



The 22nd World Puzzle Championship

Instruction Booklet

Instruction Booklet – 22nd World Puzzle Championship

This booklet explains competition procedures, scoring and ranking in the table, as well as the structure of the competition and the individual types of puzzles in each of the rounds. All the examples herein are for demonstrative purposes only and they may not accurately reflect the difficulty of the competition puzzles. Any questions and queries will be answered during the Q&A session between 20:30 and 22:00 on 15th October 2013.

General Rules and Procedures

There are 14 rounds in the main competition during 2 days. Rounds 1, 13 and 14 are team competition, where teams of four competitors participate. The remaining 11 rounds are individual rounds. There is no elimination during the main competition.

Please keep quiet during the individual rounds. All communication among participants or between participants and the team captains is strictly forbidden during all these rounds. Participants should remain seated for the entire length of each round, even if they finish ahead of time. Participants who need to leave their seats for any reason may raise their hands and ask for permission from the judges.

For team rounds, participants are welcome to communicate within the team but they should keep their voices down and stay at their own team table.

No electronic devices (including but not limited to cell phones, laptops, tablets, calculators, and headphones) are allowed during the competition. Participants may choose to use any pens or pencils in any color except red color in all rounds.

Scoring Standard

Full credit

There is a unique solution for each puzzle. Participants who correctly fill in all numbers, letters, or any other required artifacts for a puzzle get full points.

Partial credit

Partial scores for individual puzzles are not generally available in this Championship. However, there are a few exceptional cases (e.g. in Round 11 and in some of the team rounds), these are discussed along with the rules of those specific puzzles. For puzzles where the availability of partial credit is not explicitly discussed, any incorrect or incomplete solution will unfortunately receive no credit.

Team scores

Scores obtained during individual rounds will be included in the team scores for the purpose of determine the rankings of the teams. Scores obtained during team rounds will not be included in the individual scores, even if Round 13, while being a team round, contains elements of individual solving.

Scoring of Rounds 04-07

Please refer to the section “Around the world in 80 puzzles” for more information.

Bonus points

Bonus points are available in every round of the Championship.

Individual rounds

In any of the individual rounds, solvers who finish early and turn in a perfect round, will receive ten (10) bonus points for any full minute saved. In rounds 04-07, any bonus points are awarded after the conversion of the scores.

Team rounds

In any of the team rounds, teams who finish early and turn in a perfect round, will receive thirty (30) bonus points for any full minute saved.

Partial Bonus

While the concept of partial credit is not recognised for the purpose of marking single puzzles, partial bonus points are still available. This is designed to get around situations where a small mistake in a single puzzle not only costs the full score for that one puzzle but also the complete time bonus that was secured through finishing early. The rules for this are:

- A single puzzle is considered to be solved *near-perfectly* if, in the opinion of the judge, the solver (or team, referred to as “solver” hereinafter) has made a reasonable attempt to solve the puzzle correctly and as a result has reached a solution that is at least 95% correct. *For example, swapping two digits or placing one extra line segment in an otherwise correctly solved puzzle can be seen as a reasonable attempt to solve the puzzle, although with small mistakes. On the other hand, a solution where the last 5 digits of an otherwise cleanly solved 10x10 puzzle were not even attempted to be written onto the paper will be seen as an attempt to get around this partial bonus rule, rather than an attempt to arrive at a complete solution of the puzzle. We do not enumerate an exact classification, the decision will be made by the judges on a case by case basis.*
- In case a solver finishes a round early with exactly **one** of the puzzles solved *near-perfectly* rather than correctly, and all the other puzzles are solved correctly, they will receive no credit for that particular puzzle but they are still eligible to receive 80% of the bonus score they would have received with a perfect round.
- In case a solver finishes a round early with exactly **two** of the puzzles solved *near-perfectly* rather than correctly, and all the other puzzles are solved correctly, they will receive no credit for those particular puzzles but they are still eligible to receive 50% of the bonus score they would have received with a perfect round.
- No partial bonus is available in any other cases.

Please note that the partial bonus rule does not apply in Round 10 (Sprint) and Round 11 (Visual Puzzles), given the nature of the puzzles in those rounds. Of course, full bonus points are still available for solving those rounds perfectly within time.

Ranking of Preliminary Rounds

1. Individual Competition

1. Ranking will be based on the overall scores from the 11 individual rounds.
2. If two or more participants have identical overall scores, they will be ranked by their scores from Round 2 (Classic Puzzles).
3. If two or more participants have identical overall scores and Round 2 scores, they will be ranked by their scores from Round 9 (Assorted Puzzles).
4. If two or more participants are still tied after taking all the previous criteria into account, their ranking will be tied for consideration for the Semi-Final.

2. Team Competition

Ranking will be based on the combined total scores of the four individuals of the team in all the individual rounds and the total scores of the three team rounds.

1. If two or more teams have identical overall scores, they will be ranked by the total scores of the three team rounds.
2. If two or more teams have identical scores overall and from the three team rounds, they will be ranked by their scores in Round 14 (Year of Snake).
3. If two or more teams are still tied after taking all the previous criteria into account, their final final ranking will be tied.

Note that there is no play-off phase for the team competition. The ranking obtained from the two days of the main competition will be the final ranking.

Play-offs

Semi-Final

Only the top 10 highest A-team scorers (or more with tied ranking) of all the individual rounds will enter the semi-final. No B-team participants or guests are entitled to the Semi-Final even if their scores are higher than some of the top 10 Team-A players. The 1st-ranking participant starts with a time bonus of 10 minutes ahead of the 10th ranked participant, while the rest of the participants have time bonuses adjusted proportionally based on their scores in the main competition.

There are 10 rows of desks in the Semi-Final, with one puzzle on each row. All participants start from the back row and work their way to the front. Once a participant finishes a puzzle, they should raise their hand, signalling completion. The judges are given 1 minute to check the answer every time. If the solution is correct, judges can indicate this fact to the solver so that they can move to the next desk, but they can only start solving the next puzzle once the one minute is up. This is designed to ensure that solvers' speed at physically moving from one table to another does not contribute to their overall solving times. However, if the solution is incorrect, the judges wait the full minute before handing over the

solution to the solver. Judges will not point out where the mistake is or what constraints are not satisfied, this is the solver's task to figure out and fix. Upon re-submitting a solution, the one-minute rule applies in the same way again.

The number of desks in each row decreases - there are 10 (or more) desks to start with (the four back rows), 7 desks starting from the 5th puzzle (the three middle rows), and 5 desks starting from the 8th puzzle (the three front rows). The desks will be taken in a first-come-first-serve basis. If all desks in a row are occupied, the participants who are still behind are eliminated.

The Semi-Final ends when the first three participants finish the last puzzle. The third participant earns third place in the Championship, while the top two participants proceed to the Final. The 4th–10th participants will be ranked based on their seating rows at the end of the semi-final. If there are multiple participants in the same row, their ranking will be determined by their scores from the results of the two days of main competition. The participant finishing first in the semi-final has the bonus of one more chance to pick a puzzle in the final (see details below).

The list of puzzles of the Semi-Final and all the rules of those puzzles is available towards the end of this booklet, under Round 15. Puzzles marked with A and a serial number will feature in the Semi-Final, the order will be as shown therein.

Final

There are 5 puzzles to be solved in the play-offs, which will be held on billboards in front of the audience. These five puzzles will be selected by the two finalists from what is initially a pool of 10 puzzles. The list of these puzzles and all the rules of these puzzles is available towards the end of this booklet, under Round 15. Puzzles marked with B and a serial number will be available for selection in the puzzle pool.

During the selection process, in each turn, a participant picks one puzzle from a pool of these 10 puzzles, and eliminates another puzzle from the pool. Puzzles that are eliminated are no longer available for selection. The choice alternates between the two finalists - the top participant from the semi-final picks puzzles for rounds 1, 3, and 5, while the second-place participant picks puzzles for rounds 2 and 4. The Final will be carried out in the same order as the puzzles are picked.

In each round, two participants start solving the puzzle simultaneously. Once a participant finishes, they should raise their hand to signal completion, and turn away while the judge checks the answer. If the answer is correct, the participant has won the round and the round terminates. Otherwise, the participant is allowed to return to the puzzle after one minute, they can then fix the mistakes and submit again. Judges will not point out where the mistake is or what constraints are not satisfied, this is the solver's task to figure out and fix. The procedure continues until one participant correctly solves the puzzle and the round terminates. The participant who earns 3 points first in the final will be the champion of the Championship, while the other participant will be the runner-up.

Clarifications from the Forum

Solvers in the Final will be given two markers (one black, one blue) and will be asked not to use any other tools for writing. According to local organisers, the rationale includes that the type of paper that these puzzles will be printed on does not work well with pencils. Spare markers will be available in case they run out of ink.

There will be exactly two copies available of each of the puzzles in the Final. In case their puzzle becomes too obscured, solvers have the option to ask for a clean sheet (once per puzzle) at any point of time during their solve (but not within the one minute of verification time).

The solving times of each of the puzzles in the Final will be measured by a clock that's clearly visible in the room by the solvers, judges and the audience. In case neither solvers finish a puzzle within 15 minutes, the round is halted and declared a draw, whereby neither solver gets any points (but if a solver declares "ready" just seconds before the 15 minutes elapse and their solution is correct, they will get the win for the round, even if the verification of their puzzles does not finish before the 15 minutes are up).

If such a draw occurs, then it is possible that neither finalists reach 3 points from the 5 rounds (e.g. the standing is 2-2 with one uncounted draw). In an event like that, as a tiebreak, they will start solving a 6th puzzle (or possibly even a 7th one, in case of at least two draws, and so on). The puzzles in a tiebreak will be the puzzles that have been eliminated by the finalists. The puzzles that were eliminated last will be used first. E.g. the 6th puzzle should be the one that was eliminated with the 5th choice. *Note that this way the sequence of alternated favouring of the finalists that is implied from their alternate choice/elimination of puzzles does not break, because in the 6th round they are solving a puzzle that the 1st placed solver had chosen to eliminate, therefore this is designed to be in favour of the 2nd placed solver, just as all the other even rounds, while the odd rounds are designed to be in favour of the 1st placed solver.*

The Final is designed with 10 puzzles, with the Finalists choosing 5 and the other 5 available for tiebreaks. If 10 rounds were not enough to decide the winner, the title is decided by the results of the two days of main competition, according to the rules in the Instruction Booklet. If even that doesn't help, we will toss a coin, seriously. (We are not talking about plausible events here - we thoroughly tested the Final puzzles and we believe they are all humanly solvable and well within 15 minutes, especially by people capable of getting there!)

Around the world in 80 puzzles

Round 04-07 of the main event, all individual rounds of assorted puzzles, are part of a novel competition structure, code named “Around the world in 80 puzzles”. Puzzles for these rounds were provided by four different international teams from around the world. With 20 puzzles in each of the sets and the teams being truly distributed across the globe, the code name for this structure is implied.

Further reading:

<http://wpc-2013.blogspot.com/2013/08/around-world-in-80-puzzles-introduction.html>

Format

Most of the authors of these puzzles will also compete in the Championship, of course they do not solve their own puzzle set. Therefore, every competitor will only solve three puzzle set, and skip one of them.

How do I know which set I will skip? In short, teams who are affiliated with the authors of one of the puzzle set are required to only attempt the other three puzzle sets. Teams who are in no way affiliated with the authors of any of the four puzzle sets will have to distribute the sets within their team so that each of the four members of the team attempts exactly three of the puzzle set and each of them skips a different one. Please see the reference below for a more thorough description.

Further reading:

<http://wpc-2013.blogspot.com/2013/08/around-world-in-80-puzzles-format-update.html>

Scoring

Since not everybody solves the same exact rounds, the head-to-head comparison between raw scores does not give a reliable measure of solvers’ true performance. To eliminate any perceived or real difference between the difficulties of the four puzzle set, a score normalisation applies to these four rounds.

In short, the scores indicated with the puzzles in this booklet are considered *raw scores*, which are subject to be converted to *puzzle points* (the currency of the remainder of the Championship, which is used to score all the other rounds), using the following process:

- The 5th best raw score of any puzzle set will receive 500 puzzle points
- The median raw score of any puzzle set will receive 250 puzzle points
- Other raw scores will be interpolated based on these two fixed points and rounded to closest integer

This way, while the raw scoring of these rounds follows a 2 points per minute schedule on a grand average, after the conversion the puzzle points are expected to line up better with the 10 points per minute schedule on a grand average that is used in every other round of the Championship.

Further reading:

<http://wpc-2013.blogspot.com/2013/08/around-world-in-80-puzzles-scoring.html>

Schedule

Please note that this is a preliminary schedule, subject to minor changes in actual starting times. The rounds, their order and their lengths are confirmed.

Round	Name		Type	Duration	From	To
01	Welcome to China!		Team	60 minutes	(day 1) 09:00	10:00
02	Classic Puzzles		Individual	60 minutes	10:20	11:20
03	Digital Puzzles		Individual	40 minutes	11:40	12:20
04	Around the world in 80 puzzles	Dutch Delight	Individual	60 minutes	14:15	15:15
05		Indian Intrigue	Individual	60 minutes	15:30	16:30
06		Doubled Decathlon	Individual	60 minutes	16:45	17:45
07		Serbian Snacks	Individual	60 minutes	18:00	19:00
08	Black and White Matrix		Individual	60 minutes	(day 2) 09:00	10:00
09	Assorted Puzzles		Individual	90 minutes	10:20	11:50
10	Sprint		Individual	30 minutes	12:10	12:40
11	Visual Puzzles		Individual	30 minutes	14:30	15:00
12	The Zodiac		Individual	45 minutes	15:20	16:05
13	Weakest Link - Samurai		Team	60 minutes	16:40	17:40
14	Year of Snake		Team	60 minutes	18:00	19:00
15	Play-offs		Individual	continuously	(day 3)	

Acknowledgements

This booklet and all the other material of the Championship is a result of the teamwork of a large number of individuals. In each of the sections, the names are listed in alphabetical order.

Puzzle authors

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“Around the world in 80 puzzles” – discussions

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Editor

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PART 1		Welcome to China!	
Team round		60 minutes	2000 points

Overview

This is a team round to be solved on a Chinese round table whose outer deck is fixed and the inner deck is slightly elevated and can be rotated.

There will be eight puzzles in this round, the types and rules are described below. Each of the puzzles has a rectangular shape and the size of 20 rows and 10 columns. However, each of these puzzles are split into two parts: the bottom 13 rows are separated from the top 7 rows, these will be referred to as “top half” and “bottom half”, even though technically their sizes are not exactly halves. The bottom halves are placed onto the outer deck of the table, the top halves are placed onto the inner deck of the table. The position of these puzzles will be fixed, the papers will be stuck onto the table and it is not allowed to move or remove them during the round.

However, it is allowed to rotate the inner deck at any time and team members are welcome to move freely around the table during the entire round. In fact, all this may be useful since the top and bottom halves may be placed onto the table in different orders. Moreover, although the bottom halves of the puzzles will be identified (that is, a label will clearly show the name of the puzzle for each bottom), the top halves will not be identified. It is part of the challenge to figure out which top half belongs to which bottom half.

Given the order below, the first four puzzle types feature regions surrounded by thick lines (“region puzzles”), whereas the last four types contain black and white circles (“circle puzzles”). Therefore, it will be obvious to classify the top halves as region puzzles or circle puzzles, but further identification of the top halves may not be very obvious.

Bottom halves may or may not have a unique solution on their own. For any given bottom half, there may be one or more top half so that they together have a unique solution. However, the solution of the entire puzzle round is unique.

In the samples, puzzle sizes are reduced from 10 by 13+7 to 10 by 6+4. The round table is visualised using four puzzles only, whereas in the actual competition all eight puzzles will be placed onto one table for each team. In the example, the inner deck can be rotated so that each of the four top halves will end up aligned with one of the bottom halves. This will apply at the competition layout too: it will be possible to rotate the inner deck so that each of the eight top halves will align with one of the bottom halves (though of course, not necessary with the bottom half of the same puzzle).

As opposed to the example below, the layout of the printed puzzle halves in the actual competition will be such that the puzzle grids will not be strictly rectangular. Instead, the “horizontal” grid lines will slightly bend to follow the curvature of the edge of the inner deck of the table. This ensures that when the inner deck is rotated such that puzzle halves are aligned, they actually align pretty well, at least when viewed from above. The “vertical” grid lines, however, will be parallel.

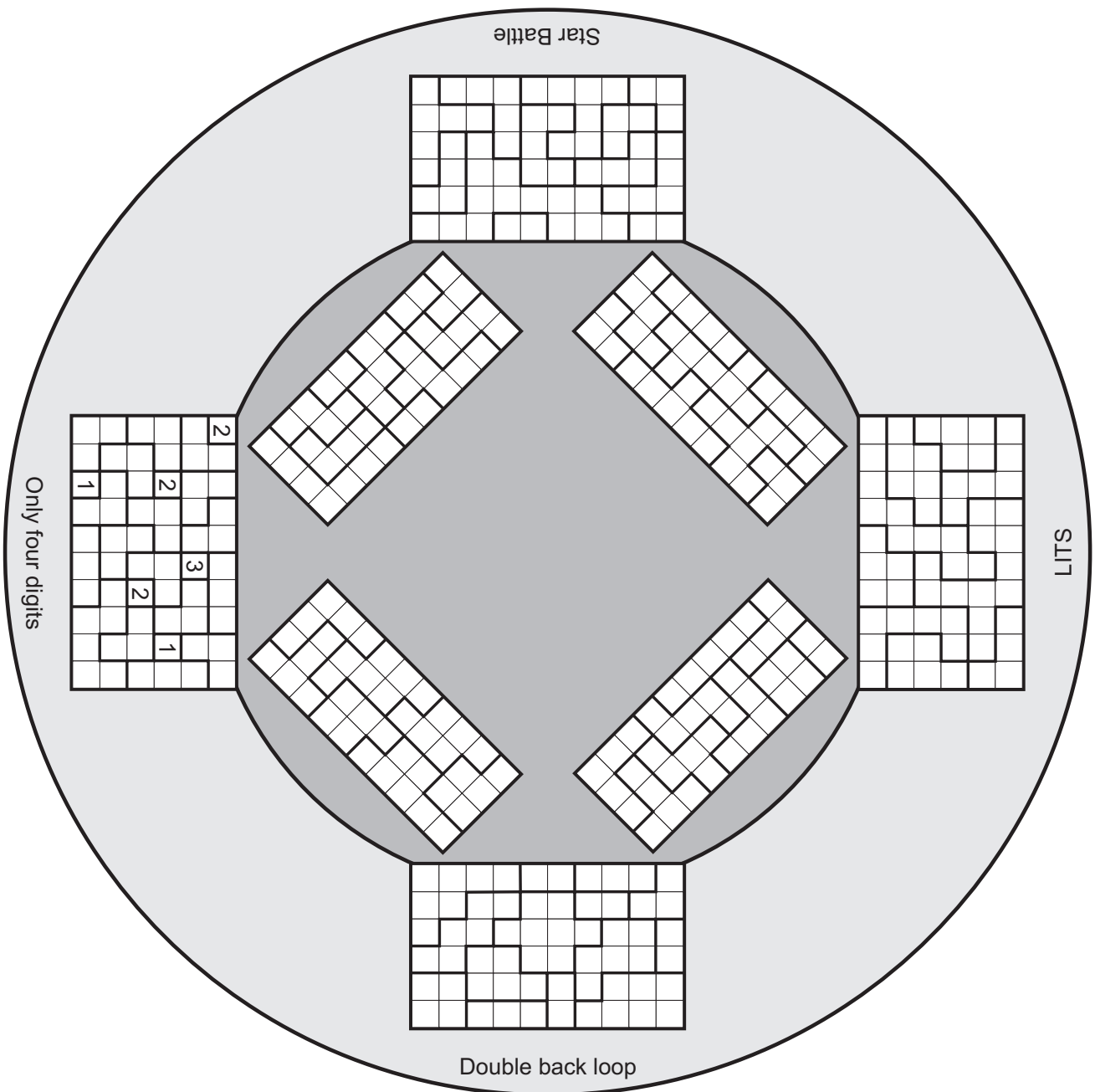


Figure 1 - Sample of the round table using only region puzzles

General rules

For region puzzles, the regions are constructed such that there is no region divided by the boundary between the top and bottom halves (in other words: all regions are either entirely in the bottom half or entirely in the top half).

Other than that, the edge between the halves plays no special role in the puzzle rules, it does not serve as a boundary of either half.

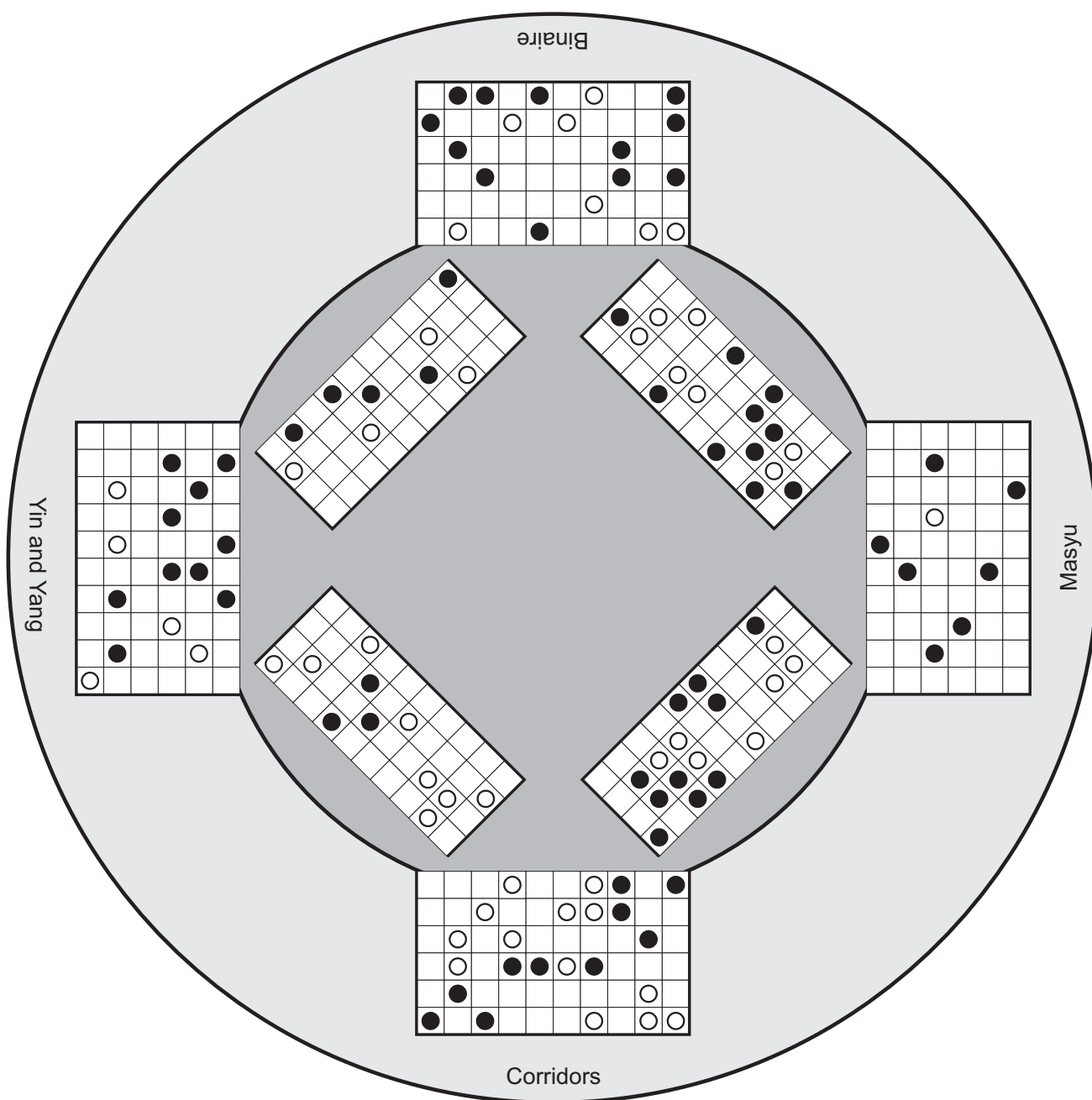


Figure 2 - Sample of the round table using only circle puzzles

Solving and scoring

Every puzzle is worth 250 points, which is awarded if the top half of the puzzle is correctly identified and both halves of the puzzle are solved correctly. The full solution to the complete round is therefore worth 2000 points.

It may be possible to “solve” one or more of the puzzles completely even if their top halves are not correctly identified. E.g. it might be possible to put the top half of the Star Battle puzzle on top of the bottom half of the LITS puzzle and solve these two as a LITS puzzle (the bottom types are specified). If a valid solution is obtained according to the rules of the bottom puzzle type but with a different top half, the same 250 points are still awarded. However, please note that with such a type mismatch, it will no longer be possible to find a solution for the entire round.

Puzzle descriptions

Puzzle 1 – Star Battle

Place stars into some of the cells such that cells containing stars do not touch each other, not even diagonally. There is exactly one star in each area surrounded by thick lines. There are two stars in each row and four stars in each column. (*In the example, only two stars per column.*)

Puzzle 2 – 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.

Puzzle 3 – Double back loop

Draw a single closed loop of horizontal and vertical segments passing through adjacent squares. Every square must be visited exactly once. Each thickly outlined region must be visited exactly twice.

Puzzle 4 – Only four digits

Place a digit from 1 to 4 into each of the areas surrounded by thick lines such that areas containing the same digit do not touch each other, not even at a single point.

Puzzle 5 – Yin and Yang

Place a black circle or a white circle into every empty cell so that all cells with black circles form a connected area and all cells with white circles also form a connected area. Circles in an area of 2×2 cells cannot all have the same colour.

Puzzle 6 – Binaire

Place a black circle or a white circle into every empty cell so that each row contains five black circles and five white circles. There is no similar rule for columns. Three circles in horizontally or vertically consecutive cells cannot all have the same colour.

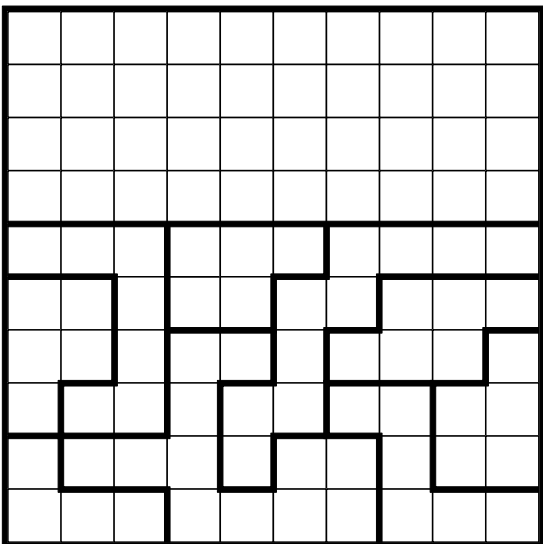
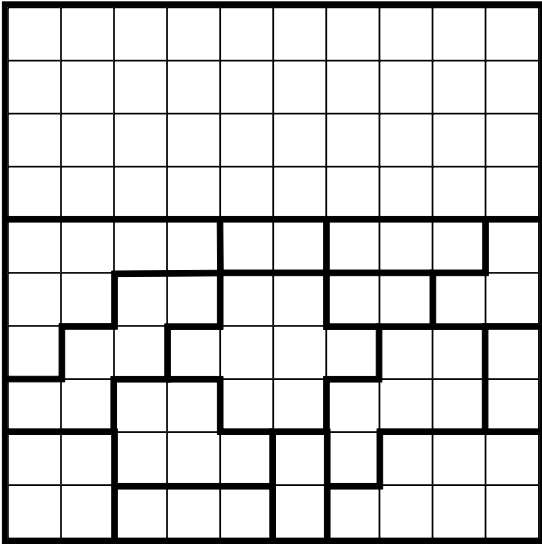
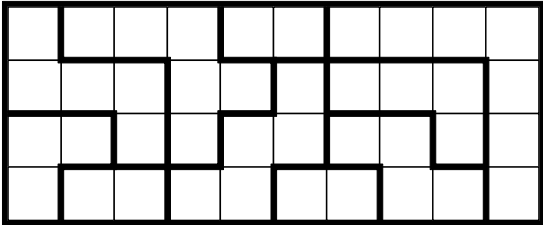
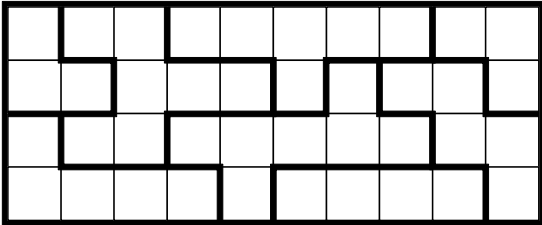
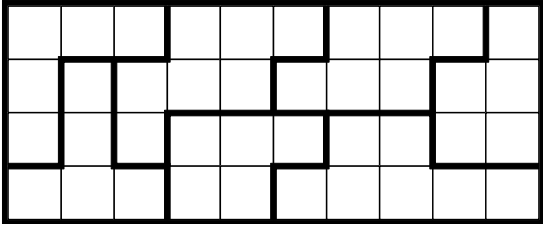
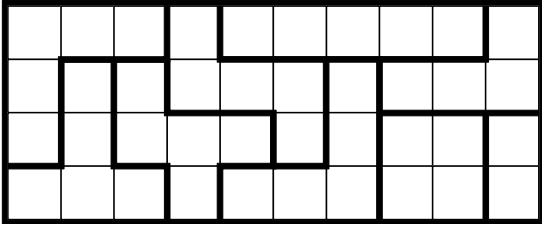
Puzzle 7 – Masyu

Draw a single, non-intersecting loop that passes through all circled cells but not necessarily through all empty cells. The loop must go straight through the cells with white circles, with a turn in at least one of the cells immediately before/after each white circle. The loop must make a turn in all the black circles, but must go straight in both cells immediately before/after each black circle.

Puzzle 8 – Corridors

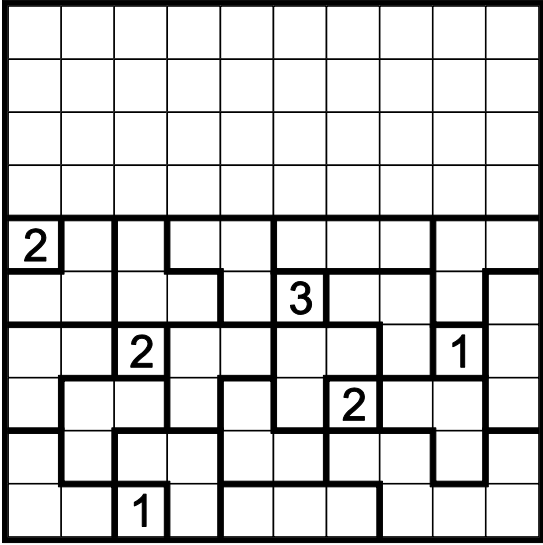
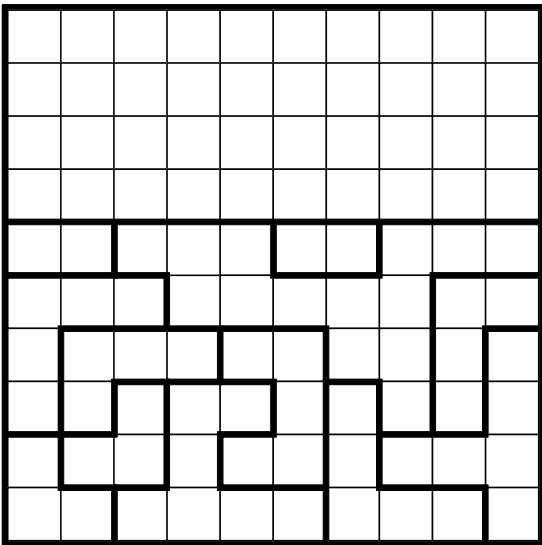
Divide the grid along the grid lines into corridors consisting of five adjacent cells. Each corridor contains exactly one white and one black circle. No 2X2 area belongs to a single region. *It is allowed for a corridor to be split between the bottom and the top half.*

(These are the same four region puzzles as in the round table images earlier, shown here separately for a better practise solving experience.)



Double back loop

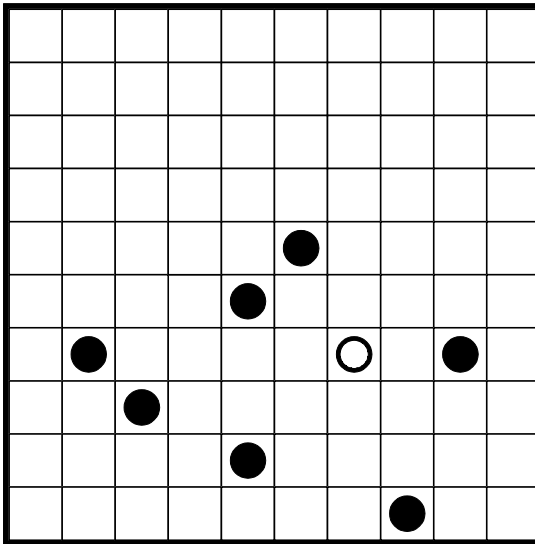
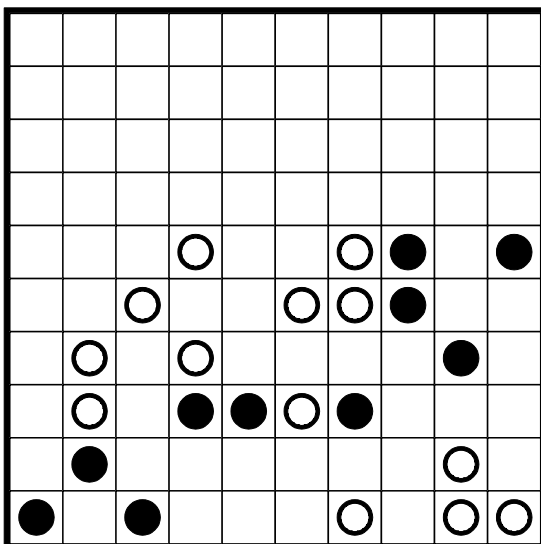
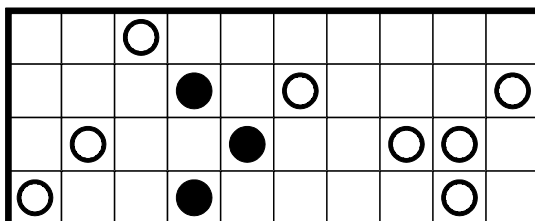
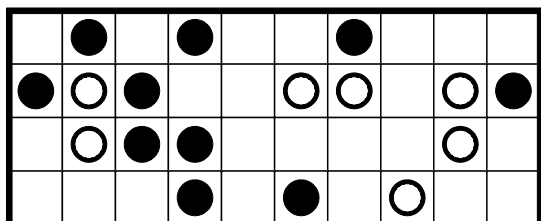
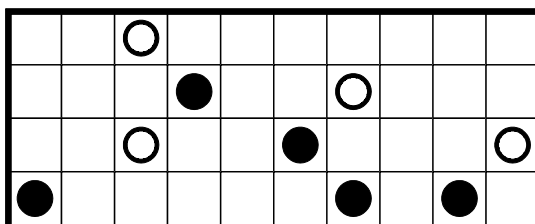
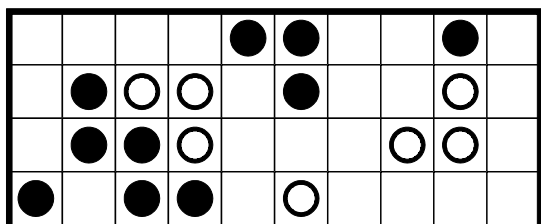
LITS



Star Battle

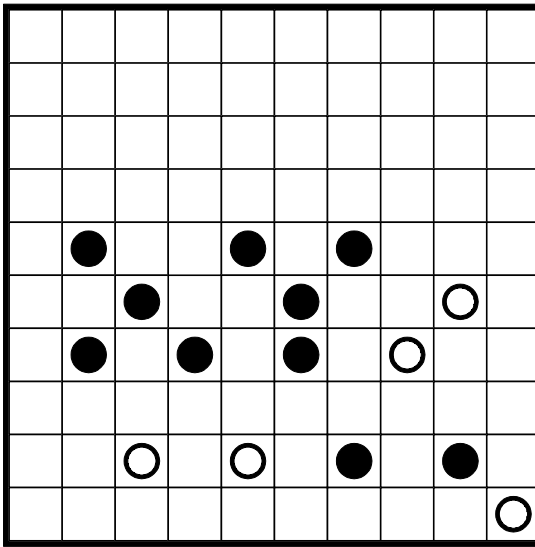
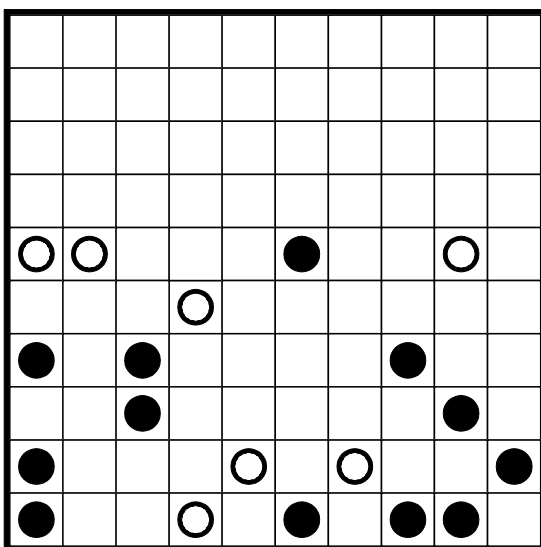
Only four digits

(These are the same four circle puzzles as in the round table images earlier, shown here separately for a better practise solving experience.)



Corridors

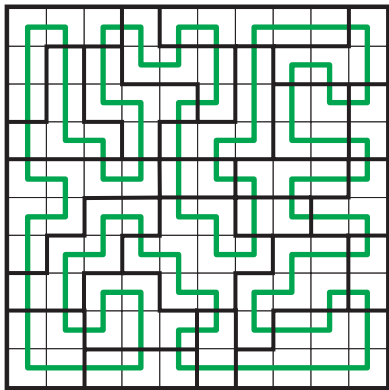
Masyu



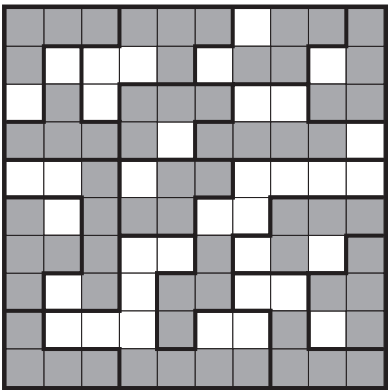
Binaire

Yin and Yang

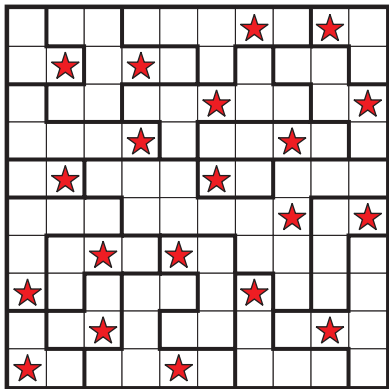
Solutions



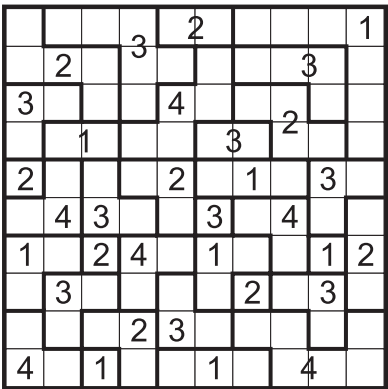
Double back loop



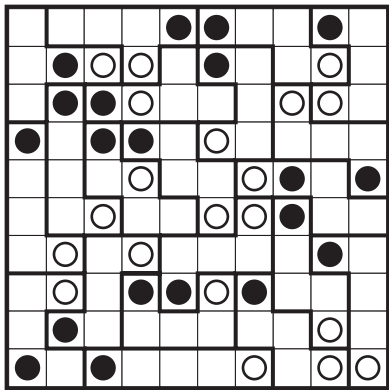
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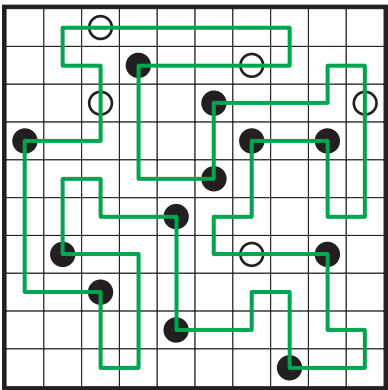
Star Battle



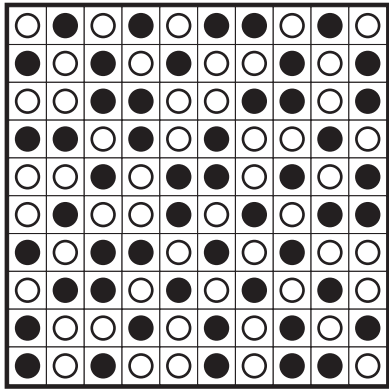
Only four digits



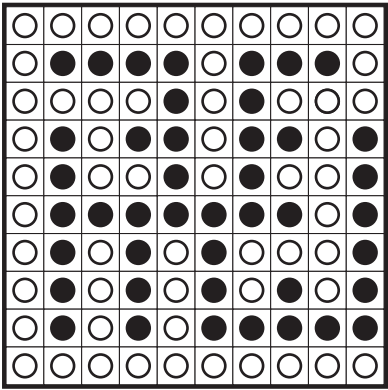
Corridors



Masyu



Binaire

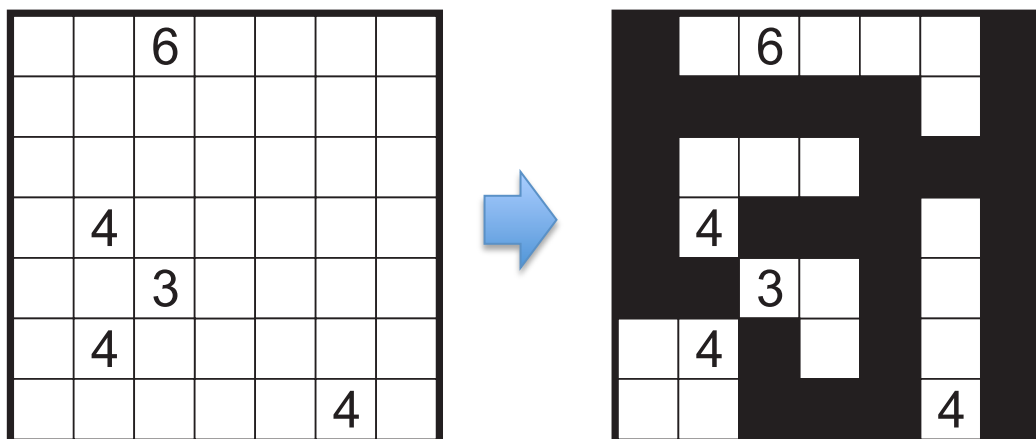


Yin and Yang

PART 2		Classic Puzzles	
Individual round		60 minutes	600 points

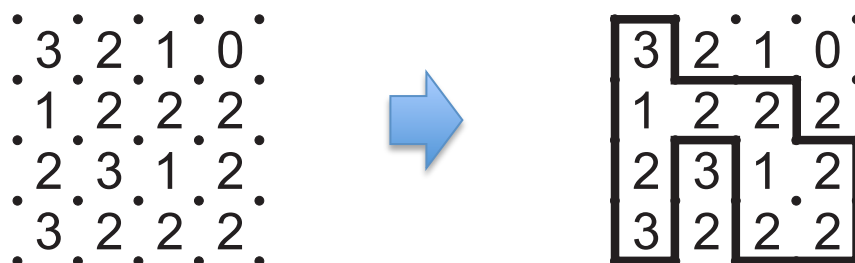
Puzzle 1 – Nurikabe (20+35 points)

Shade some empty cells black so that the grid is divided into white areas, each containing exactly one number and with an area in cells equal to the value of that number. Two white areas may only touch diagonally. All black cells must be connected with each other, but no 2 x 2 square of cells can be entirely shaded black.



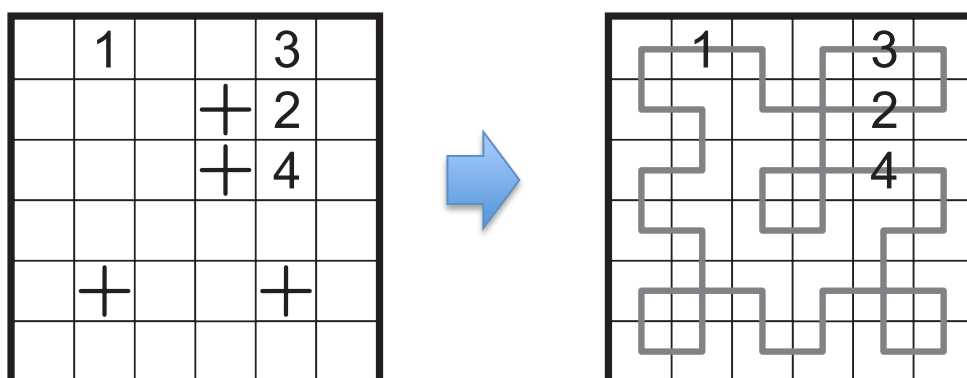
Puzzle 2 – Fences (25+50 points)

Draw a single closed loop into the grid so that it does not touch or cross itself. A number in a cell indicates the number of sides of that cell occupied by the loop.



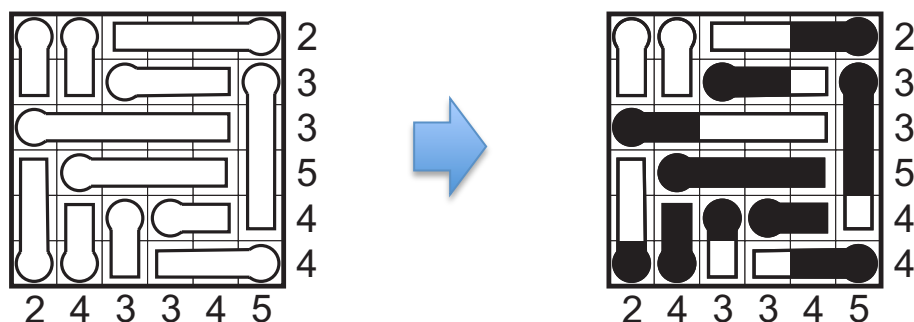
Puzzle 3 – Railroads / Bahnhöfe (25+30 points)

Draw a single closed loop that consists of horizontal and vertical segments and visits all cells with a “+” sign exactly twice, crossing itself, and visits all other cells exactly once. The loop makes no turn in cells with numbers and has to visit all such cells in an increasing order 1-2-3-... with the last station followed by 1 again.



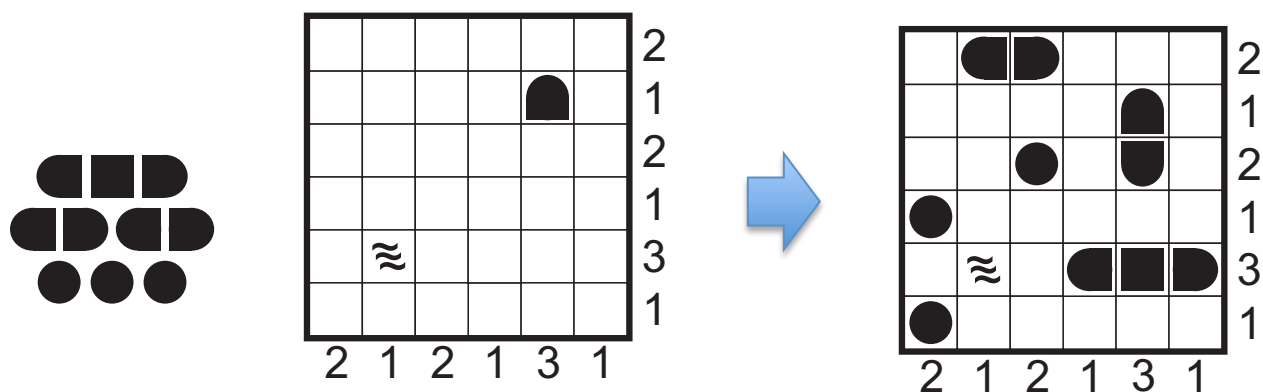
Puzzle 4 – Thermometers (30 points)

Fill in all, some or none of each thermometer so that numbers outside the grid indicate how many cells are filled in that row/column. Each thermometer is filled from the bulb upwards, it is not allowed to have empty cells between two filled cells in any thermometer.



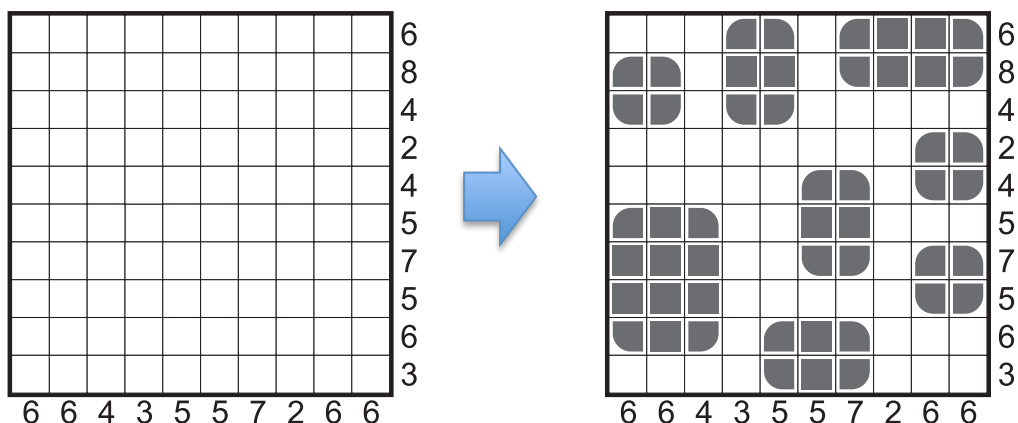
Puzzle 5 – Battleships (30+35 points)

Locate the indicated fleet of ships in the grid. Each segment of a ship occupies a single cell, and the numbers on the right and bottom edges of the grid reveal the number of ship segments in that row or column. Ships can be rotated. Ships do not touch each other, not even diagonally. Some ship segments, or sea cells without any ship segments, are given in the grid.



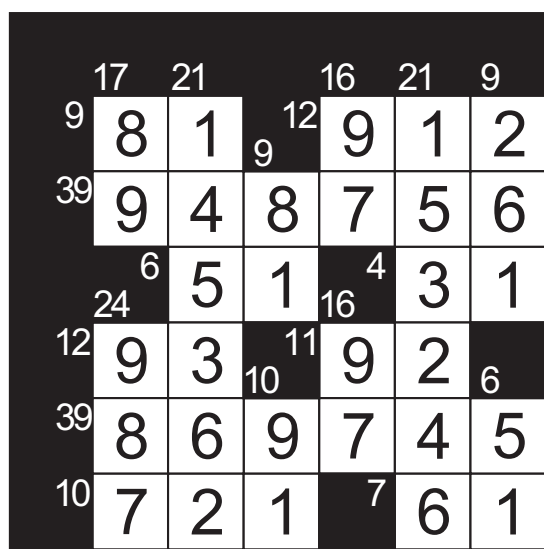
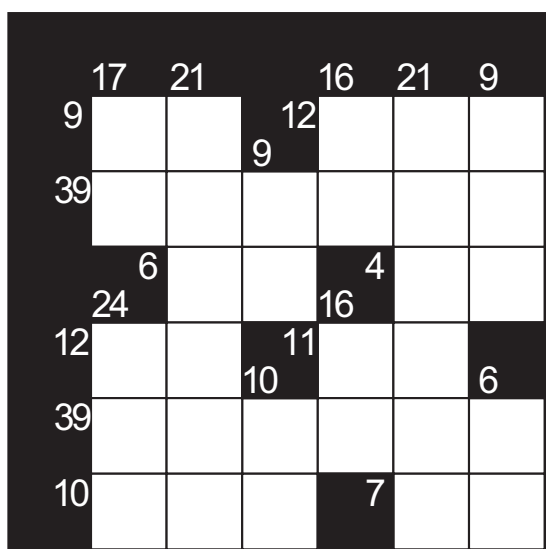
Puzzle 6 – Radar (30 points)

Shade some rectangular areas in the grid so that they do not touch each other, not even diagonally (in other words: if two cells are occupied by two different shaded areas, then those two cells cannot share even a single point). Rectangles of size 1xN are not allowed, both dimensions of all rectangles have to be at least 2. Numbers outside the grid indicate how many cells are shaded in that row/column.



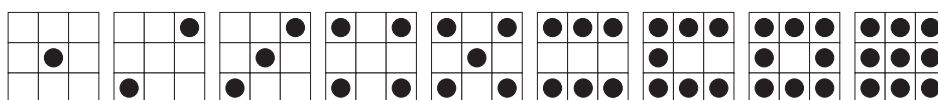
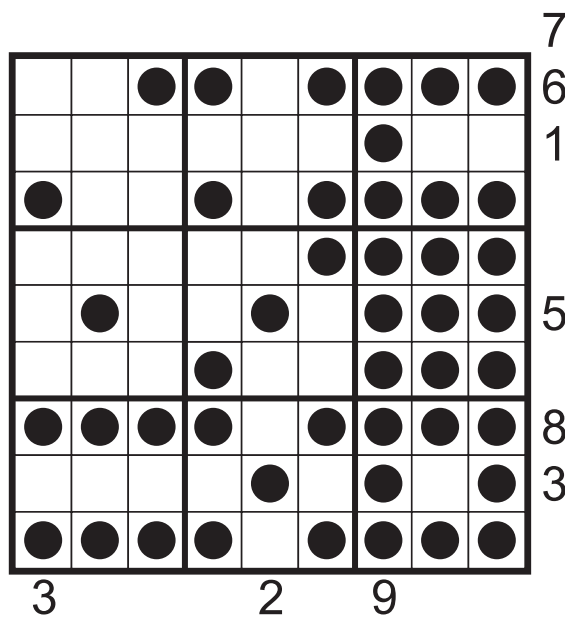
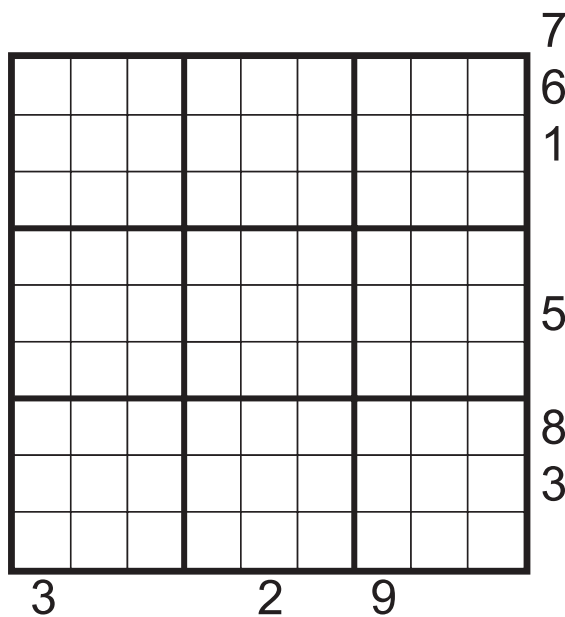
Puzzle 7 – Kakuro (30+50 points)

Enter digits 1–9 into all cells of the grid so that no digit repeats in any of the “words” across and down. Clues denote the sum of digits in each of the words.



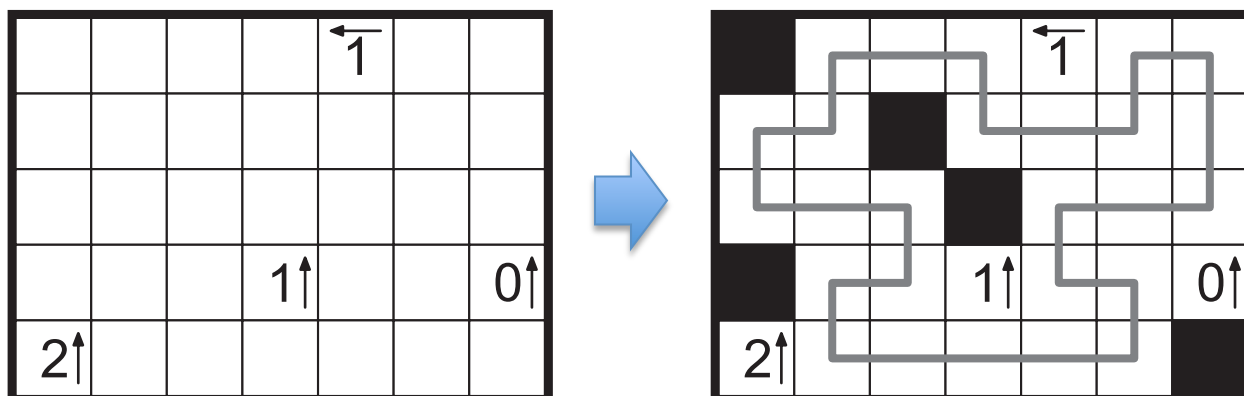
Puzzle 8 – Domino Halves (40+50 points)

Place the given domino halves into the grid so that each of them occupies a 3x3 region as marked with thick lines. Domino halves cannot be rotated or reflected. Numbers around the grid indicate the number of dots in the given row, column or main diagonal.



Puzzle 9 – Yajilin (50 points)

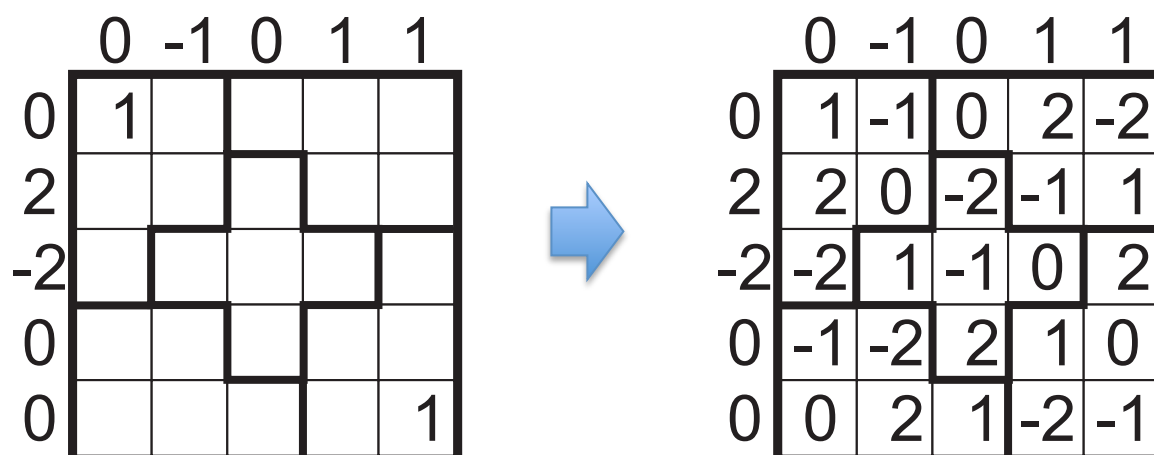
Shade some white cells black so that each number indicates how many blackened cells are in the indicated direction. Black cells cannot share an edge. The remaining white cells must all be connected to form a single closed loop without intersecting or overlapping with itself.



Puzzle 10 – Sudoku +/-4 (70 points)

Enter whole numbers between -4 and +4 (from -2 to +2 in the example), inclusive, into the grid so that each row, column and region contains all possible numbers exactly once. Clues outside the grid indicate the sum of all numbers that appear between the clue and the cell containing zero in that row/column.

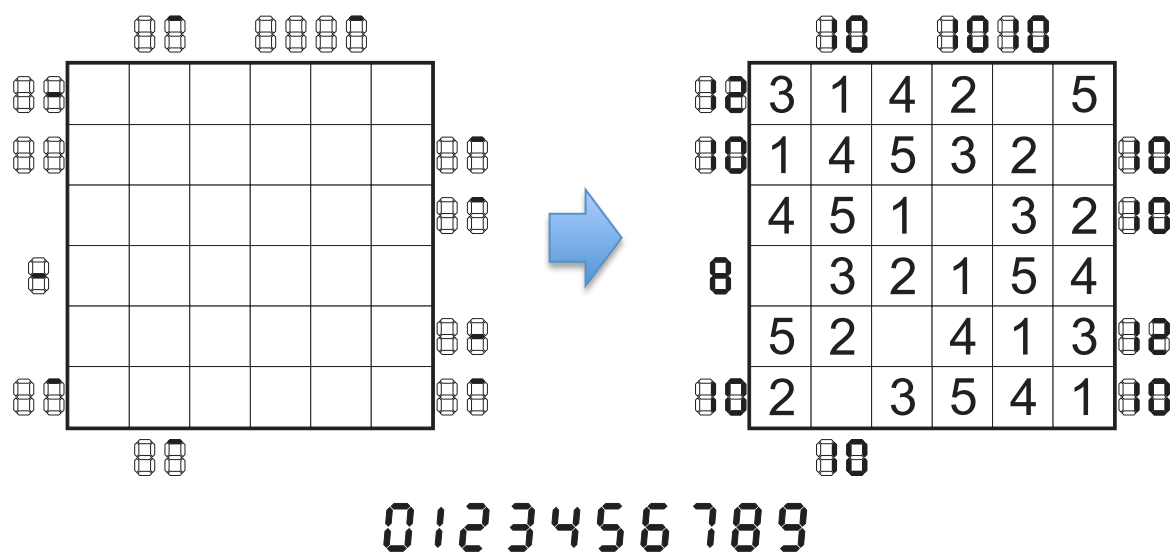
Some cells already contain a number. However, the signs for these clues are not indicated, it is part of the puzzle to determine whether they are positive or negative values.



PART 3		Digital Puzzles	
Individual round		40 minutes	400 points

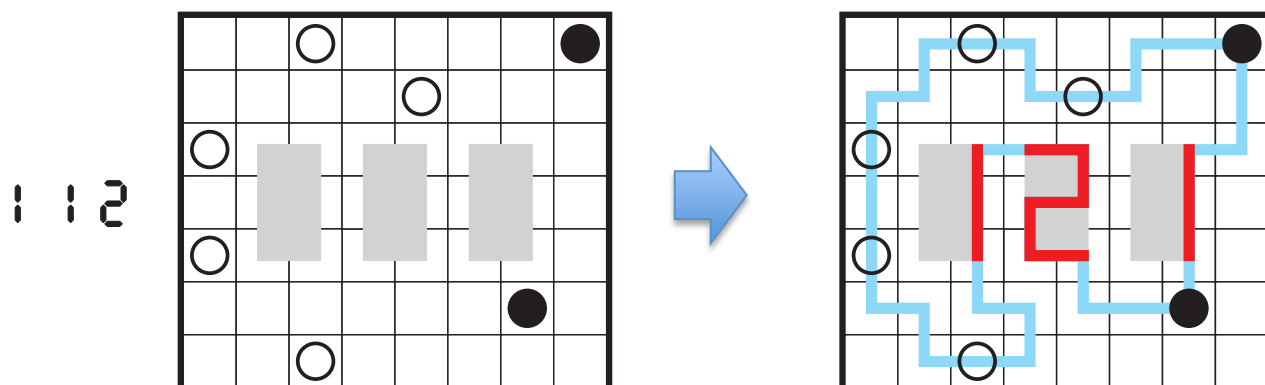
Puzzle 1 – Digital Sum Skyscrapers (25+35 points)

Enter digits 1-5 into the grid so that no digit repeats in any row or column. Some cells may remain empty. Each digit in the grid represents the height of a building and the digital clues on the outside of the grid indicate the sum of the heights of buildings that can be "seen" when looking from that direction. Some of the digital clues's segments are given, and the number of digit placeholders correctly corresponds to the number of digits of the actual clue (e.g. one digit if at most 9; two digits if at least 10). Taller buildings block smaller ones from being seen. The digit "1", wherever it appears, occupies the right hand side of its placeholder.



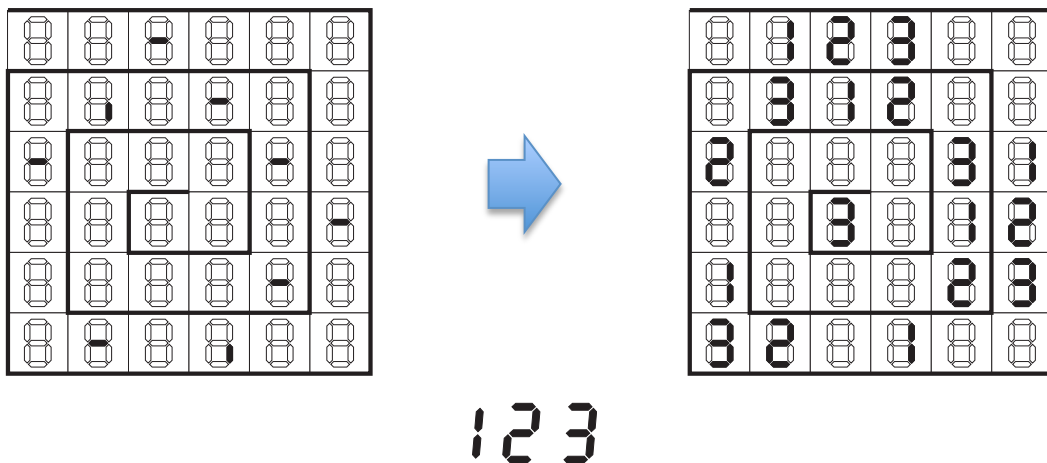
Puzzle 2 – Digital Masyu (30 points)

Draw a single, non-intersecting loop that passes through all circled cells but not necessarily through all empty cells. The loop must go straight through the cells with white circles, with a turn in at least one of the cells immediately before/after each white circle. The loop must make a turn in all the black circles, but must go straight in both cells immediately before/after each black circle. Additionally, the loop must go through all the grey placeholders in a way that all the given digits appear in the placeholders exactly once, without rotation or reflection. The digit "1", wherever it appears, occupies the right hand side of its placeholder.



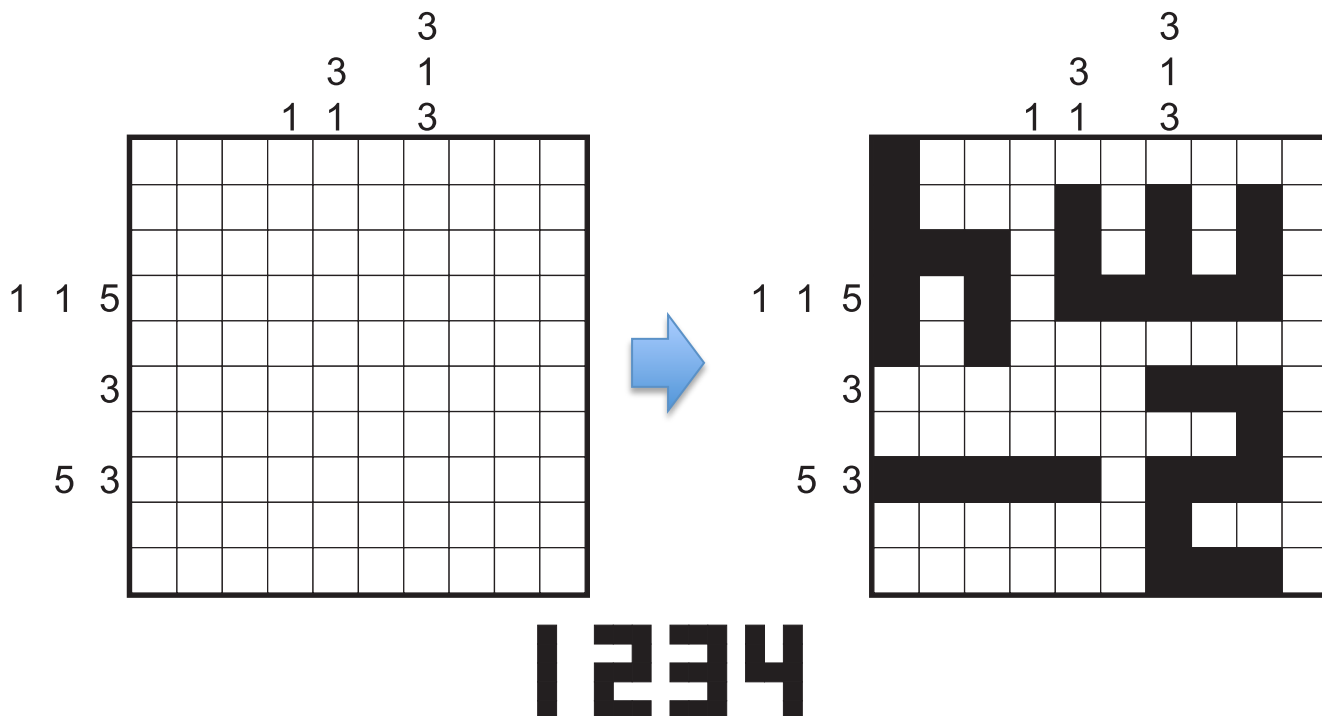
Puzzle 3 – Digital Snail (30+40 points)

Enter digits 1-4 (1-3 in the example and in the smaller puzzle) into the grid so that no digit repeats in any row or column. Along the spiral of the snail, starting from outside, digits are encountered in order 1-2-3-4-1-... and repeating similarly, starting with 1 and finishing with 4. Segments of some digits are given. A digit must be placed into any cell that has at least one segment given in it. The digit “1”, wherever it appears, occupies the right hand side of its placeholder.



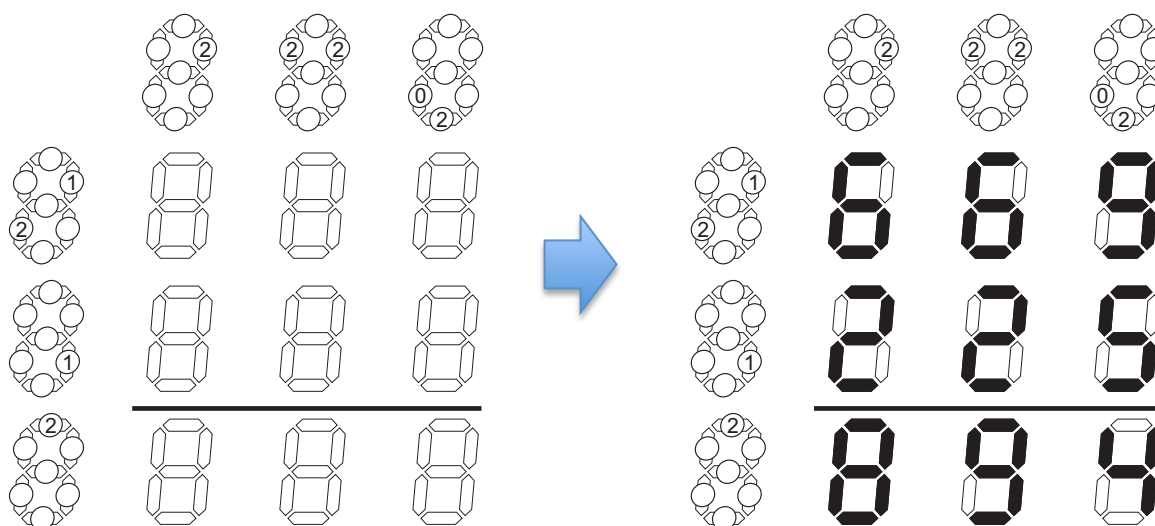
Puzzle 4 – Digital Paint (50 points)

Place the given digits into the grid so that they do not touch each other, not even diagonally. Digits can be rotated but not reflected. Numbers outside the grid indicate the sizes of consecutive blocks occupied by digits in that row/column. Numbers outside are given in the order the blocks appear in that row/column, first number describes the closest block.



Puzzle 5 – Digital Price Tags (60 points)

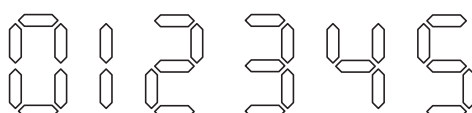
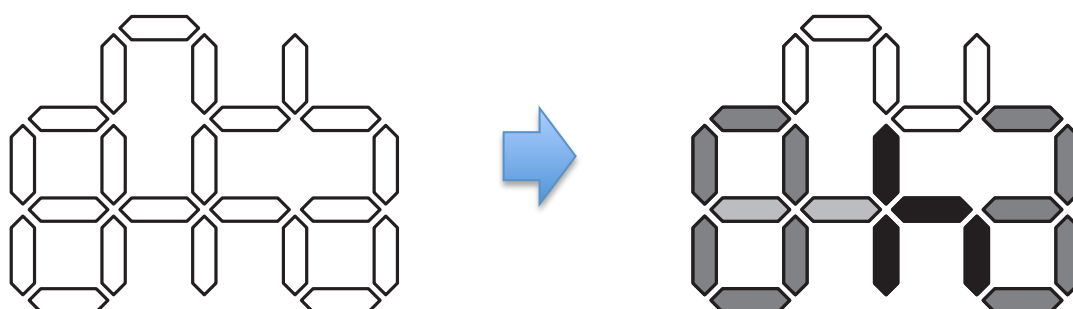
Fill in all the seven-segments placeholders with digits to obtain a valid multi-digits number in each row so that the number in the bottom row equals to the total of the numbers above it. All placeholders contain a digit and no number can start with a zero digit. Clues to the left and on the top indicate how many times a particular segment is contained by the digits in the given row/column. The digit “1”, wherever it appears, occupies the right hand side of its placeholder.



0 1 2 3 4 5 6 7 8 9

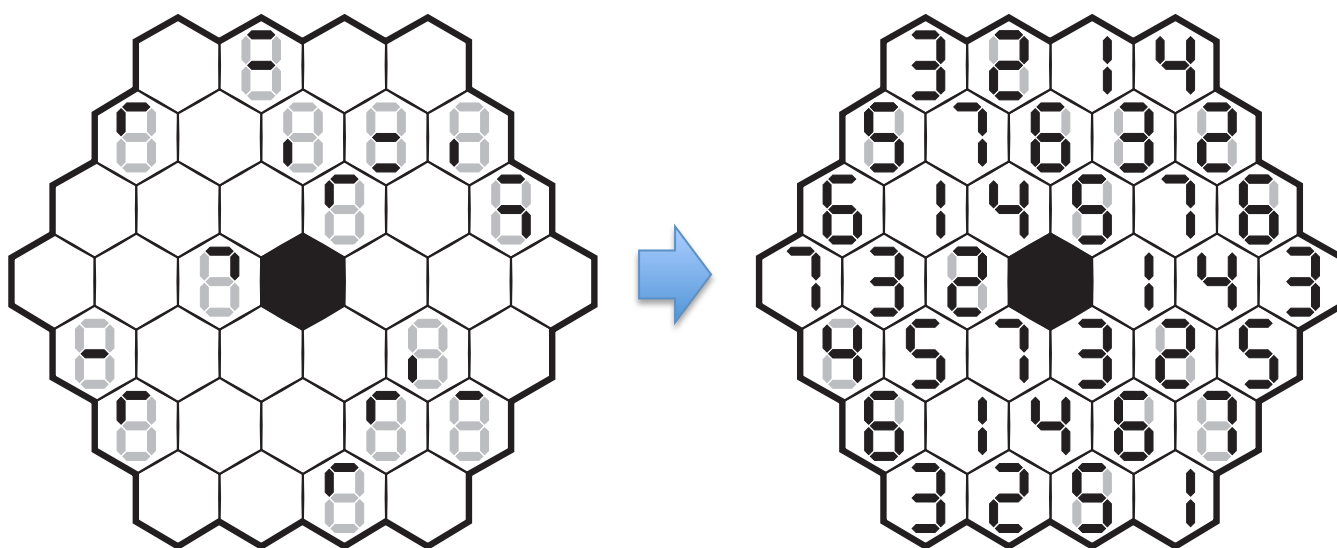
Puzzle 6 – Digital Mess (60 points)

All the given digits were placed into the figure, except for one of them which is missing. Digits may be rotated but not reflected. Each of the segments belongs to exactly one digit. Identify the location of the digits.



Puzzle 7 – Digital Honey (70 points)

Enter digits 1-7 into all white hexagonal cells such that every digit is different from all its neighbours, and the neighbours of a digit are different from each other too. Neighbours of a black cell are not required to be all different. The digit “1”, wherever it appears, occupies the right hand side of its placeholder.



1 2 3 4 5 6 7

Around the World in 80 Puzzles

“Around the World in 80 Puzzles” is a set of individual rounds of assorted puzzles within World Puzzle Championship 2013 where the puzzles are provided by an international team of authors.

Round		Puzzle Authors
04	Dutch Delight	Bram de Laat, Hans Eendebak, Tim Peeters, Richard Stolk
05	Indian Intrigue	Prasanna Seshadri, Amit Sowani
06	Doubled Decathlon	Thomas Snyder, Wei-Hwa Huang, Palmer Mebane
07	Serbian Snacks	Nikola Zivanovic, Branko Ceranic, Cedomir Milanovic, Zoran Tanasic

Every competitor will solve exactly three of these four puzzle sets. The rules for determining who skips what have been described in a blog entry earlier (see details at the address specified below).

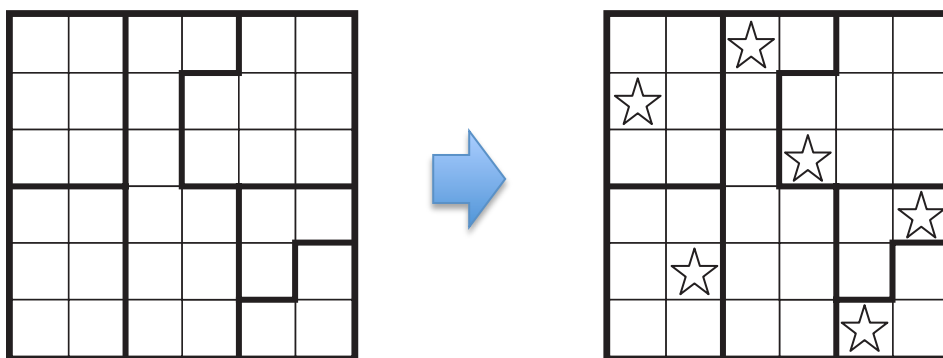
The indicated scores within this booklet are subject to the normalisation process that was described and communicated in a blog entry earlier. This communication is available, along with the general introduction and further details about “Around the World in 80 Puzzles”, at the address below:

<http://wpc-2013.blogspot.com>

PART 4	Around the world in 80 puzzles Dutch Delight	
Individual round	60 minutes	120 points*

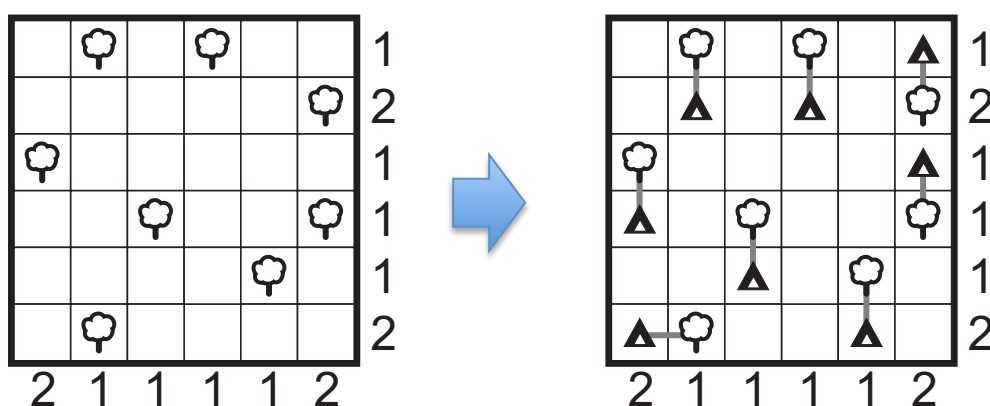
Puzzle 1 – Star Battle (2 points)

Place stars into some of the cells such that cells containing stars do not touch each other, not even diagonally. There are two stars in each row, column and region (one in the example).



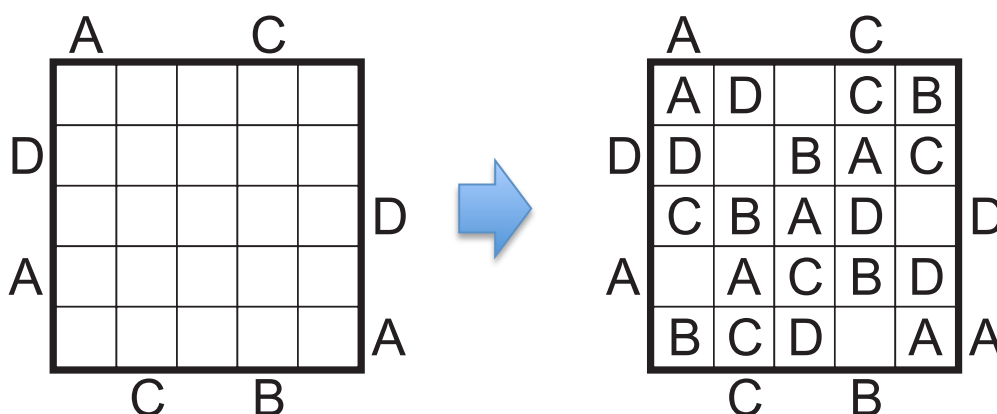
Puzzle 2 – Tents and trees (4 points)

Attach a tent to each tree, in a horizontally or vertically adjacent cell, so that cells with tents do not touch each other, not even diagonally. Numbers outside the grid indicate the number of tents in that row/column.



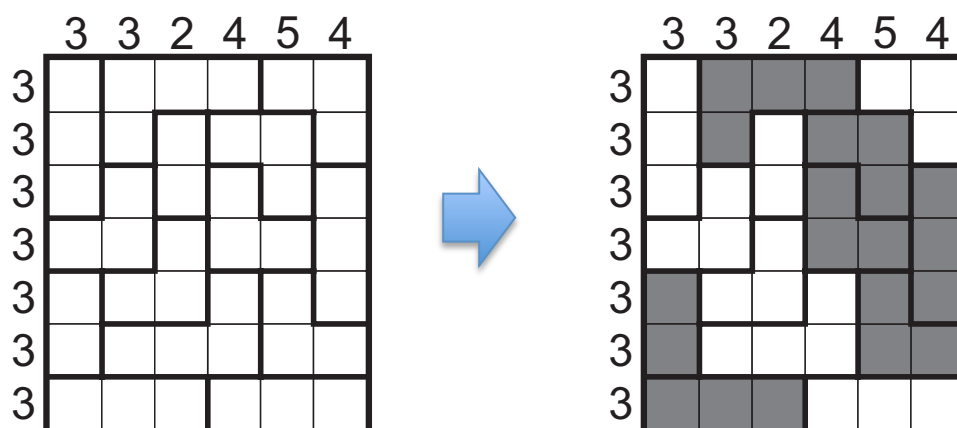
Puzzle 3 – Easy as ABCDE (3 points)

Fill in the grid with letters ABCDE (ABCDE in the example) so that each row and column contains each letter exactly once. Some cells remain empty. Letters outside the grid indicate the first letter in that row/column from that direction.



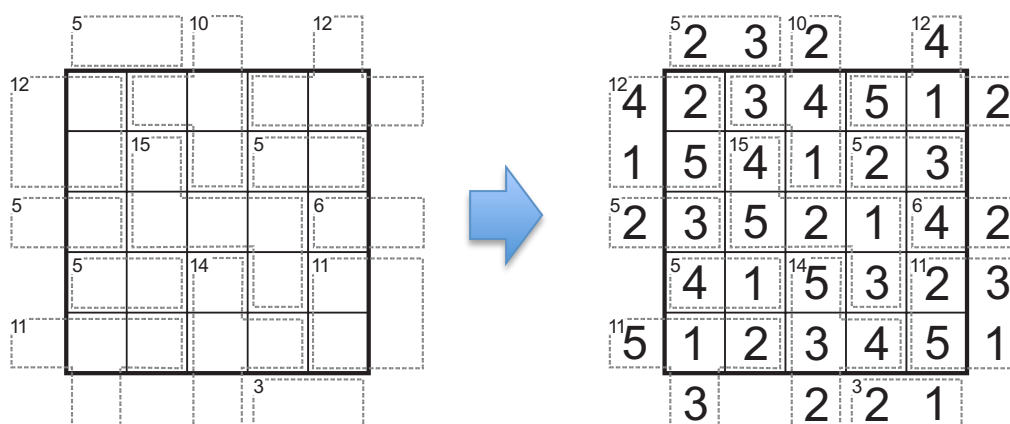
Puzzle 4 – Crazy Pavement (4 points)

Paint some cells in the grid so that for each region either all its cells are painted or none at all. Numbers outside the grid indicate the number of painted cells in that row/column.



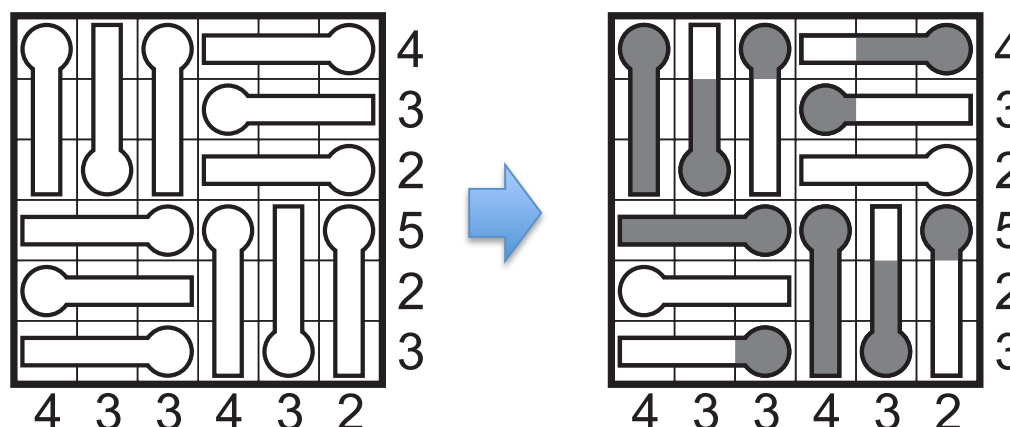
Puzzle 5 – Killer Skyscrapers (4 points)

Enter a digit from 1 to 6 into each cell (1–5 in the example) so that each row and column contains each number exactly once. Each digit in the grid represents the height of a building and the clues on the outside of the grid indicate how many buildings can be "seen" when looking from that direction. Taller buildings block smaller ones from being seen. Numbers in the top left corner of a region indicate the sum of numbers inside that region. No digit can be repeated within a region, even if some or all of them are outside the grid.



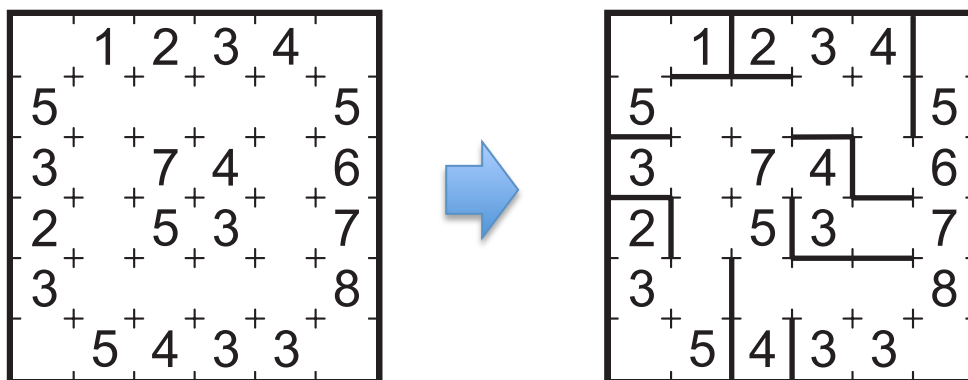
Puzzle 6 – Thermometers (3 points)

Fill in all, some or none of each thermometer so that numbers outside the grid indicate how many cells are filled in that row/column. Each thermometer is filled from the bulb upwards, it is not allowed to have empty cells between two filled cells in any thermometer.



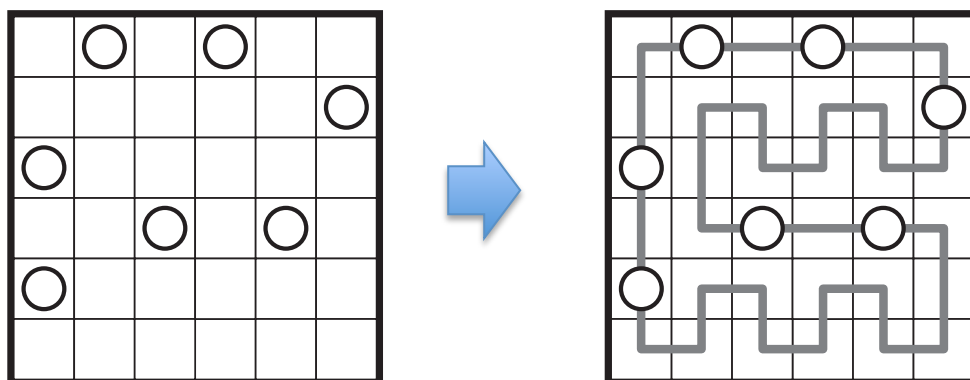
Puzzle 7 – Office (4 points)

Place some wall segments along the grid lines so that each number indicates how many other cells can be seen from that cell, not including itself. Wall segments block visibility. There is a connectivity rule: the entire office area must remain connected.



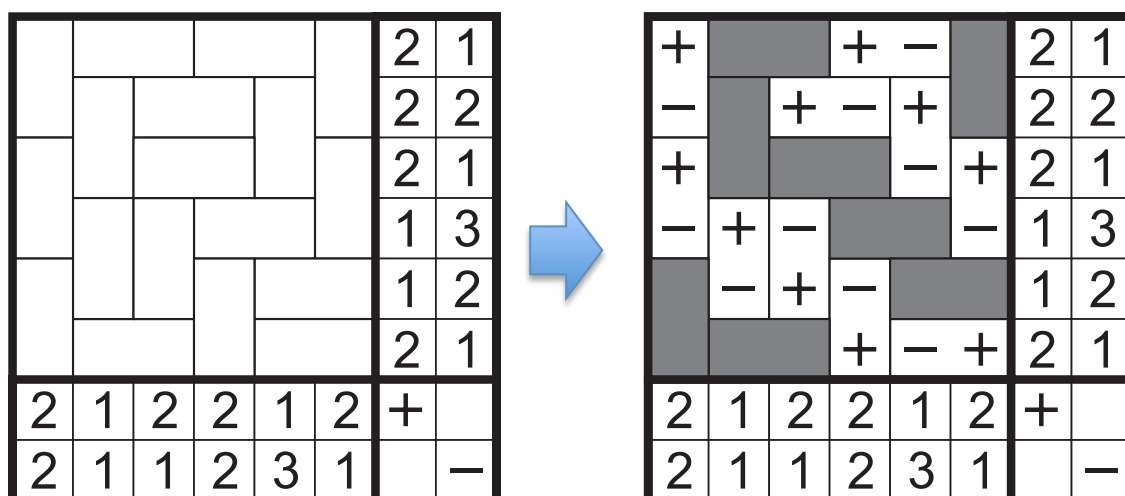
Puzzle 8 – Every Second Straight (4 points)

Draw a single closed loop that consists of horizontal and vertical segments and visits every cell exactly once. Along the loop, every second cell where the loop makes no turn is marked with a circle.



Puzzle 9 – Magnets (6 points)

Place magnets into some of the regions so that each magnet has a positive and a negative pole. Cells containing magnet halves of the same polarity cannot share an edge. Numbers outside the grid indicate the number of positive and negative poles in the rows/columns.



Divide the grid into a number of regions so that every pair of numbers appears in exactly one region. All regions contain exactly two numbers.



2		3	3	3
1	0	1	3	0
0		1	3	
	1	2	2	0
0	2		2	1

Draw a single closed loop that consists of horizontal and vertical segments and visits every cell exactly once. Cells with identical letters contain identical loop segments, cells with different letters have different loop segments. The direction of the loop is not considered, in other words the loop may go through cells with identical letters from left to right the first time and from right to left another time.



A 10x10 grid with a complex path of gray squares. The path starts at the top-left (0,0) and ends at the bottom-right (9,9). The path is composed of gray squares, and the cells not on the path are white. The path is a single continuous line. The labels A, B, and C are placed in white cells, and D is placed in a gray cell.

Place an arrow into some of the cells so that there are exactly four arrows, one arrow for each of the four directions, in every row and column. Some cells remain empty. No arrow can point at another arrow. Thick walls block visibility.

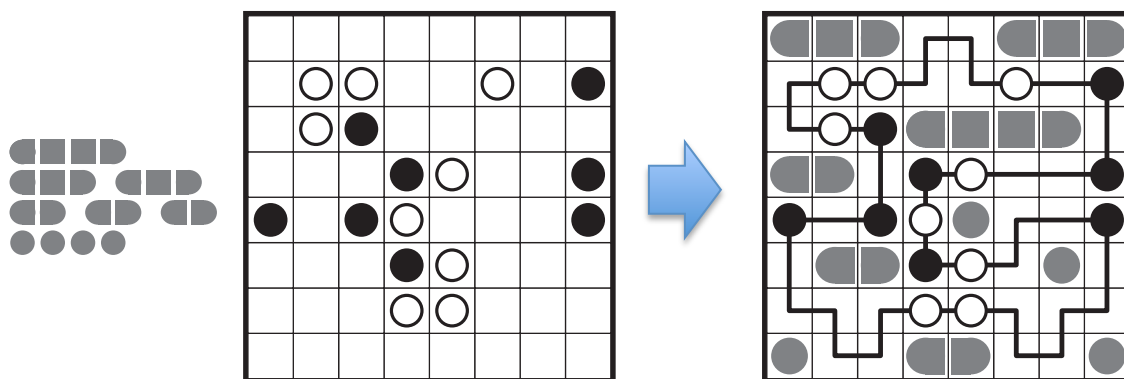


	←	↑	→	↓
↑	↓	→	←	
→		←	↓	↑
←	↑	↓		→
↓	→		↑	←

Puzzle 13 – Masyu Battleships (7 points)

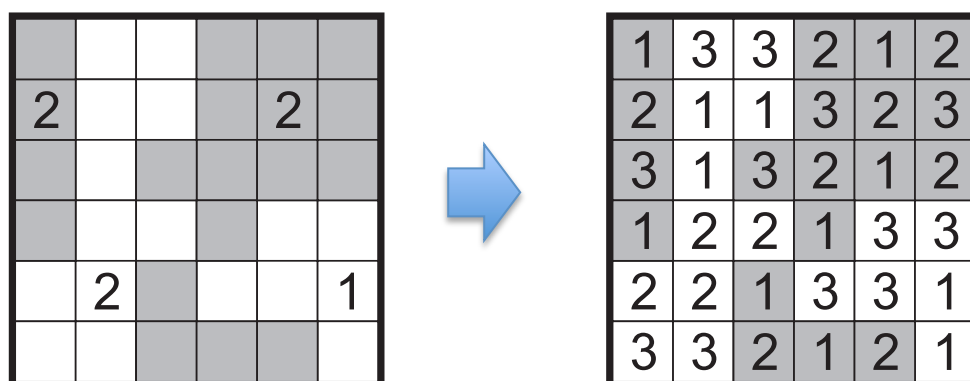
Masyu rules apply: draw a single, non-intersecting loop that passes through all circled cells but not necessarily through all empty cells. The loop must go straight through the cells with white circles, with a turn in at least one of the cells immediately before/after each white circle. The loop must make a turn in all the black circles, but must go straight in both cells immediately before/after each black circle.

Additionally, place the given battleship fleet into the cells that are not occupied by the loop so that ships do not touch each other, not even diagonally.



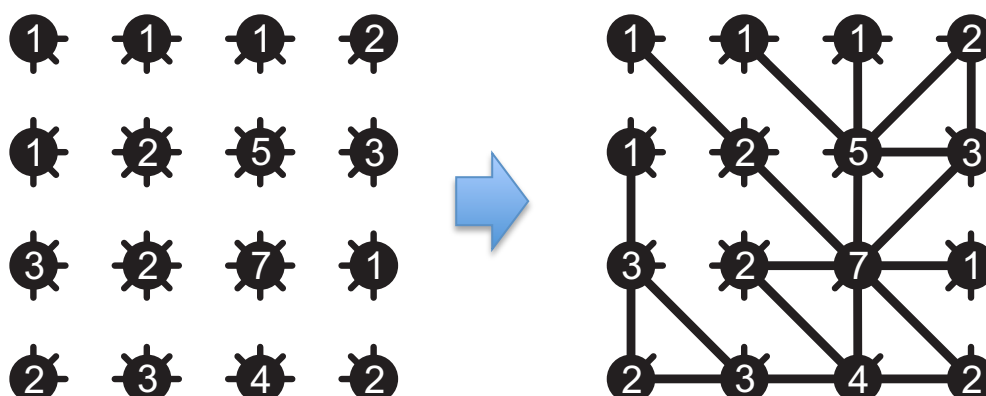
Puzzle 14 – Neighbours (8 points)

Place digits 1–3 in the grid so that in each row and column, each digit appears three times (only twice in the example). Numbers in grey cells do not share an edge with a cell containing the same number. Numbers in white cells share an edge with at least one cell containing the same number. Cells that are not painted grey should be considered as white.



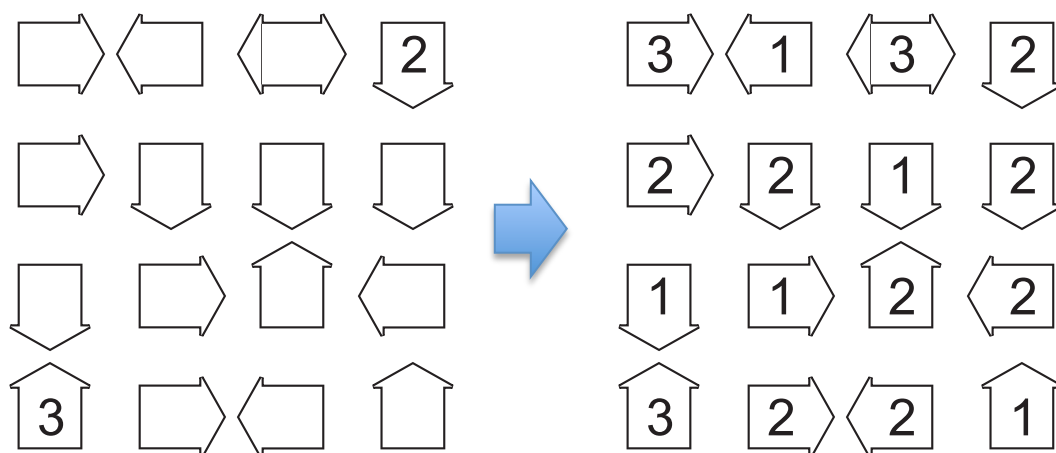
Puzzle 15 – Spokes (8 points)

Draw some spokes into the grid to ensure that all nodes are eventually connected. Spokes can go in any of the eight directions (horizontally, vertically or diagonally) but cannot cross each other. Digits in a node indicate the number of spokes starting from that node.



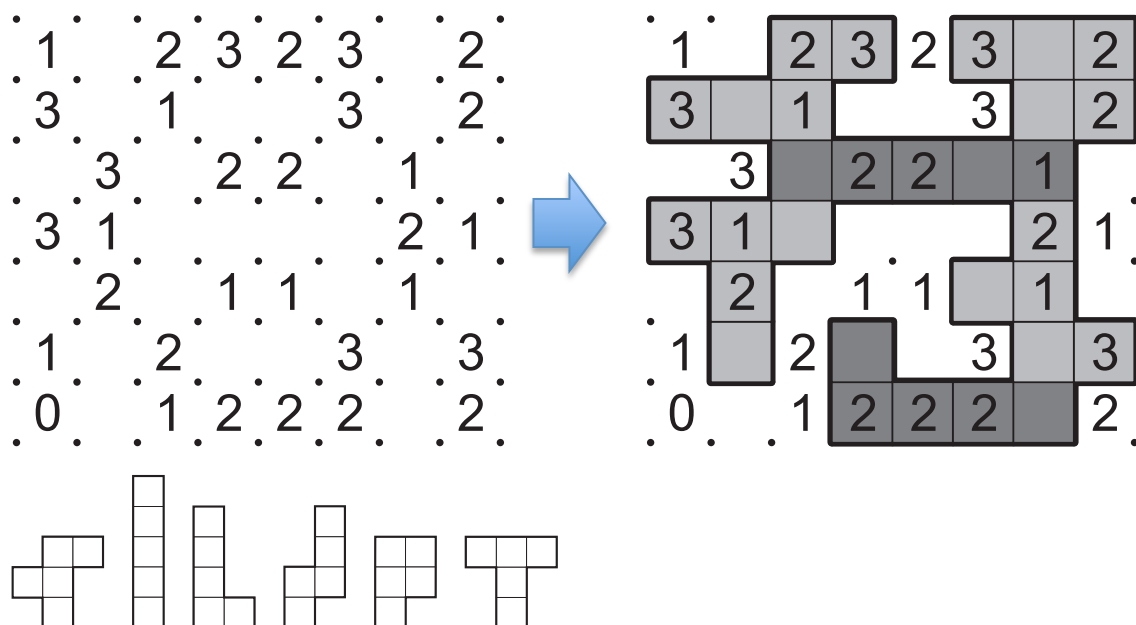
Puzzle 16 – Numbered Arrows (8 points)

Place a number into the arrows so that each number indicates how many different digits its arrow is pointing at.



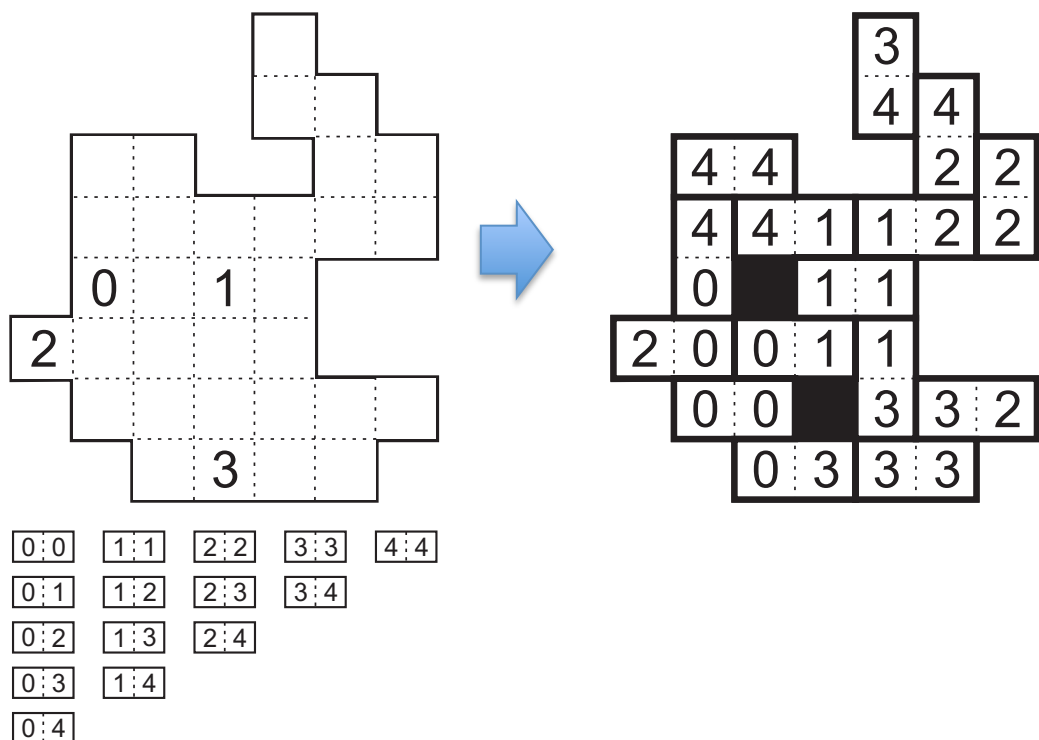
Puzzle 17 – Pento Fences (8 points)

Draw a single closed loop into the grid so that it does not touch or cross itself. A number in a cell indicates the number of sides of that cell occupied by the loop. Then divide the interior of the loop into the given twelve pentomino shapes (six in the example). Each cell inside the loop must be covered by exactly one pentomino. Adjacent pentominos touch each other at exactly one border segment. There is no single point where three or more pentominos meet. Pentominos may be rotated and/or reflected.



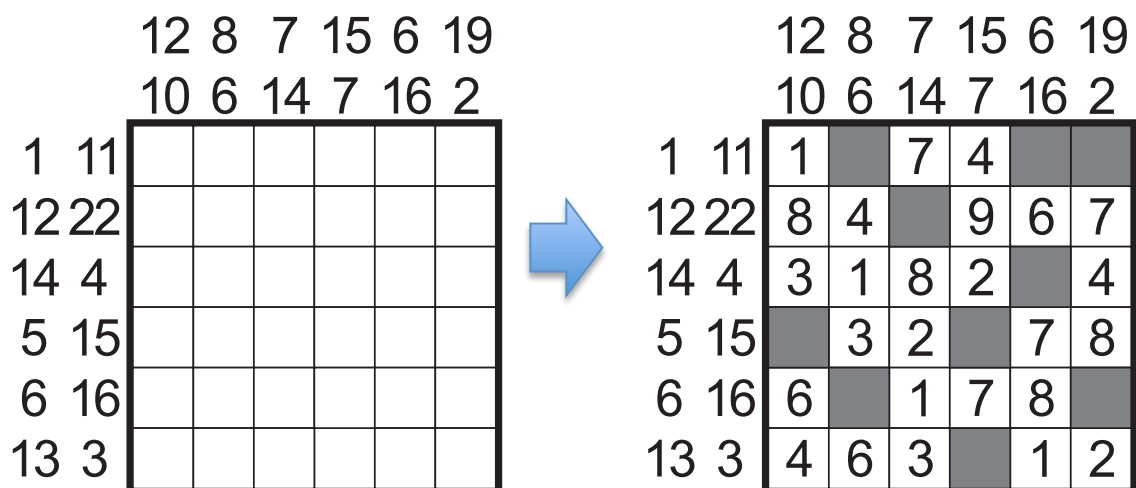
Puzzle 18 – Blackout Domino (8 points)

Paint some cells black so that black cells do not share an edge with the outside border or with each other. Then place all the given domino tiles, each exactly once, into the grid so that the tiles do not overlap. If two domino tiles share an edge, their touching halves must contain the same number.



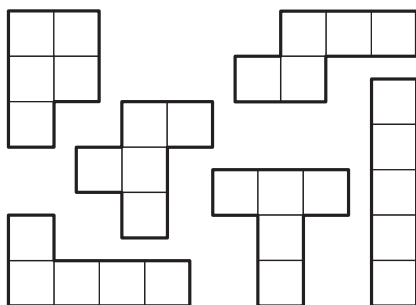
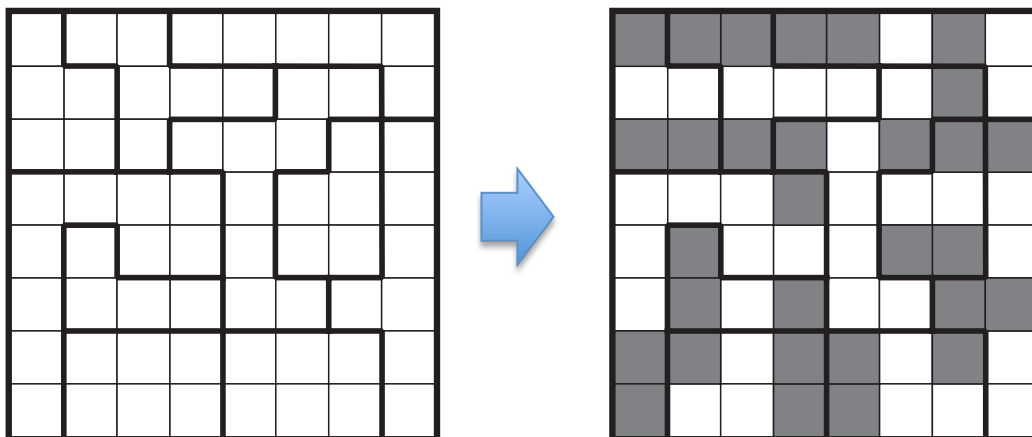
Puzzle 19 – Japanese Sums (10 points)

Place digits 1–9 into the grid so that no digit is repeated within a row or column. Numbers outside the grid indicate the sums of contiguous blocks of digits in that row or column. Blocks have to be separated by at least one empty square.



Puzzle 20 – Pentomino in the Box (12 points)

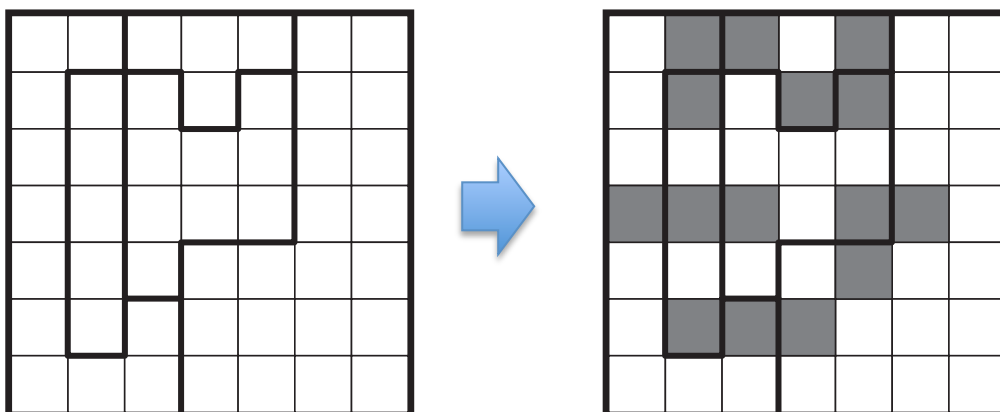
Place the given set of pentominoes into the grid, each of them exactly once, so that they do not touch each other, not even diagonally. Pentominoes may be rotated and/or reflected. Every region contains exactly three cells that are occupied by a pentomino and those three cells belong to two different pentominoes. (Note: the two cells that belong to the same pentomino within a region do not have to share an edge).



PART 5	Around the world in 80 puzzles Indian Intrigue	
Individual round	60 minutes	120 points*

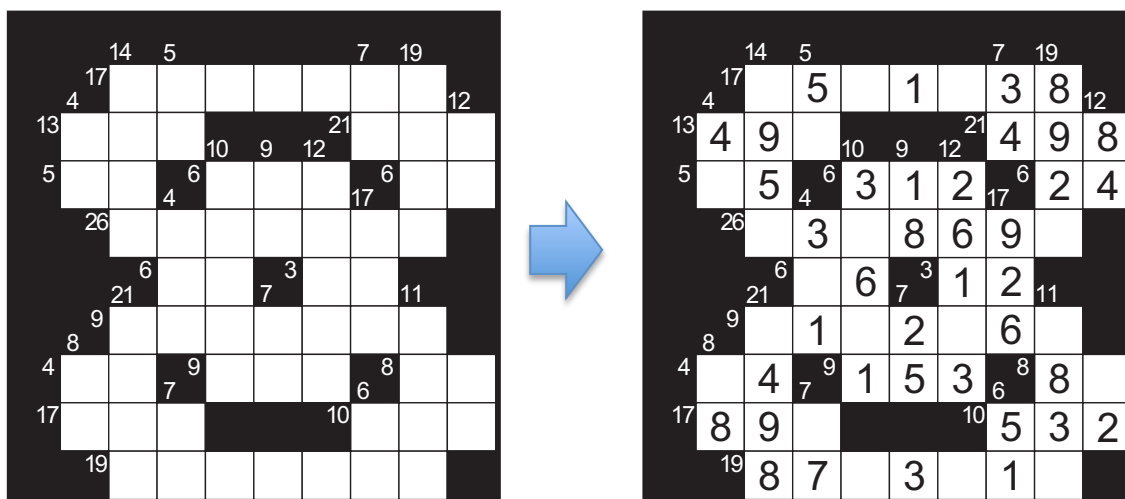
Puzzle 1 – Trio Cut (4 points)

Paint some cells to obtain triminos consisting of three edge-connected cells. Triminos can touch each other diagonally but cannot share an edge. Each trimino is cut twice by thick lines and each region contains exactly three trimino cells.



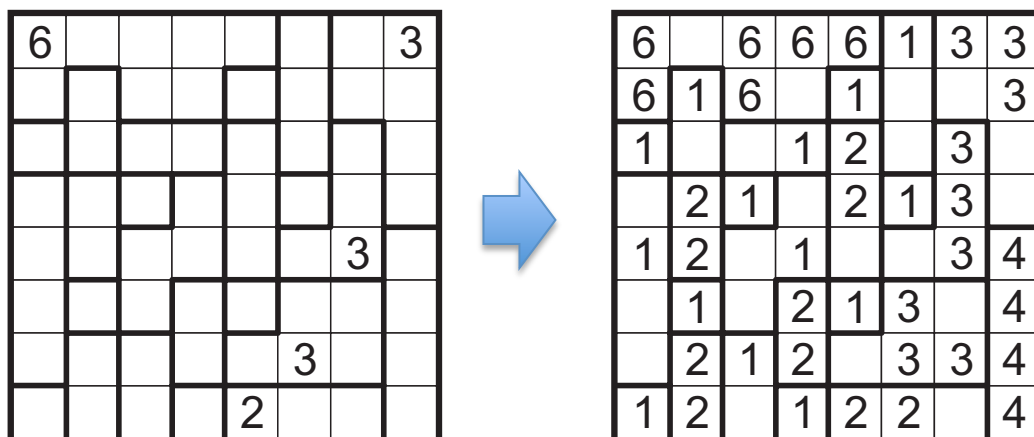
Puzzle 2 – Gapped Kakuro (11 points)

Fill in some of the cells with digits 1–9 so that no digit repeats in any of the “words” across and down. Clues denote the sum of digits in each of the words. Some cells will remain empty but these empty cells cannot share an edge.



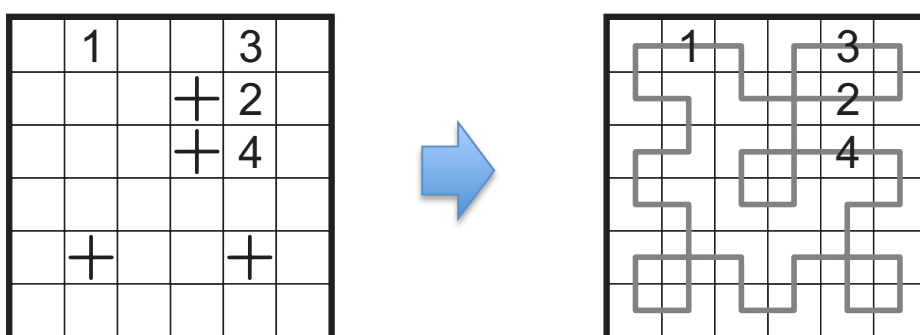
Puzzle 3 – Nanro (5 points)

Place numbers into some of the cells so that no 2x2 area is completely covered by numbers. All numbers in a region must equal to the number of numbers in that region. If two edge-adjacent cells are in different regions, they cannot contain the same number. Finally, the set of all cells containing numbers must occupy a single connected area.



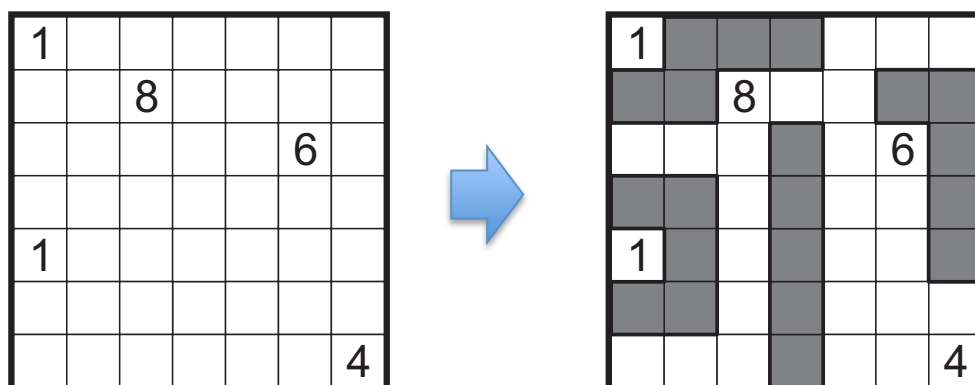
Puzzle 4 – Railroads / Bahnhöfe (3 points)

Draw a single closed loop that consists of horizontal and vertical segments and visits all cells with a “+” sign exactly twice, crossing itself, and visits all other cells exactly once. The loop makes no turn in cells with numbers and has to visit all such cells in an increasing order 1-2-3-... with the last station followed by 1 again.



Puzzle 5 – PentaSight (5 points)

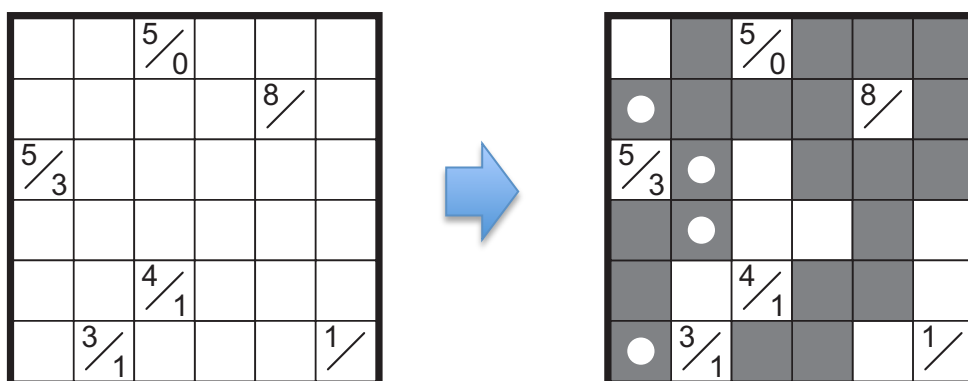
Place some pentomino pieces into the grid, each of them at most once. Rotations and reflections are considered the same piece. Pentomino pieces cannot touch each other, not even diagonally. Numbers in the grid indicate the total number of white cells that can be seen from the number’s cell horizontally and vertically, including its own cell. Pentomino pieces block the visibility of cells beyond them.



Puzzle 6 – Dotted Wall (10 points)

Paint some cells to obtain a contiguous wall that may touch itself diagonally but cannot cover any 2x2 area. Then consider the cells covered by the wall enumerated from left to right, then top to bottom: given this order, place a dot onto every N^{th} cell. It is part of the puzzle to figure out the value of N (in the sample puzzle, we have $N = 5$). Note that the wall counter does not have to end at a multiple of N .

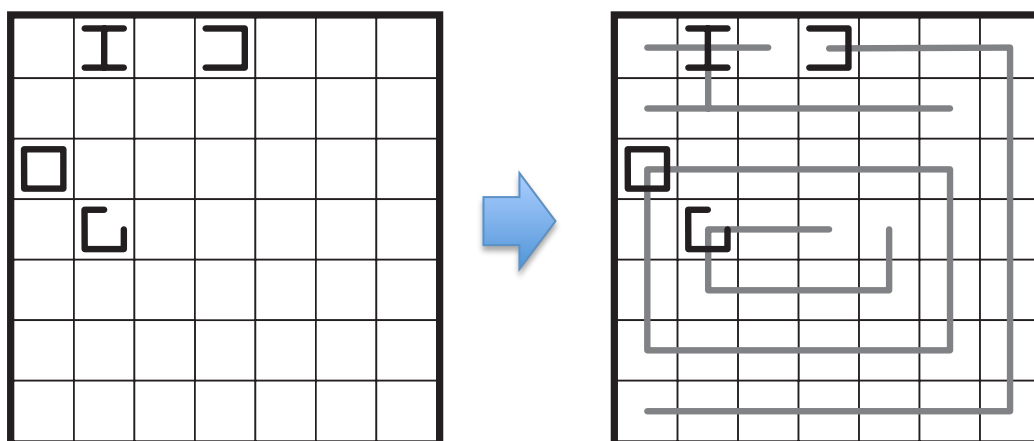
Clue cells are halved, they contain one or two numbers. A number in the top half of a clue cell indicates the number of wall cells around that clue cell (up to 8). A number in the bottom half of a clue cell indicates the number of dots around it. An empty half of a clue cell does not provide any information.



Puzzle 7 – Curve Data (3 points)

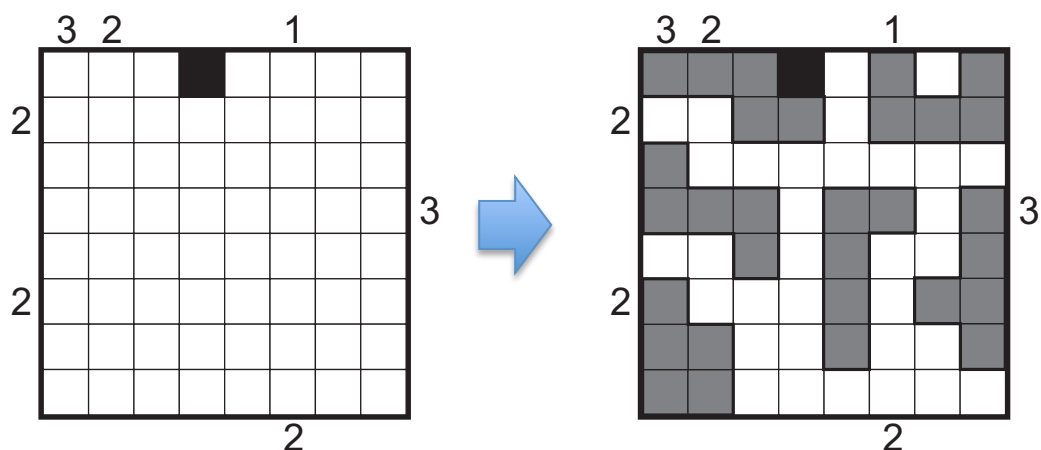
Draw some shapes into the grid so that each of them goes through exactly one of the provided clue shapes. Every cell is occupied by exactly one of these shapes. Each clue indicates the structure of its containing shape, in terms of number of segments and how they are turning, branching or connecting, without any rotation or reflection.

However, clues do not imply actual or relative lengths of any segments of the shape, except that no segment can be of length zero.



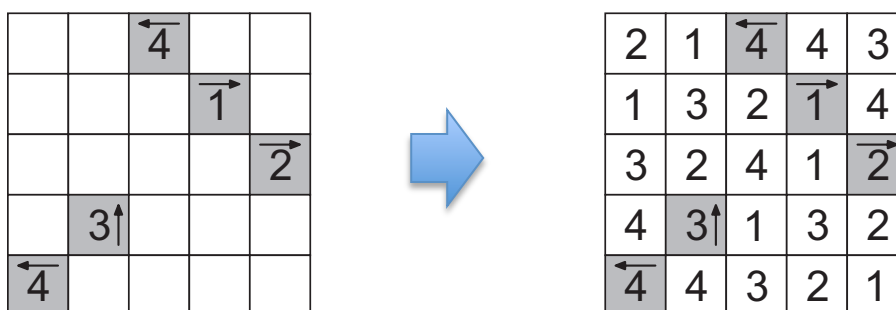
Puzzle 8 – Skyscraper Pentomino (8 points)

Place all twelve pentominoes into the grid, they can be rotated and/or reflected but they cannot touch each other, not even diagonally. No pentomino can be placed onto black cells. For any row/column, a contiguous segment of N cells containing pentomino parts is considered to be a building of height N. Numbers outside the grid indicate the number of segments that are visible from that direction given that height definition. Buildings (segments) of length N block visibility of all other buildings (segments) of length N or below that are behind them.



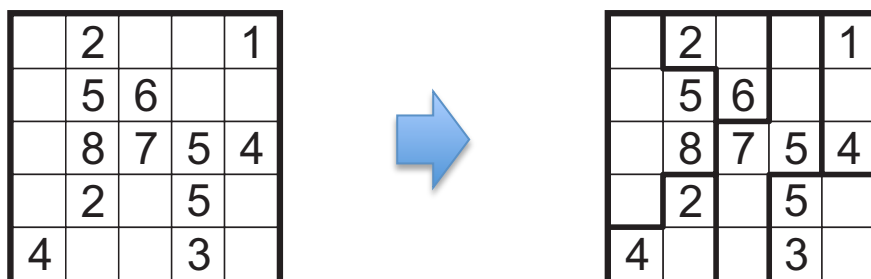
Puzzle 9 – Toroidal Skyscrapers (4 points)

Enter a digit from 1 to 5 (1 to 4 in the example) into each cell so that each row and column contains each number exactly once. Each digit in the grid represents the height of a building. Clues with arrows inside the grid indicate how many buildings can be "seen" when looking from that direction. The grid is considered to be "toroidal", i.e. the rows and columns are wrapped around and visibility is assumed. Taller buildings block smaller ones from being seen.



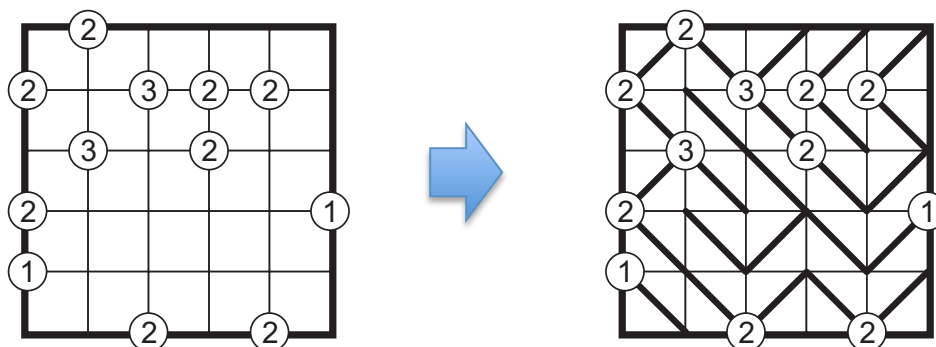
Puzzle 10 – Araf (4 points)

Divide the grid into connected regions so that each of these regions contains exactly two numbers. The area of a region should be strictly between the two values given by the two numbers in that region.



Puzzle 11 – Slalom (7 points)

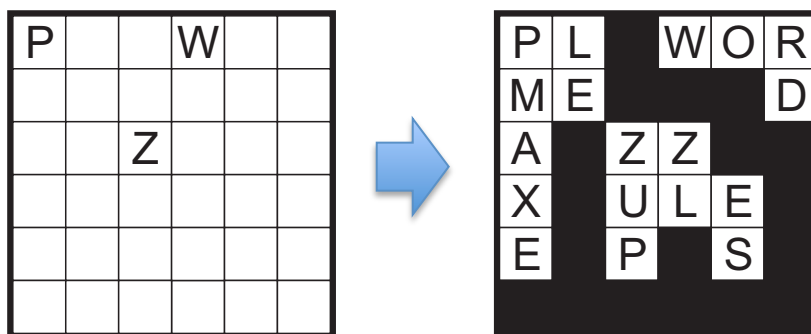
Draw one of the diagonals of each cell so that numbers in each node denote the number of line segments attached to that node. The diagonals do not form a closed loop anywhere in the grid.



Puzzle 12 – Word Nurikabe (5 points)

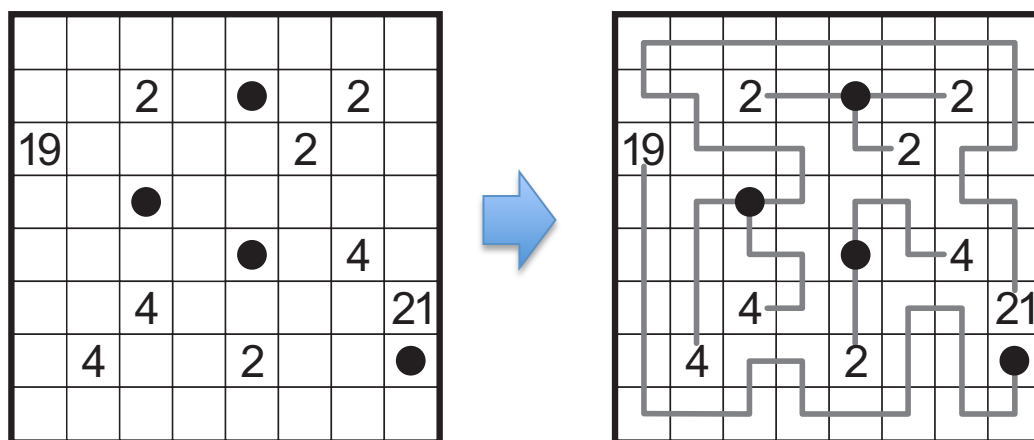
Place the given words into the grid so that they are readable in horizontally and vertically consecutive cells. Different words do not touch each other by side but they can touch diagonally. The remaining cells form a single connected shape that cannot have any 2x2 area anywhere. One letter from each word is given.

WORD
PUZZLES
EXAMPLE



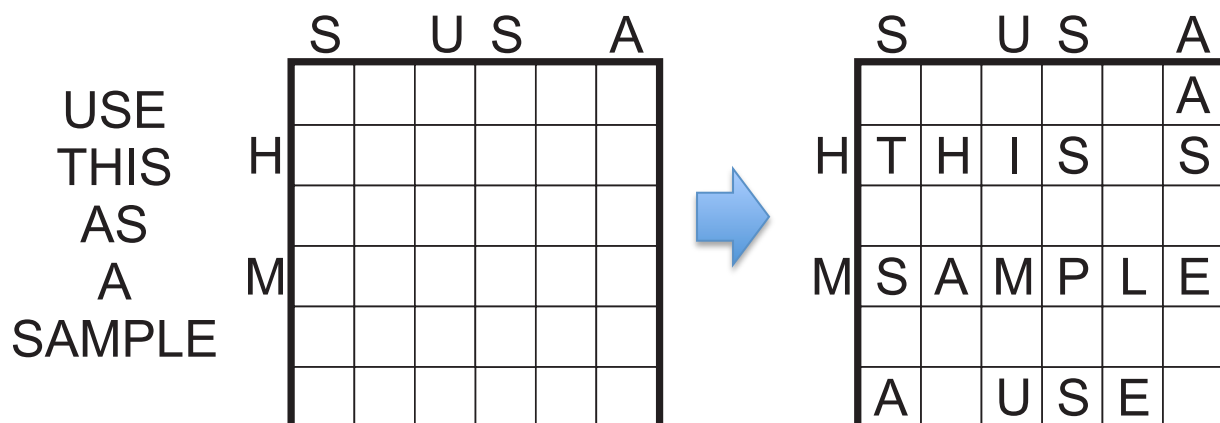
Puzzle 13 – Pipes (3 points)

Draw a path of horizontal and vertical segments from each number to a circle which has a total length equal to the number. Each cell must be used by exactly one path, and a path may not use a cell twice. It is possible for multiple numbers to be attached to a circle. All circles are used.



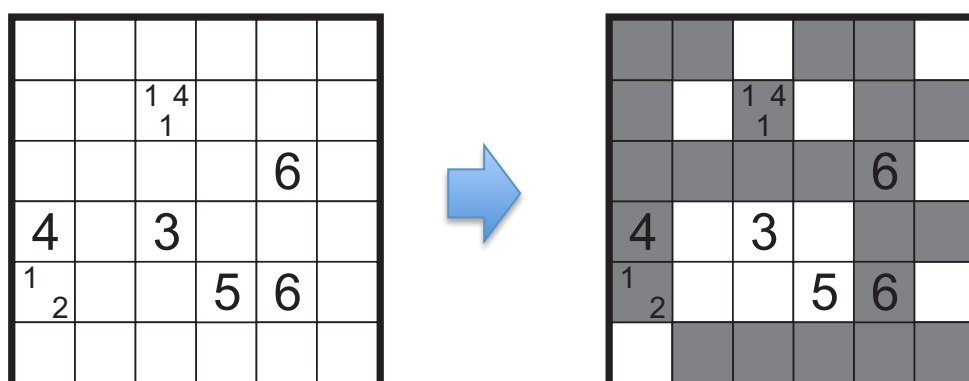
Puzzle 14 – Hidden Words (7 points)

Place all the given words into the grid so that each of them can be read across or down. Words cannot touch each other, not even diagonally. Letters outside the grid indicate that the letter appears in that row/column at least once.



Puzzle 15 – Transparent Tapa (7 points)

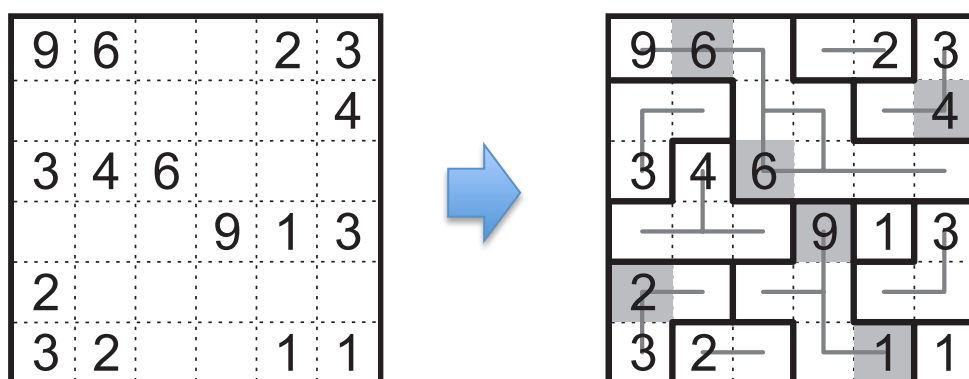
Paint some cells to create a single contiguous wall that does not have any 2 x 2 area in it. Clues in a cell indicate the sizes of connected blocks within the neighbourhood of the cell, including the cell itself (up to 9 cells). A block of cells has to be connected within the neighbourhood of the cell.



Puzzle 16 – Liar Fillomino (12 points)

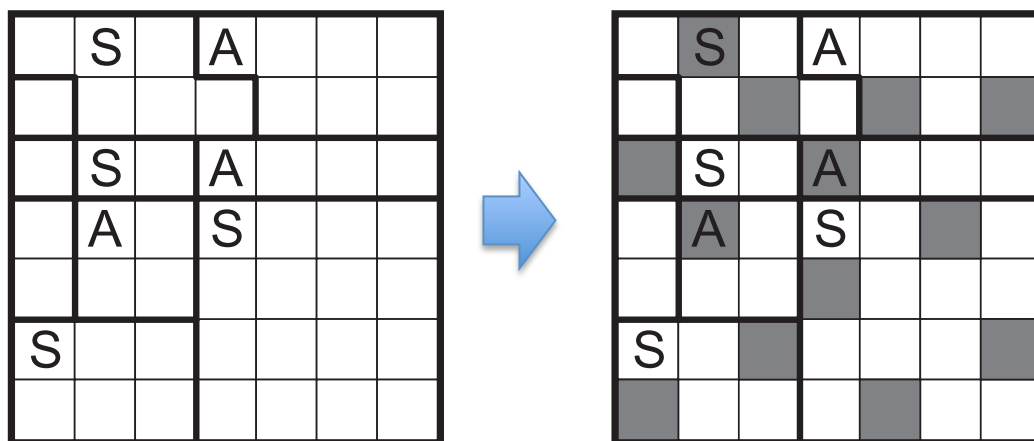
Divide the grid into regions along the grid lines so that no two regions of identical size share an edge (but may touch at a single point). It is possible for a region to contain one or multiple numbers or none at all. All the given numbers are supposed to be equal to the area of the region they are in.

However, in each row and each column, exactly one of the clues is wrong.



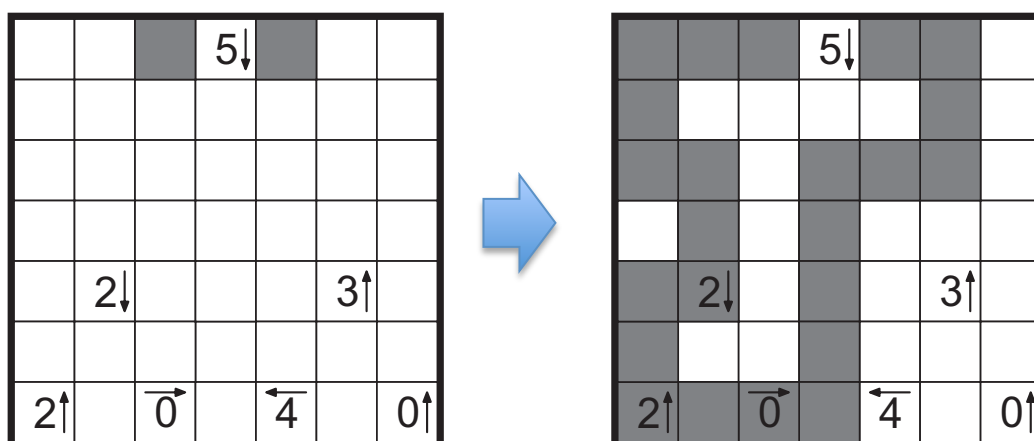
Puzzle 17 – Heyawacky (Symmetry) (7 points)

Paint some of the grid cells so that no two painted cells share an edge and all unpainted cells are connected. A string of horizontally or vertically consecutive unpainted cells can never cross two region boundaries (even if the string exits and then re-enters the same room). A region with an S inside it must have 180 degrees rotational symmetry, whereas a region with an A inside it cannot have 180 degrees rotational symmetry. A region is considered to have symmetry if and only if both its shape and the location of its painted cells, if any, are symmetric.



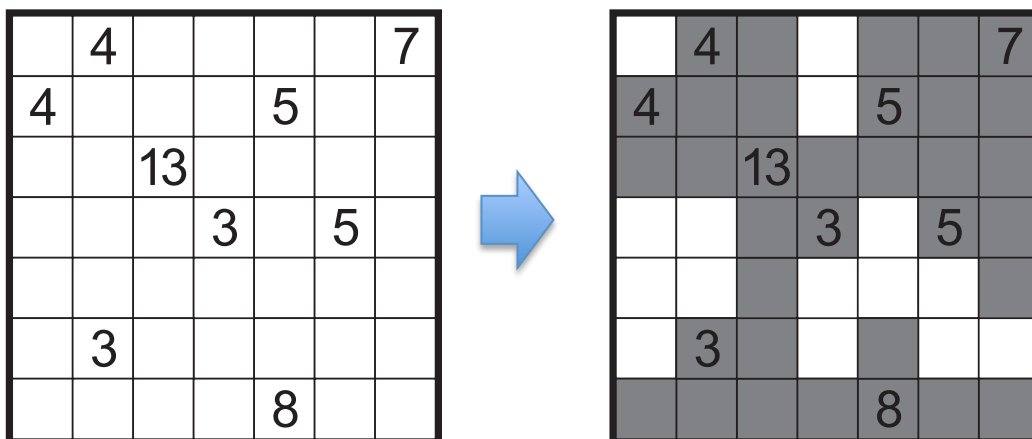
Puzzle 18 – True-False Snake (7 points)

Find a snake in the grid whose head and tail are given but its length is unknown. The snake cannot touch itself, not even diagonally. Numbers indicate the number of cells occupied by the snake that are pointed at by their arrow. The snake is allowed to occupy cells with clues. Clues that are occupied by the snake are all false, while the other clues are all true.



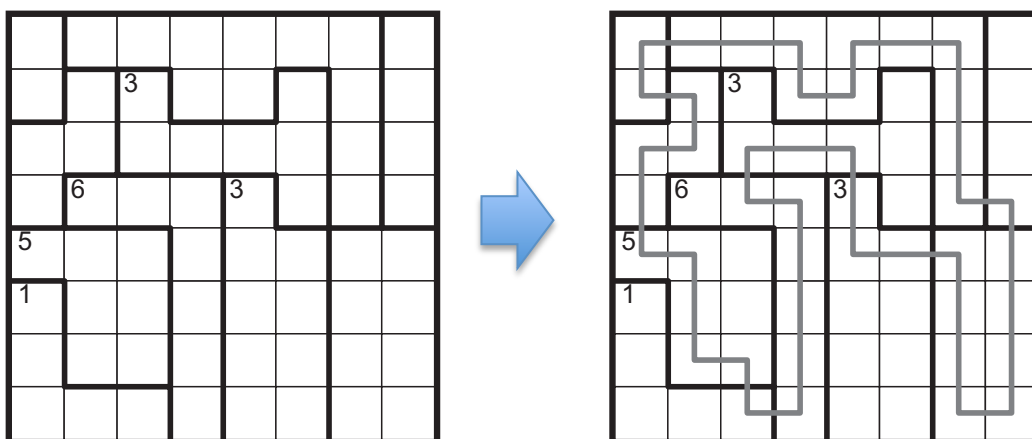
Puzzle 19 – Cave (3 points)

Select a connected set of squares (a cave) so that it contains all the numbers inside and each number reveals the number of cells that are visible horizontally or vertically from the given number's cell (which is included). The cave cannot touch itself, not even diagonally – in other words, it cannot have an island inside. It is allowed for the cave or the walls to have 2 x 2 areas.



Puzzle 20 – Country Road (5 points)

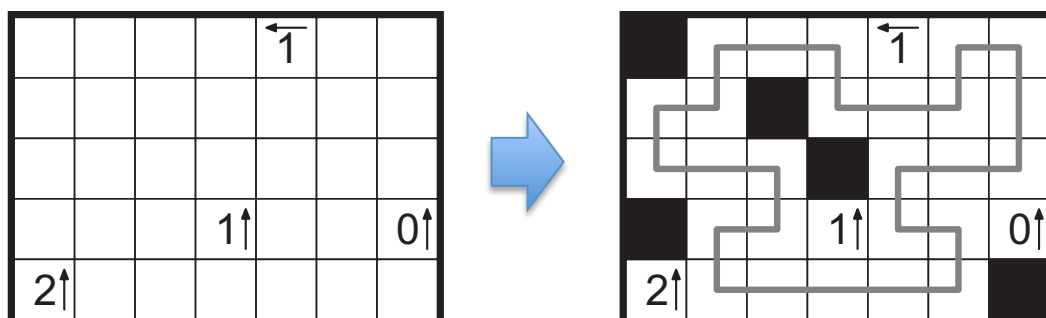
Draw a single closed loop into the grid that is made of horizontal and vertical segments through cell centres. The loop enters and exits each of the regions exactly once. A number in a region indicates the number of cells visited by the loop in that region. For any edge-adjacent pair of cells separated by region boundaries, at least one of them is visited by the loop (this does not apply to the outer boundary of the puzzle).



PART 6	Around the world in 80 puzzles Doubled Decathlon	
Individual round	60 minutes	120 points*

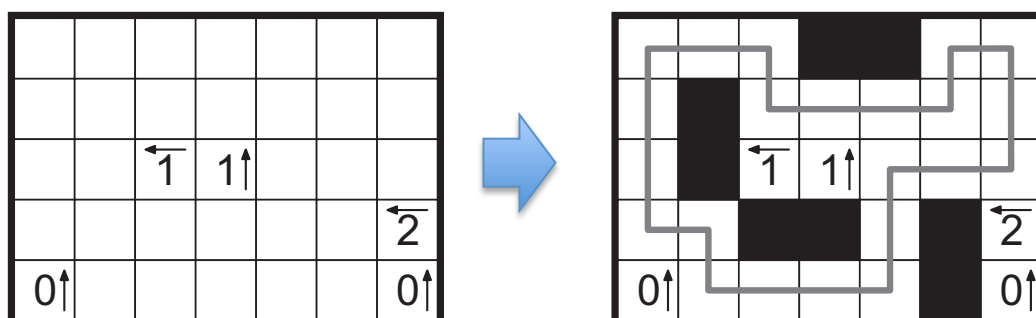
Puzzle 1 – Yajilin (6 points)

Shade some white cells black so that each number indicates how many blackened cells are in the indicated direction. Black cells cannot share an edge. The remaining white cells must all be connected to form a single closed loop without intersecting or overlapping with itself.



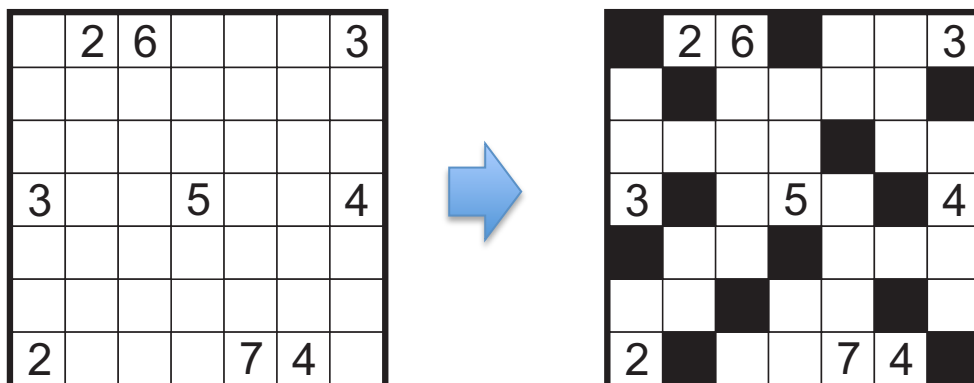
Puzzle 2 – Doubled Yajilin (3 points)

Standard Yajilin Rules except that instead of single black cells, shade in dominoes (1 x 2 black cell groups). Dominoes cannot share an edge. The numbers in the grid indicate how many dominoes (not how many cells) are pointed at in the indicated direction.



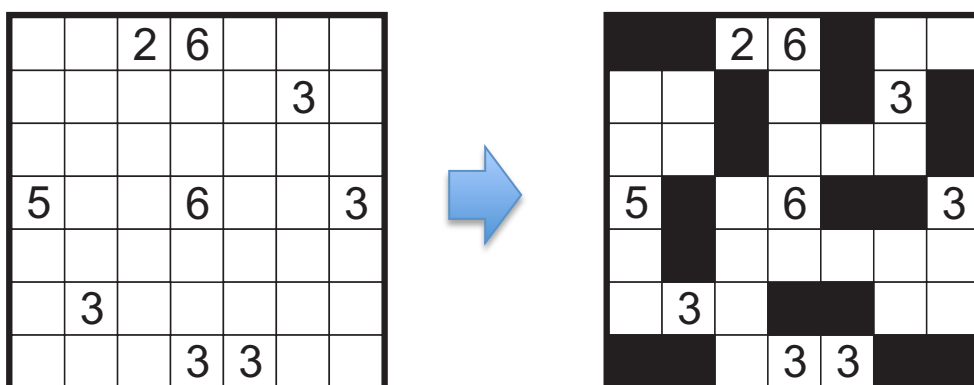
Puzzle 3 – Kuromasu (4 points)

Shade some white cells black so that each number indicates the total count of white cells connected vertically and horizontally to that number's cell including the numbered cell itself. Black cells cannot share an edge, and all white cells must belong to a single connected group.



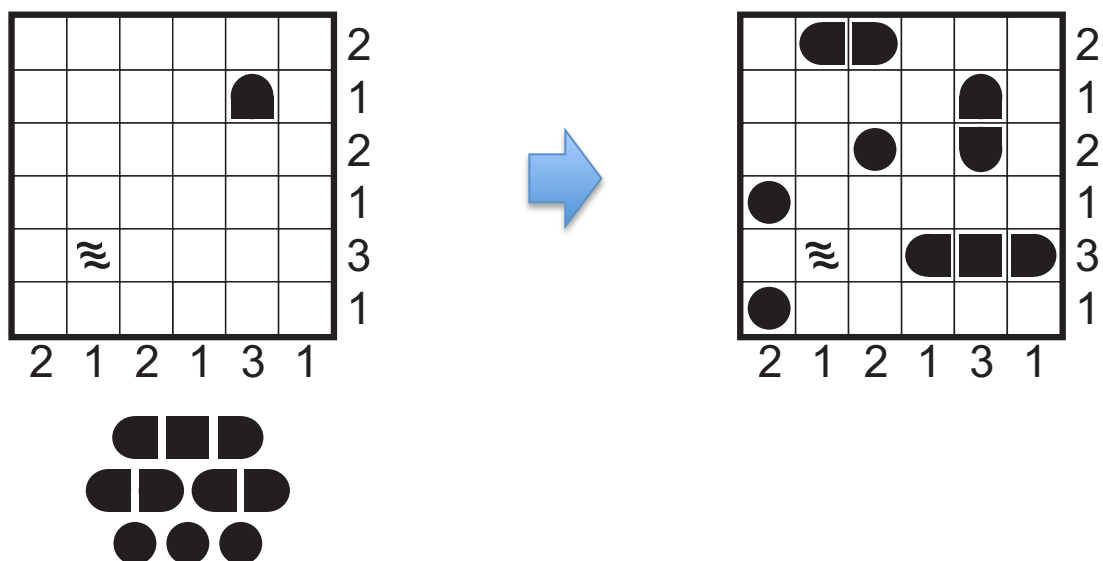
Puzzle 4 – Doubled Kuromasu (8 points)

Standard Kuromasu rules except that instead of single black cells, shade in dominoes (1 x 2 black cell groups). Dominoes cannot share an edge.



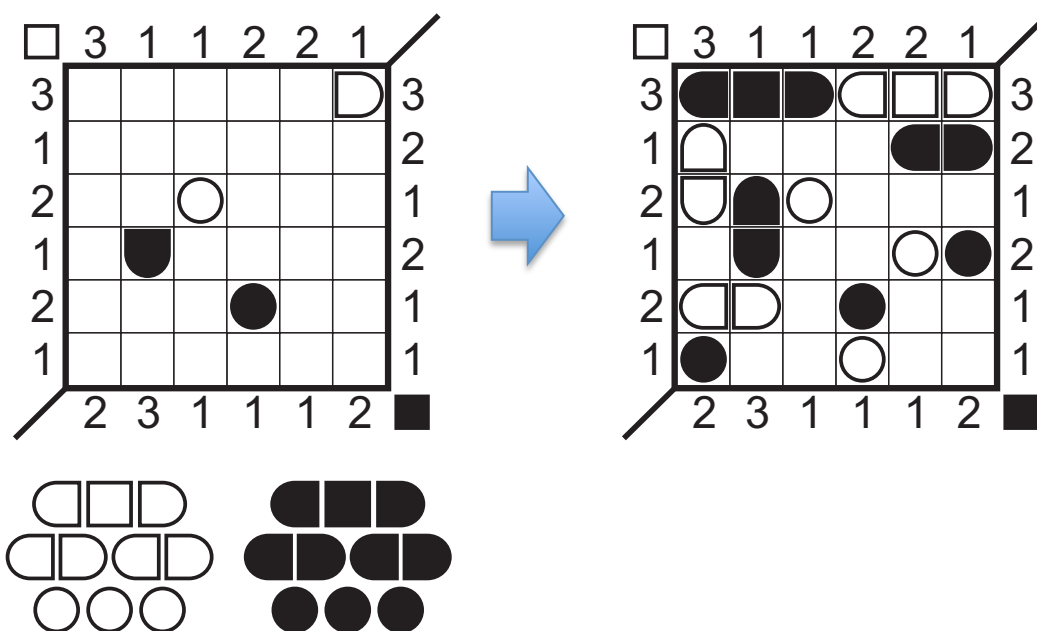
Puzzle 5 – Battleships (3 points)

Locate the indicated fleet of ships in the grid. Each segment of a ship occupies a single cell, and the numbers on the right and bottom edges of the grid reveal the number of ship segments in that row or column. Ships can be rotated. Ships do not touch each other, not even diagonally. Some ship segments, or sea cells without any ship segments, are given in the grid.



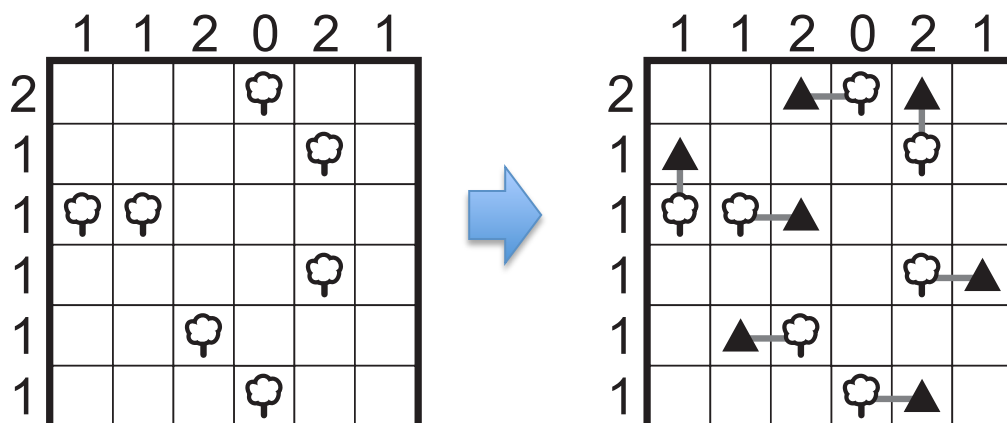
Puzzle 6 – Doubled Battleships (9 points)

Standard Battleship Rules except that instead of one fleet, there are two fleets (one white and one black). Ships from the same fleet cannot touch each other, even diagonally; ships from different fleets are allowed to touch but cannot overlap on any square. Clues for the white fleet are on the left and top edges of the grid; clues for the black fleet are on the right and bottom.



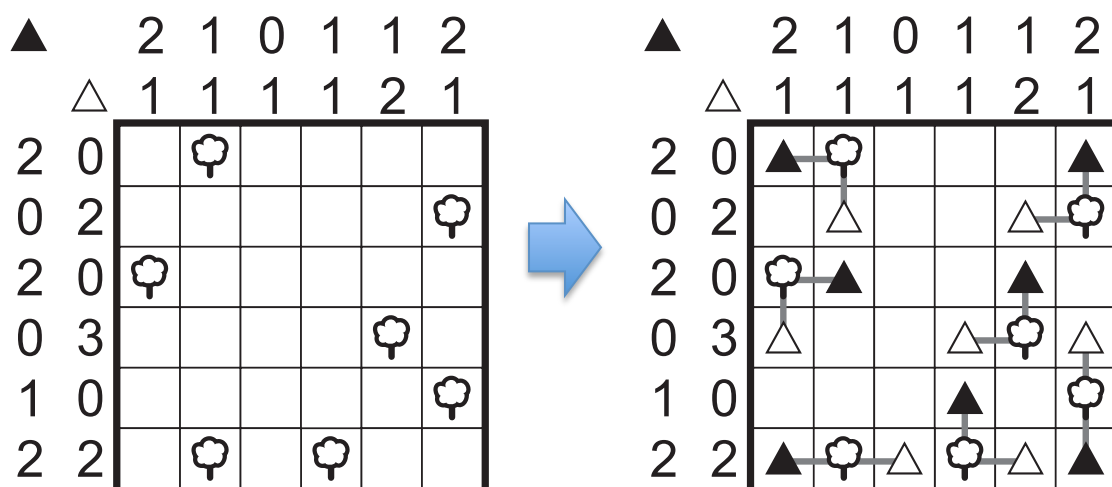
Puzzle 7 – Tents (2 points)

Locate some tents in the empty cells of the grid so that each tent is attached to a tree in an adjacent cell and each tree has one adjacent tent attached. Tents do not touch each other, even diagonally. Numbers on the left and top edges of the grid reveal the total number of tents in that row or column.



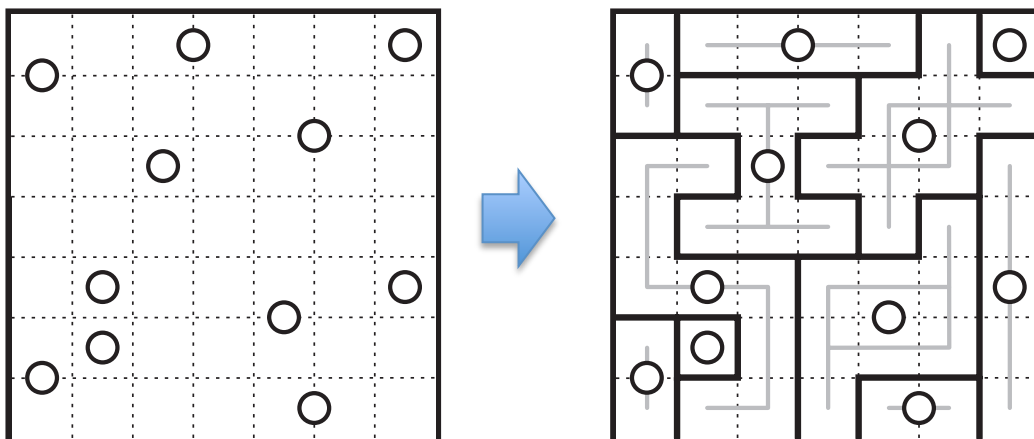
Puzzle 8 – Doubled Tents (8 points)

Standard Tent Rules except that instead of one set of tents, there are two sets of tents (one white and one black). Tents of the same colour are not allowed to touch, even diagonally; tents of different colours can touch but not overlap. Numbers on the left and top edges of the grid reveal the number of white or black tents in that row or column.



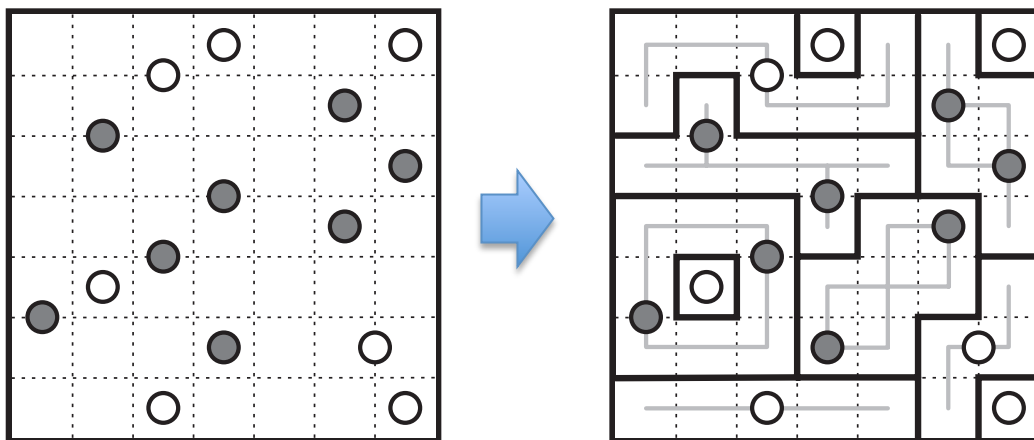
Puzzle 9 – Spiral Galaxies (8 points)

Divide the grid along the indicated lines into connected regions ("galaxies") with rotational symmetry. Each cell must belong to one galaxy, and each galaxy must have exactly one circle at its center of rotational symmetry.



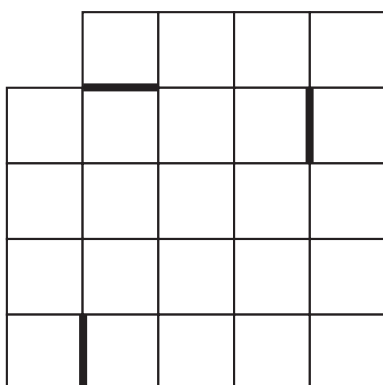
Puzzle 10 – Doubled Spiral Galaxies (7 points)

Standard Spiral Galaxies rules except that some circles are shaded grey and must belong to galaxies containing two circles, not one, with the circles in rotationally symmetric spots for those galaxies.



Puzzle 11 – Criss-Cross (4 points)

Place a single character in each cell so that every word from the list can be found in the given grid, reading left-to-right or top-to-bottom.

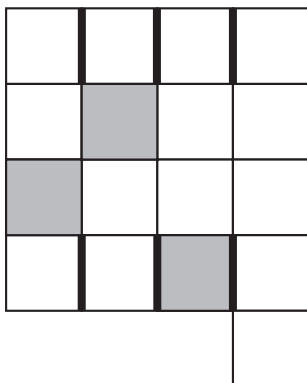


	2	0	A	8
T	A	H	Y	X
Y	3	T	8	A
A	5	X	3	4
5	T	A	0	Y

A35T A5X34
 TAHY AY830
 TA0Y Y3T8A
 TYA5 0HTXA
 20A8 8XA4Y

Puzzle 12 – Doubled Criss-Cross (6 points)

Standard Criss-Cross rules except that some cells are shaded grey and must contain two characters, not one. The doubled characters in these cells must appear in the same order from left-to-right and top-to-bottom.

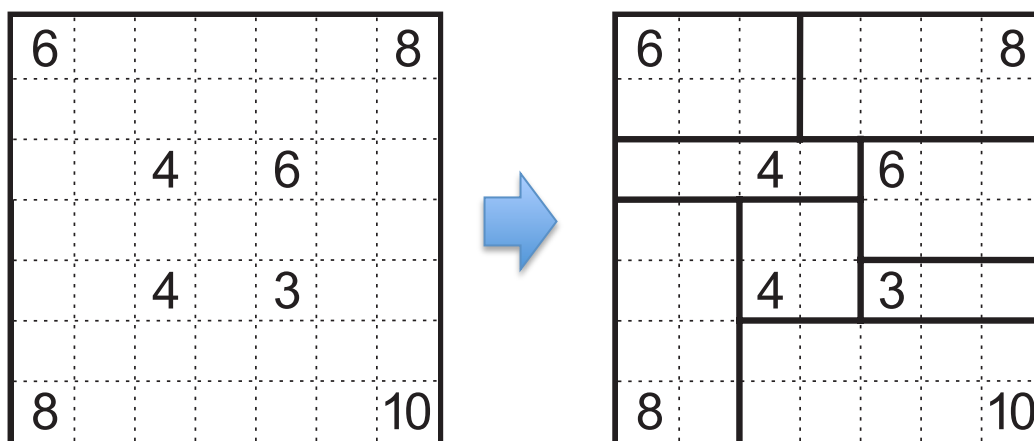


A	T	X	4
4	0X	5	0
T0	4	3	X
H	Y	A8	5
			8

X53A8
 40X50
 40X58
 A4T0H
 T043X
 T0X4Y

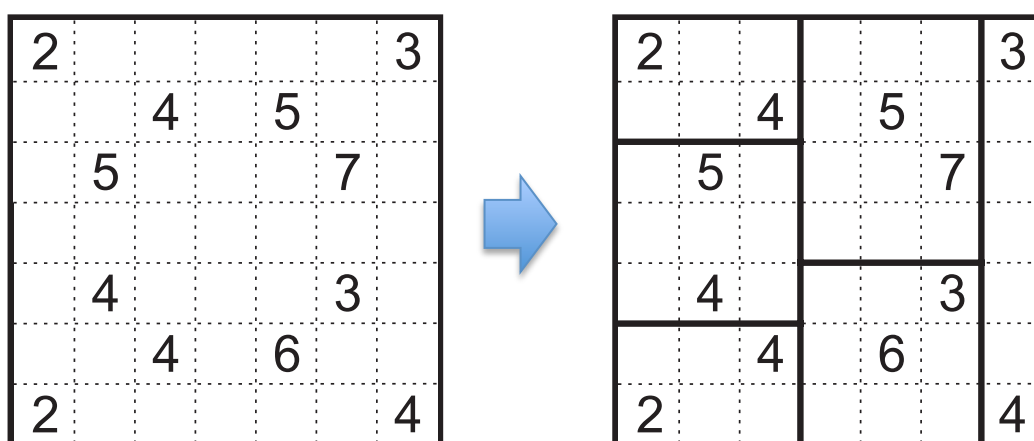
Puzzle 13 – Shikaku (2 points)

Divide the grid along the dotted lines into rectangles. Each rectangle must contain exactly one number, with an area in cells equal to the value of that number.



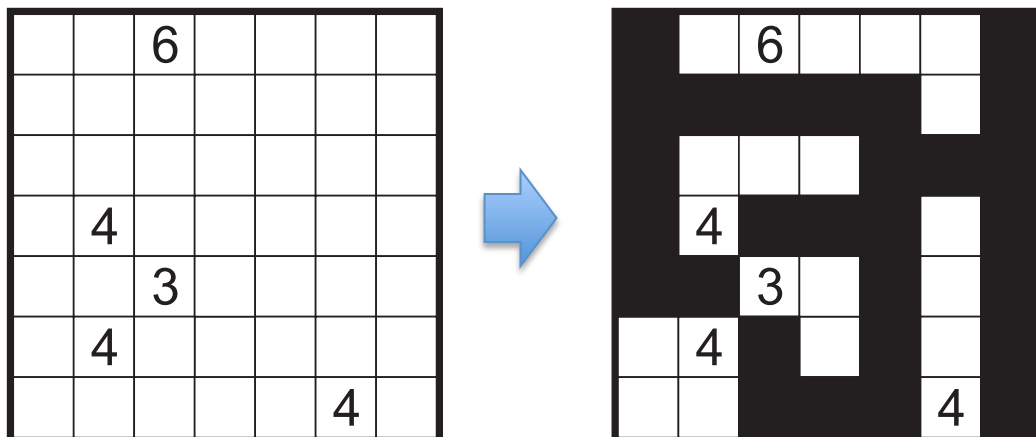
Puzzle 14 – Doubled Shikaku (3 points)

Standard Shikaku rules, except that each rectangle must contain exactly two numbers with an area equal to the sum of those numbers.



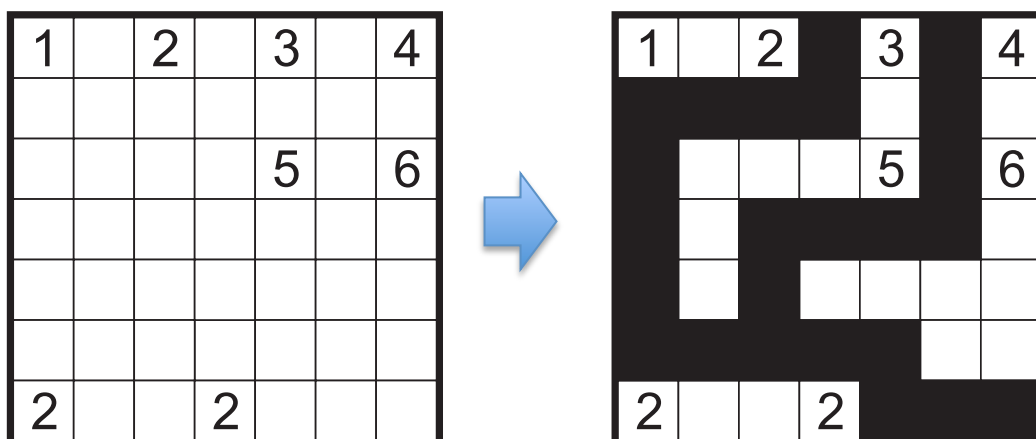
Puzzle 15 – Nurikabe (7 points)

Shade some empty cells black so that the grid is divided into white areas, each containing exactly one number and with an area in cells equal to the value of that number. Two white areas may only touch diagonally. All black cells must be connected with each other, but no 2 x 2 square of cells can be entirely shaded black.



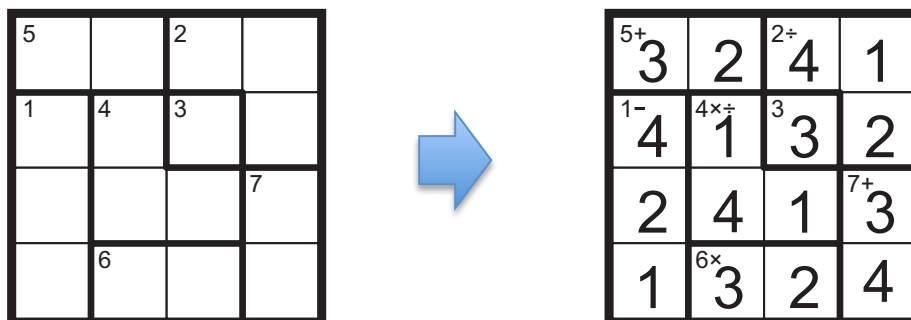
Puzzle 16 – Doubled Nurikabe (8 points)

Standard Nurikabe rules, except that each white area must contain exactly two numbers with an area equal to the sum of those numbers.



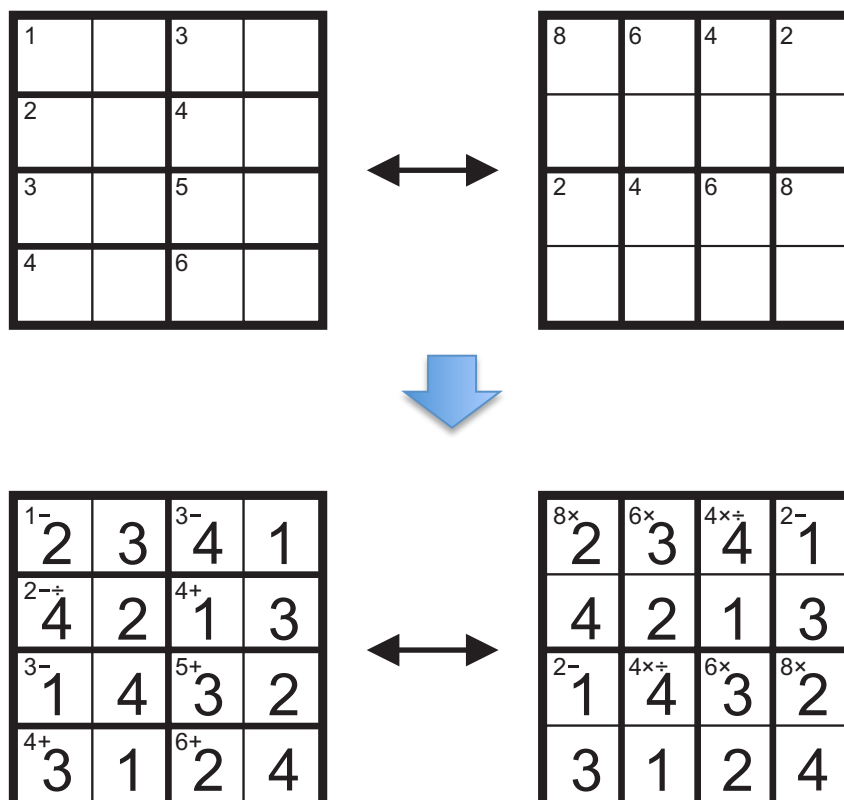
Puzzle 17 – TomTom (5 points)

Insert a single digit from 1 to N into each cell in the N by N grid so that no digit repeats in any row or column. Also, the number in the upper-left of each bold cage must indicate the value of some mathematical operation (addition, subtraction, multiplication, or division) applied successively to all digits in the cage, starting with the largest digit for subtraction and division. Digits can repeat within a cage.



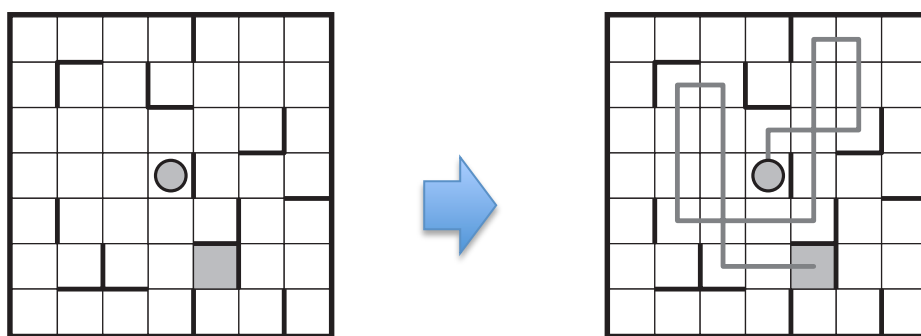
Puzzle 18 – Doubled TomTom (10 points)

Standard TomTom rules, except that instead of one grid there are two grids provided. The solution to the puzzle will be the arrangement of digits that simultaneously solves both grids. To receive credit, one grid must be fully completed.



Puzzle 19 – Rolling Maze (5 points)

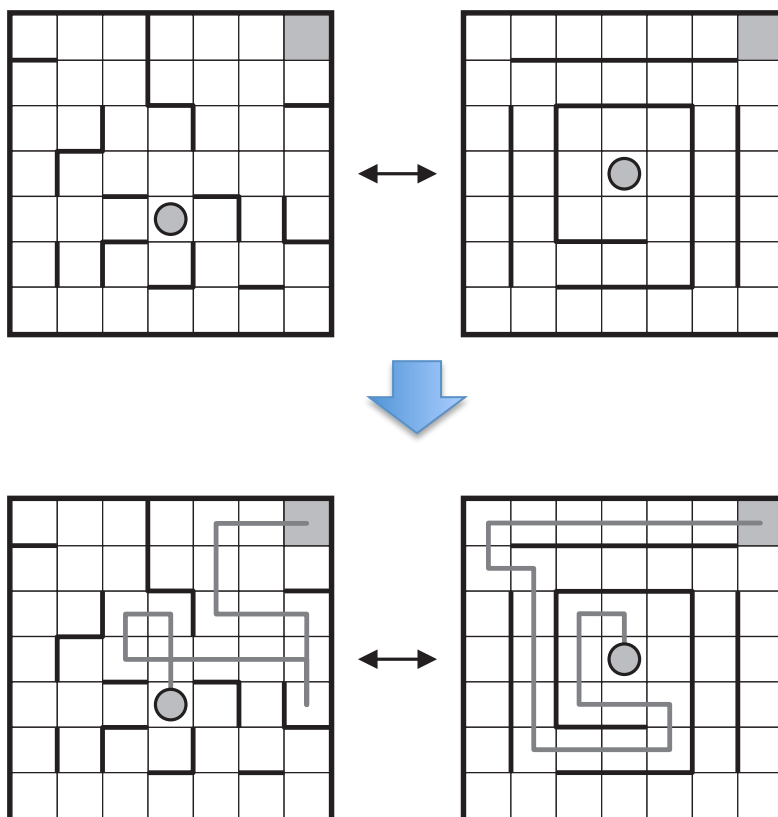
Find a sequence of 15 moves (10 in the example), each going in one of the four directions up, down, left, right, so that the grey ball in the maze stops on the grey square after all moves are made. For each move, the ball rolls until it hits a wall and then stops. The maze is only finished when the ball stops on the grey square; it is not sufficient to roll over it. It is sufficient to write out the set of moves (as U,D,L,R) to receive credit.



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Puzzle 20 – Doubled Rolling Maze (12 points)

Standard Rolling Maze rules, except that instead of one grid there are two grids provided. The solution to the puzzle will be the sequence of 15 moves (10 in the example) that simultaneously solves both grids. The balls must both be stopped on the grey squares after 15 moves, regardless of whether a single ball ever reached its goal at an earlier point in time. It is possible for only one ball to change positions during a move due to the other ball being pinned by walls.

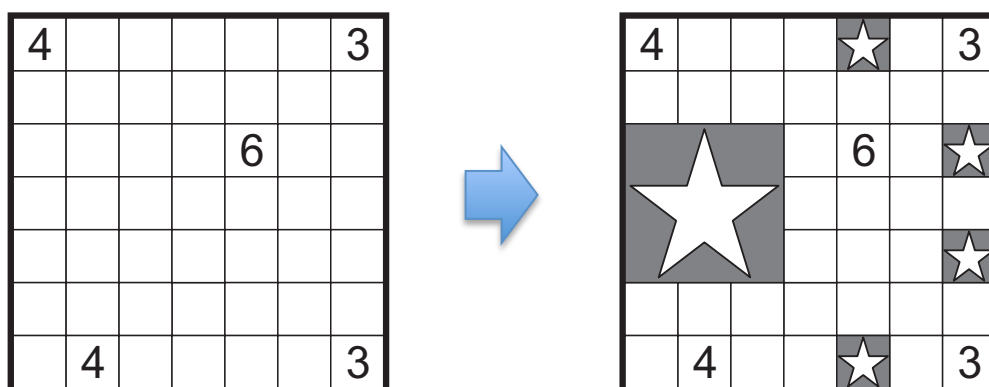


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PART 7	Around the world in 80 puzzles Serbian Snacks	
Individual round	60 minutes	120 points*

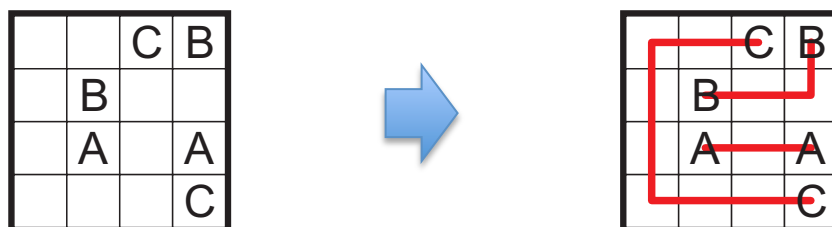
Puzzle 1 – Five Stars (2 points)

Place five stars into the grid so that their cells do not touch each other or cells with numbers, not even diagonally. One of the stars is large and covers 3 x 3 cells, the others are small and cover a single cell. Digits denote the number of cells occupied by stars in the same row/column.



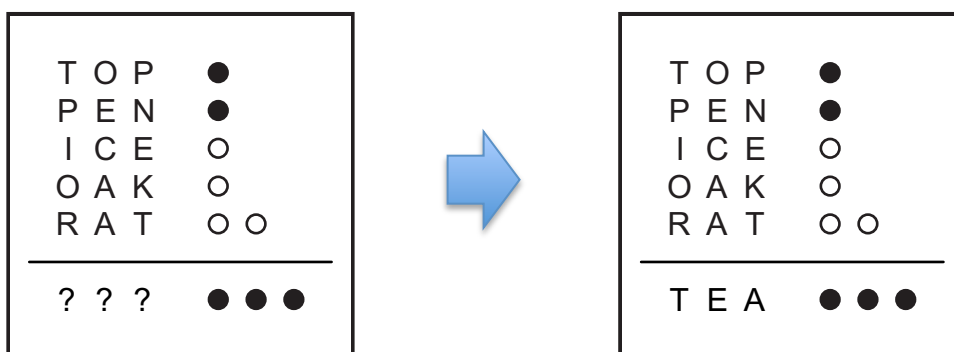
Puzzle 2 – Arukone (2 points)

Connect identical letters by lines of horizontal and vertical segments that do not cross or overlap each other.



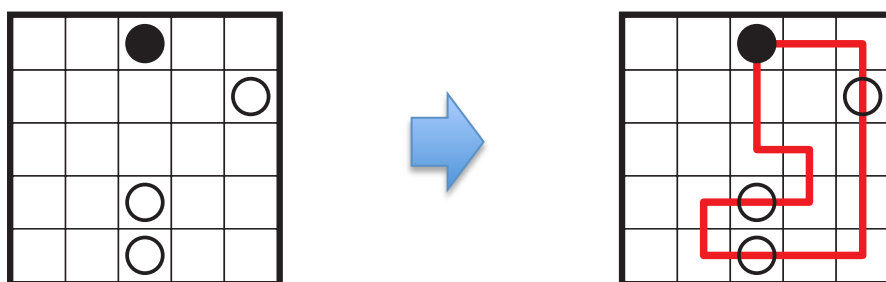
Puzzle 3 – Mastermind (2 points)

There is a word hidden beneath the question marks. A couple of guesses are marked using black and white circles. The number of black dots indicates the number of letters that are in the correct position. The number of white dots indicates the number of letters that are part of the hidden word but at a different position. Find the hidden word.



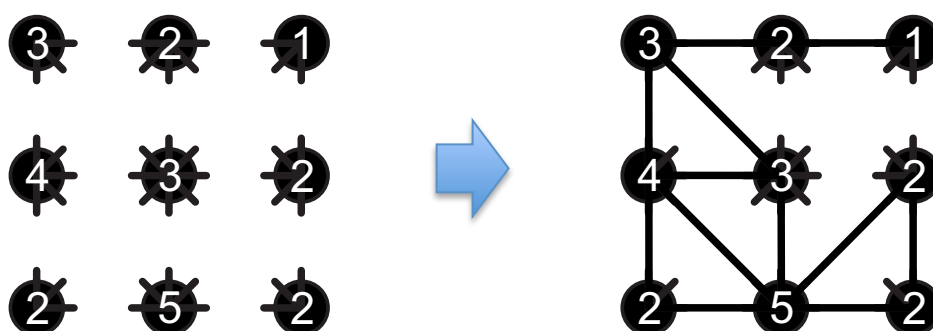
Puzzle 4 – Masyu (3 points)

Draw a single, non-intersecting loop that passes through all circled cells but not necessarily through all empty cells. The loop must go straight through the cells with white circles, with a turn in at least one of the cells immediately before/after each white circle. The loop must make a turn in all the black circles, but must go straight in both cells immediately before/after each black circle.



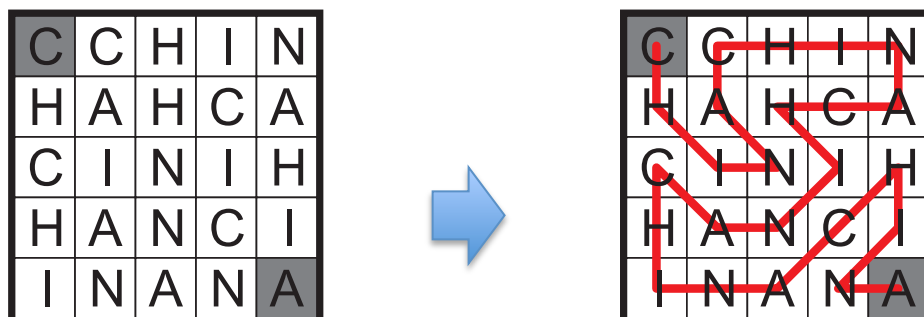
Puzzle 5 – Spokes (3 points)

Draw some spokes into the grid to ensure that all nodes are eventually connected. Spokes can go in any of the eight directions (horizontally, vertically or diagonally) but cannot cross each other. Digits in a node indicate the number of spokes starting from that node.



Puzzle 6 – Password Path (4 points)

Draw a path from the top left corner to the bottom right corner that consists of horizontal, vertical and diagonal segments and travels through all cells of the grid exactly once. The path cannot touch, overlap or cross itself. Along the path, the order of the letters encountered is the repetition of the given password.



Password: CHINA

Puzzle 7 – February Math (4 points)

Place all missing numbers from 1 to 28 into the grid so that every number is used exactly once eventually. The sum of the numbers in every column should be exactly 58. The sum of the numbers in every row should be a three digits number. An auxiliary table with all missing numbers will be provided along with the puzzle.

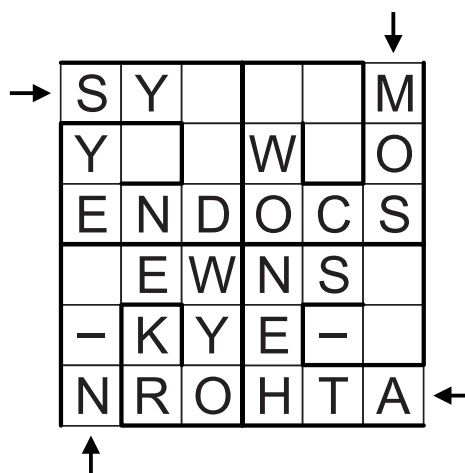
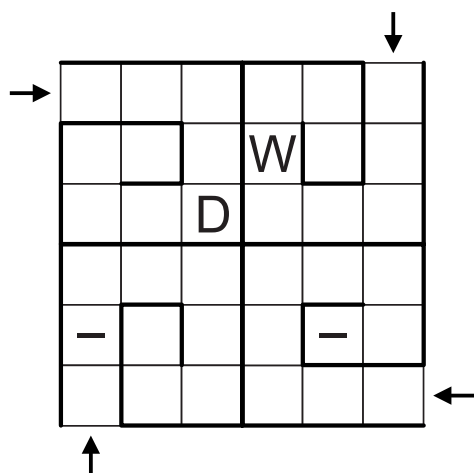
12						5
13	3	23		28	8	7
16	4	6		27	11	24
	26		10		18	



12	25	20	15	2	21	5
13	3	23	19	28	8	7
16	4	6	14	27	11	24
17	26	9	10	1	18	22

Puzzle 8 – Four Snails (5 points)

Place all the given words into the grid so that each of them goes into one of the snails starting outside and reading towards the middle. Words do not have to be contiguous, there may be one or more empty cells inside them, before them or after them. No letter is repeated in any row or column. Some letters are already given and some cells are marked with “-”, these contain no letter.



ATHENS
MOSCOW
NEW YORK
SYDNEY

Puzzle 9 – Domino Hunt (4 points)

The set of domino tiles were drawn into the grid, each tile exactly once, without overlapping. Unfortunately, the tile boundaries have later been erased. Reconstruct the tiles.

1	2	2	1
0	2	0	1
0	2	1	0



1	2	2	1
0	2	0	1
0	2	1	0

0	0	1	1
0	1	1	2
0	2	2	2

Puzzle 10 – Snake (5 points)

Find a snake in the grid whose body consists of horizontal and vertical segments and its total length is 45 cells. The snake's body never touches itself, not even diagonally. The head and tail of the snake are given. Digits outside the grid indicate the number of cells occupied by the snake in that row/column.

	3	5	5	1	5	3	7	4	5	7	
4											
2											
6											
7											
2											
6											
4											
3											1
7											
4		45									



	3	5	5	1	5	3	7	4	5	7	
4											
2											
6											
7											
2											
6											
4											
3											1
7											
4		45									

Puzzle 11 – Fillomino (6 points)

Divide the grid into regions along the grid lines so that no two regions of identical size share an edge (but may touch at a single point). All the given numbers are equal to the area of the region they are in. It is possible for a region to contain one or multiple numbers or none at all.

3			1
	3		3
2			
	2		3

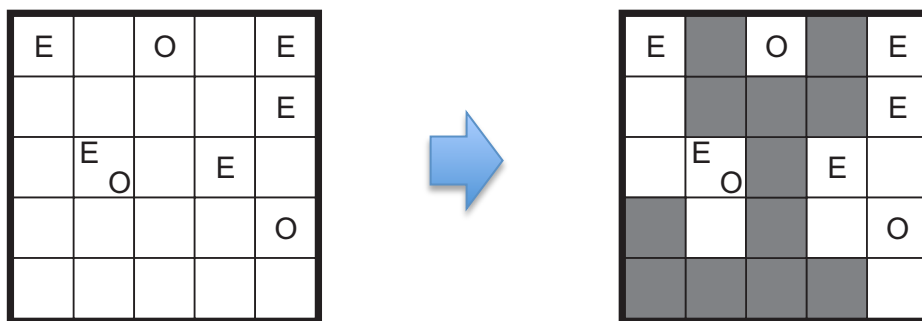


3			1
	3		3
2			
	2		3

Puzzle 12 – Odd/Even Tapa (8 points)

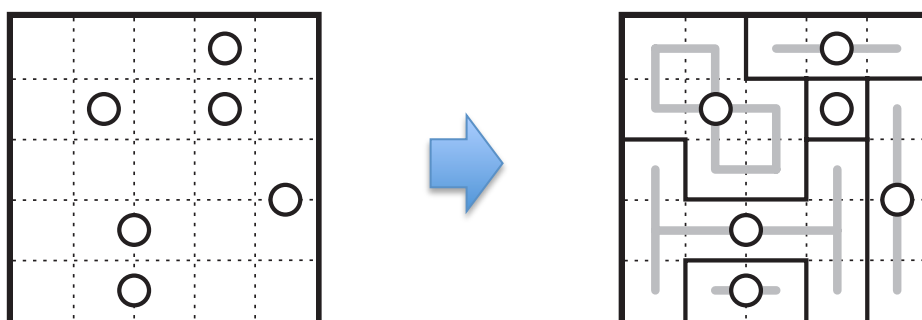
Standard Tapa rules apply: shade some empty cells black to create a single connected wall. Numbers in a cell indicate the length of consecutive shaded blocks in the neighbouring cells. If there is more than one number in a cell, then there must be at least one white (unshaded) cell between the black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

In this puzzle, numbers are replaced with letters. Odd numbers are replaced with letter „O”, even numbers are replaced with letter „E”. None of the numbers concealed by „E” can be zero.



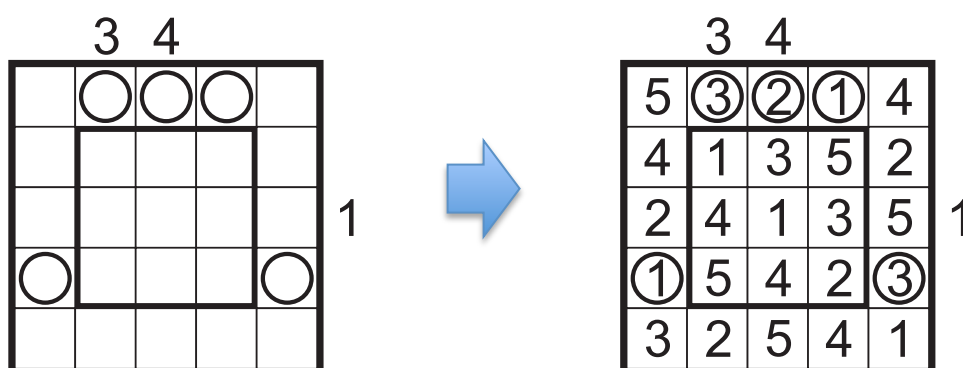
Puzzle 13 – Spiral Galaxies (8 points)

Divide the grid into connected regions (“galaxies”) so that each of the regions has exactly one circle inside. Every region must have rotational symmetry and the circle must be the centre of the rotational symmetry.



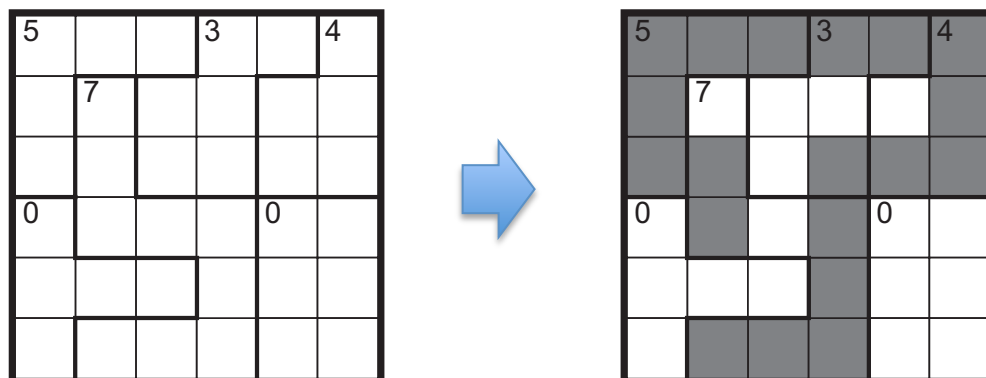
Puzzle 14 – Double Skyscrapers (7 points)

Enter a digit from 1 to 6 (1 to 5 in the example) into each cell so that each row and column contains each number exactly once. Each digit in the grid represents the height of a building and the clues on the outside of the grid indicate how many buildings can be “seen” when looking from that direction. Taller buildings block smaller ones from being seen. In addition, digits in cells in the outer grid with a circle provide similar Skyscrapers clues for the inner grid for a horizontal or vertical (but not diagonal) direction. All such cells are marked with a circle.



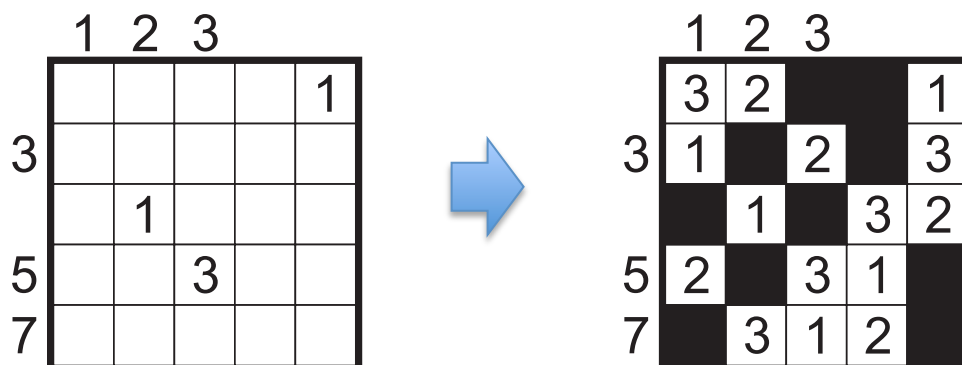
Puzzle 15 – Regional Snake (6 points)

Find a snake in the grid whose body consists of horizontal and vertical segments and its total length is 45 cells. The snake's body never touches itself, not even diagonally. The head and tail of the snake are not given. Numbers in each of the regions surrounded by thick lines denote the number of cells occupied by the snake in that region.



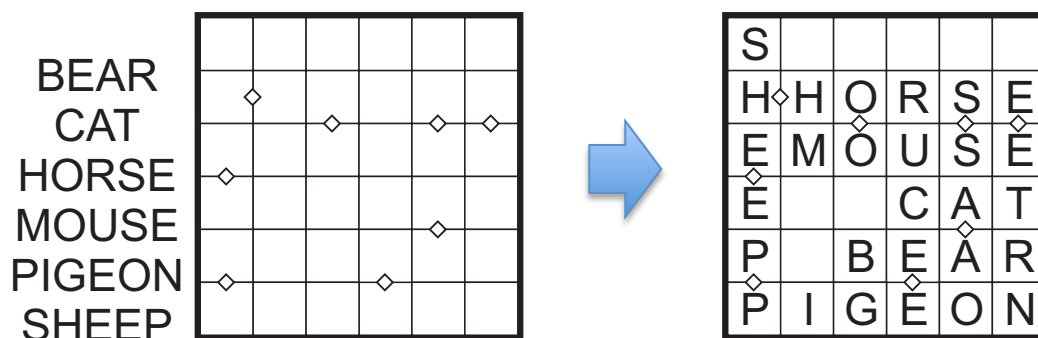
Puzzle 16 – False Doppelblock (10 points)

Blacken some cells, then fill in the remaining empty squares with digits 1–6 (1–3 in the example) so that each row and column contains two black squares and all the digits exactly once. Numbers outside the grid provide a clue on the sum of digits between the two black squares in that row/column. However, these clues are all off by one, the actual sum is one higher or one lower than the given clue.



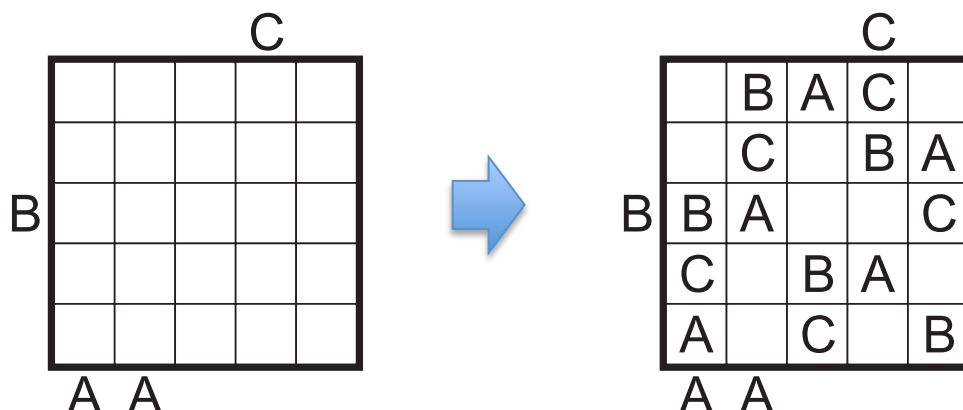
Puzzle 17 – Letter Pairs (9 points)

Place all the given words into the grid so that they read either across or down, without crossing or overlapping each other. Wherever two adjacent cells contain the same letter, those two cells are marked with a dot on the boundary between them. There are no groups with more than two connected cells containing the same letter anywhere in the grid.



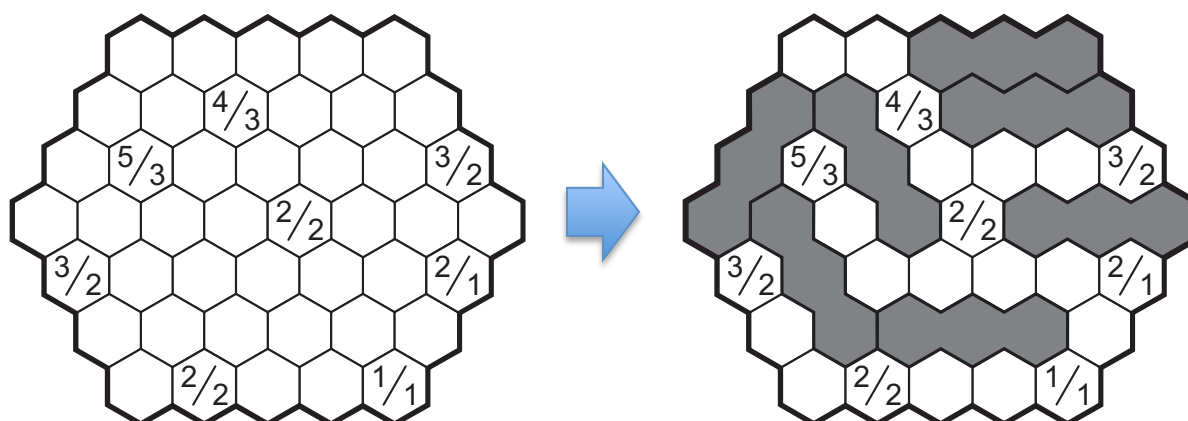
Puzzle 18 – Easy as ABCDE Untouch (8 points)

Fill in the grid with letters ABCDE (ABC in the example) so that each row and column contains each letter exactly once. Some cells remain empty. Letters outside the grid indicate the first letter in that row/column from that direction. Cells inside the grid containing identical letters cannot touch each other diagonally.



Puzzle 19 – Hexa Briquets (12 points)

Place some blocks of three hexagons connected along a straight line (“briquets”) into the grid so that they do not overlap numbers or each other. For any given pair of numbers in a clue cell, the left number indicates the number of surrounding cells occupied by briquets, while the right number indicates the number of briquets occupying the surrounding cells. The cells that are not covered by briquets (with or without numbers) must all be connected.



Place the given set of pentominoes into the grid, each of them exactly once. Pentominoes may be rotated and/or reflected. Pentominoes form a standard corral: all painted cells are connected, there are no 2 x 2 area painted, and the corral does not touch itself, not even diagonally. Numbers outside the grid indicate the length of contiguous blocks occupied in that row/column, in an increasing order, not necessarily in the order the blocks appear.



PART 8	Black and White Matrix	
Individual round	60 minutes	600 points

Overview

This round consists of twelve (12) puzzles that are connected in two ways. Firstly, all of them are to be coloured black and white in the process of solving.

Secondly, if two puzzle grids are placed adjacent to each other (sharing an edge), then the rows/columns along that shared edge must be identical in both puzzles. In other words, any two cells that are in different puzzles but share an edge must either both be black or both be white.

The layout of the actual round will be that all puzzles are sized 10 by 10 cells, and these twelve puzzles are arranged into a 4 by 3 matrix, yielding a 40 by 30 cells grid. The location of each of the puzzles within the 4x3 matrix is known in advance, note that it is different between the sample puzzle and the competition puzzle, both layouts are provided below. Depending on the location of each of the puzzles, the external clues may be given on the top or the bottom, or left/right from the puzzle. In such cases, external clues only refer to the puzzle they are adjacent to.

Scoring

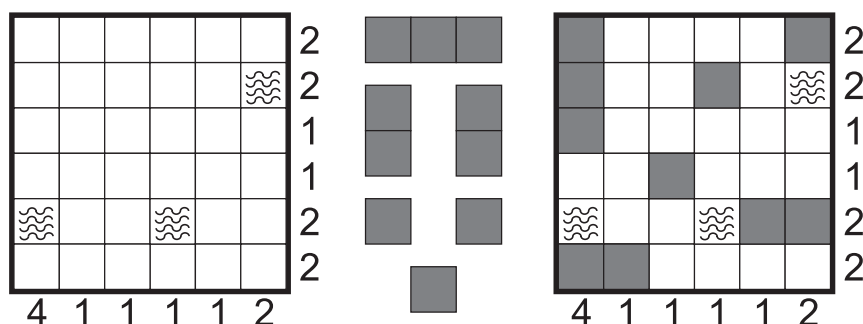
The individual puzzles may or may not have a unique solution on their own. However, once the interaction between the puzzles are taken into account, the solution for the whole round becomes unique.

Each of the twelve puzzles is worth 50 points. A puzzle is considered to be solved correctly if and only if the solution is part of the solution of the overall round.

Puzzle rules

Puzzle 1 – Battleships

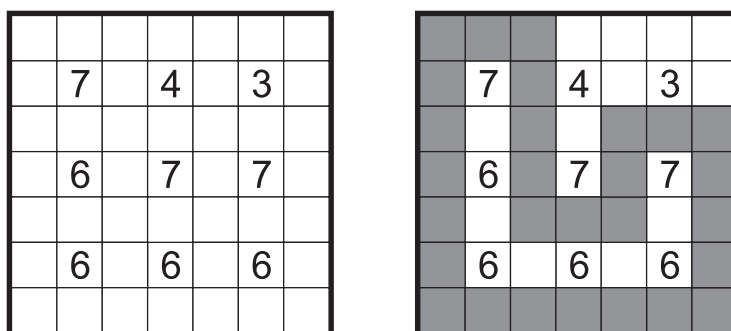
Locate a standard fleet of ships in the grid so that ships do not touch each other, not even diagonally. Numbers outside the grid indicate the number of ship segment in that row/column. Some ship segments or sea cells without any ship segments may be given in the grid.



The “standard fleet” consists of one battleship (4 unit cells), two cruisers (3 unit cells each), three destroyers (2 unit cells each) and four submarines (1 unit cell each). The fleet will not be drawn separately.

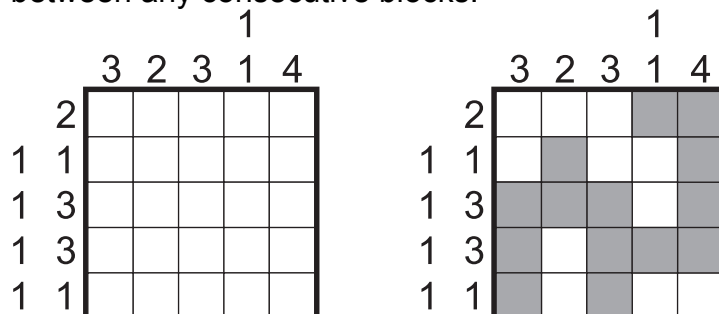
Puzzle 2 – Bosnian Loop

Draw a single closed snake-like loop that is one cell wide and does not touch itself, not even diagonally. Numbers in the grid indicate how many cells around the number’s cell (horizontally, vertically or diagonally) are visited by the loop.



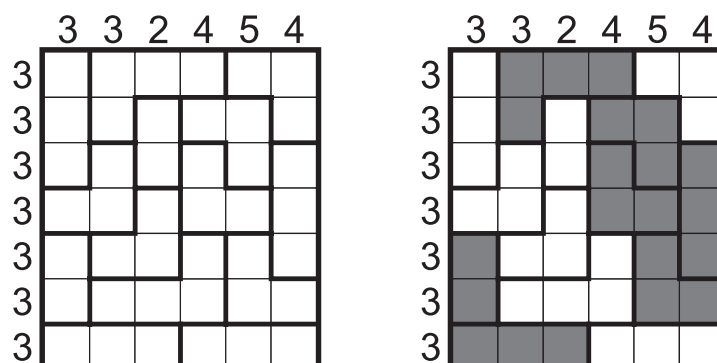
Puzzle 3 – Corral

Paint a single connected set of cells (the corral) so that it does not touch itself, not even diagonally, does not surround any white areas and does not contain any 2x2 painted area. Numbers outside the grid indicate the sizes of consecutive painted blocks in that row/column. Numbers are given in increasing order and not in the order the blocks appear. There must be at least one white cell between any consecutive blocks.



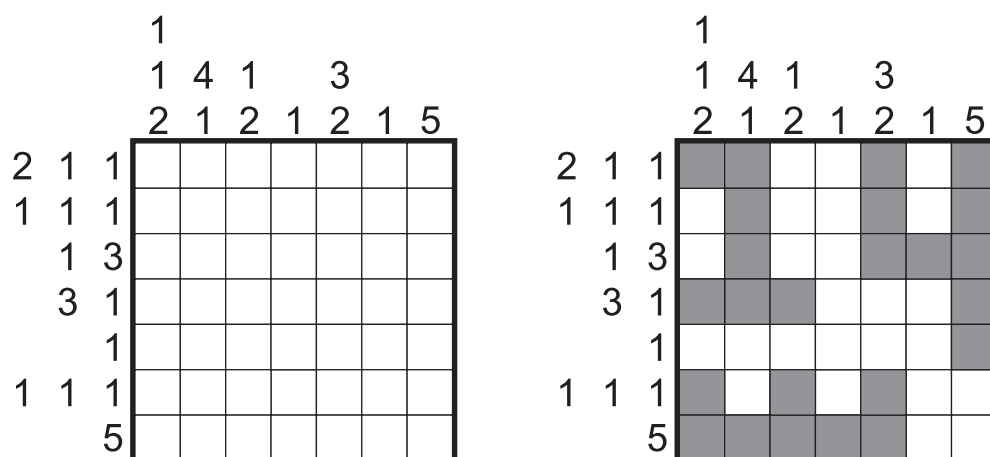
Puzzle 4 – Crazy Pavement

Paint some cells in the grid so that for each region either all its cells are painted or none at all. Numbers outside the grid indicate the number of painted cells in that row/column.



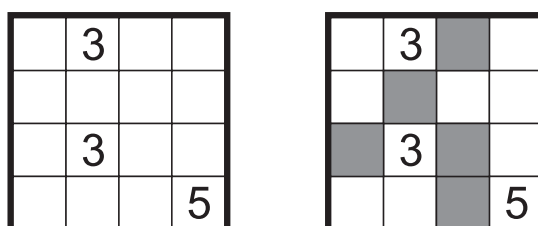
Puzzle 5 – Paint it Black

Paint some cells black so that numbers outside the grid indicate the sizes of consecutive painted blocks in that row/column. Numbers are given in the order the blocks appear in that row/column, first number describes the closest block. There must be at least one white cell between any consecutive blocks.



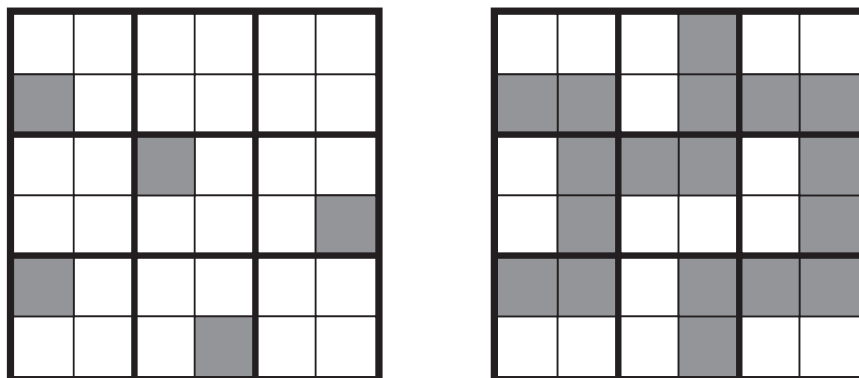
Puzzle 6 – Lakes

Paint some cells black so that the grid is divided into white areas, each of them containing exactly one number, and that number equals to the size of the white area it is included in. As opposed to a Nurikabe puzzle, the black cells are allowed to have 2x2 area and they do not have to belong to a single connected group.



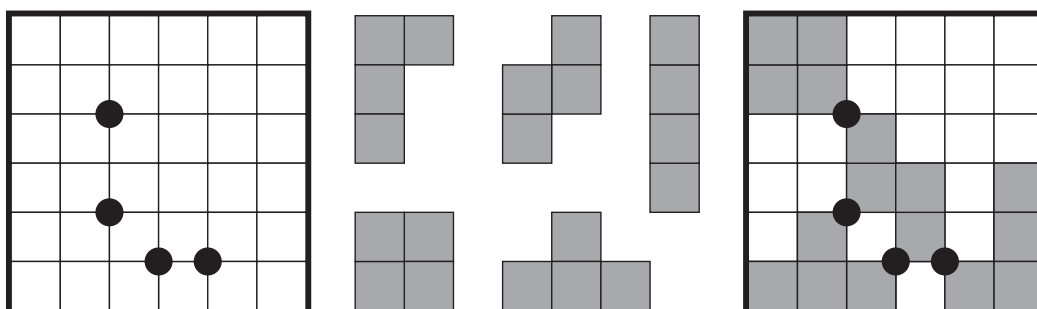
Puzzle 7 – Windows

For each of the 2x2 areas (the windows), paint two of its cells black and the other two cells white. The black cells of the grid form a Corral, i.e. a single connected group without a 2x2 area (see puzzle 3). Additionally, the white cells also cannot contain a 2x2 area.



Puzzle 8 – Pento Blokus

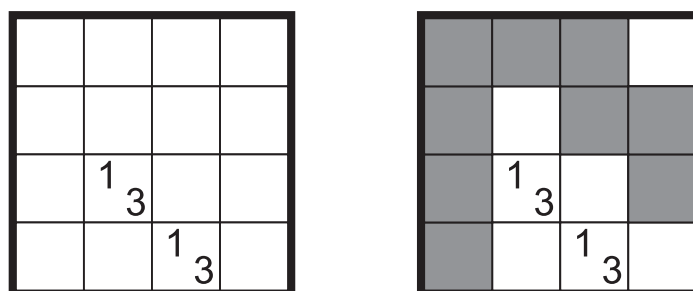
Place some different pentomino pieces into the grid so that no two of them shares an edge. They can touch diagonally, though: every node where two pentomino pieces share a corner are marked with a dot.



Puzzle 9 – Pata

Standard Tapa rules except numbers denote white blocks instead of black ones.

Shade some empty cells black to create a single connected wall. Numbers in a cell indicate the length of consecutive white blocks in the neighbouring cells. If there is more than one number in a cell, then there must be at least one black (shaded) cell between the white cell groups. Cells with numbers cannot be shaded, and the shaded cells cannot form a 2x2 square anywhere in the grid.



Puzzle 10 – Fill-a-Pix

Paint some cells black so that each given number equals to the number of painted cells around it out of the horizontally, vertically or diagonally adjacent cells and the cell with the number itself, up to a total of 9 cells (up to 4 and 6 in corners and edges, respectively).

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

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

Puzzle 11 – Line-a-Pix

Connect pairs of identical numbers with a line whose length equals to the numbers the line connects. The cells with the numbers have to be at the ends of the line and are included in the length. Lines cannot cross or overlap themselves or each other. Cells with a line count as black, cells without a line count as white.

3		3		3	
	8	6			2
3			8		2
			1		6

3		3		3	
8	8	6			2
3			8		2
			1		6

Puzzle 12 – Heyawake

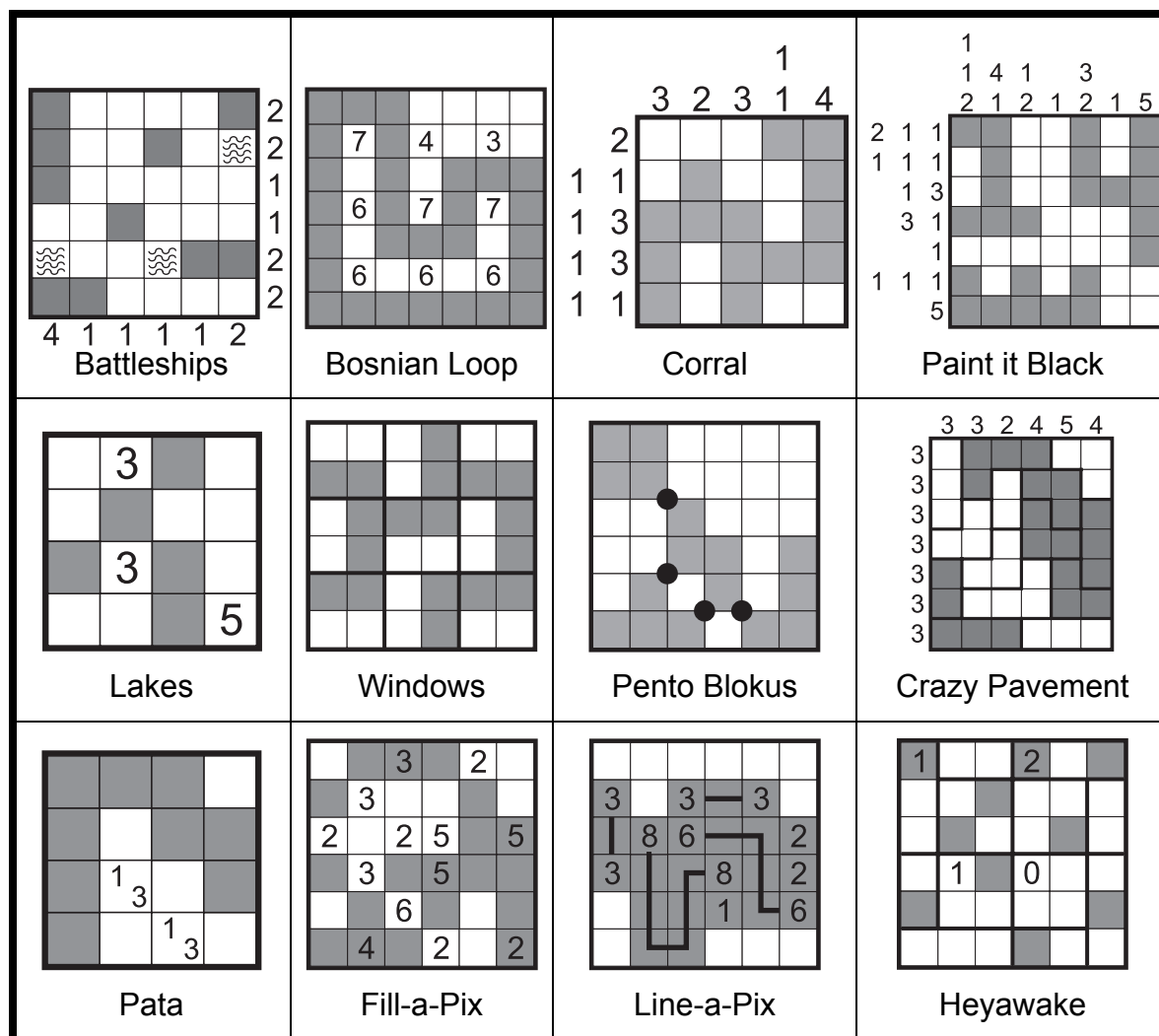
Paint some of the grid cells so that no two painted cells share an edge and all unpainted cells are connected. Numbers in regions indicate the number of painted cells in the region they are in. A string of horizontally or vertically consecutive unpainted cells can never visit three regions.

1			2		
	1		0		

1			2		
	1		0		

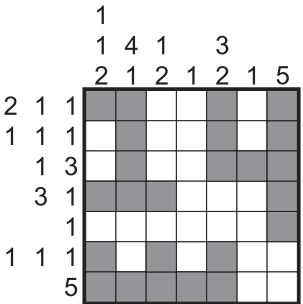
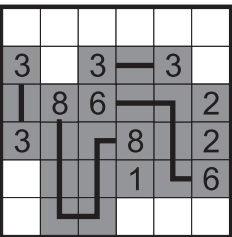
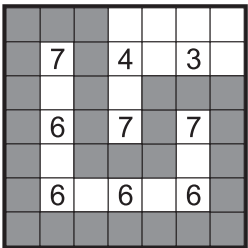
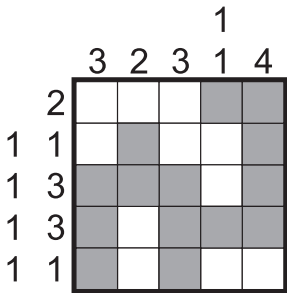
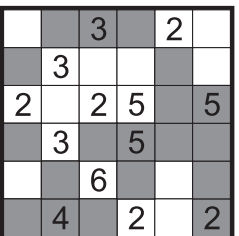
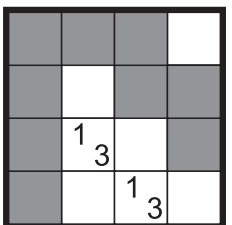
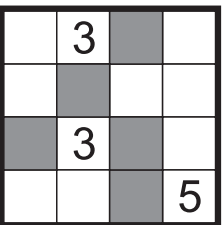
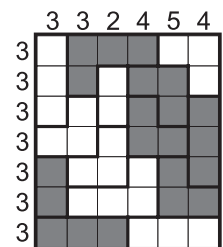
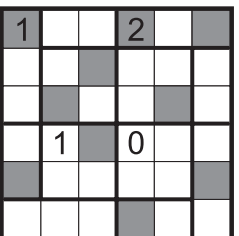
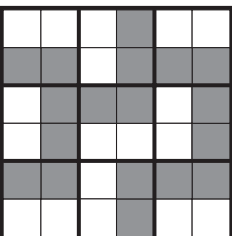
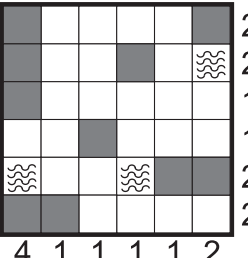
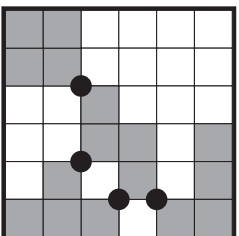
Layout of the sample puzzle

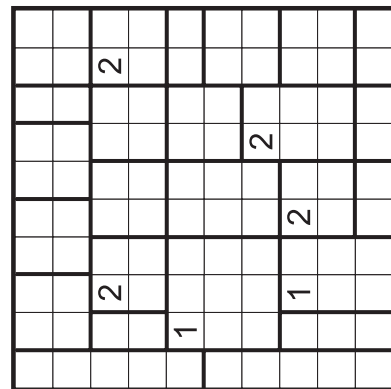
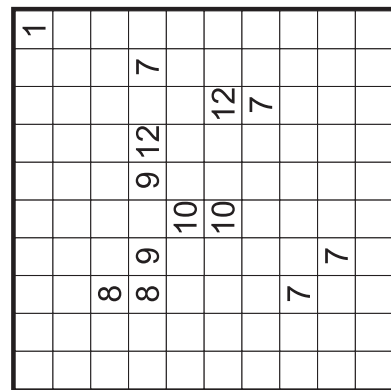
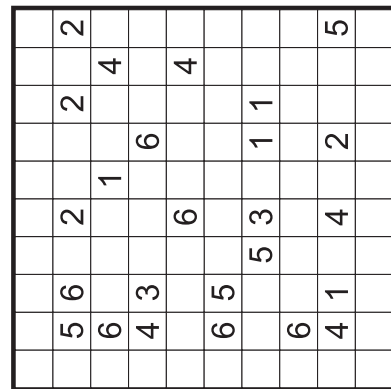
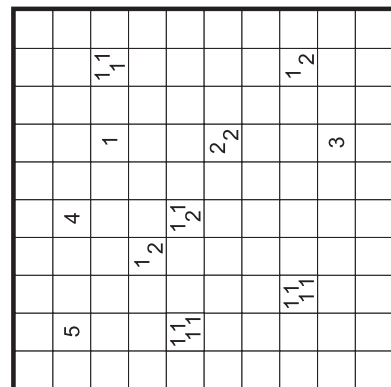
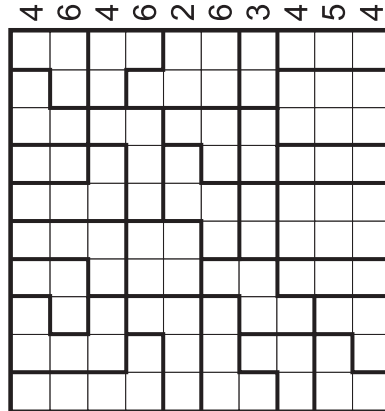
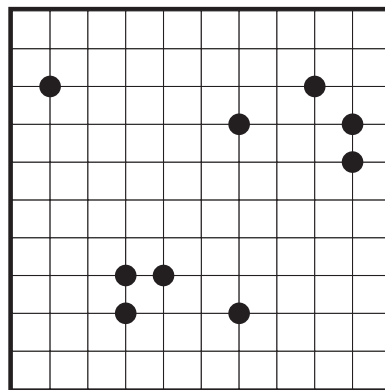
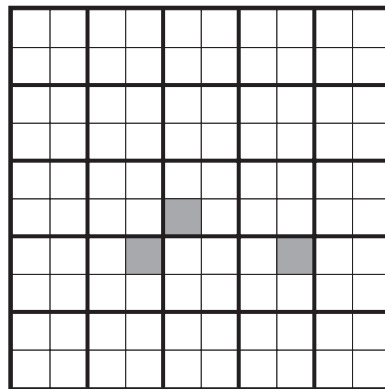
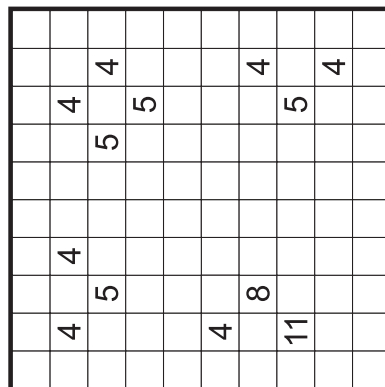
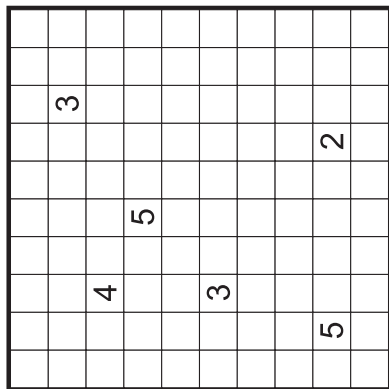
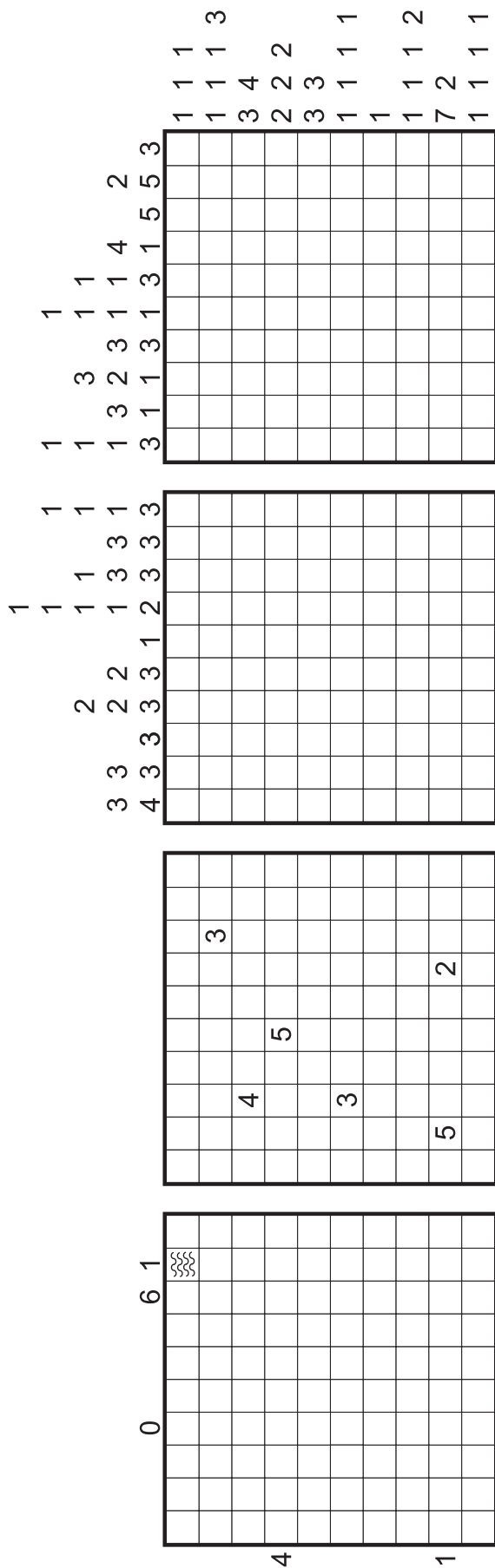
Note that the neighbourhood constraints do not hold for these example puzzles, this figure is solely intended to demonstrate the location of the puzzles but not the interactions between them.

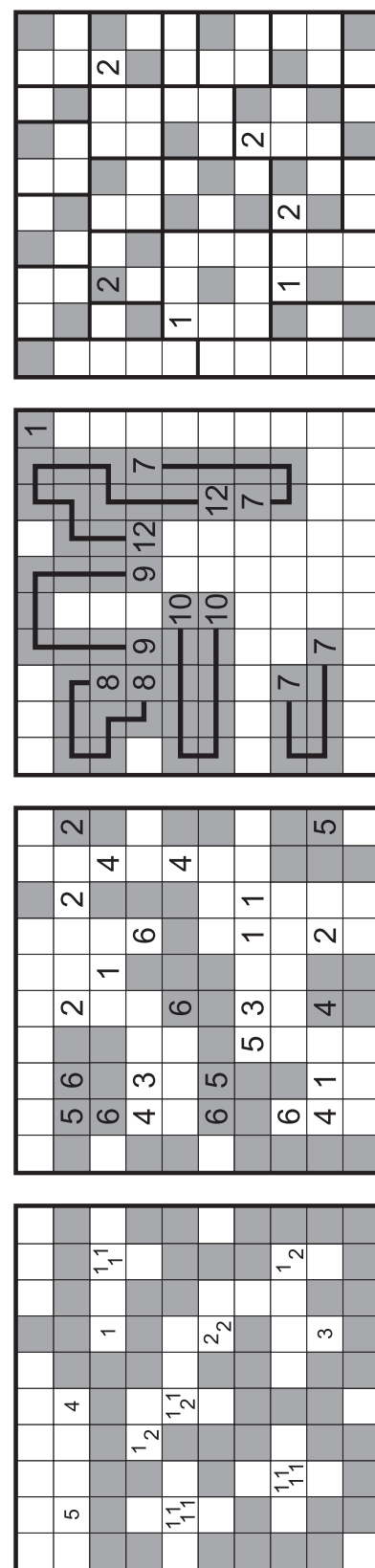
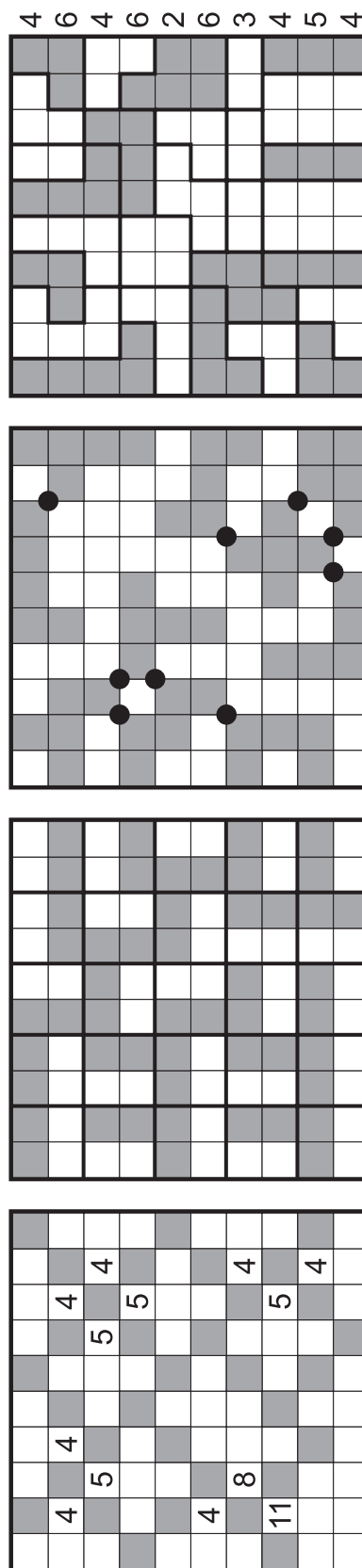
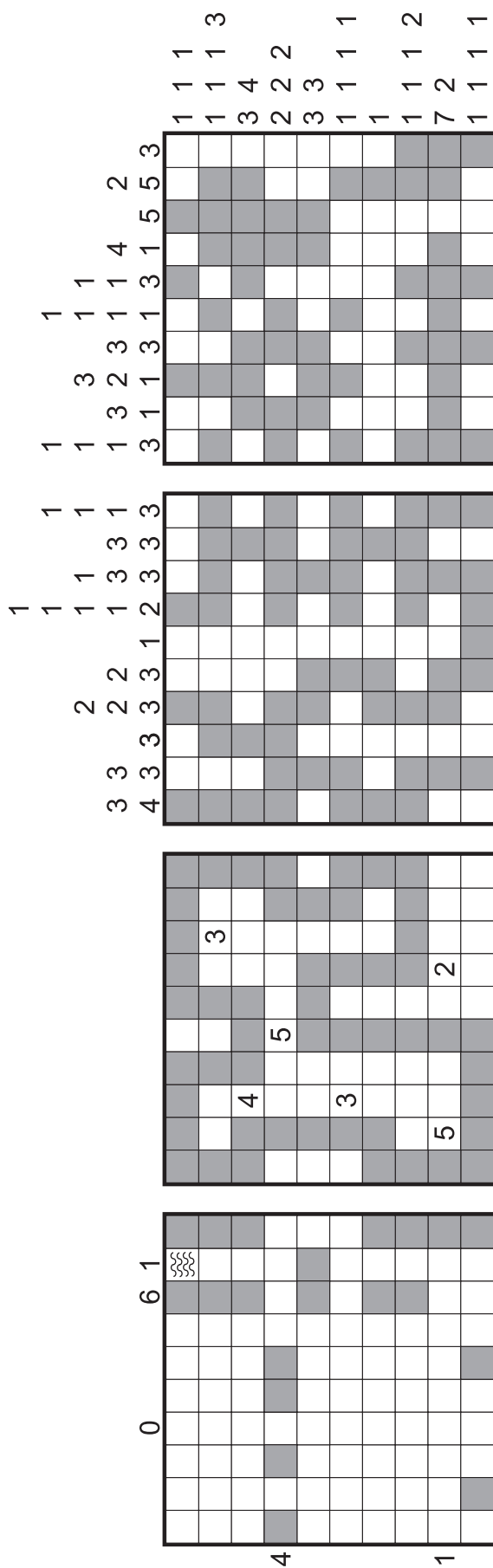


Layout of the competition puzzle

Note that the neighbourhood constraints do not hold for these example puzzles, this figure is solely intended to demonstrate the location of the puzzles but not the interactions between them.

 Paint it Black	 Line-a-Pix	 Bosnian Loop	 Corral
 Fill-a-Pix	 Pata	 Lakes	 Crazy Pavement
 Heyawake	 Windows	 Battleships	 Pento Blokus

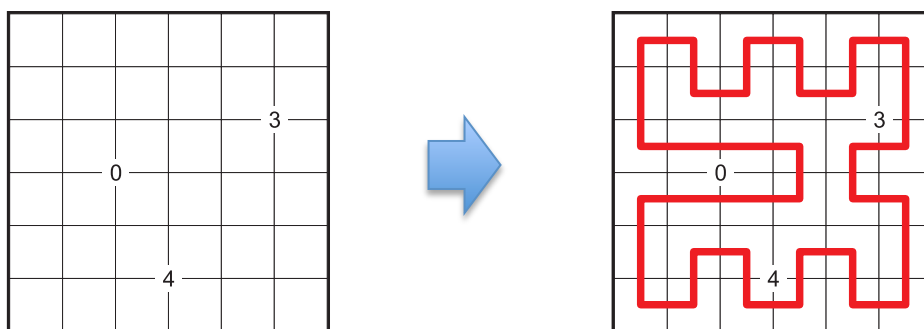




PART 9		Assorted Puzzles	
Individual round		90 minutes	900 points

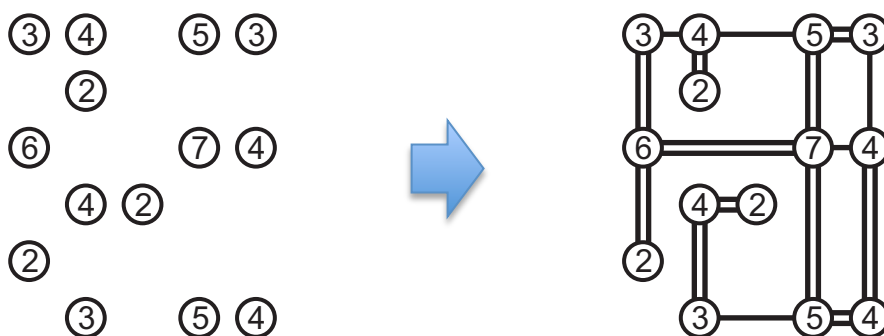
Puzzle 1 – Breakpoints (20+20+15 points)

Draw a single, non-intersecting loop that passes through all cells. Numbers in the grid indicate how many times the loop makes a 90 degrees turn in the cells surrounding that number.



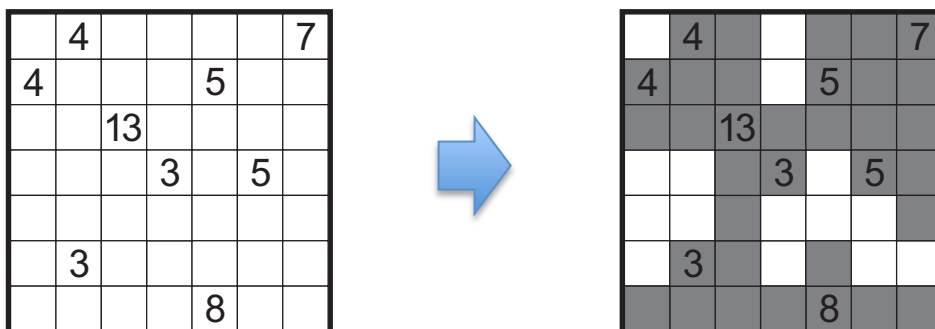
Puzzle 2 – Hashi (10+20+30 points)

Connect the circles with single or double bridges that can be horizontal or vertical. Bridges do not overlap or cross each other and do not go over another island. All circles must form a single connected network. Numbers in a circle indicate the number of bridges that are attached to that circle.



Puzzle 3 – Cave (10+15+40 points)

Select a connected set of squares so that it contains all the numbers inside and each number reveals the number of cells that are visible horizontally or vertically from the given number's cell (which is included). The cave cannot touch itself, not even diagonally – in other words, it cannot have an island inside. It is allowed for both the cave or the walls to have 2x2 areas.



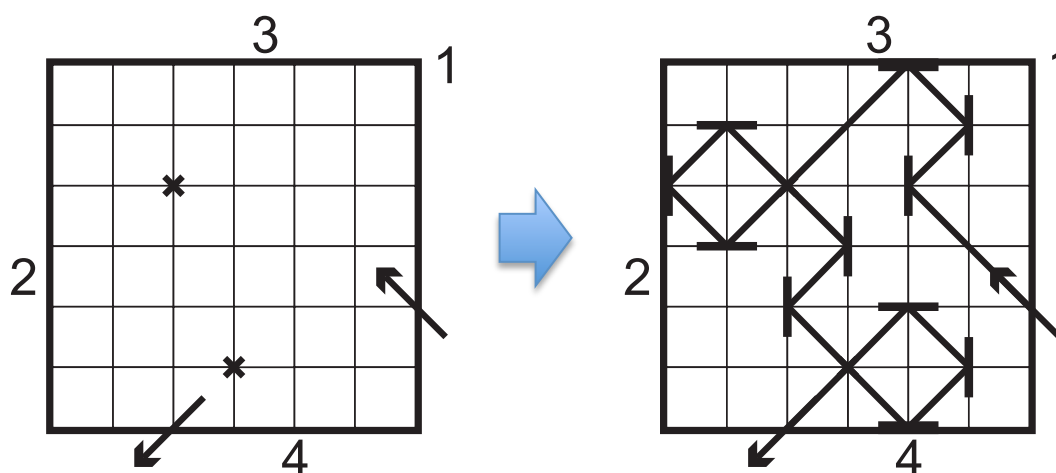
Puzzle 4 – Laser (20+20+20 points)

Draw a laser beam into the grid that only travels through the main diagonals of unit squares. Place a number of mirrors that are capable of reflecting the beam. Mirrors can be placed onto grid nodes (including nodes on the border) and should be oriented horizontally or vertically. Only one side of a mirror can be used this way, the beam cannot hit a mirror on both its sides. The beam can cross itself, though: each node where such crossing occurs is marked.

The entrance and exit of the beam is marked on the boundary of the grid, the beam cannot leave and re-enter the grid elsewhere.

Numbers on the left side of and above the grid, aligned with rows/columns of squares, indicate the number of unit squares in that row/column that are visited by the beam. Numbers on the right side of and below the grid, aligned with grid lines, indicate the number of mirrors of any orientation placed onto that grid line.

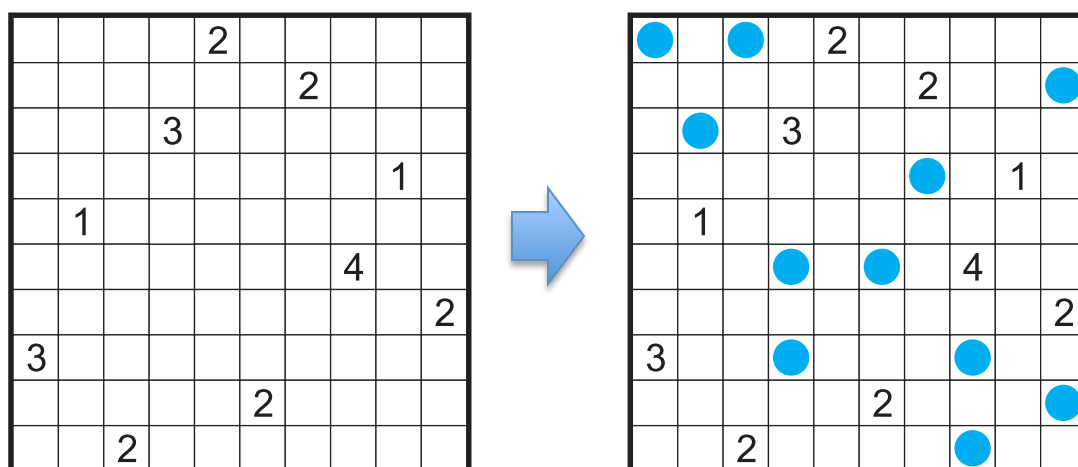
A solution will be accepted if the path of the laser beam is correctly drawn. There is no need to indicate the placement of mirrors.



Puzzle 5 – Lighthouses (30+20+20 points)

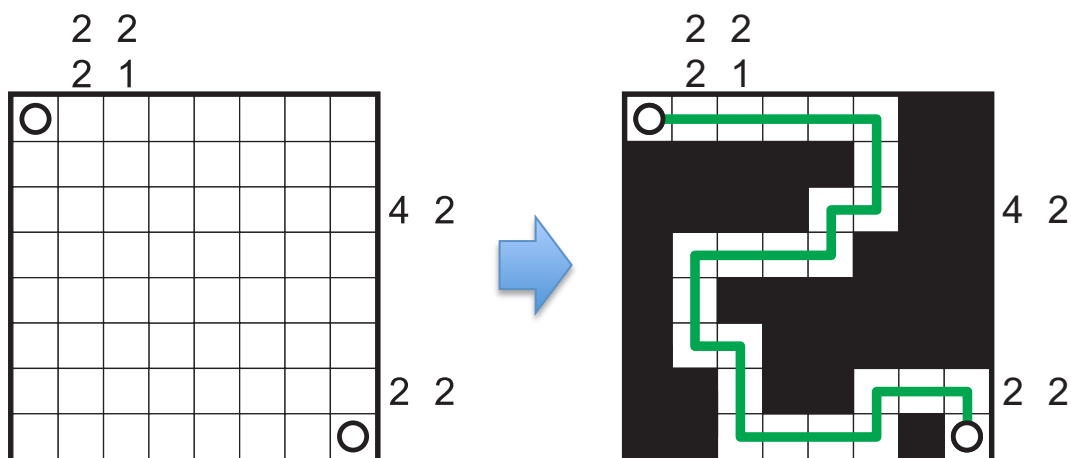
Place some boats into the grid that each occupy one cell so that these boats do not touch each other or any of the numbers, not even diagonally. The numbers represent lighthouses that emit light beams into four directions (horizontally and vertically). Neither boats nor lighthouses block light beams of (other) lighthouses from illuminating objects beyond them.

Each number equals to the number of boats that are lit by that lighthouse.



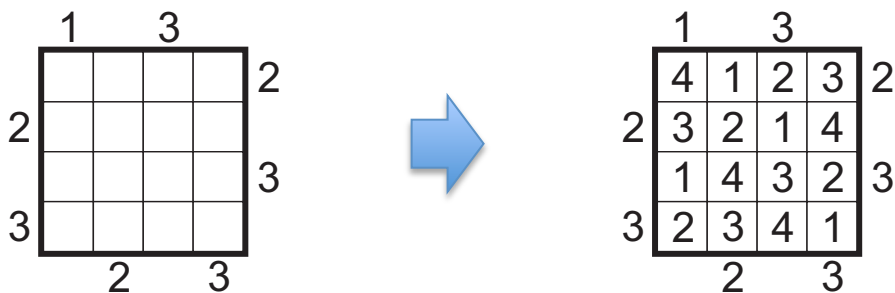
Puzzle 6 – Graffiti Snake (40+25+35 points)

Find a snake in the grid whose body consists of horizontal and vertical segments. The snake never touches itself, not even diagonally. The head and tail of the snake are given. Numbers outside the grid indicate the sizes of consecutive blocks in that row/column that are not occupied by the snake. Numbers are given in the order the blocks appear in that row/column, first number describes the closest block.



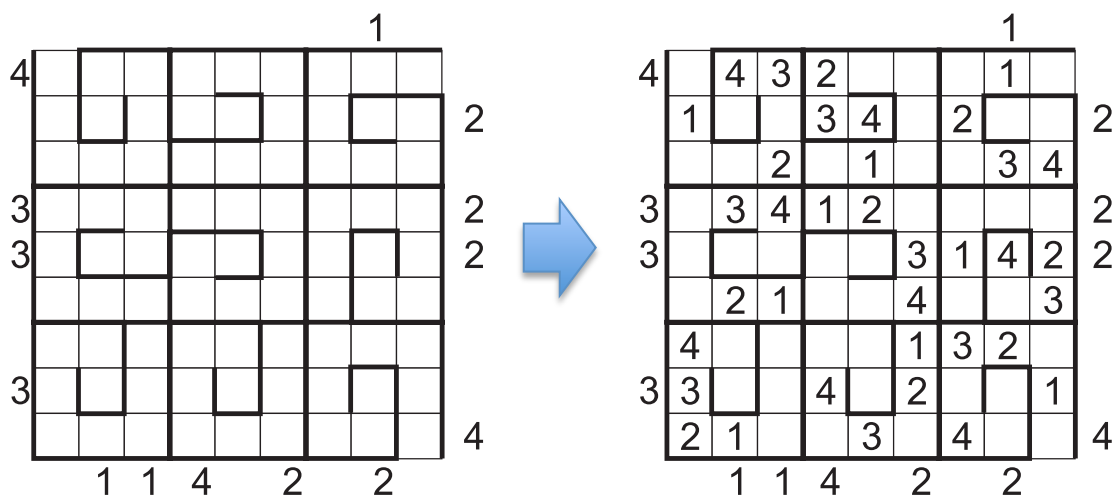
Puzzle 7 – Skyscrapers (20+20+45 points)

Fill in the grid with numbers 1 through N (where N is the grid size) so that in each row and column, every number appears exactly once. Digits represent skyscrapers, denoting their heights. Numbers outside the grid indicate the number of different skyscrapers visible from outside that direction, with taller buildings blocking smaller ones from being seen.



Puzzle 8 – Sudoku Snail (35+40+50 points)

Enter digits 1-4 into the grid so that no digit repeats in any row, column and 3x3 region. For each of the regions, digits must be ordered from 1 to 4 increasing from the outside of the spiral. Numbers outside the grid indicate the first digit that occurs in that row/column from that direction.

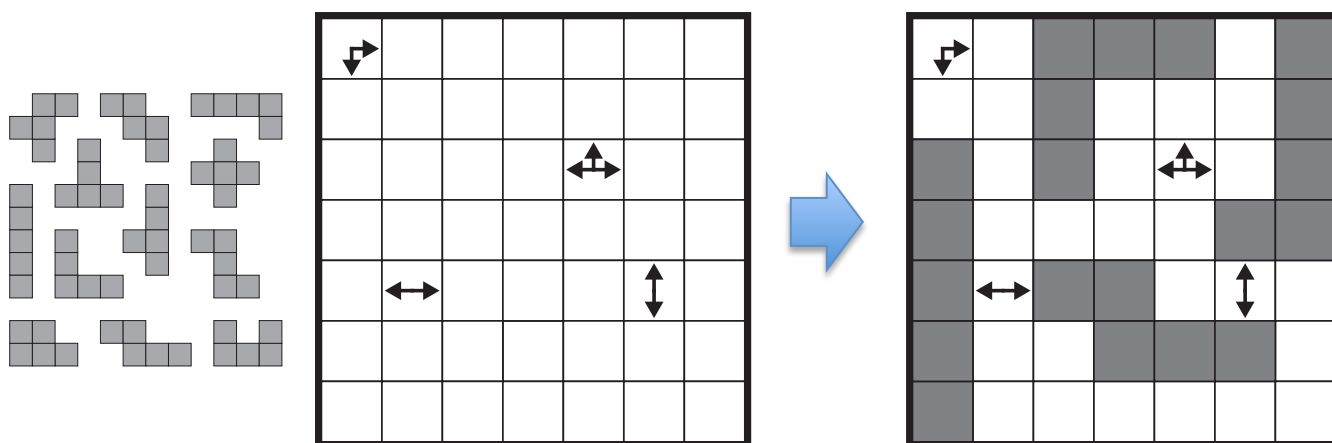


Puzzle 9 – Pentopia (40+35+65 points)

Place some of the given pentomino pieces into the grid (not necessarily all of them), using each of them at most once, so that they do not touch each other, not even at a single point. Pieces may be rotated but not reflected.

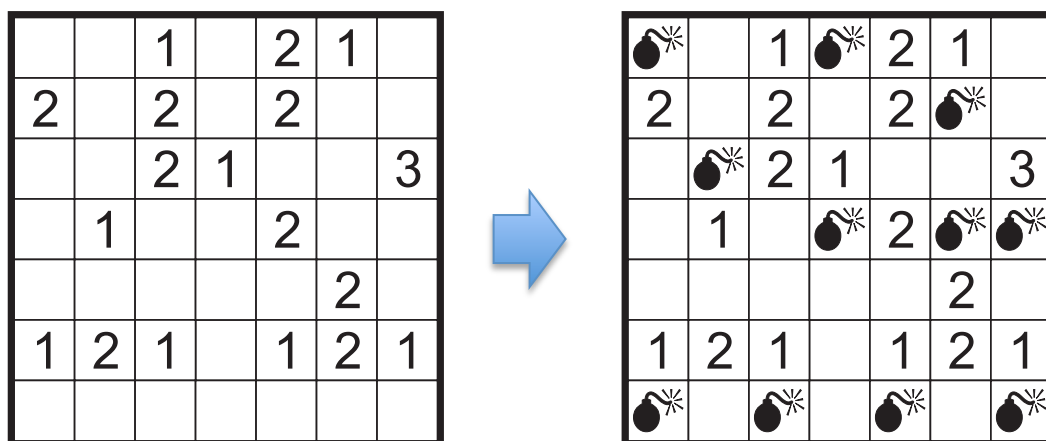
Arrows denote the direction of the closest pentomino piece out of the four (horizontal and vertical) directions. In case there are at least two such directions, all of them are indicated with arrows.

A square with arrow(s) cannot be covered by any piece.



Puzzle 10 – Minesweeper (25+45+70 points)

Some of the empty cells of the grid contain a mine. Numbers in the grid indicate how many of the adjacent squares (including diagonally adjacent squares) contain a mine. The total number of mines is given outside the grid.



11 mines

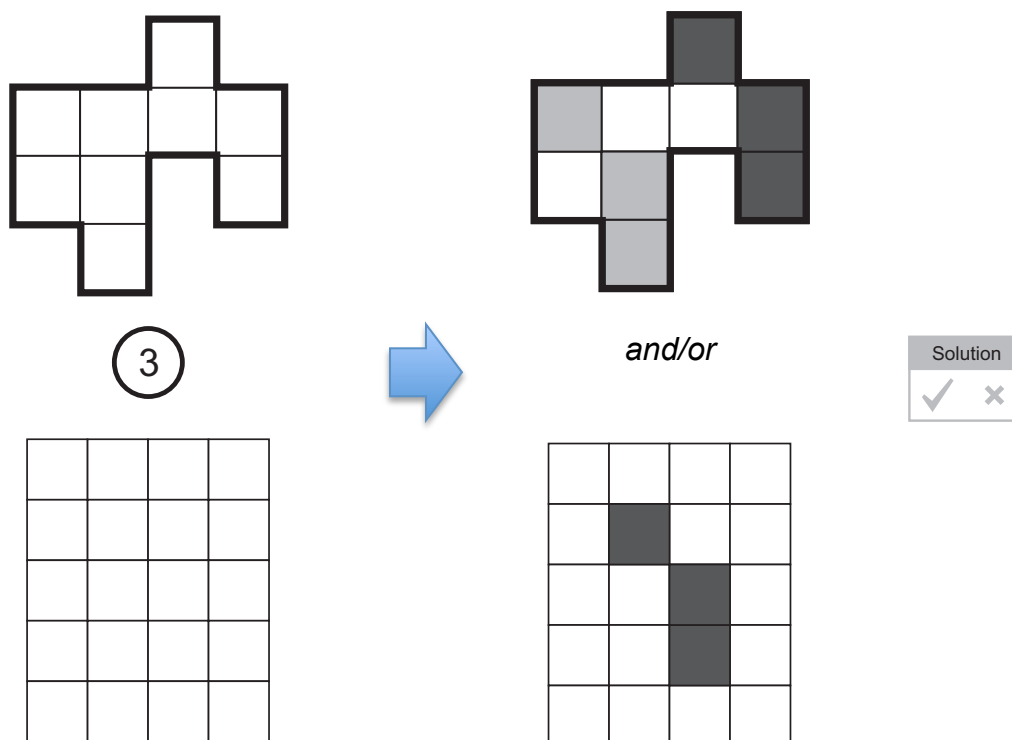
PART 10		Sprint	
Individual round		30 minutes	300 points

Puzzle 1 – Diagonal Dissection (22 puzzles, ladder points)

Divide the given shapes into a number of congruent pieces. Pieces consist of several unit cells that are connected by edge or diagonally. Pieces may be rotated relative to each other but they cannot be reflected. The number of pieces to divide each shape into is given next to the shapes (circled). In addition, an auxiliary grid is provided with each of the puzzles.

Puzzles in this round are considered to be solved if at least one of the following two actions is performed on them:

1. The shape is completely and correctly divided into the required number of congruent pieces, according to the rules above.
2. One instance of those congruent pieces is correctly drawn into the empty grid that is provided with each of the shapes.



The “Solution” box on the right hand side is just designed to help judges to mark the solutions correct or incorrect, it has nothing else to do with the puzzles.

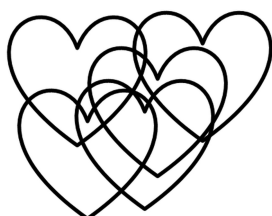
Scoring: Points will be awarded on a ladder base, in other words based on the number of correct solutions across the round, irrespective of which of those puzzles were solved correctly.

First 10 correct solutions:	10 points for each correct solution
11 th to 18 th correct solutions:	15 points for each correct solution
19 th to 22 nd correct solutions:	20 points for each correct solution
Total possible score	300 points

PART 11	Visual Puzzles	
Individual round	30 minutes	300 points

Puzzle 1 – Count the shapes (20 points)

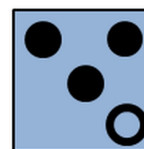
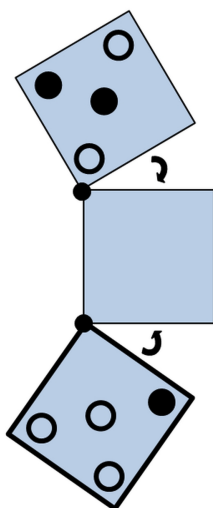
How many identical shapes are there in the picture? Half the points awarded for missing by one. (No, “1” is not a good answer here – the naturally observable shape is meant to be counted and not the entire drawing. Here we have hearts – in the competition puzzle it may be something else.)



5

Puzzle 2 – Squares Rotator (15 points)

A few squares are joined to each other by their corners so that they can be rotated around those joints. The squares are made of glass so they are transparent. The black painting on them is, of course, not transparent. What do we see if we rotate all the outer squares onto the central one?



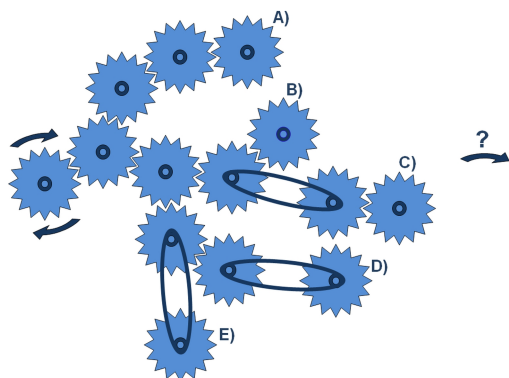
Puzzle 3 – Flags (25 points)

Identify the flag that appears exactly twice. (Sketch it out or just mark it with a circle.)



Puzzle 4 – Cog-wheels (20 points)

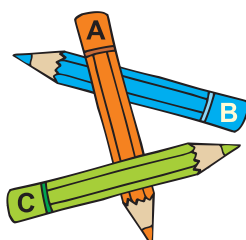
Which cog-wheels turn clockwise if the leftmost one turns clockwise? List all their letters.



A, B, C, D

Puzzle 5 – Pencils (10 points)

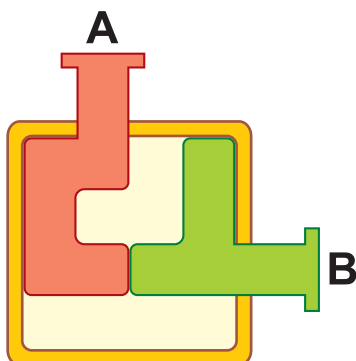
In what order can we pick up all the pencils if at any point of time we can only touch the topmost one?



C, A, B

Puzzle 6 – Buttons (15 points)

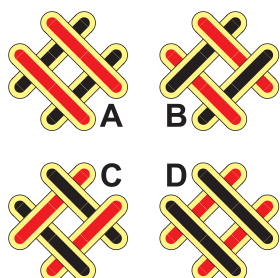
In what order can we push all the shapes into the box?



A, B

Puzzle 7 – Stripes (15 points)

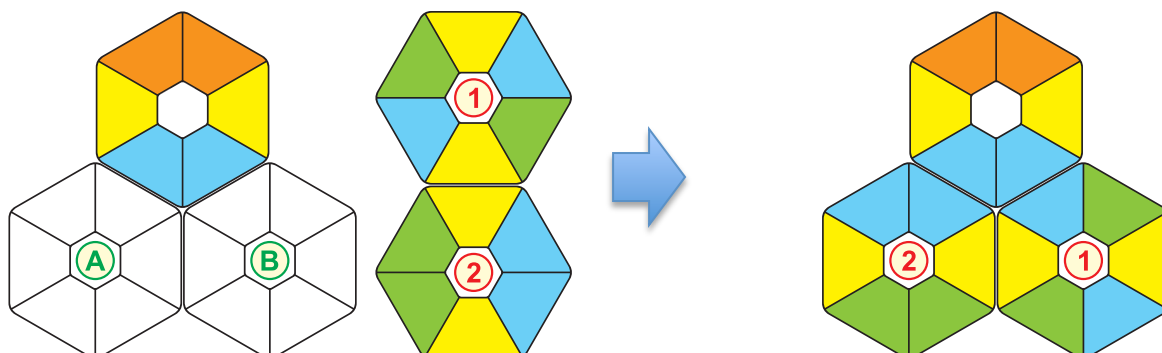
Some stripes are arranged into these meshes. Some meshes are seen from above and others from below. Identify the pairs of letters that belong to the same mesh but viewed from opposite direction. (Stripes have the same colour on both sides: either both sides are red or both sides are black.)



A-D, B-C

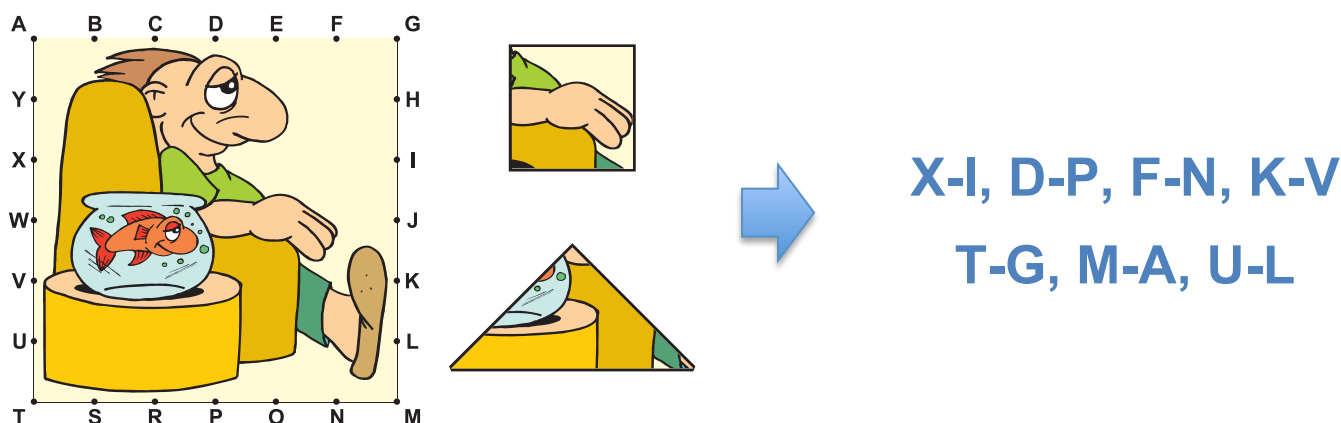
Puzzle 8 – Hexagon arrangement (40 points)

Put the numbered hexagons into the placeholders with letters so that wherever two hexagons touch by an edge, their triangles on that edge have identical colour. The hexagons can be rotated but not reflected.



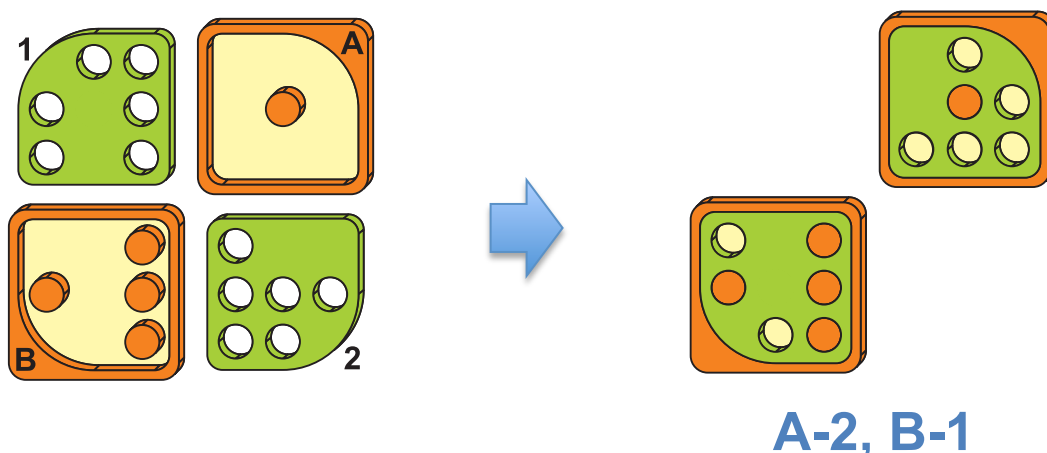
Puzzle 9 – Picture slices (30 points)

For each of the partial pictures, determine the set of letter pairs so that cutting the figure along straight lines connecting those letter pairs would result in obtaining those partial pictures. There will be three such fragments, each is worth 10 points.



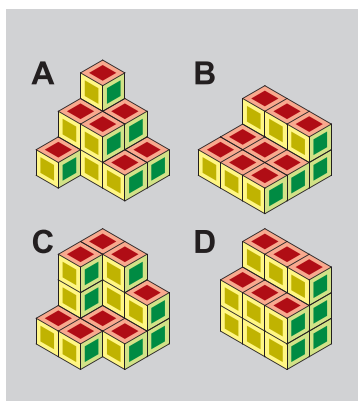
Puzzle 10 – Flat Fit (30 points)

Fit the numbered objects into the ones with letters. The numbered objects can be rotated and/or flipped over.



Puzzle 11 – Build the cubes (40 points)

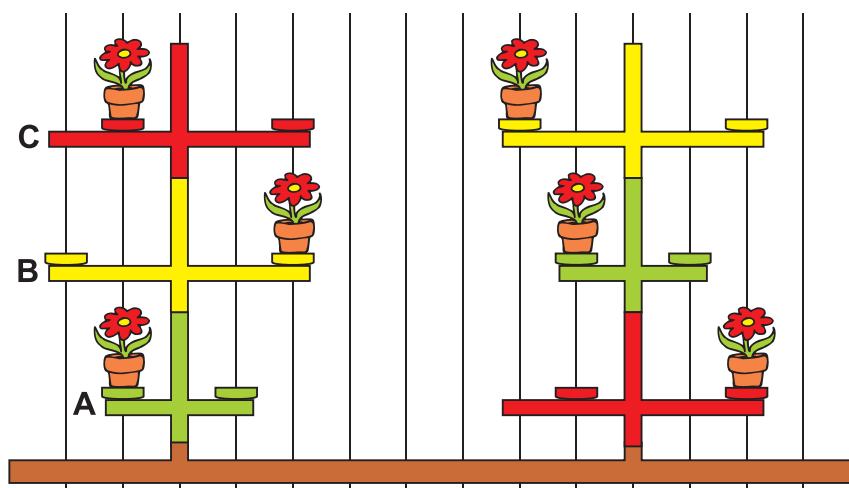
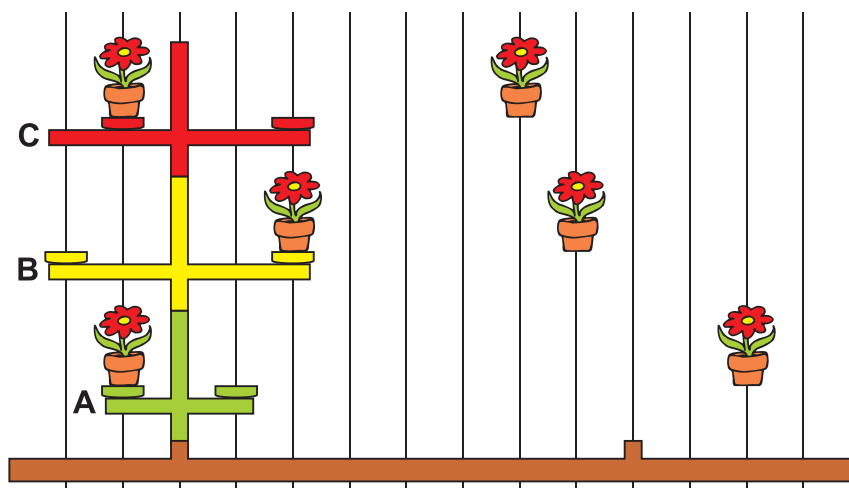
Pair up the given objects so that each pair can be used to assemble a 3x3x3 cube.



A-C, B-D

Puzzle 12 – Flower Tower (40 points)

Re-arrange the elements of the flower tower on the left hand side to build another flower tower that holds all flower pots on the right hand side. Flower pots must be placed onto the designated plates. The tower elements can not be rotated or flipped over in any way, and they can only support each other using their columns.



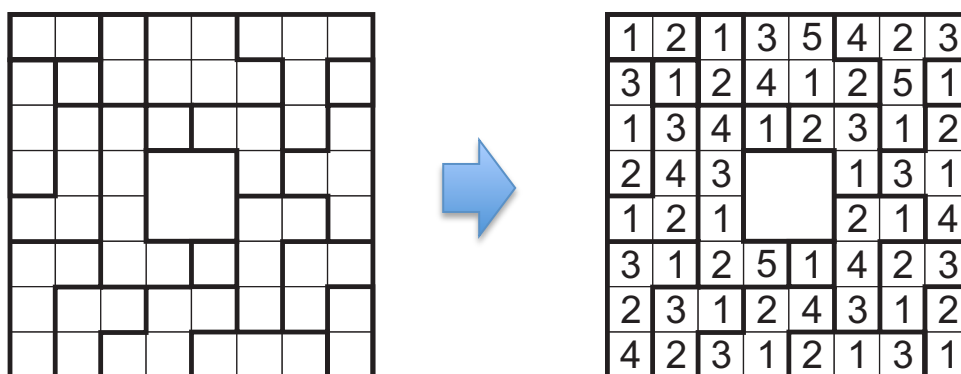
B, A, C (from top to bottom)

PART 12	The Zodiac	
Individual round	45 minutes	450 points

In this round, each of the puzzles is associated with one of the signs of the Chinese Zodiac, through the (approximate) shape of the puzzles. Puzzles are also ordered according to the Zodiac.

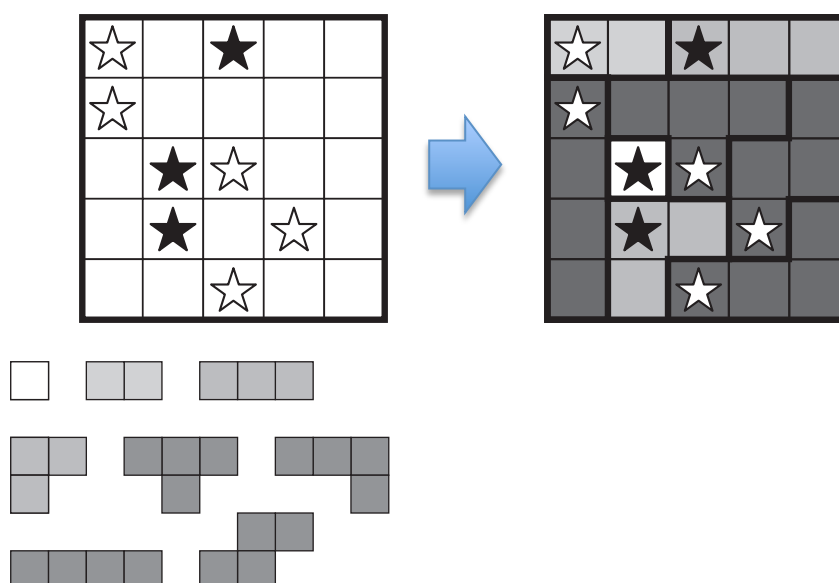
Puzzle 1 – Rat Ripple Effect (40 points)

Fill in the grid with digits so that each region contains all digits from 1 to N exactly once, where N denotes the size of that region (measured in cells). If two identical numbers appear in the same row or column, then at least that many cells with other numbers (or an equivalent distance) must separate them.



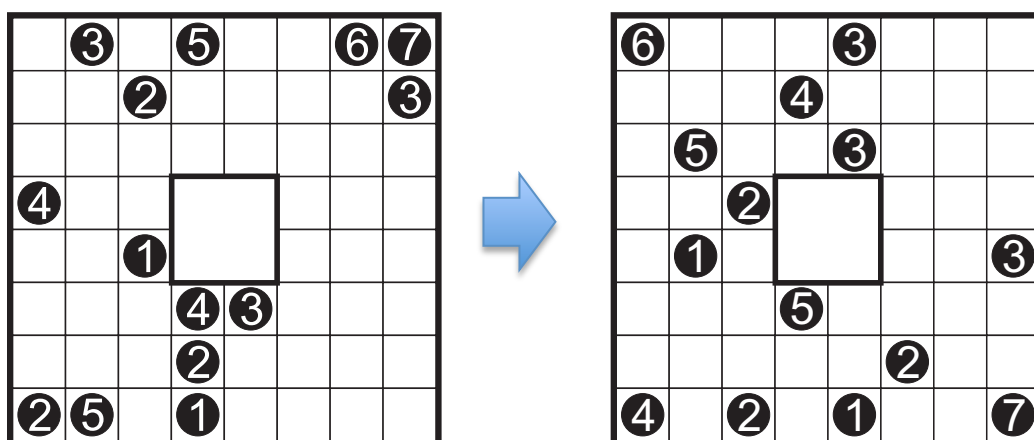
Puzzle 2 – Ox Division (35 points)

Divide the grid along the grid lines so that each of the given pieces will appear exactly once. Pieces may be rotated and/or reflected. Each of the pieces contains exactly one star. Pieces consisting of an odd number of cells contain a black star, pieces consisting of an even number of cells contain a white star. The colour of the pieces plays no role.



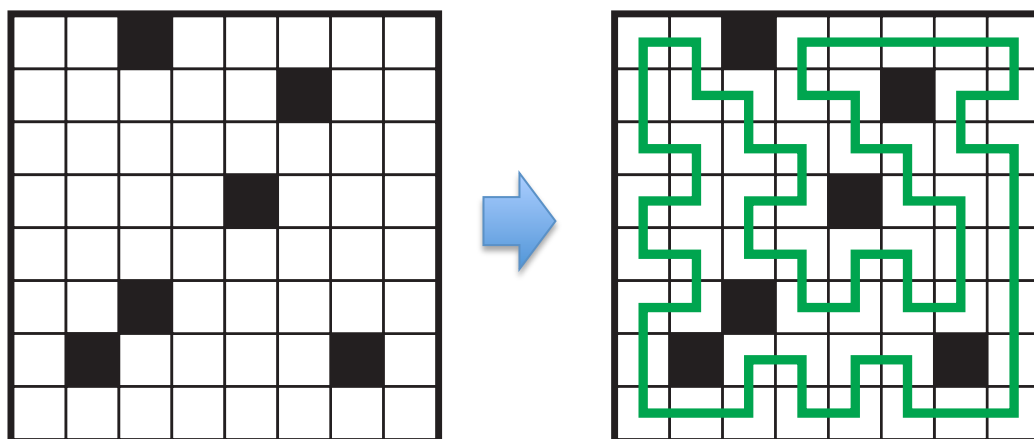
Puzzle 3 – Tiger Hamle (45 points)

Move each of the given black circles to one of the four directions so that each of them moves the distance marked upon it. In the final position, cells with circles do not share an edge (they may touch diagonally, though), and all empty cells are connected. During the move, circles may exit and re-enter the grid, as long as their movement remains straight. An additional empty grid will be provided for this puzzle.



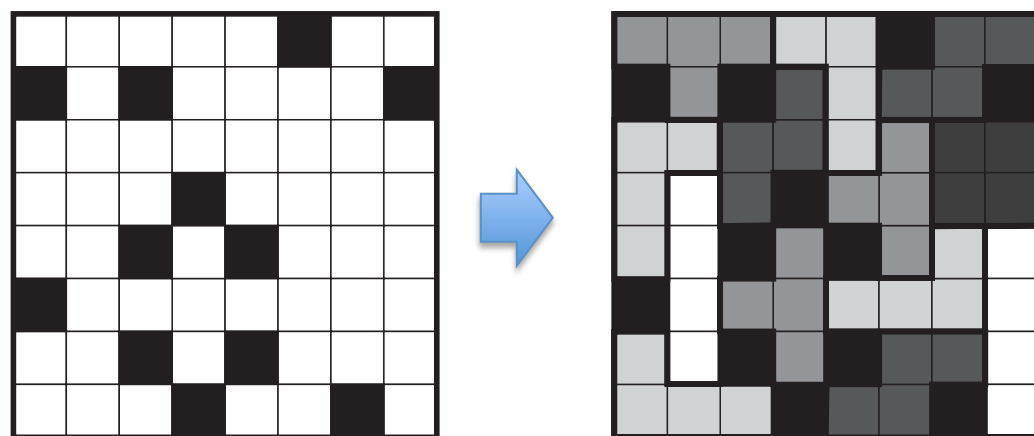
Puzzle 4 – Rabbit Loopfinder (20 points)

Draw a single closed loop that consists of horizontal and vertical segments, visiting all white cells but none of the black ones.



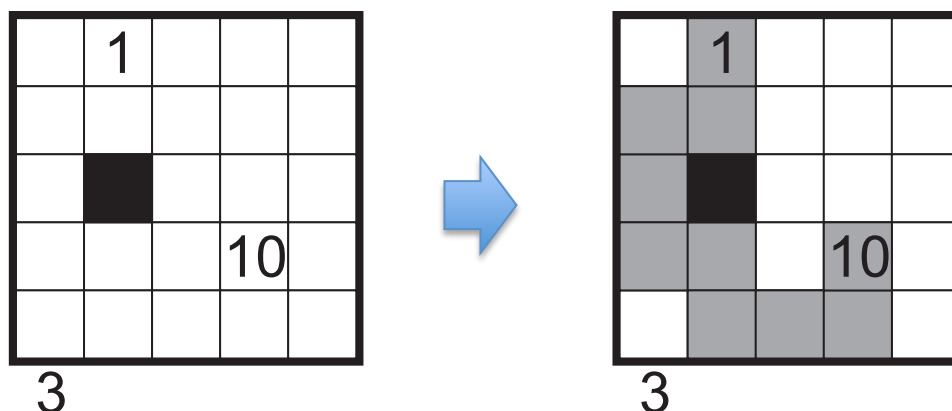
Puzzle 5 – Dragon LITSO (35 points)

Divide the grid into tetrominos so that two identical tetrominos never share an edge. Tetrominos that are rotations/reflections of each other are considered identical.



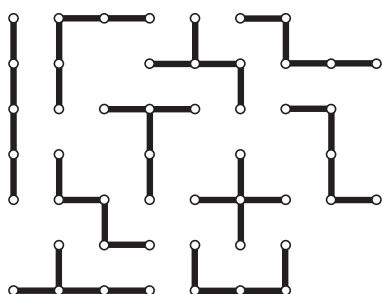
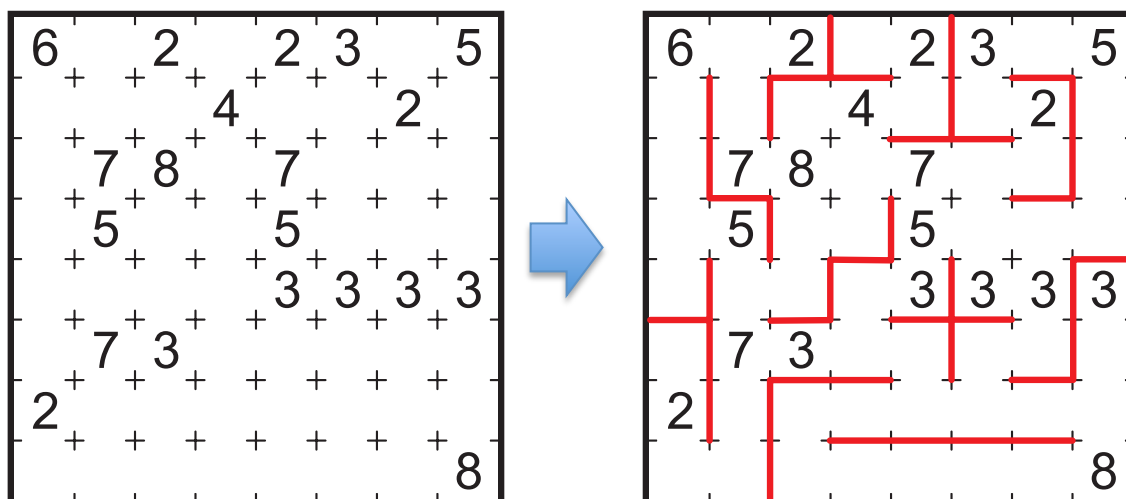
Puzzle 6 – Snake Snake (10 points)

Find a snake in the grid whose body consists of horizontal and vertical segments. The snake's body never touches itself, not even diagonally. The head and tail of the snake are given using numbers, this also indicates the length of the snake. The snake avoids black squares. Numbers outside the grid indicate the number of cells occupied by the snake in that row/column.



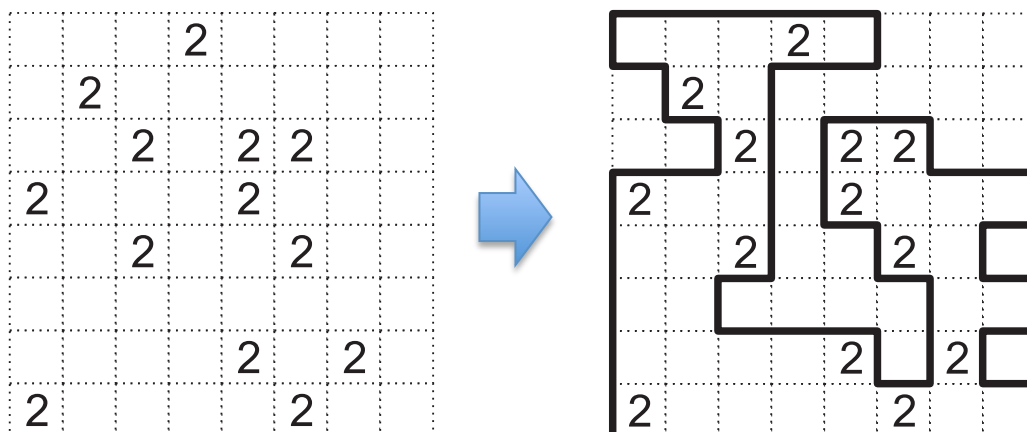
Puzzle 7 – Horse Pento Office (60 points)

Place some wall segments so that each number indicates how many other cells can be seen from that cell, not including itself. Wall segments cannot overlap with the outer boundary of the grid. The wall segments are arranged so that they form the given pentomino shapes, these shapes can be rotated and reflected but they cannot touch each other, not even at a single point. Wall segments block visibility (as does the edge of the grid). There is a connectivity rule: the entire office area must remain connected.



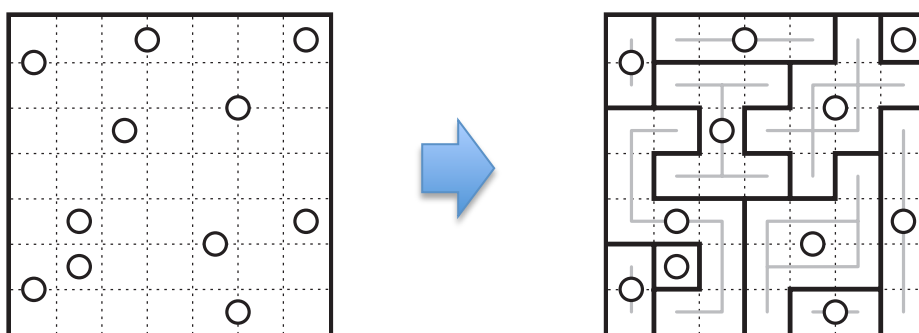
Puzzle 8 – Goat Inner-Two Fences (60 points)

Draw a single closed loop into the grid so that it does not touch or cross itself. A clue number in a cell indicates the number of sides of that cell occupied by the loop. The given clues are all inside the loop and are all 2's. All such possible clues are shown.



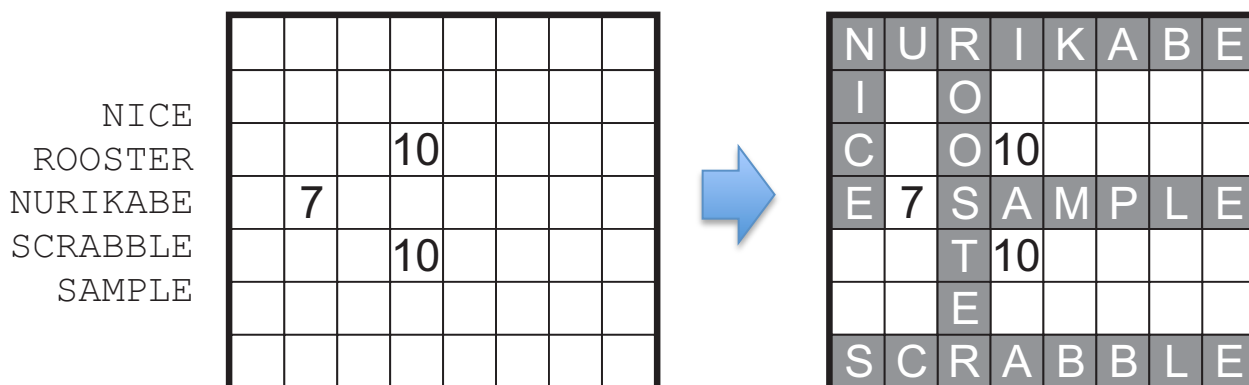
Puzzle 9 – Monkey Galaxies (40 points)

Divide the grid along the indicated lines into connected regions ("galaxies") with rotational symmetry. Each cell must belong to one galaxy, and each galaxy must have exactly one circle at its center of rotational symmetry.



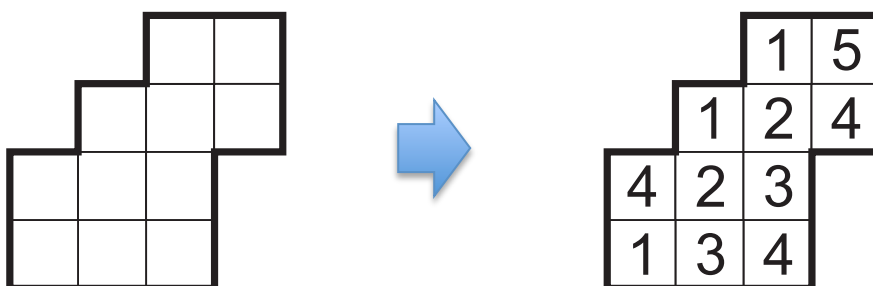
Puzzle 10 – Rooster Nurikabe Scrabble (50 points)

Place the given words into the grid, across or down, so that they are all connected. No unlisted word can appear anywhere, not even two-letter ones. The words do not occupy any 2x2 area. Numbers indicate the size of the area without words that the number is in. All areas are represented by a number but no letters are given.



Puzzle 11 – Dog Criss-Cross (30 points)

Place the given words (of digits) into the grid so that they can be read in one of the four directions (left, right, up or down). All words of length at least two are given exactly once.

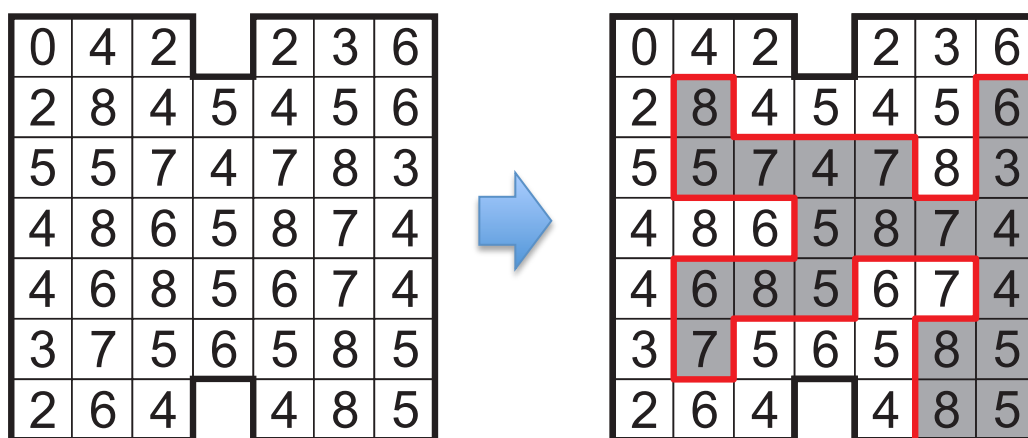


14 124
15 134
45 324
123 1234

Puzzle 12 – Pig Wall (25 points)

The grid is separated into two connected areas by a wall whose segments only use the boundaries of unit squares. A cell is „visible” from another cell if they are either in the same row or in the same column (irrespective of the wall or the boundary of the grid).

A number in a cell indicates how many cells on the opposite side of the wall are visible from there.



PART 13		Weakest Link – Samurai
Team round	60 minutes	2000 points

Overview

This is a “Weakest Link” type team round. This means that at the start of the round, team members solve some puzzles individually and then make their way to a team table where more puzzles await them.

Round structure

In this round, there are five (5) types of puzzles, the rules of which are detailed below. For each of those five types, four (4) puzzles are meant to be solved individually (referred to as “corner puzzles” hereinafter) and the last one is meant to be solved as a team (“central puzzle”). For the individual part, every team member will get exactly one corner puzzle from each of the types (different team members get different puzzles). Therefore a team of 4 solvers will collectively have all 4 corner puzzles for all 5 puzzle types.

For each of the types, there is an interaction between the corner puzzles and the central puzzle. Namely, the central puzzle shares each of its four corners with one of the corner puzzles, meaning that it is possible to place all four corner puzzles onto the central puzzle such that areas overlapping each other have identical content. Note that aside from sharing certain content, there is no interaction between corner puzzles and central puzzles. In other words, puzzle specific rules only apply within single puzzles – we also provide some type specific examples at the description of the puzzle types to illustrate this.

The exact size of the overlapping part is marked clearly on the central puzzle. None of the puzzles shall ever be rotated when looking for overlaps, all of them remains oriented upright. However, it is part of the challenge to figure out which corner puzzle fits into which area of the central puzzle. Therefore, the typical path towards a full solution looks like:

1. Solve all the corner puzzles (individually). Each of the corner puzzles has a unique solution.
2. Individual solutions will be checked right away. If at least four puzzles are correctly solved, the solver can proceed to the team table (even if the 5th puzzle is wrong or empty). Judges will be instructed to clearly mark correct solutions, but they will not point out any mistake in puzzles that are incorrectly solved (they will just indicate that the solution is incorrect). There is no time penalty with re-trying, but the solver needs to go back to their table to continue solving / correct the mistakes.
3. Bring all corner puzzles to the team table and find out which of the four corner puzzles fits which area of the central puzzle.
4. Copy the necessary information from the corner puzzles onto the central puzzle. This ensures that the central puzzle has a unique solution (without the additional information from the corner puzzles, that may not be the case).
5. After 40 minutes, any competitors still on the individual puzzles are asked to move to the team room (bring unsolved puzzles along) and continue as a team together.
6. Solve the central puzzle (as a team).

Scoring

Each of the corner puzzles is worth 60 points. Each of the central puzzles is worth 160 points. This round only counts into the team competition, even though it is partly solved individually.

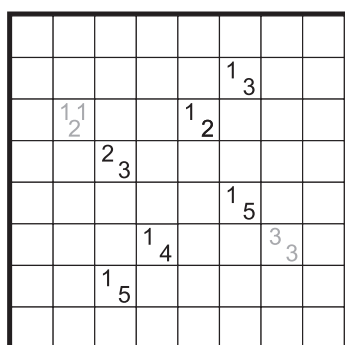
Puzzle 1 – Tapa

Shade some empty cells black to create a single connected wall. Numbers in a cell indicate the length of consecutive shaded blocks in the neighbouring 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.

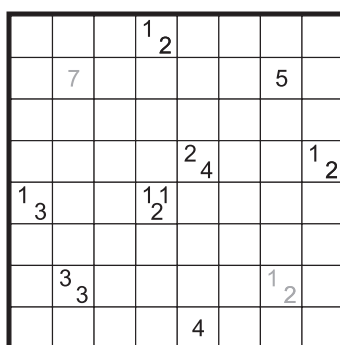
In the central puzzle, some clues are given as a question mark. Each of these question marks conceals a non-zero number (in case there are multiple question marks within a cell, there is no constraint on the numbers they conceal, they may repeat or may all be different).

Note that Tapa rules only apply within single puzzles, they do not have to be satisfied when the puzzles are placed together overlapping. E.g. see the “1-2” clue in R1C4 of Corner Puzzle #2: it is valid within the context of Corner Puzzle #2 but not when the overlap with Central Puzzle is considered, e.g. it does not stop R5C8 of Central Puzzle from being shaded.

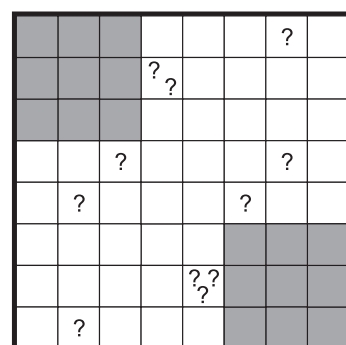
For the interaction between the corner puzzles and the central puzzle, identify which corner puzzle fits which part of the central puzzle, then copy over the respective parts of the solution. Black cells and white cells should be copied. The clues do not propagate to the central puzzle, so they should not be copied, their cells is copied as a white cell. (For this reason, all clues of the corner puzzles that are in a region which might be copied, are typeset in a grey colour.)



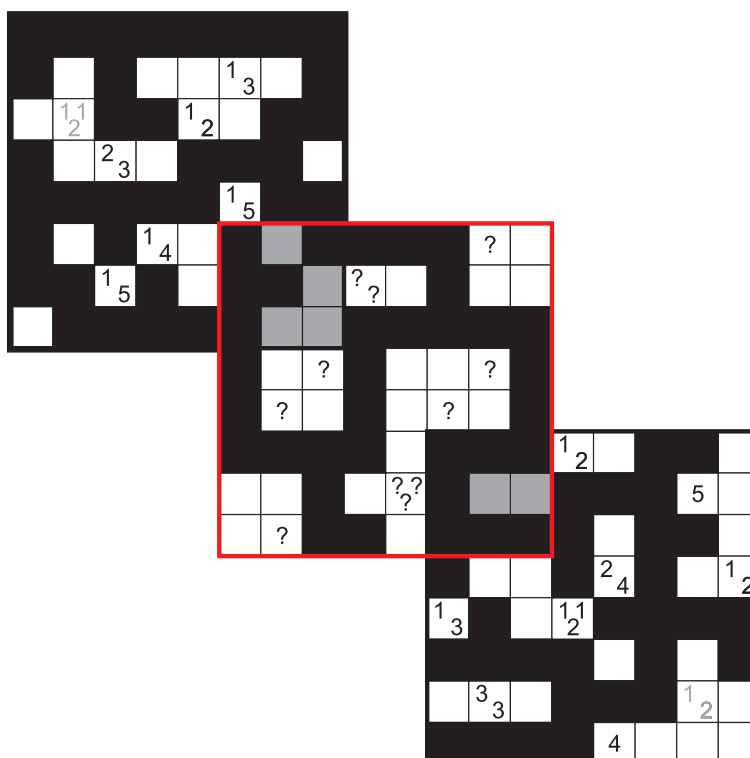
Corner puzzle #1



Corner puzzle #2



Central puzzle



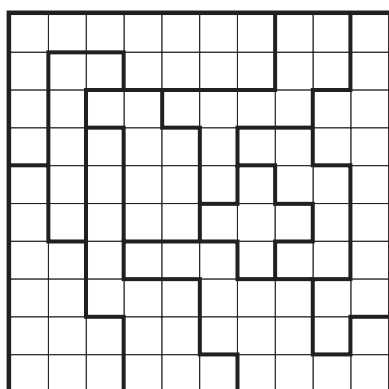
Puzzle 2 – Star Battle

Place stars into some of the cells such that cells containing stars do not touch each other, not even diagonally. There are two stars in each row, column and region.

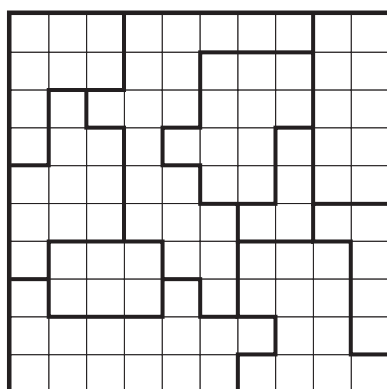
In the competition's central puzzle, there are **three (3)** stars in each row, column and region.

Note that Star Battle rules only apply within single puzzles, e.g. the star in R10C7 of Corner puzzle #2 (top left in the solution) would not stop there being another star in R4C1 of Central Puzzle, even though these two cells touch diagonally in the overlapped representation.

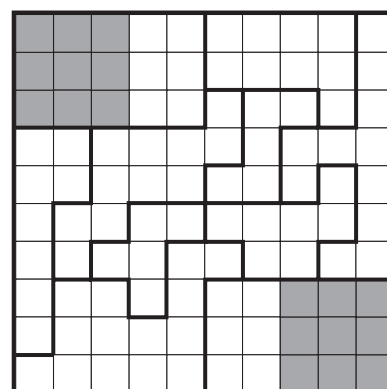
For the interaction between the corner puzzles and the central puzzle, identify which corner puzzle fits which part of the central puzzle, then copy over the respective parts of the solution. Stars and empty cells should be copied. The region boundaries do not propagate to the central puzzle, so they should not be copied. Similarly to the sample puzzles below, each of the grey zones of the central puzzle belongs to a single region in the competition puzzle.



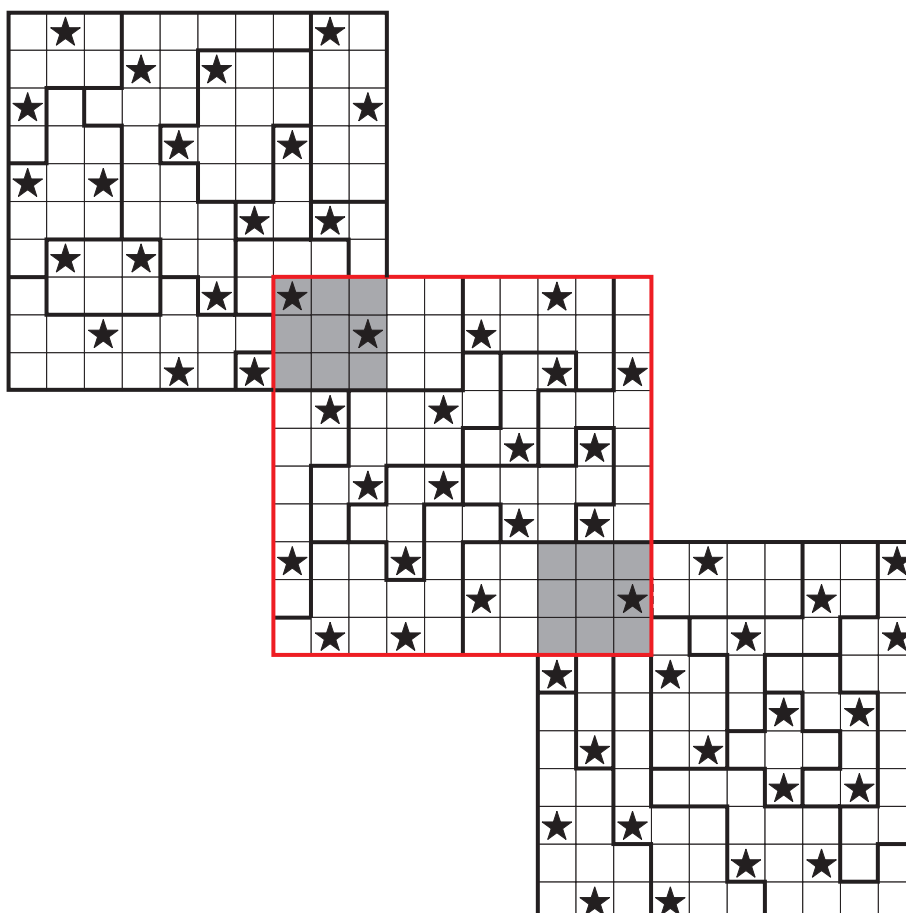
Corner puzzle #1



Corner puzzle #2



Central puzzle



Puzzle 3 – Trinaire

Fill in the grid with digits 1–3 such that each row and column contains each digit exactly three times. A digit in a grey cell cannot appear in any of the four cells that share an edge with its own cell.

For the interaction between the corner puzzles and the central puzzle, identify which corner puzzle fits which part of the central puzzle, then copy over the respective parts of the solution. Only the digits should be copied. The grey cells do not propagate to the central puzzle, so the shading should not be copied. (For this reason, the overlapping regions of the central puzzle are highlighted with a dashed rectangle, rather than a grey area.)

3			3				1	
		2			1			
	1					3		2
			1					
	3			2			2	
		1				1		
3			2		2			1
	2			3		2		
								2

Corner puzzle #1

			1					
		1			1	2		
3				3				
	2				3	1		
		1		2				
1					3		1	
		3				3		
	1			2		1	1	

Corner puzzle #2

					3			
						1		
						3		1
					2			
		1		2				2
3					1			
				1				
	2							
			3		1			

Central puzzle

2	1	3	1	3	2	3	1	2
1	3	1	2	2	1	3	2	3
3	1	2	2	3	2	1	3	1
1	2	3	2	1	3	2	1	3
2	3	1	3	2	1	1	3	2
1	3	2	3	1	3	2	2	1
3	2	3	1	1	1	2	3	2
3	1	2	3	2	3	1	2	3
2	2	1	1	3	2	1	2	3
2	3	2	1	1	3	2	1	3
1	2	3	2	1	3	2	1	3
3	1	3	2	3	1	2	2	1
2	3	3	2	1	2	3	1	1
1	2	1	1	3	3	2	3	2
2	1	2	3	2	1	3	1	3
2	2	2	1	3	3	1	1	3
1	3	2	3	2	1	3	2	1
2	2	1	3	1	3	1	3	2
3	1	3	2	1	2	3	2	1
1	2	3	1	3	1	2	3	2
1	3	1	2	2	3	1	2	3

Puzzle 4 – No Four in a Row

Fill in the grid with O's and X's so that four consecutive identical letters in a row, column or diagonal never occur.

Note that “No Four in a Row” rules only apply within single puzzles. Starting at R7C5 of Central puzzle in the solution figure and moving towards down/right diagonally, there are 4 consecutive O's, but this does not violate the rules within any of the single puzzles.

For the interaction between the corner puzzles and the central puzzle, identify which corner puzzle fits which part of the central puzzle, then copy over the respective parts of the solution. All X's and O's are to be copied.

		X				X	X
	O			O			
				X		O	X
X	O		X				
	X	X			X		
		O	O			X	
	O	O			X		
			O	O			O

Corner puzzle #1

X		O		O		X	
O		X					O
					X		O
			O		X		O
X	O		X	X			X
	O			O			
							X
O			X	X			

Corner puzzle #2

					X		X
			O			O	
					O		
					O		X
			O				X
O			X				
		X					
O	X		X				

Central puzzle

O	X	X	X	O	X	X	X
X	O	X	O	O	O	X	O
O	O	X	O	X	O	O	X
X	O	O	X	X	X	O	X
X	X	X	O	O	X	X	X
X	O	O	O	X	O	X	O
O	O	O	X	O	X	X	O
X	X	O	O	O	X	O	O
O	O	X	O	X	O	X	X
X	X	X	O	O	O	X	X
O	O	O	X	O	X	X	O
O	X	X	X	O	O	O	X
O	X	O	X	X	O	X	X
X	O	O	X	X	O	O	O
X	O	O	X	X	X	O	X
X	O	O	X	O	O	O	X
O	X	X	O	X	O	X	X
O	O	O	X	X	X	O	O

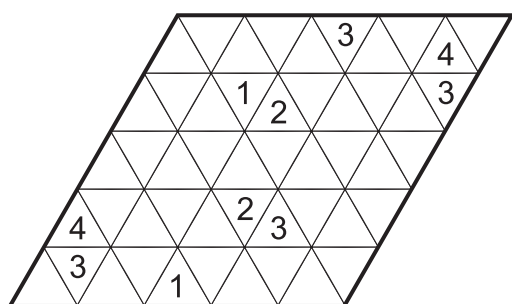
Puzzle 5 – Tria 4

Fill in the grid with digits 1–4 such that every “large triangle”, consisting of four small triangles, contains all digits between 1 and 4 exactly once.

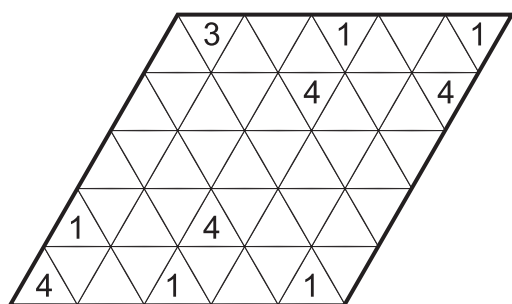
Note that at the obtuse corners of the grid, it is possible for two small triangles that share an edge to have identical digits – this is allowed as long as the main rule is not violated, i.e. there is no “large triangle” that contains them both.

Also note that the “large triangles” rule only applies within single puzzles. The “large triangles” around the overlapping areas that are not entirely contained within either the corner or the central puzzle, do not have to satisfy the main rule. See triangles #6-7-8 in the bottom row of Corner puzzle #2 containing 3-2-4, joined by another triangle from the bottom containing a 3. However, this “large triangle” is not part of any of the single puzzles, therefore the Tria rule does not apply.

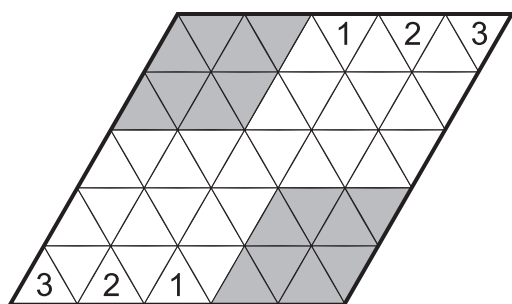
For the interaction between the corner puzzles and the central puzzle, identify which corner puzzle fits which part of the central puzzle, then copy over the respective parts of the solution. All numbers are to be copied.



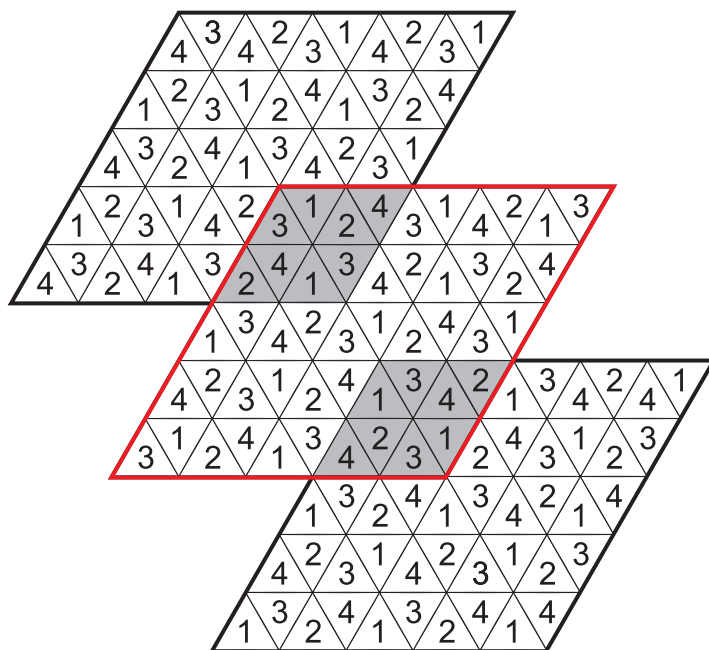
Corner puzzle #1



Corner puzzle #2



Central puzzle



PART 14	Year of Snake	
Team round	60 minutes	2000 points

Overview

This round consists of multiple puzzles that are interconnected in various ways. The large grid initially contains a number of fixed puzzles (5 in the competition puzzle) that are printed onto the grid and a set of floating puzzles (20 in the competition puzzle) that will be distributed separately on paper tiles. In addition to solving all these puzzles, the tiles need to be placed onto the grid. If all solutions and tile placements are correct, a Giant Snake will be revealed.

Fixed puzzle 1 (Triangle Snake) uses the white areas on the grid. Fixed puzzles 2-5 are found in coloured areas (yellow). The floating puzzles' tiles are numbered from 1 to 20 and are also coloured. The placement of the floating puzzles' tiles onto the grid is aided by shaded grey areas that mark the location of the tiles.

Notably, some of tiles actually touch the fixed puzzles by side, this is related to an interaction between the solutions of the fixed puzzles and the placement of the tiles: there are a few „small numbers” written in red colour into the bottom right corner of some of the cells of the fixed puzzles. These „small red numbers” do not play a role in the fixed puzzles but some of them will provide clues to identifying the floating tiles that will touch that particular fixed puzzle: for all the cells with such clues, the clue identifies a touching tile if and only if the cell ends up containing a one (1) as part of the solution of the fixed puzzle. A tile touches a fixed puzzle if they share an edge of at least one unit. These clues reveal all the touching tiles for all the fixed puzzles.

Note that even though both the example and the competition puzzles are quite colourful, there is no colouring requirement during solving the rounds.

Fixed puzzles

All fixed puzzles have a unique solution. The small red numbers in the bottom right corner in some of the cells play no role for the purpose of these puzzles.

Puzzle 1 – Triangle Snake

Draw a triangle snake onto the grid. This snake consists of a consecutive set of unit squares and half unit square triangles. (Such a triangle is defined as the isosceles right triangle obtained by cutting a unit square into two halves by one of the square's main diagonals.) There is no restriction on the number or the order of triangles and squares. The length of the snake is not given.

The snake's body is edge-connected. The snake's body does not touch itself, not even at a single point. The snake does not have any of its parts located in coloured cells that belong to the other fixed puzzles, nor does it enter any of the grey floating tile placeholders.

Numbers above and to the left indicate the lengths and shapes of the blocks that the snake occupies in that row or column, in the order they appear. The shape of these blocks is indicated by using triangles and squares in the clues, in the same order they appear within the block. In case of triangles, even the orientation of the triangle is given exactly as they appear. However, if a block contains multiple consecutive squares, the clue will show a single square instead, with the actual number of squares in the block written into the clue square.

Puzzle 2 – Easy as 12345 (top left puzzle):

Place digits 1–5 into the grid so that each of them appears in every row and column exactly once. Some cells remain empty. Clues outside the grid identify the first digit seen in that row/column from that direction.

Puzzle 3 – Fillomino (bottom left puzzle)

Divide the grid into regions along the grid lines so that no two regions of identical size share an edge (but may touch at a single point). All the given numbers are equal to the area of the region they are in. It is possible for a region to contain one or multiple numbers or none at all. *It is not mandatory to write numbers, as long as the areas are correctly indicated. However, for the purpose of selecting the “small red numbers” to identify touching tiles, an area of 1 counts as if a digit 1 was there.*

Puzzle 4 – Skyscrapers (bottom right puzzle)

Enter a digit from 1 to 7 into each cell so that each row and column contains each number exactly once. Each digit in the grid represents the height of a building and the clues on the outside of the grid indicate how many buildings can be "seen" when looking from that direction. Taller buildings block smaller ones from being seen.

Puzzle 5 – Magic Snail (top right puzzle)

Place digits 1–4 into the grid so that each of them appears in every row and column exactly once. Some cells remain empty. Along the snail from outside towards the centre, digits are encountered in order 1-2-3-4-1-...

Note: in the sample puzzle, Magic Snail is at the top (with numbers 1–4), Fillomino is at the bottom, Easy as 1234 is on the left hand side (with numbers 1–4), finally Skyscrapers is on the right hand side (with numbers 1–6). In the competition puzzle the layout will be as indicated in the puzzle titles above.

Floating puzzles

The floating puzzles will be handed to teams on tiles numbered from 1 to 20. The floating puzzles' tiles are numbered from 1 to 20 and are also coloured (red, yellow, green and blue but the actual colours do not matter). There are four different puzzle types for the tiles, their numbering and colouring corresponds to the puzzle tiles, i.e. tiles 1-5 are of a particular colour and contain a particular puzzle type, whereas tiles 6-10, 11-15 and 16-20 are similarly grouped by having the same colour and the same puzzle type. *(In the example, there are similarly four groups of puzzles but each group has only two puzzles.)*

Some of the floating puzzles have a unique solution without interacting with any other component of the round. Some others will only be uniquely solveable in the context of other constraints of the grid.

The placement of all the tiles have to be on grey areas that are highlighted. The tiles cannot be rotated. The rules of the individual floating puzzles are discussed after the introduction of the Giant Snake.

The Giant Snake

Upon solving all fixed and floating puzzles and placing the tiles correctly, the final result of the puzzle is a Giant Snake that is obtained from snake fragments on the floating tiles (see rules below). In the sample puzzle, the Giant Snake is marked with colours orange-black.

The standard snake rules naturally apply to this Giant Snake: it consists of horizontal and vertical body parts and its body never touches itself, not even diagonally. The entire body of the Giant Snake lies on the floating puzzle tiles, no part of it is found in any of the fixed puzzles or nobody's land. In particular, the Giant Snake is allowed to touch the Triangle Snake but of course cannot cover any parts thereof.

The Giant Snake has its head on tile 1 and its tail on tile 20 (1 and 8 in the example), but the other parts of its body do not necessarily visit the tiles in the order the tiles are numbered. In fact, it is allowed for the Giant Snake to enter a particular tile more than once and it is also allowed for certain tiles to contain two or more distinct parts of the body of the Giant Snake.

Puzzle A (red): Snake around the fire (Bosnian Snake)

Numbers in blackened cells denote the number of horizontally, vertically or diagonally adjacent cells that are occupied by the Giant Snake. The clue squares denote campfires so are not part of its body.

Puzzle B (yellow): Snake on the earth (Tents Snake)

Attach a tent to each tree, in a horizontally or vertically adjacent cell, so that cells with tents do not touch each other, not even diagonally. The Giant Snake occupies all cells that do not contain a tree or a tent.

Puzzle C (green): Snake in the water (Nurikabe Snake)

Each of the connected areas that the Giant Snake's body divides the tile into, has a number inside it that reveals the size of that area in unit squares (including the cell with number). The Giant Snake cannot occupy a cell with a number.

Puzzle D (blue): Snake in the air (Four Winds Snake)

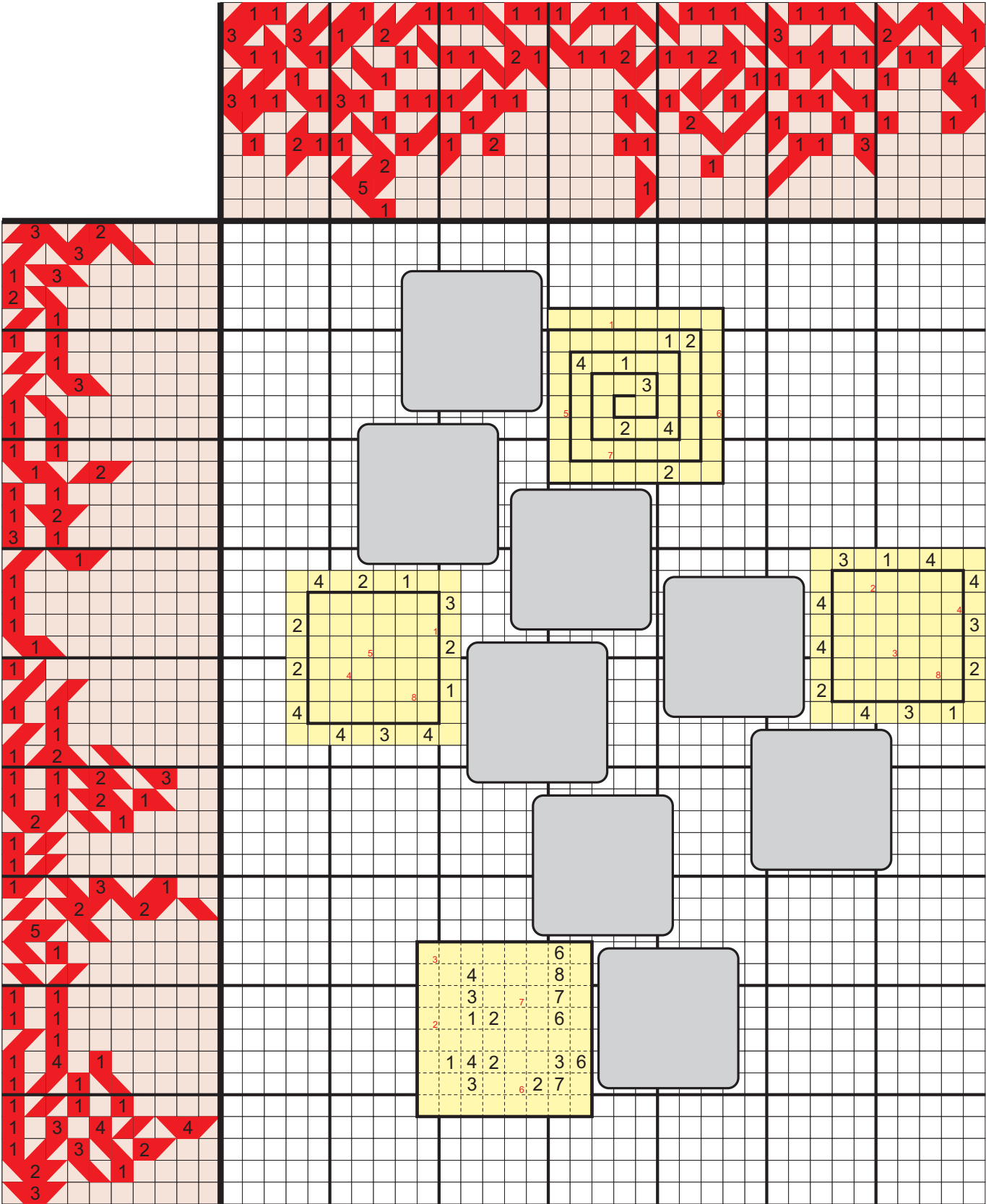
Draw horizontal and vertical line segments from the cells with numbers so that these line segments do not cross or overlap each other. Numbers denote the total length of the segments starting from its cell. The Giant Snake occupies all cells that do not contain a number or a line segment.

Scoring

Partial scores are available in this round, using the following breakdown:

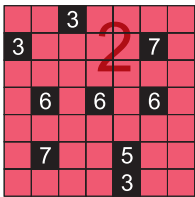
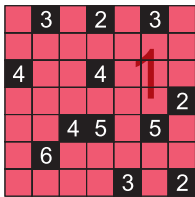
- Correctly drawing the Triangle Snake is worth 300 points. In case it is drawn with a small mistake (at most three cells being incorrect), then 150 points are granted.
- Fixed puzzles (other than the Triangle Snake) are each worth 100 points.
- The tiles are rewarded on a ladder basis, based on how many tiles are solved correctly, irrespective of which ones they are. First five tiles score 20 points apiece, second five tiles score 30 points, third five tiles 40 and the last five tiles 50 points each. This gives a total of 700 points for all tiles.
- As for the Giant Snake, each of the tiles that are correctly placed and has the relevant parts of the Giant Snake on it, is worth 30 points. Therefore the entire Snake is worth a total of 600 points. (It is also acceptable to enter the tiles' number into the grey placeholders and then remove the tiles, as long as they are filled in with the Snake parts).

The puzzle grid

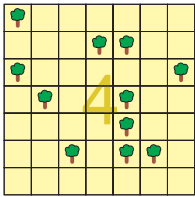
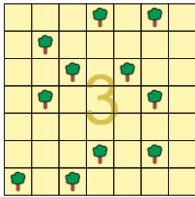


The floating tiles

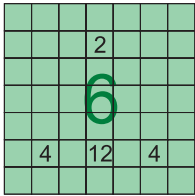
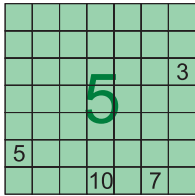
Bosnian Snake



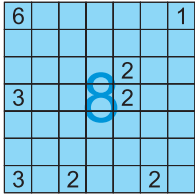
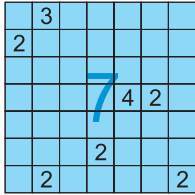
Tents Snake

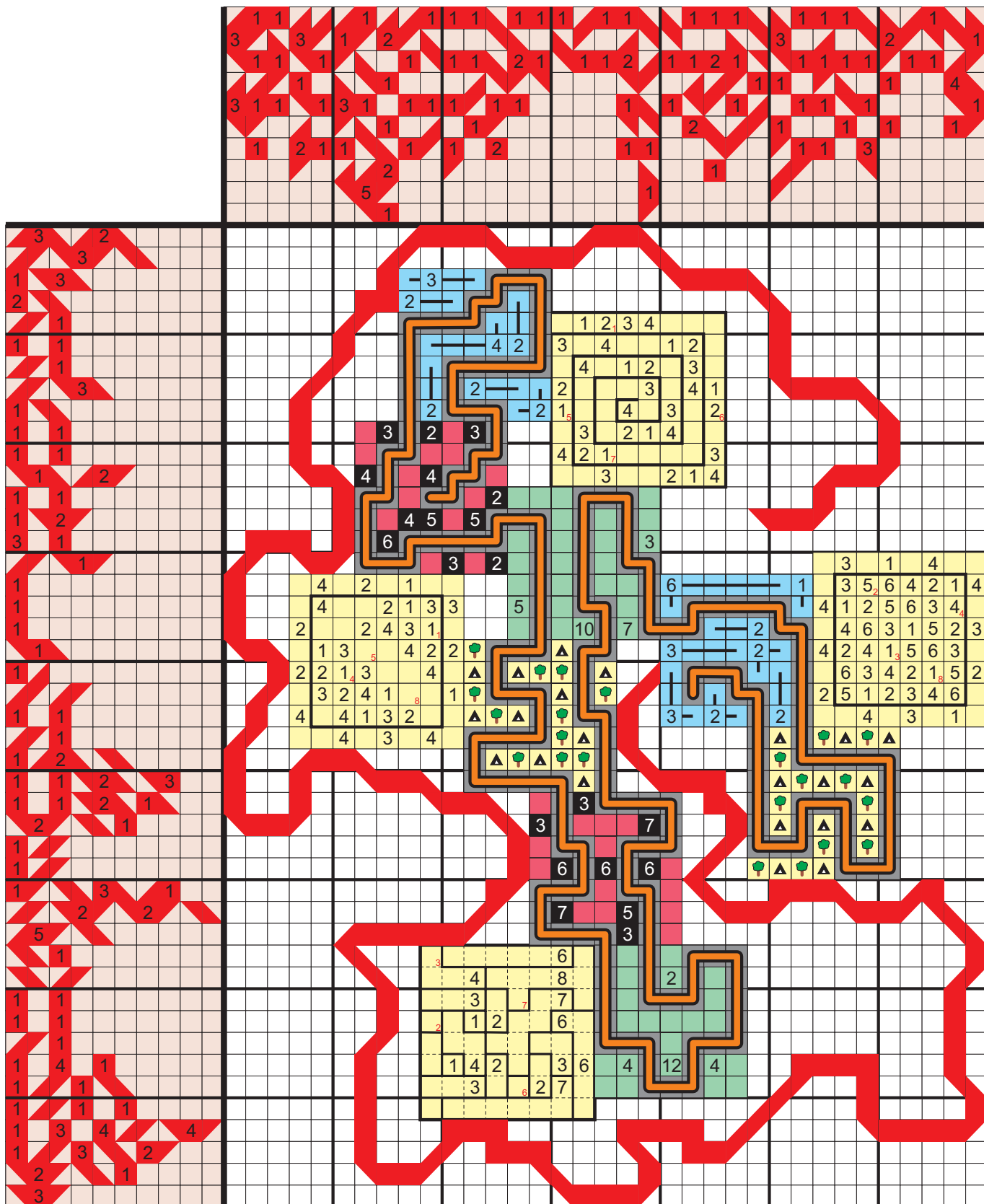


Nurikabe Snake



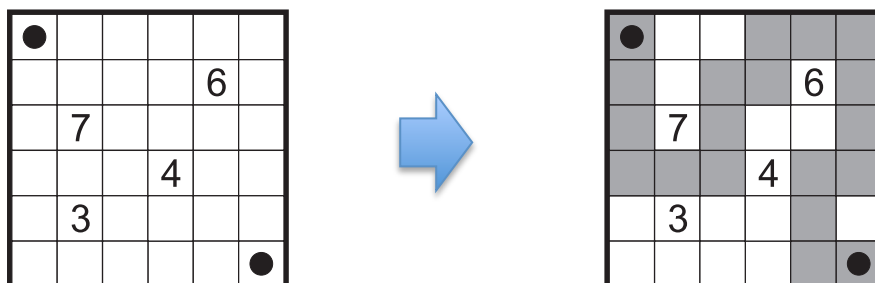
Four Winds Snake





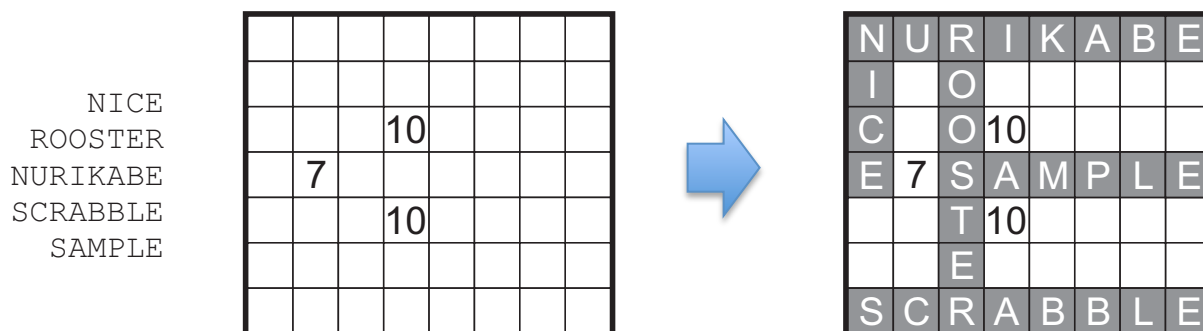
Puzzle A1 – Bosnian Snake

Draw a snake into the grid whose head and tail are given as black dots but its length is unknown. The snake cannot touch itself, not even diagonally. Clues in the grid indicate the number of horizontally, vertically or diagonally adjacent cells that are occupied by the snake.



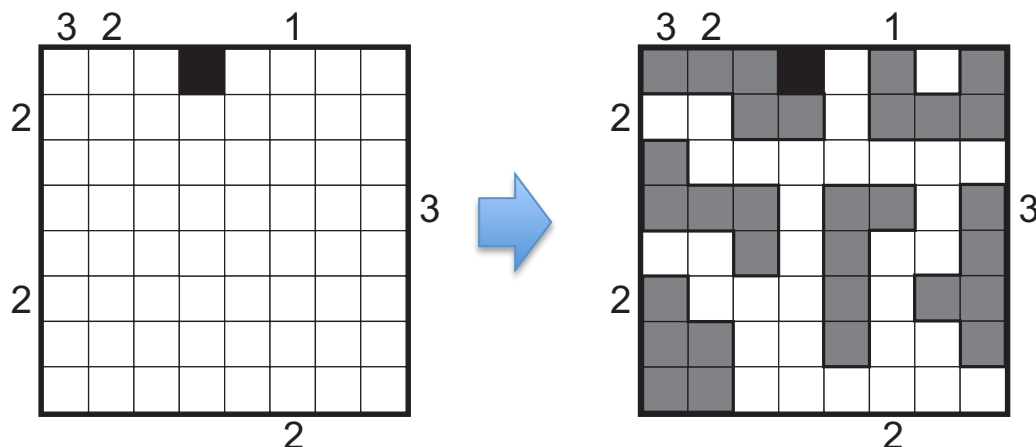
Puzzle A2 – Nurikabe Scrabble

Place the given words into the grid, across or down, so that they are all connected. No unlisted word can appear anywhere, not even two-letter ones. The words do not occupy any 2x2 area. Numbers indicate the size of the area without words that the number is in. All areas are represented by a number but no letters are given.



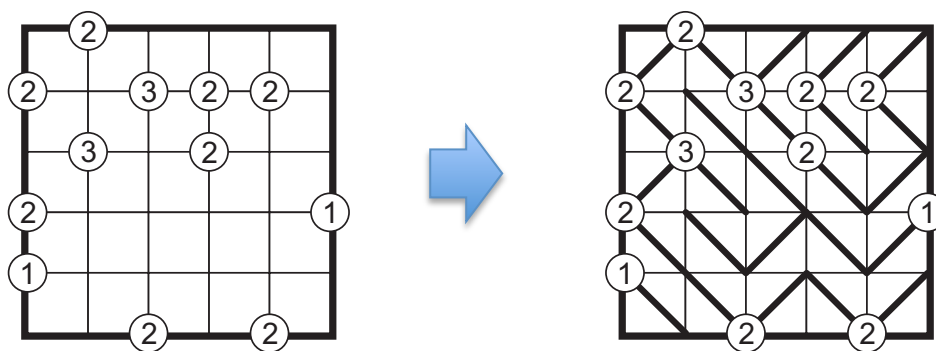
Puzzle A3 – Skyscraper Pentomino

Place some pentominos into the grid, using each of them at most once. Reflections and rotations do not count as different pieces. Pentominos cannot touch each other, not even diagonally. No pentomino can be placed onto black cells. For any row/column, a contiguous segment of N cells containing pentomino parts is considered to be a building of height N. Numbers outside the grid indicate the number of segments that are visible from that direction given that height definition. Buildings (segments) of length N block visibility of all other buildings (segments) of length N or below that are behind them.



Puzzle A4 – Slalom

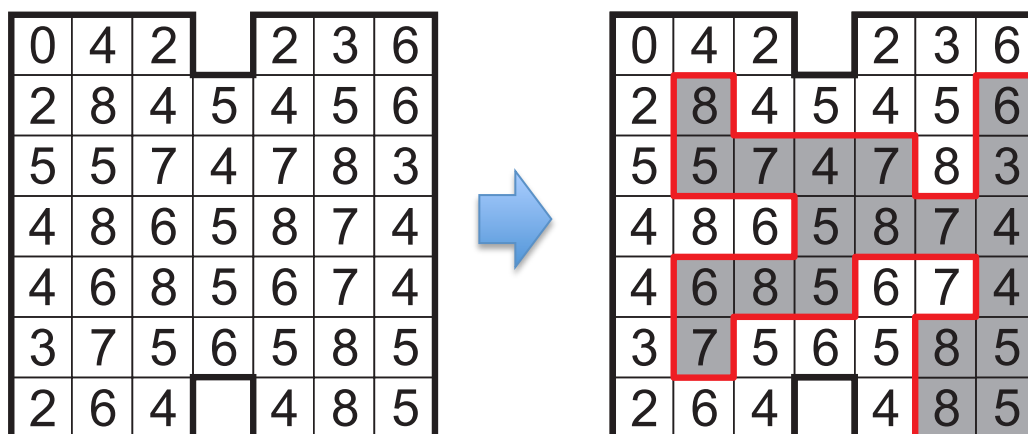
Draw one of the diagonals of each cell so that numbers in each node denote the number of line segments attached to that node. The diagonals do not form a closed loop anywhere in the grid.



Puzzle A5 – The Wall

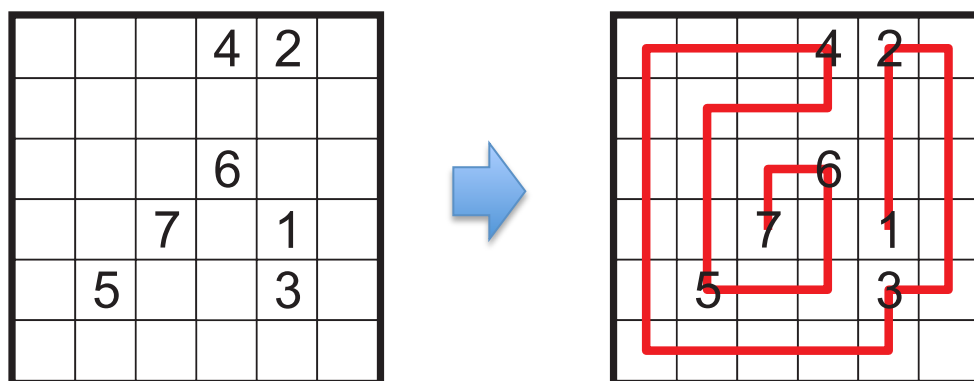
The grid is separated into two connected areas by a wall whose segments only use the boundaries of unit squares. A cell is „visible” from another cell if they are either in the same row or in the same column (irrespective of the wall or the boundary of the grid).

A number in a cell indicates how many cells on the opposite side of the wall are visible from there.



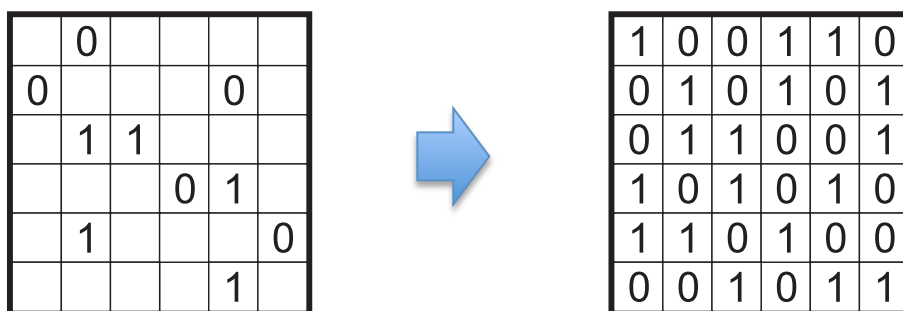
Puzzle A6 – Ariadne’s Thread

Connect all the numbers in increasing order starting from 1. The line consists of horizontal and vertical segments only and it never crosses or overlaps itself. Some cells may remain empty.



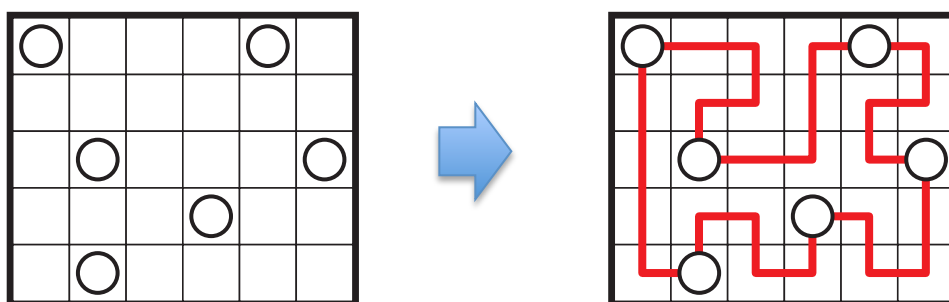
Puzzle A7 – Binaire 0-1

Place digits 0 or 1 into every empty cell so that each row and each column contains an equal number of both digits. Three horizontally or vertically consecutive cells cannot all have the same digit.



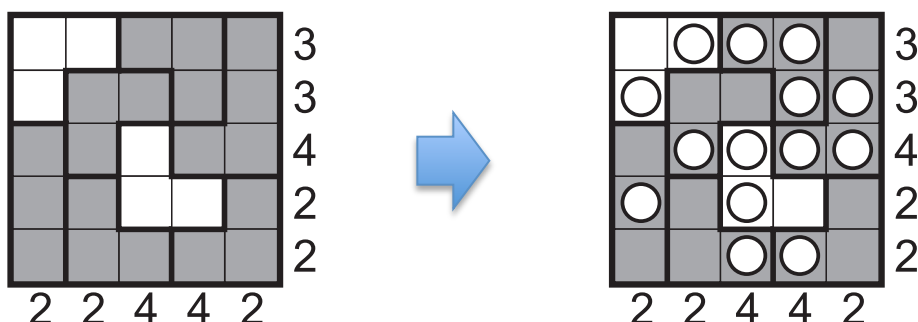
Puzzle A8 – Give me a five

Draw a single, non-intersecting loop into the grid that passes through all cells. Every fifth cell of the loop is marked with a circle.



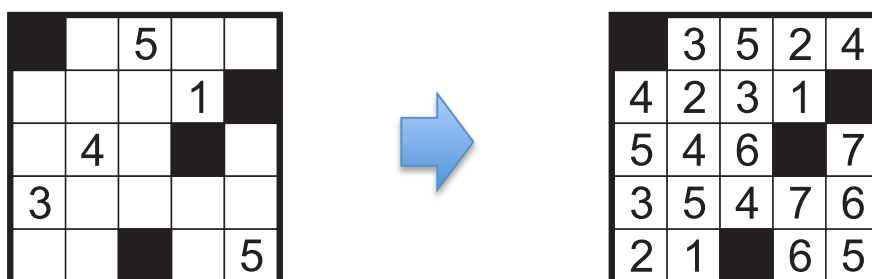
Puzzle A9 – Black and white areas

Draw a circle into some of the cells such that each white region contains an even number of circles and each shaded region contains an odd number of circles. Numbers around the grid indicate how many circles are there in that row/column.



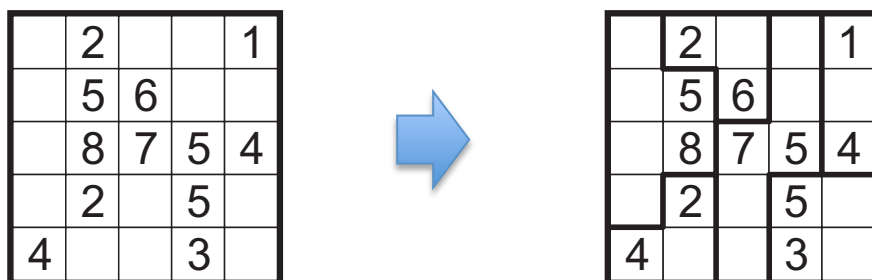
Puzzle A10 – Renban Words

Enter digits 1–7 into the grid such that no digit repeats in any row or column. Any “word”, i.e. any group of digits in a contiguous white block between walls and/or black cells contain a group of consecutive digits. There is no ordering constraint on these digits.



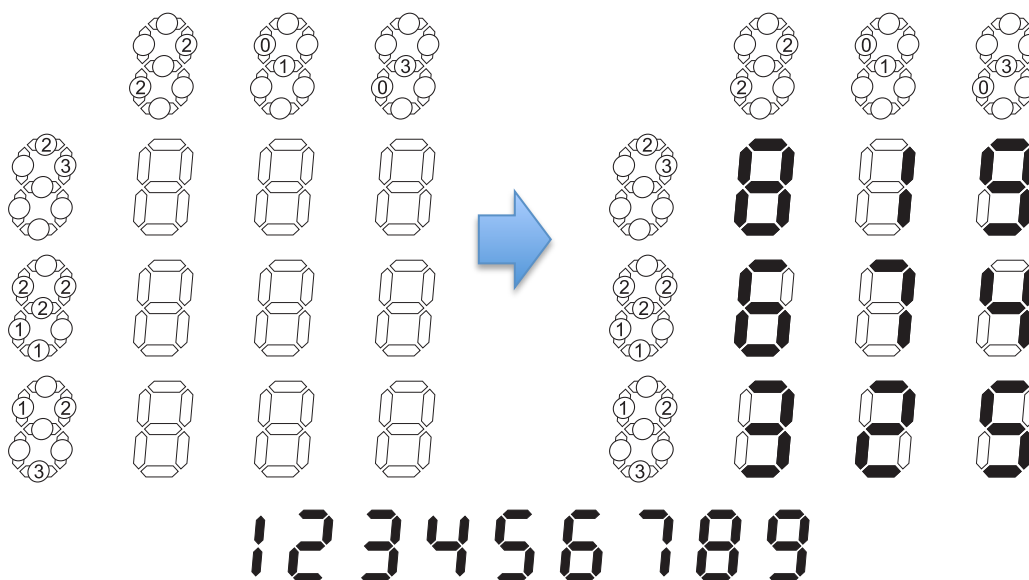
Puzzle B1 – Araf

Divide the grid into connected regions so that each of these regions contains exactly two numbers. The area of a region should be strictly between the two values given by the two numbers in that region.



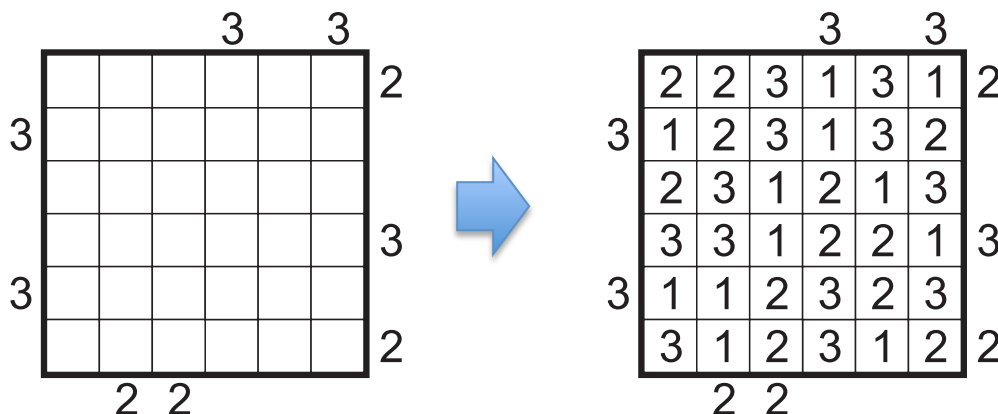
Puzzle B2 – Digital Numbers

Fill in all the seven-segments placeholders with digits so that each digit between 1–9 appears exactly once. Clues to the left and on the top indicate how many times a particular segment is contained by the digits in the given row/column. The digit “1”, wherever it appears, occupies the right hand side of its placeholder.



Puzzle B3 – Doubled Skyscrapers

Enter a digit from 1 to 4 into each cell so that each row and column contains each digit exactly twice. Digits represent skyscrapers, denoting their heights. Numbers outside the grid indicate the number of different skyscrapers visible from outside that direction, with taller buildings blocking smaller ones from being seen.



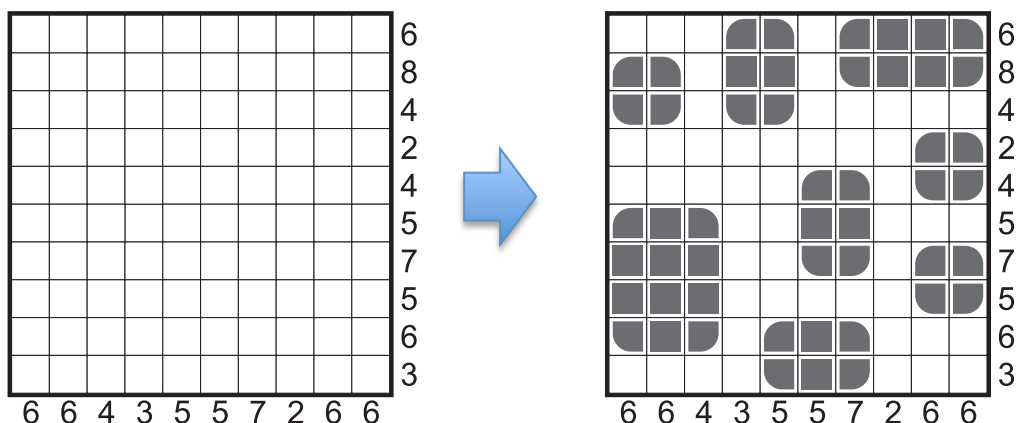
Puzzle B4 – Easy as ABCDE Numbered

Enter letters from A to E into the grid so that each row and column contains each of the letters exactly once. Some cells remain empty. Clues outside the grid all consist of one letter and one number, meaning that the letter's position when seeing from that direction equals to the number (i.e. A2 means that the letter A appears as 2nd in that row/column).



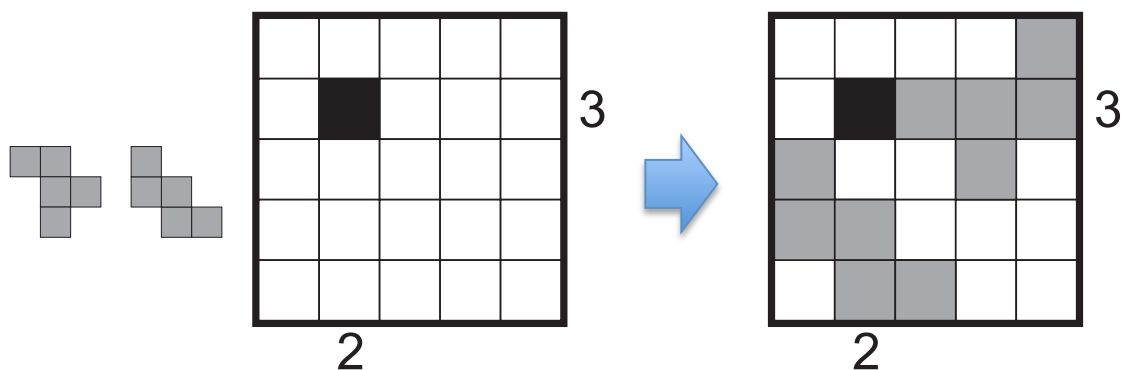
Puzzle B5 – Radar (30 points)

Shade some rectangular areas in the grid so that they do not touch each other, not even diagonally (in other words: if two cells are occupied by two different shaded areas, then those two cells cannot share even a single point). Numbers outside the grid indicate how many cells are shaded in that row/column.



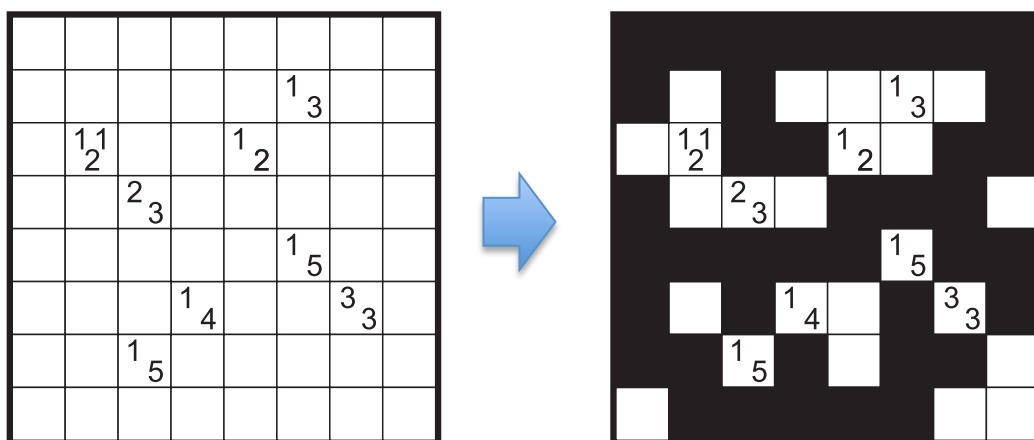
Puzzle B6 – Pentomino

Place the given pentomino tiles into the grid so that they do not touch each other, not even diagonally. The pieces may be rotated but not reflected and they cannot cover any of the black cells. Numbers outside the grid indicate the number of cells occupied by the pentomino tiles in that row/column.



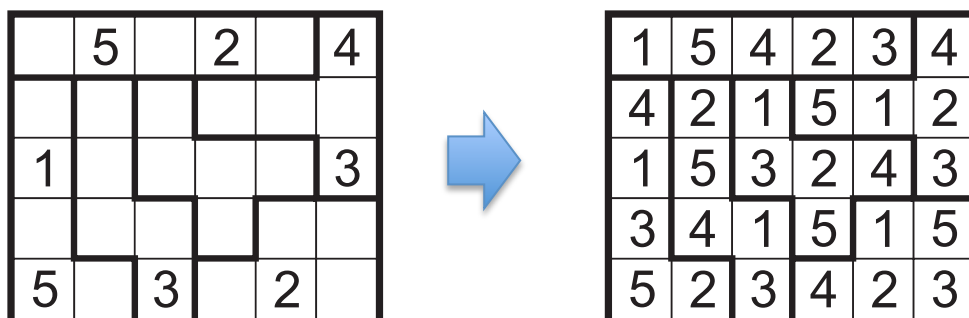
Puzzle B7 – Tapa

Shade some empty cells black to create a single connected wall. Numbers in a cell indicate the length of consecutive shaded blocks in the neighbouring 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.



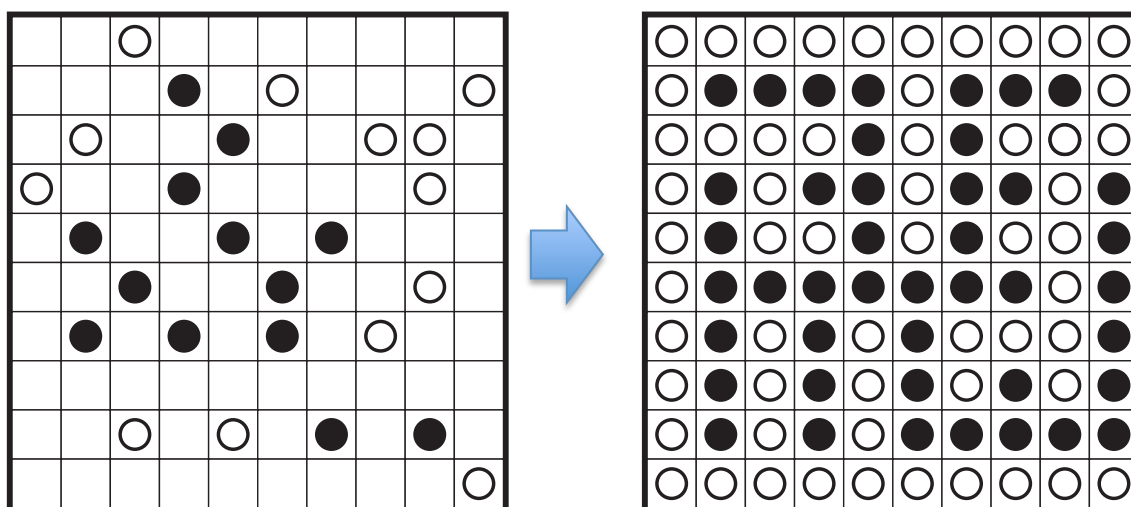
Puzzle B8 – Capsules

Enter a digit from 1 to 5 into each cell so that each region contains each of the digits exactly once. Cells that contain identical digits cannot touch each other, not even diagonally.



Puzzle B9 – Yin and Yang

Place a black circle or a white circle into every empty cell so that all cells with black circles form a connected area and all cells with white circles also form a connected area. Circles in an area of 2x2 cells cannot all have the same colour.



Puzzle B10 – Kakuro

Enter digits 1–9 into all cells of the grid so that no digit repeats in any of the “words” across and down. Clues denote the sum of digits in each of the words.

	17	21		16	21	9
9				12		
			9			
39						
	6			4		
	24			16		
12				11		
			10			6
39						
10				7		



	17	21		16	21	9
9	8	1		12	9	1
			9			
39	9	4	8	7	5	6
	6			4		
	24			16		
12	9	3		11	9	2
			10			6
39	8	6	9	7	4	5
10	7	2	1	7	6	1