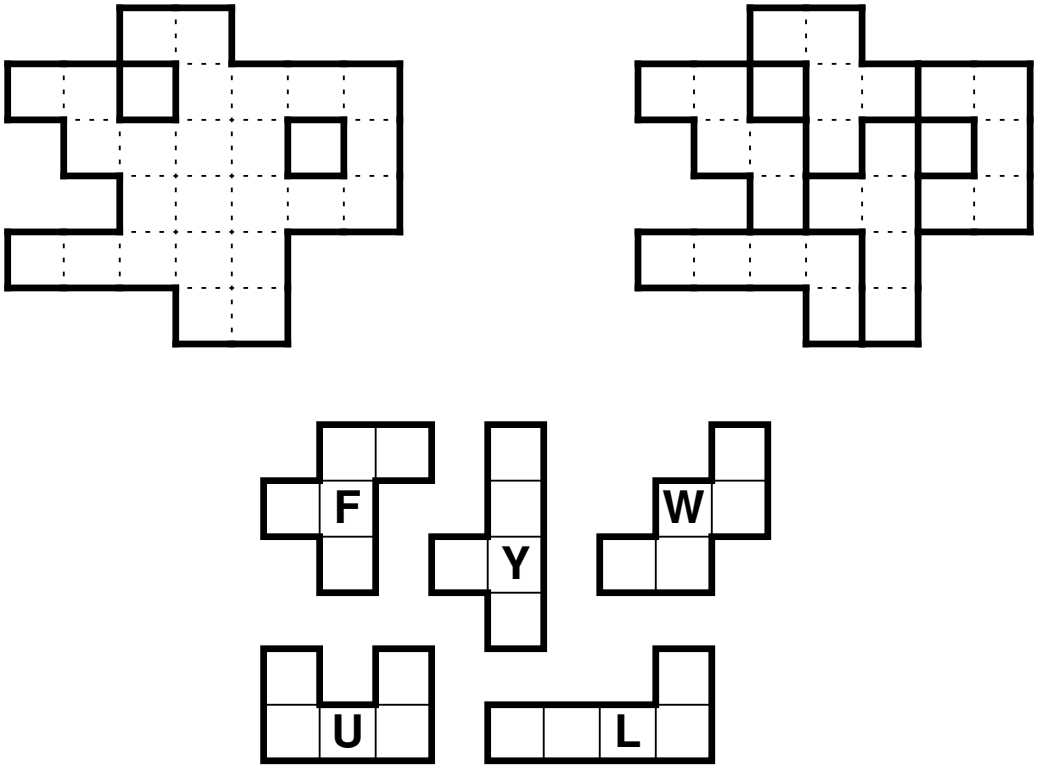
Write numbers from 1 to 4 in some empty cells, representing candles with the respective height Given numbers indicate the total height of all candles in the eight adjacent cells. Candles without adjacent candles have height 4. As the heat of nearby candles melts wax, the height of a candle has to be reduced by 1 for each horizontally or vertically adjacent candle. Diagonally adjacent candles do not melt wax. There are no candles of height 0, thus no candle may be adjacent to four other candles. A solution is considered correct if the position of the candles is correct. Inscribing the heights of the candles is optional.





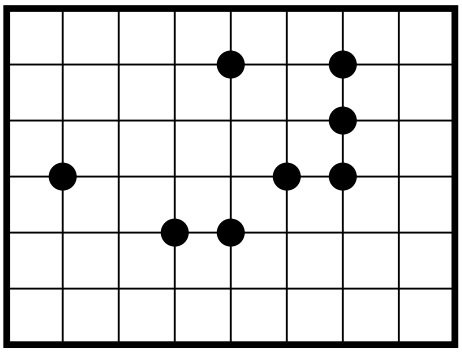
4.17 Pentomino Dissection — 35 Punkte

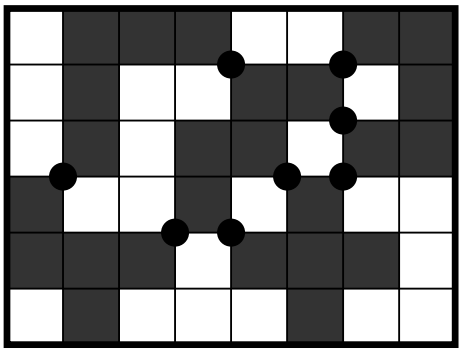
Divide the grid along the dotted lines into the twelve different pentominoes (the five pentominoes F, L, U, W, Y in the example). Pentominoes may be mirrored and rotated.

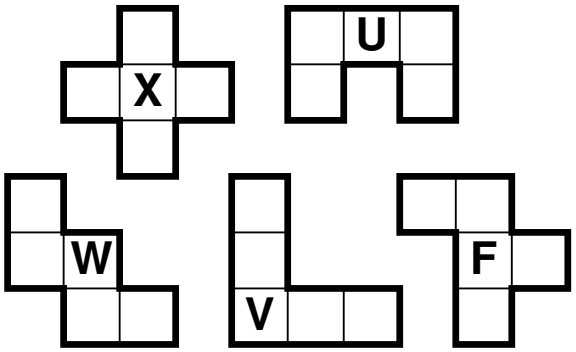


4.18 Touching Pentominoes 35 Punkte

Place twelve different pentominoes (in the example the pentominoes F, U, V, W, X) in the grid. All points where two pentominoes touch each diagonally other are marked with circles. Pentominoes do not touch at any other points and do not share edges. There may be pentominoes that do not touch any of the circles. Pentominoes may be mirrored and rotated.

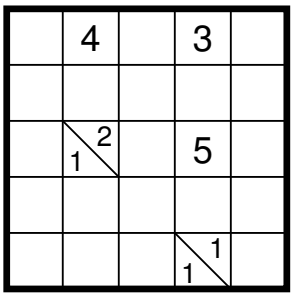


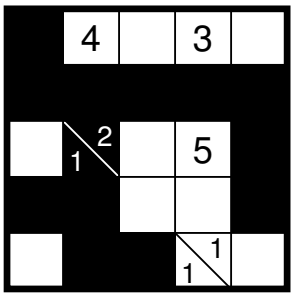




4.19 Twilight Tapa 35 Punkte

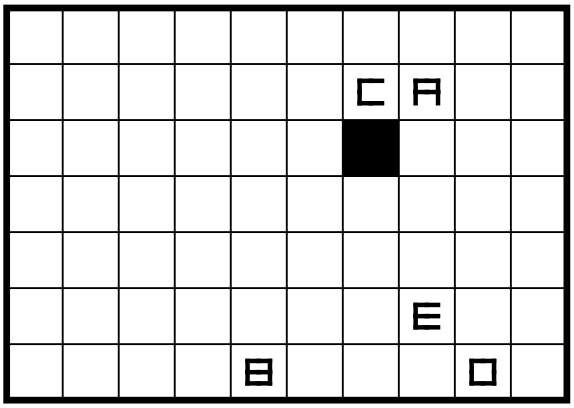
Blacken some cells such that all black cells are connected but no 2x2 area is blackened completely. Cells are connected if they share an edge. Numbers in white cells determine the size of all black groups in the eight adjacent cells. Numbers in black cells determine the size of all white groups in the eight adjacent cells. A group is a sequence of connected cells having the same color. Different groups are separated by at least one cell of a different color. The order of numbers in a clue cell is irrelevant.

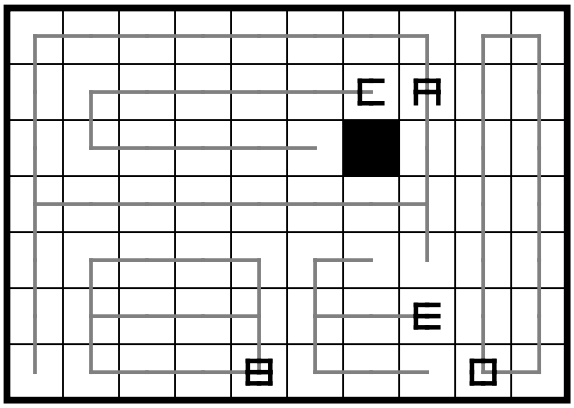




4.20 Curve Data — 45 Punkte

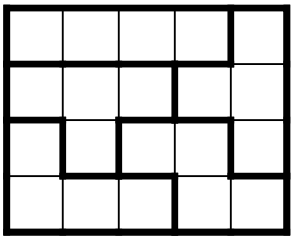
Draw lines which connect centers of horizontally or vertically adjacent white cells such that each empty cell is connected to exactly one clue. The shape of lines connected to a clue must be like the clue in that the relative position of connected horizontal and vertical segments and turns must be the same, without rotations or reflections. The lengths of straight segments may vary, but must not be 0.





4.21 Word Placement — 60 Punkte

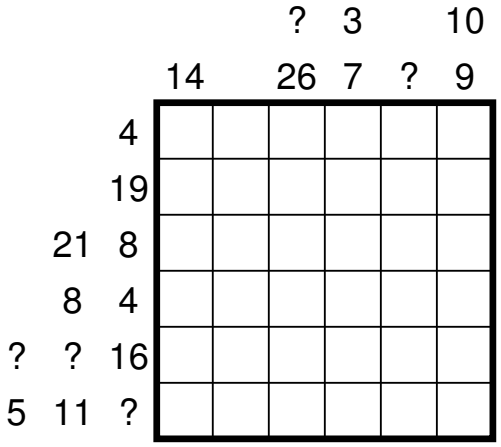
Write one of the given words in every region, line by line from left to right, such that identical letters do not touch, not even diagonally. Every word is used exactly once.
Words (Beispiel): EGER, ELBE, ISAR, LECH, ODER

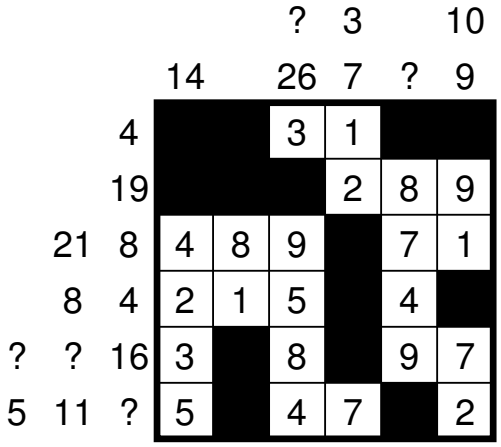


E	G	E	R	O
I	S	A	D	E
L	R	E	L	R
E	C	H	B	E

4.22 Japanese Sums — 95 Punkte

Blacken some cells and write numbers between 1 and 9 into the remaining cells such that no number appears twice in any row or column. Numbers at the edge of the grid determine the sums of numbers in consecutive cells in the correct order. Different sums are separated by at least one black cell. Some numbers are replaced by question marks. A question mark can stand for a one-digit number or a two-digit number greater than 0.





Round 5 – Ghost Train

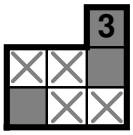
Time: 50 minutes

Total points: 254 points

Bonus: 4 points for every minute remaining

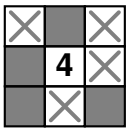
The Ghost Train consists of black-white puzzles. 12 rules are explained below. For every puzzle some of these rules apply. You will not know which rules apply for which puzzle until the competition starts. To solve each puzzle, decide for each cell whether it is black or white, following the respective rules of that puzzle. It suffices to find all black cells (and the path, if applicable), white cells do not have to be marked. In every puzzle, black or white cells can be given as clues. White cells are marked by ×. The rules are:

The number determines how many cells have to be blackened in the respective row or column.

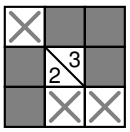


The number determines how many cells have to be blackened in the respective region.

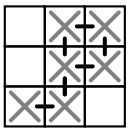
Numbers determine the lengths of all groups of connected black cells in the respective row or column in ascending order (Coral clue). Different groups in the same row or column must be separated by at least one white cell.



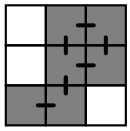
Numbers determine how many of the eight adjacent cells have to be blackened (Minesweeper clue). Cells with a number must not be blackened.



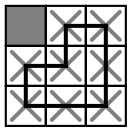
Numbers determine the lengths of all groups in the eight adjacent cells (Tapa clue). A group consists of horizontally or vertically connected black cells. Different groups around the same clue cell must be separated by at least one white cell. The order and position of numbers in a cell is irrelevant. Cells with numbers must not be blackened.



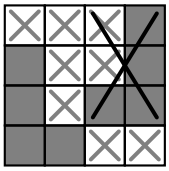
All white cells are connected.



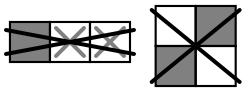
All black cells are connected.



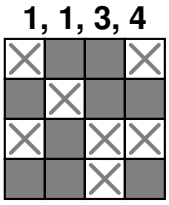
All white cells are connected and a loop has to be drawn that connects the centers of horizontally or vertically adjacent cells and passes each white cell exactly once.



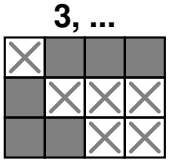
All connected components of black cells are different. Components that match each other when they are rotated or reflected are considered identical.



The specified pattern must not occur, neither as depicted nor rotated or reflected. Empty cells can be white or black, none of the variants are allowed to occur. The patterns depicted here are examples only.



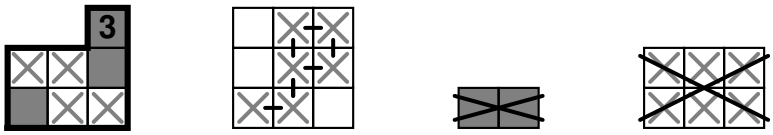
Every number represents the number of black cells of one connected component. There is a number for every component. In the competition the correct numbers are printed to the right of the picture.

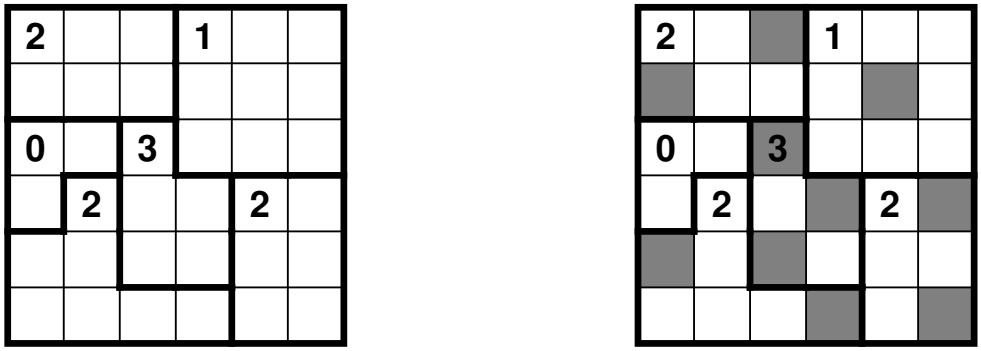


Every connected component consists of as many black cells as the number indicates. In the competition the correct number is printed to the right of the picture.

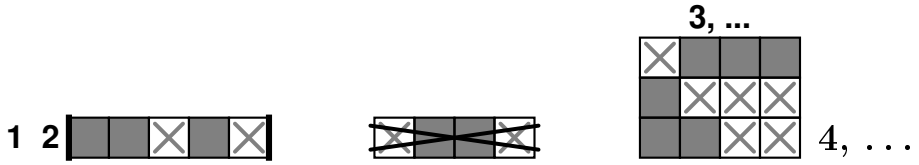
The competition booklet **does not** contain the rules. Please keep the instruction booklet ready.

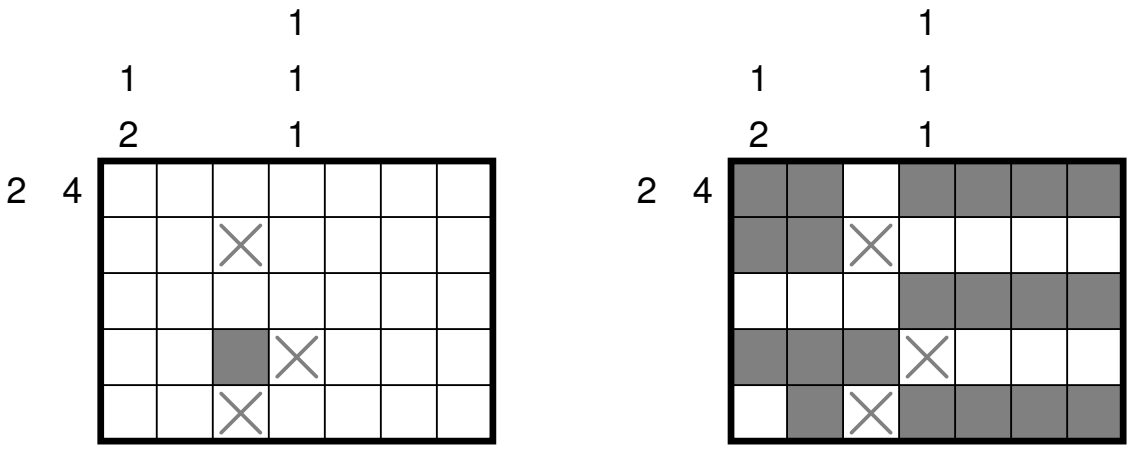
Example A



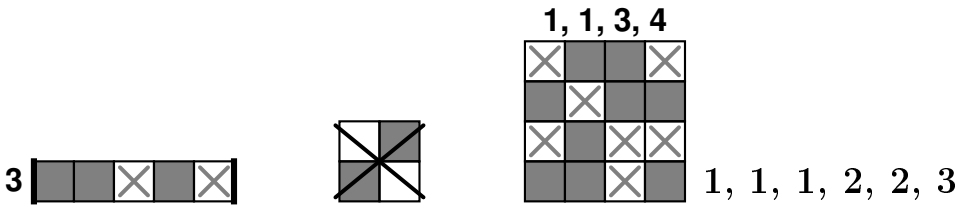


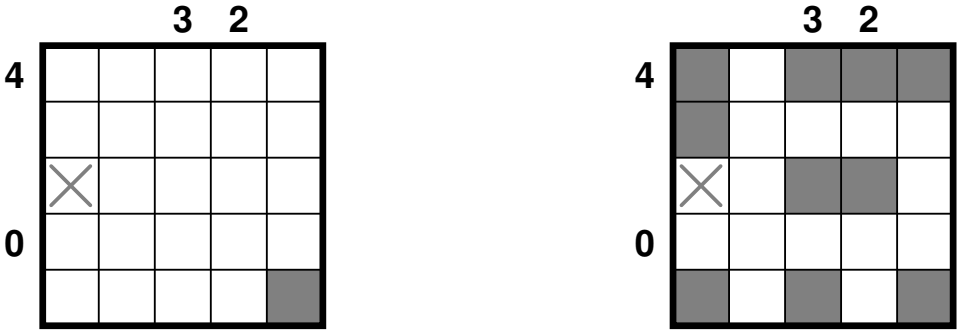
Example B



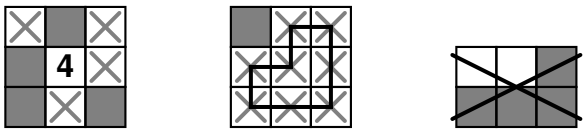


Example C





Example D



5.1	**Puzzle 1**	**10 Punkte**
5.2	**Puzzle 2**	**14 Punkte**
5.3	**Puzzle 3**	**15 Punkte**
5.4	**Puzzle 4**	**15 Punkte**
5.5	**Puzzle 5**	**20 Punkte**
5.6	**Puzzle 6**	**20 Punkte**
5.7	**Puzzle 7**	**40 Punkte**
5.8	**Puzzle 8**	**45 Punkte**
5.9	**Puzzle 9**	**75 Punkte**

Round 6 – Roller Coaster

Time: 60 minutes

Total points: 280 points

Bonus: 4 points for every minute remaining

The Roller Coaster consists of 8 partially overlapping puzzle grids. Assign one of the following 8 puzzle types to each of the grid: Double block, Hakyuu, Skyscrapers, Capsules, Nanro, Renban, Snake and Easy as 123. Enter numbers from 1 to 9 into some of the cells, such that every grid by itself fulfills all of its rules. Some of the puzzle types have clues outside of the grid. For those, all numbers directly next to the grid have to be valid clues, even if they lie inside another puzzle. The rules of the puzzle types are explained below. Caution: The rules of Capsules, Snake and Easy as 123 vary slightly from their standard rules. Additionally, the following holds:

- Every puzzle type applies to exactly one grid.
- All puzzle grids a rectangular.
- No cell belongs to more than two grids.
- Puzzles with regions contain no region with more than 9 cells.
- Puzzles without regions can only contain regions where they intersect puzzles that have regions.
- Every region lies completely within a puzzle or the intersection of two puzzles. There is no region which lies only partially in a puzzle.
- Size and arrangement of puzzles in the example give no information about size and arrangement of the competition puzzles.

At most 280 points can be reached (excluding bonus points for early completion). A grid or part of a grid are only correctly filled if the filled solution is part of the correct global solution. Points for partial solving of grids can be attained as follows:

- Assigning a puzzle type correctly to a grid yields 5 points. For this it is enough to write the puzzle type next to the grid.
- Filling an intersection of two grids completely and correctly yields 10 points, if none of the two grids are completely correct.
- An incomplete or incorrect grid, in which all cells are filled correctly that do not belong to an intersection with a different grid, yields 20 points.
- There are no negative points for incorrect solutions or puzzle type assignments.

6.1 Double block

Enter the numbers 1 to n-2 into the grid, where n is the number of rows in the grid, such that every row and column contains two empty cells and every digit exactly once. Numbers next to the grid (in all four directions) indicte the sum of all numbers between the two empty cells in the corresponding row or column.

6.2 Hakyuu

Fill the grid with numbers, such that every outlined region contains all numbers from 1 to the number of cells in that reagion exactly once. Within a row or column, two cells containing the same number have to have at least as many cells between them as the number indicates.

6.3 Skyscrapers

Fill the grid with numbers from 1 to n, where n is the number of rows in the grid, such that every row and column contains every number exactly once. The numbers represent skyscrapers of the respective size. Clues outside of the grid indicate how many skyscrapers are visible from that position in the corresponding row or colum, where higher skyscrapers hide lower ones.

6.4 Capsules

Fill the grid with numbers, such that every outlined region contains every number from 1 to the number of cells in that region exactly once. Cells with the same number may not touch, not even diagonally.

6.5 Nanro

Write numbers into some cells, such that all numbers within an outlined region are the same and indicate, how many numbers this cell contains. Every region has to contain at least one number. Cells of different regions containing the same number may not share an edge. No 2x2-area maybe be completely filled with numbers. All cells with numbers have to be orthogonally connected.

6.6 Renban

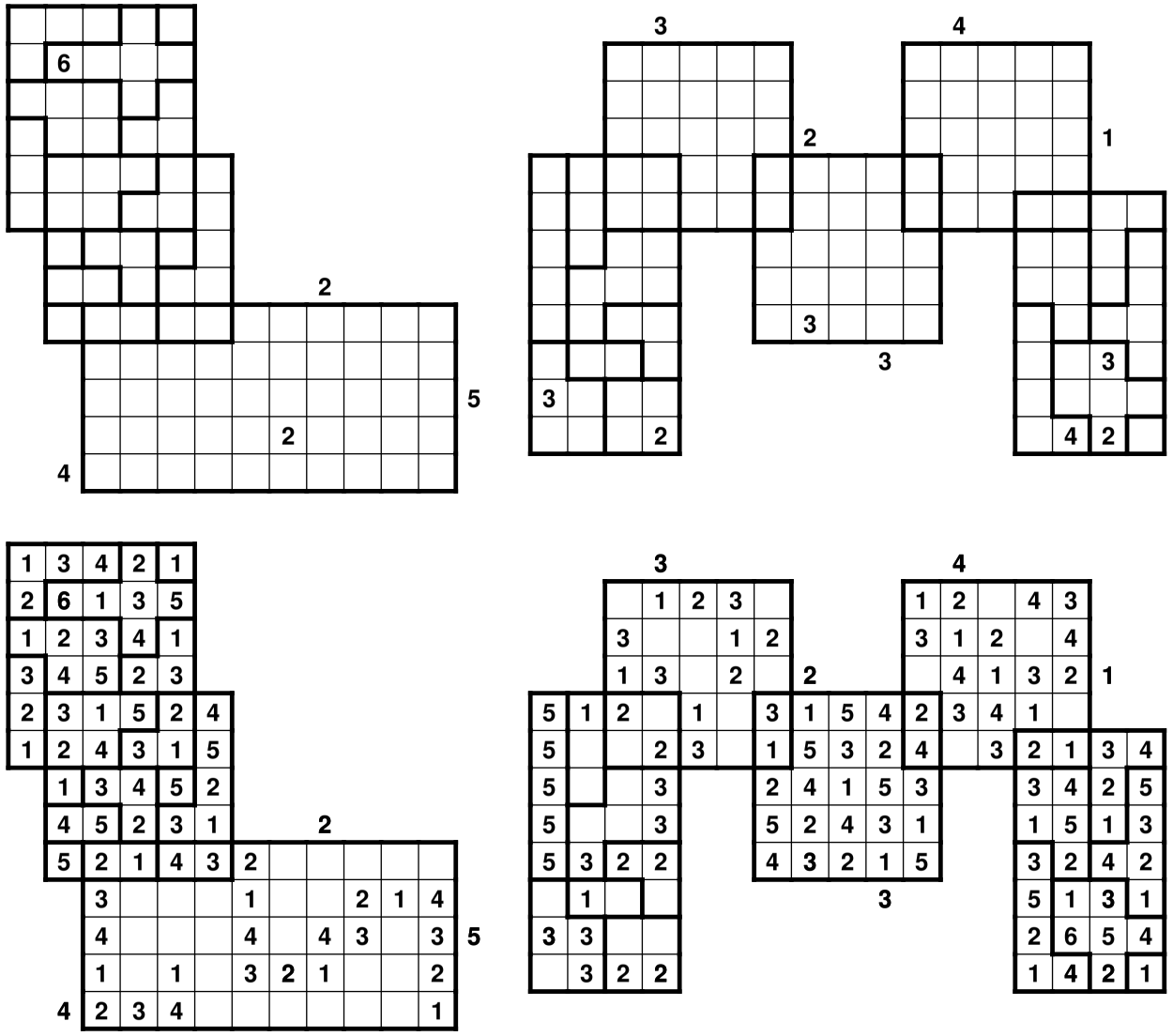
Fill the grid with numbers from 1 to the number of rows in the grid, such that every row and column contains every number exactly once. Numbers within an outlined region have to be consecutive numbers, not necessarily in the right order.

6.7 Snake

Draw a snake into the grid that does not touch itself, not even diagonally. The numbers outside the grid (in all four directions) indicate, how many of the cells in the corresponding row or column are used by the snake. The cell covered by the snake repeatedly contain the numbers 1-2-3-4 in this order, starting with 1 in the head of the snake. The last cell can contain any number from 1 to 4. Some numbers can be given, which are not necessarily the first and last cell.

6.8 Easy as 123

Enter the numbers from 1 to 4 into the grid, such that every row and column contains every number exactly once. The numbers outside of the grid indicte the third number in the corresponding row or column, counting from the clue's direction.



Puzzle types from left to right: Hakyuu, Renban, Snake, Nanro, Double block, Skyscrapers, Easy as 123, Capsules

Round 7 – Shooting Gallery

Time: 30 minutes

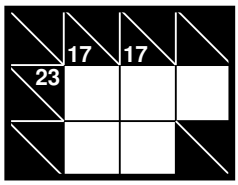
Total points: 140 points

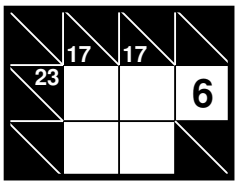
Bonus: 4 points for every minute remaining

Every puzzle in the Shooting Gallery has more than one solution. Your task is to find the unique element that all valid solutions share. For each puzzle type, the type of element is described in the instructions, for example a black cell, a number, or a pentomino. A solution is only considered correct if it is clear which element is meant to be the unique one, for example by drawing nothing else, or by pointing with an arrow.

7.1 + 7.2 Kakuro — 5 + 5 Punkte

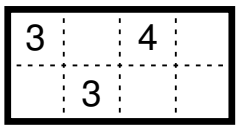
Fill the grid with numbers from 1 to 9. Given numbers are the sum of all numbers in the respective row or column up to the next black cell. Within a sum, no number is repeated. **Caution:** Only one number is uniquely determined.

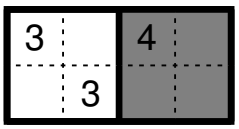




7.3 + 7.4 Rekuto — 5 + 15 Punkte

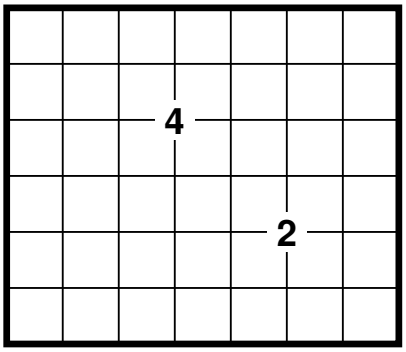
Divide the grid along the dotted lines to create rectangles. Every rectangle contains exactly one number. The number is the sum of the height and width of the rectangle. **Caution:** Only one rectangle is uniquely determined.

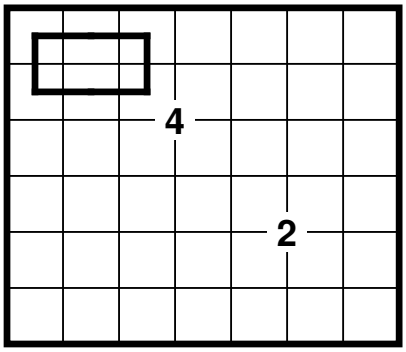




7.5 + 7.6 Transposed Multi Loop — 5 + 15 Punkte

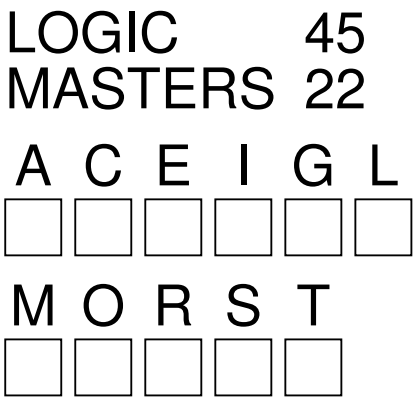
Draw one or more loops into the grid connecting the centers of horizontally or vertically adjacent cells using every cell exactly once. Numbers appear on the intersections of the grid lines and determine how many different loops pass through the four adjacent cells. **Caution:** Only one loop is uniquely determined.

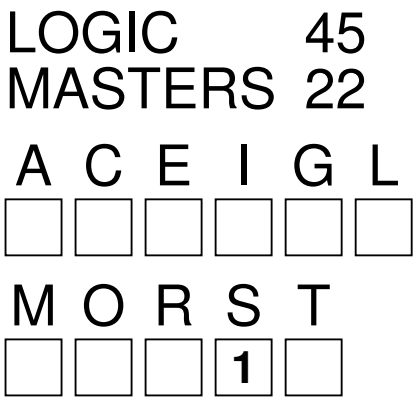




7.7 + 7.8 ABC — 10 + 20 Punkte

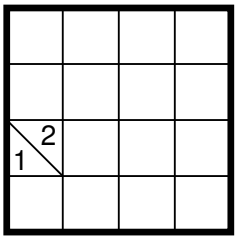
Replace the given letters by numbers from 1 to the number of letters such that different letters are replaced by different numbers and for every given word the sum of all letters equals the given sum. **Caution:** Only one letter is uniquely determined.

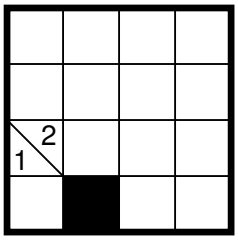




7.9 + 7.10 Tapa — 10 + 20 Punkte

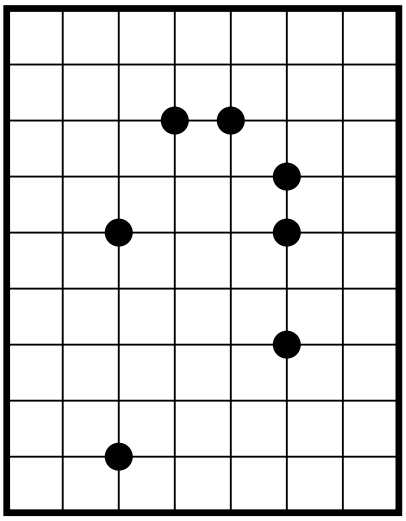
Blacken some empty cells such that all black cells are connected but no 2x2 area is blackened completely. Numbers determine the size of all groups in the eight adjacent cells. A group is a sequence of connected black cells. Different groups are separated by at least one white cell. The order of numbers in a clue cell is irrelevant. **Caution:** Only one black cell is uniquely determined. There may be unique white cells, but they are irrelevant for the puzzle.

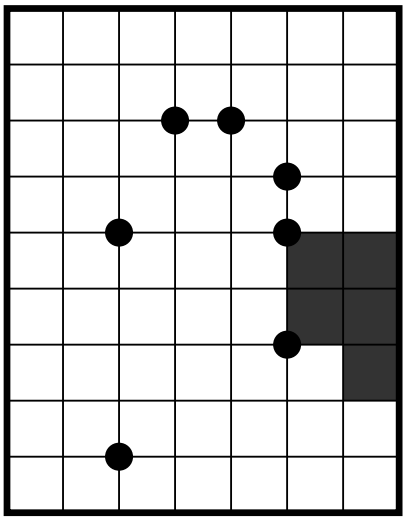


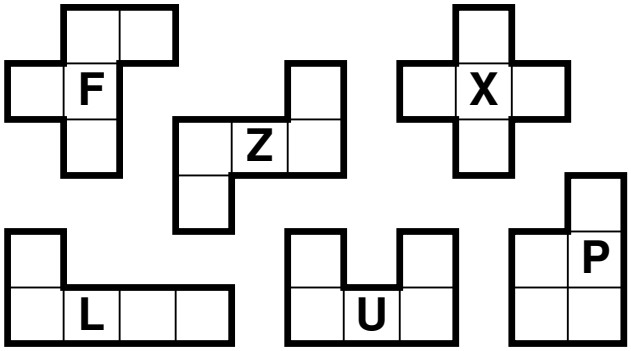


7.11 + 7.12 Touching Pentominoes 10 + 20 Punkte

Place the given pentominoes in the grid. All points where two pentominoes touch each other diagonally are marked with circles. Pentominoes do not touch at any other points and do not share edges. There may be pentominoes that do not touch any of the circles. Pentominoes may be mirrored and rotated. **Caution:** Only one pentomino is uniquely determined.



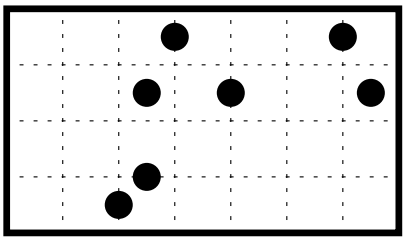


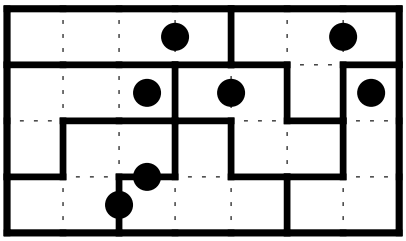


Tie-break Puzzle

Tetromino Dots

Divide the grid into along the dotted lines to create tetrominoes. Every tetromino contains exactly one black dot. Dots may be divided into parts. Identical tetrominoes do not share an edge. Rotated or mirrored tetrominoes are considered identical.





Finals

Time: 60 minutes

8.1 Rekuto – Shooting Gallery

Divide the grid along the dotted lines to create rectangles. Every rectangle contains exactly one number. The number is the sum of the height and width of the rectangle. **Caution:** Only one rectangle is uniquely determined.

8.2 8 Puzzles

The rules are identical to those of Round 6, with the following exceptions: The snake only consists of the numbers 1 to 2, not 1 to 4, starting at 1. The Easy as 123 puzzle contains only the numbers 1 to 2 in every row and column, not 1 to 4, and the outside clues indicate the second instead of the third number in the corresponding row or column, counting from the clue. Additionally, there is no region with more than 6 cells.

8.3 Building Blocks

8.4 Lighthouses in the Water

Place ships in some empty cells such that cells with a ship do not touch each other, not even diagonally. Numbers determine how many ships are visible from a lighthouse in this cell, looking straight in horizontal or vertical direction. Ships or lighthouses do not block the view of lighthouses. Every ship can be seen from at least one lighthouse. Cells with a ship may touch cells with a lighthouse.

8.5 Domino Pills

Divide the grid into rectangular regions of sizes 2 and 3 such that all dominoes with the numbers 0 to 3 (0 to 2 in the example) and ten pills with all values from 0 to 9 (1 to 6 in the example) occur. Pills consists of 3 cells. The value of a pill equals the sum of all numbers inside the pill.

8.6 Milky Way

Draw a directed loop into the grid connecting the centers of horizontally or vertically adjacent cells using every white cell without number and every cell with a star exactly once. Numbers indicate how often the loop passes through the eight adjacent cells. In cells containing stars the loop turns and goes straight through the next cell along the loop.

Authors

Ute Spreckels:

1.3, 1.5, 1.7,

2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10,

3.2, 3.4, 3.5, 3.6,

4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.9, 4.12, 4.15, 4.16, 4.18, 4.19, 4.21,

5.3,

7.5, 7.6, 7.10, 7.11, 7.12,

Tie-break puzzle,

8.1, 8.4, 8.6

Philipp Weiß:

1.1, 1.2, 1.4, 1.6, 1.7,

3.1, 3.3,

4.8, 4.10, 4.11, 4.13, 4.14, 4.17, 4.20, 4.22,

5.1, 5.2, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9,

6,

7.1, 7.2, 7.3, 7.4, 7.7, 7.8, 7.9,

8.2, 8.3, 8.5

Testsolvers

Arvid Baars, Andrey Bogdanov, Ulla Elsilä, Ken Endo, Stefan Gašpár, Michael Genier, Wei-Hwa Huang, Michael Mosshammer, Yang Pei, Henna Perälä, Yanzhe Qiu, Markus Roth, Maarit Ryynänen, Eva Schuckert, Prasanna Seshadri, Anderson Wang, Huang Xiao Wei, Annick Weyzig – thank you very much!