

Instruction booklet for the qualifying round of Logic Masters 2011

On Saturday, May 7, the official contest file will be available for download. Make sure you have read and understood the rules of the contest.

Welcome to the qualification round for the Logic Masters 2011!

We hope you enjoy the competition, regardless of whether you compete seriously or just for fun.

The contest will consist of 20 puzzles, some of them being extremely difficult. We believe most puzzlers will not be able to solve all of them in time. Solve those puzzles you can solve and skip the others; if you have time left, you can always come back to them.

The points for the puzzles have been assigned according to their difficulty. You may use these information to decide which puzzles to try first. However, keep in mind your estimation of a puzzle's difficulty may differ from ours.

We wish you good luck, enjoy the puzzles!

Last minute changes:

If there are any changes or clarifications, they will be announced in our forum at <http://forum.logic-masters.de/showthread.php?tid=819>

Remember:

- Wrong answers will yield a penalty of 5 points.
- Incorrect answer keys for an otherwise correct solution may be accepted. However, in such a case only 80% of the puzzle's points will be given.
- You may enter your answer keys at any time, to avoid time trouble at the end of the contest. Note that late answers will yield a penalty of 1 points per 8 seconds.
- You are solely responsible for sending your answers in time.
- You must solve the qualification puzzles without outside help. Computer programs, Sudoku solvers or similar are not allowed.

Answer key:

Please keep in mind the following guidelines when entering your answer keys:

- If not specified differently, enter your solution from top to bottom.
- For clarity's sake, you may use commas and spaces in your answer keys; they have no bearing on the correctness of your solutions.
- The solution form does not distinguish between capital and lower case letters.

Instructions

The following instructions come directly from the contest file; only the diagrams have been removed. Instead of them, small examples are shown. These examples can not be found in the test file. You should read and understand the instructions and examples before the test.

1. Masyu

10 points

Draw a single closed loop, traveling horizontally and vertically, connecting the centers of the cells. The loop must pass through every cell containing a circle. At each cell containing a black circle, the loop must make a 90-degree turn, and must travel straight for at least two cells in both directions. At each cell containing a white circle, the loop must pass straight through the circle, and must make a 90-degree turn in at least one of the cells immediately before or after the circle.

Example:



Answer key: For each row from top to bottom, enter the number of cells not used by the loop.

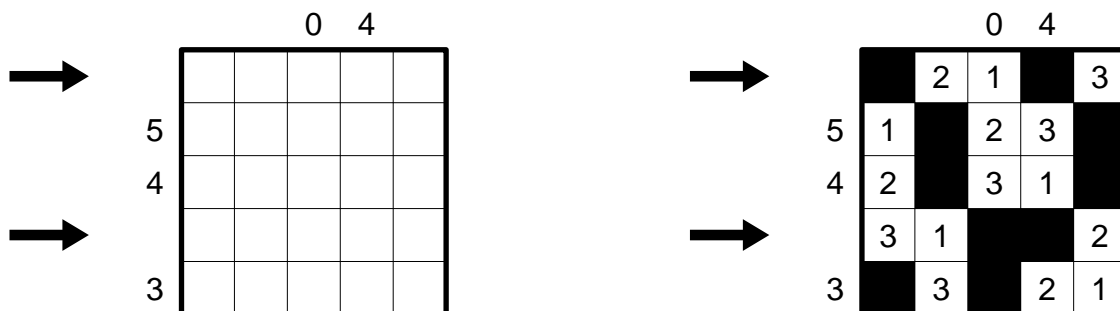
For the example, the answer key would be: 23211

2. Double Block

10 points

Fill the grid with black cells and digits from 1 to 4, so that each row and column contains two black cells and each digit exactly once. The numbers outside the grid indicate the sum of the digits between the two black cells in the respective row or column. In rows or columns without information the black cells may or may not be adjacent to each other.

Example (using digits from 1 to 3):



Answer key: Enter the digits in the marked rows from left to right. Use '-' for black cells.

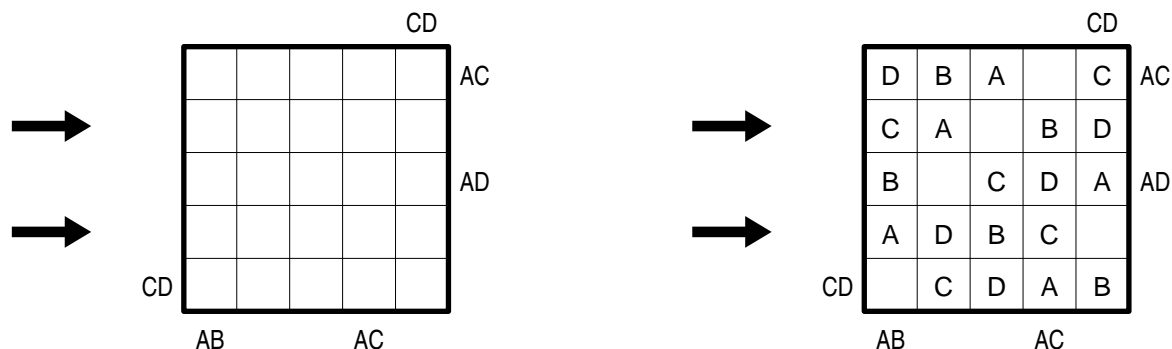
For the example, the answer key would be: -21-3, 31--2

3. Double Easy as ABCD

10 points

Place letters A, B, C, D into the grid, so that in each row and column, each letter appears exactly once; one cell remains empty in each row and column. The letters outside the grid indicate which two letters come first in the respective row or column; in what order is for you to find out.

Example:



Answer key: Enter the letters in the marked rows from left to right. Use '-' for empty cells.

For the example, the answer key would be: CA-BD, ADBC-

4. Heyawake

15 points

Blacken some cells in the grid so that no two black cells are horizontally or vertically adjacent and all white cells are connected (the black cells may not divide the grid into two or more parts). No horizontal or vertical sequence of white cells may span more than two outlined areas. The numbers indicate the number of black cells in the respective area.

Cells with numbers may be blackened; blackened numbers remain valid.

Example:



Answer key: For each row from top to bottom, enter the number of black cells in that row.

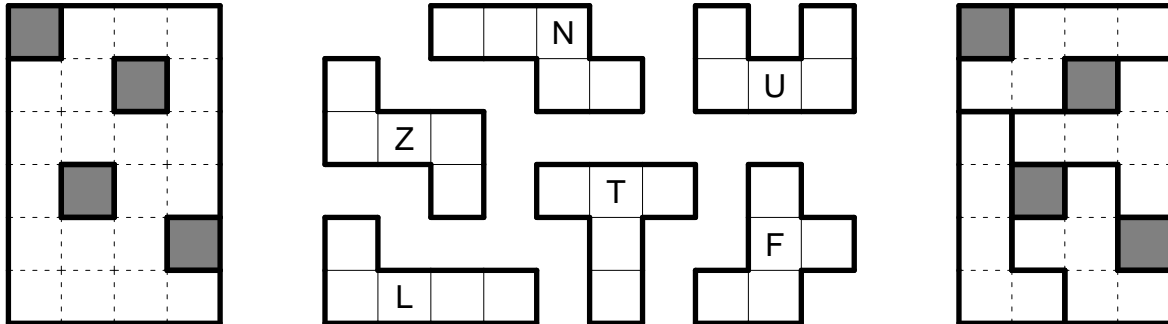
For the example, the answer key would be: 12021

5. Pentomino Dissection

15 points

Divide the grid into nine of the twelve pentominoes without overlapping. All pentominoes may be rotated and reflected, and no pentomino may be used more than once. Grey cells must remain empty.

Example (six pentominoes given, four of them being used):



Answer key: Enter the letters assigned to the three (*in the example: two*) missing pentominoes.

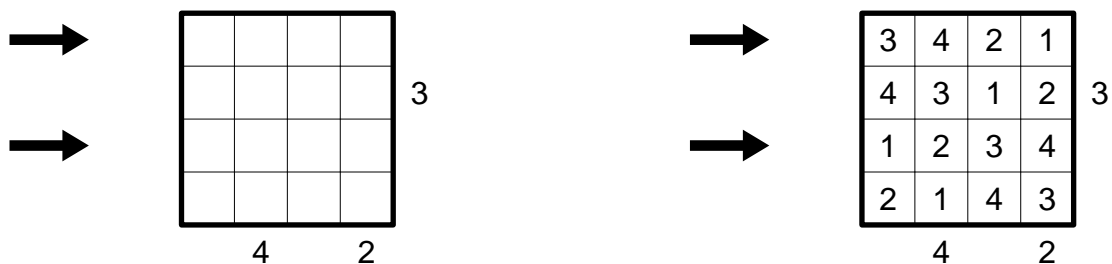
For the example, the answer key would be: UZ

6. Skyscrapers

20 points

Place digits from 1 to 6 into the grid, so that each digit appears exactly once in each row and column. The digits represent skyscrapers of different heights; the numbers outside the grid indicate how many skyscrapers can be seen in the respective row or column from the respective direction. Smaller skyscrapers are hidden behind higher ones.

Example (using digits from 1 to 4):



Answer key: Enter the digits in the marked rows from left to right.

For the example, the answer key would be: 3421, 1234

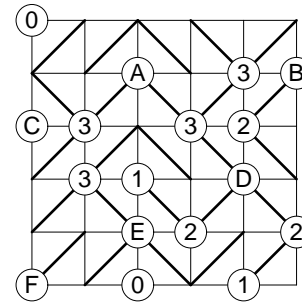
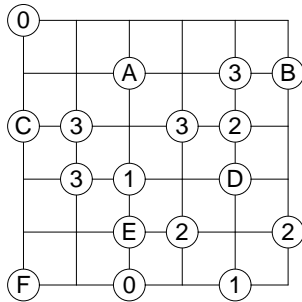
7. Slalom

20 points

Draw a diagonal line in every cell so that no closed loops are formed. The numbers indicate how many line segments meet at the respective vertex.

For solving purposes, ignore the circles with letters.

Example:



Answer key: For the letters ABCDEFGH (in the example: ABCDEF), enter the number of line segments meeting at the respective vertex.

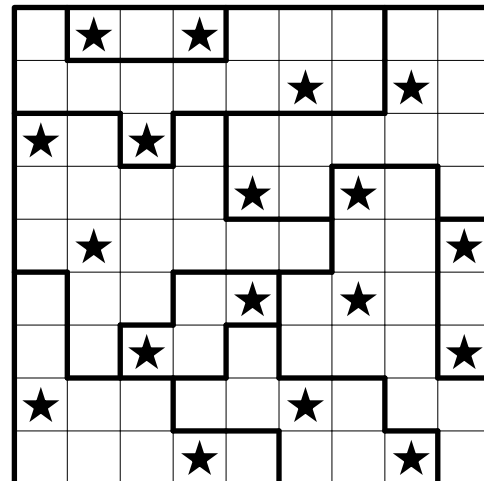
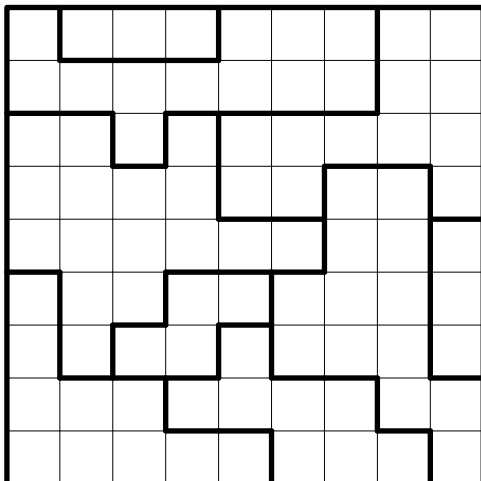
For the example, the answer key would be: 210331

8. Star Battle

20 points

Place stars into the grid, so that each row, each column and each outlined area contains exactly two stars. The stars have the size of one cell and may not touch each other, not even diagonally.

Example:



Answer key: From top to bottom, enter for each row the number of empty cells between the two stars (do not count the cells containing stars itself).

For the example, the answer key would be: 111161543

9. Masterword

25 points

A five letter word must be identified.

Using several other words, some clues are given as follows: white digits in a black cell indicate how many letters are already in the correct position; black digits in a white cell indicate how many letters appear in the solution word, but in a different position.

The solution word does not contain any letter more than once.

Note: the solution word may or may not be a word of the German (or any other) language.

Example (with a four letter word):

A	D	E	L	2	0
B	L	E	I	1	2
G	R	A	U	0	1
R	I	N	G	0	2
				4	0

A	D	E	L	2	0
B	L	E	I	1	2
G	R	A	U	0	1
R	I	N	G	0	2
I	G	E	L	4	0

Answer key: Enter the solution word.

For the example, the answer key would be: IGEL

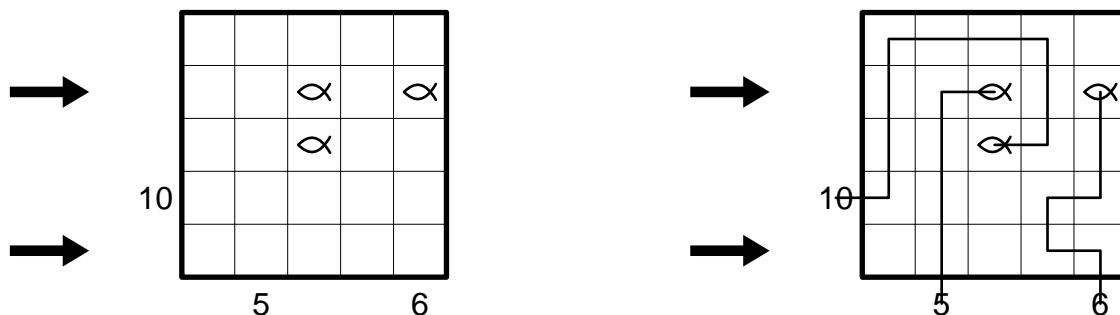
10. Anglers

25 points

Determine which angler caught which fish.

The numbers outside the grid represent anglers. Each of them has a fishing line traveling only horizontally and vertically and ending in a fish. The numbers indicate the number of cells used by the respective fishing line, including the fish itself. No cell may be used by more than one fishing line, but cells may remain empty.

Example:



Answer key: For all cells of the marked rows, enter the length of the fishing line using that cell. Use '-' for empty cells.

For the example, the answer key would be: 1055106, -5-66

11. Tapa word chains

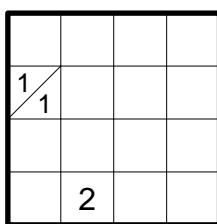
30 points

Place some letters into the grid, so that the given words can be read as „word chains“: Starting with the initial letter, every letter must be horizontally or vertically adjacent to the previous letter. Word chains may take any number of turns. However, two letters may be adjacent in the grid only if they are part of such a word chain. Each word must appear in the grid exactly once.

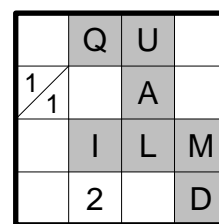
Further, Tapa rules must be observed with regard to the cells filled with letters. The numbers indicate how many of the horizontally, vertically and diagonally adjacent cells contain letters: each number corresponds to a group of horizontally and vertically continuous letters, several groups are separated by one or more empty cells. Position and order of the numbers within a cell are irrelevant.

All letters are connected horizontally and vertically, and no 2×2 square may be completely filled with letters.

Example:



LMD
QUALI



Answer key: Enter all letters from top to bottom; ignore numbers and empty cells.

For the example, the answer key would be: QU, A, ILM, D

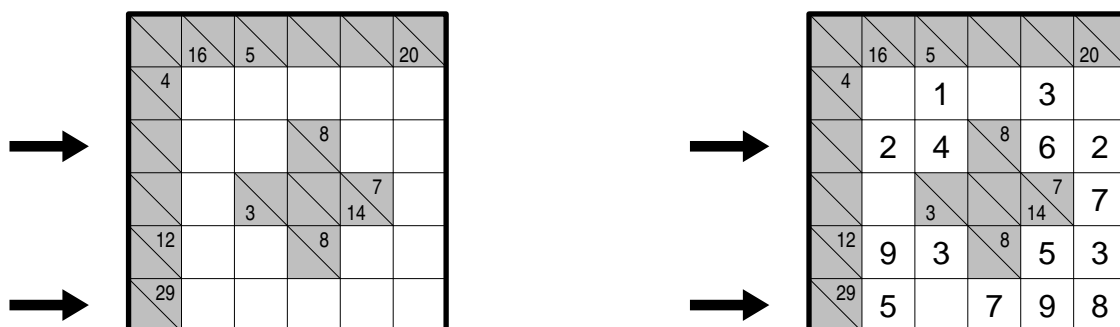
12. Gapped Kakuro

30 points

Place digits from 1 to 9 into the white cells. The numbers in grey cells indicate the sum of digits in the corresponding „word“. In each word, no digit may repeat.

Some white cells may remain empty. Empty cells may not be horizontally or vertically adjacent, but they may touch diagonally.

Example:



Answer key: Enter the digits in the marked rows from left to right. Use '-' for empty cells. Ignore the grey cells.

For the example, the answer key would be: 2462, 5-798

13. Binary dissection

35 points

Divide the grid into rectangles of sizes 1×1 , 1×2 , 1×3 and 1×4 , so that every binary number from 1 to 1111 can be found in one of these rectangles. Numbers must be read from left to right or from top to bottom.

Example (using numbers from 1 to 1000):



1 = 1

3 = 11

5 = 101

7 = 111

2 = 10

4 = 100

6 = 110

8 = 1000

Answer key: For all cells of the marked rows, enter the number (converted to decimal) of the respective rectangle.

For the example, the answer key would be: 7666335, 7188885

14. Number path

35 points

Choose a starting cell, then draw a path into the grid that travels only horizontally and vertically and visits every cell exactly once. If you number the cells along the path consecutively, beginning with 1, each of the given numbers borders the respective cell of the path.

Example:



Answer key: Enter the numbers in the marked rows from left to right.

For the example, the answer key would be: 5121110, 32116

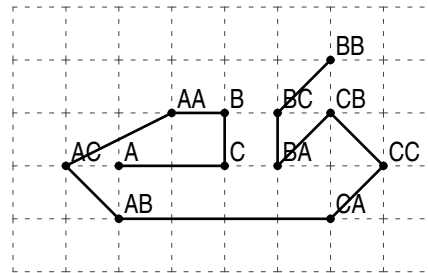
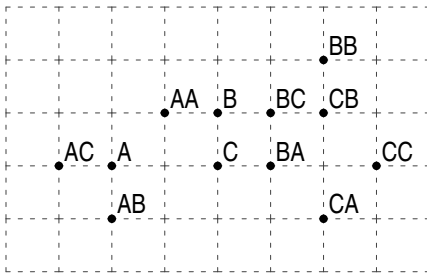
15. Paint by encrypted numbers

40 points

Replace the letters from A to J by digits from 0 to 9, so that all numbers from 1 to 29 appear in the grid (each number appears exactly once). Draw a path into the grid according to the following rules: Connect the points 1 and 2 by a straight line, similarly 2 and 3, 3 and 4, and so on up to 29. The path formed by this procedure may not touch or intersect itself.

The grid lines serve as orientation only.

Example (using letters A, B, C and numbers 1, 2, 3, 11, 12, 13, 21, 22, 23, 31, 32, 33, to be connected in ascending order):



A = 1
B = 3
C = 2

Answer key: Enter the digits corresponding to the letters ABCDEFGHIJ (*in the example: ABC*), in that order.

For the example, the answer key would be: 132

16. Area Tapa

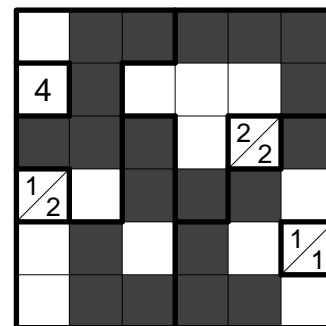
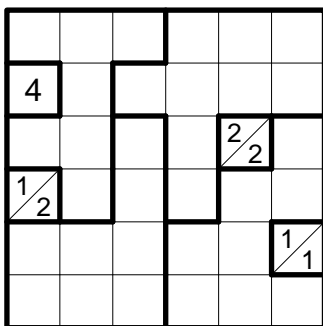
45 points

Blacken some empty cells, so that all black cells are connected horizontally and vertically. No 2×2 square may be completely black, and cells containing numbers may not be blackened at all.

The numbers indicate how many of the horizontally, vertically and diagonally adjacent cells are black: each number corresponds to a group of horizontally and vertically continuous black cells, several groups are separated by one or more white cells. Position and order of the numbers within a cell are irrelevant.

Each outlined area must contain exactly five black cells.

Example:



Answer key: For each row from top to bottom, enter the number of black cells in that row.

For the example, the answer key would be: 524324

17. ABC Box with number clues

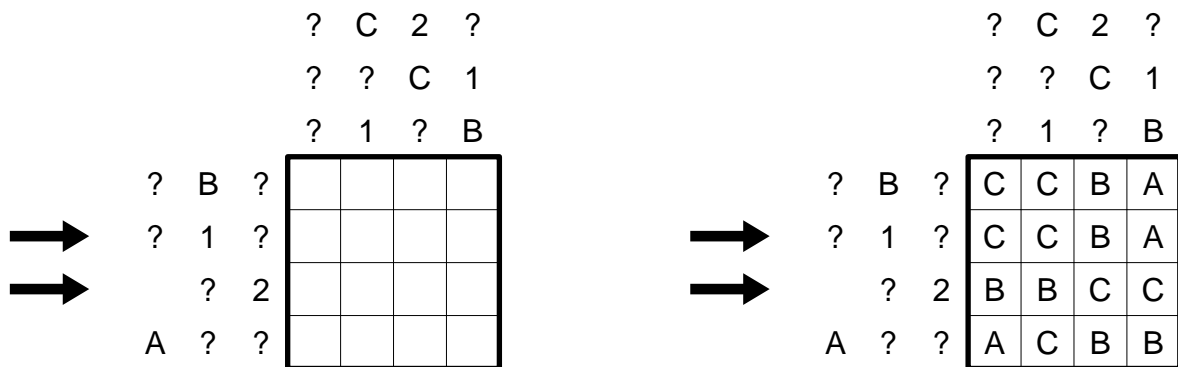
50 points

Fill the grid with letters A, B and C; no cells may remain empty.

The letters, numbers and question marks describe the letters in the respective row or column. Each symbol corresponds to a group of adjacent cells filled with the same letter; two adjacent groups must consist of different letters. The order of the symbols is the same as the order of the groups.

A letter outside the grid corresponds to a group of cells filled with that letter; a number outside the grid is equal to the length of the corresponding group. A question mark corresponds to a group with no further information.

Example:



Answer key: Enter the letters in the marked rows from left to right.

For the example, the answer key would be: CCBA, BBCC

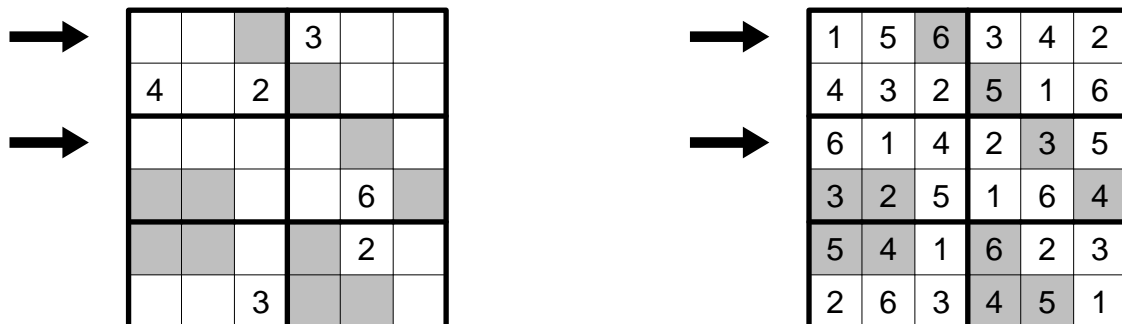
18. Renban Sudoku

50 points

Place digits from 1 to 9 into the grid, so that each digit appears exactly once in each row, column and outlined area.

Horizontally, vertically and diagonally connected grey cells form Renban groups. Each Renban group must contain consecutive digits in any order, and within such a group no digit may repeat.

Example (using digits from 1 to 6):



Answer key: Enter the digits in the marked rows from left to right.

For the example, the answer key would be: 156342, 614235

19. Galaxies

55 points

Divide the grid along the grid lines into several areas. Each area must contain exactly one circle and have point symmetry with regard to that circle.

Example:



Answer key: For all cells of the marked rows, enter the size of the respective area.

For the example, the answer key would be: 77714, 82284

20. Fences variation: letter pairs

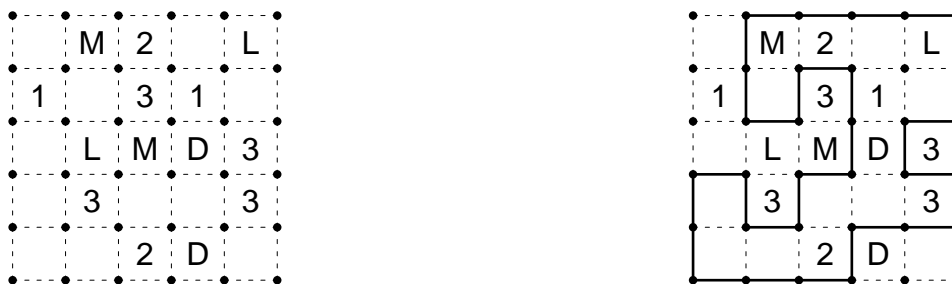
60 points

Draw a single continuous loop by connecting neighboring dots along the dotted lines. The digits indicate how many edges of the respective cells are used by the loop. The loop may not touch or cross itself, and it doesn't need to touch all of the dots.

For each pair of identical letters, one of them must be inside the loop and the other one outside.

Please take care not to confuse the letters O and I with the digits 0 and 1!

Example:



Answer key: Enter the size (number of cells) of all areas outside the loop. Start in the top left corner of the grid and proceed clockwise.

For the example, the answer key would be: 7, 1, 2

The puzzles were created by the following authors:

- Florian Kirch: 10, 16, 17, 20
- Hartmut Seeber: 5, 9, 11
- Roland Voigt: 1, 2, 6, 8, 18, 19
- Ulrich Voigt: 3, 4, 14, 18
- Philipp Weiß: 7, 13, 15
- Serkan Yurekli: 12