

# Logic Masters 2007

## Qualification test

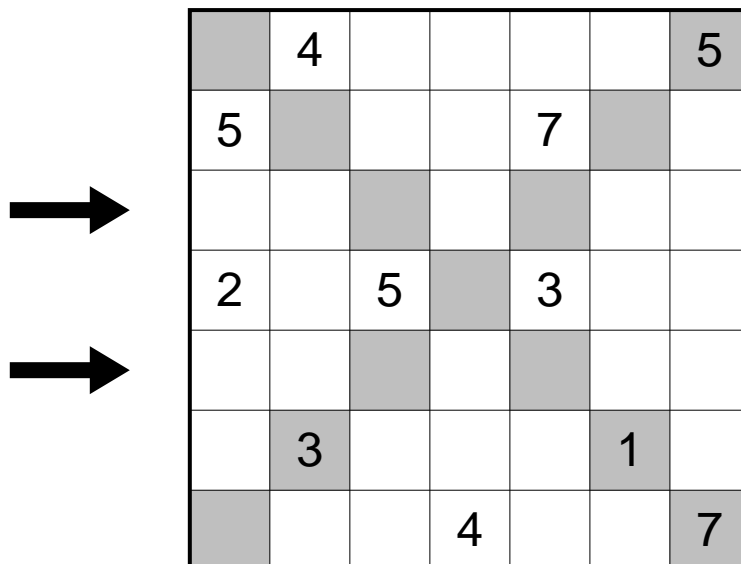
Puzzle authors: Hartmut Seeber, Roland Voigt, Ulrich Voigt  
Test solvers: Immanuel Halupczok, Bernhard Seckinger

Solving time: 2:30 hours

### 1 Sudoku

10 points

Place digits from 1 to 7 into the grid, so that each digit appears in each row, each column and both marked diagonals exactly once.



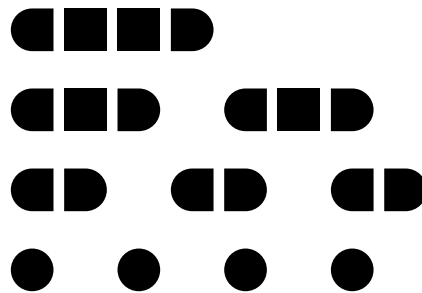
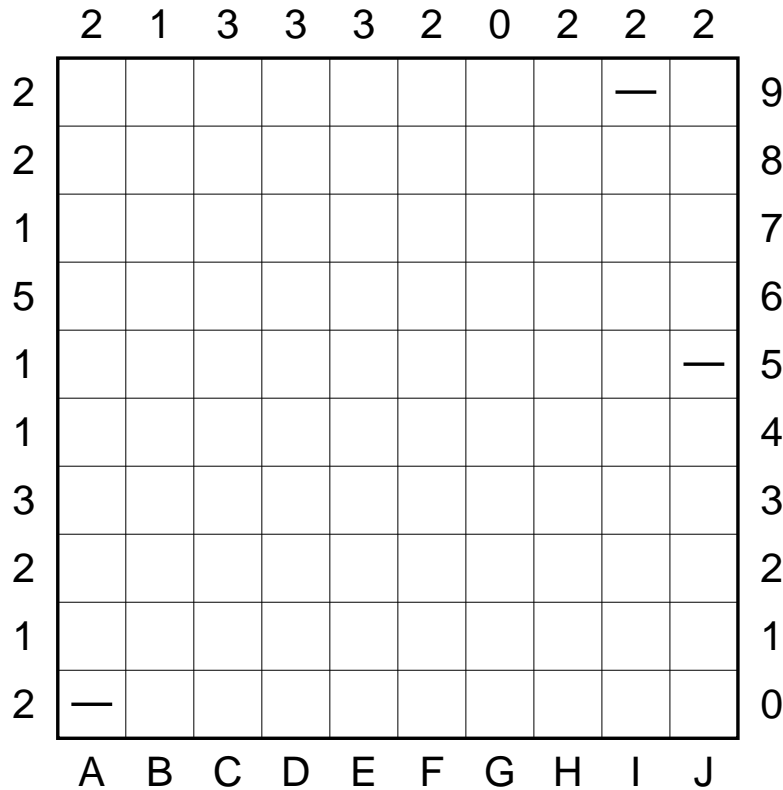
**Answer key:** Enter the digits of the third and fifth row.

## 2 Battleships

10 points

Locate the position of the 10-ship fleet in the grid. The fleet is shown below the grid: one 4-unit battleship, two 3-unit cruisers, three 2-unit destroyers, and four 1-unit submarines. Each segment of a ship occupies a single cell. Ships are oriented either horizontally or vertically, and they do not touch each other, not even diagonally. The numbers on the left and top edges of the grid reveal the total number of ship segments that appear in each respective row or column. The marked cells can not contain a ship segment.

*For solving purposes, ignore the letters below and the numbers right to the grid.*



**Answer key:** The letters below and the numbers right to the grid define a coordinate system. Enter the coordinates of all four 1-unit ships.

### 3 Magnets

15 points

The grid is made up of magnetic and non-magnetic plates. Each magnetic plate has two halves: one positive (+) and one negative (-). Halves with the same symbol can not be horizontally or vertically adjacent. The numbers outside the grid indicate how many magnetic halves of each kind can be found in that row or column.

	+		5	3	4	3	3	0	4	5	4	4
		-	4	5	2	4	3	2	5	4	4	2
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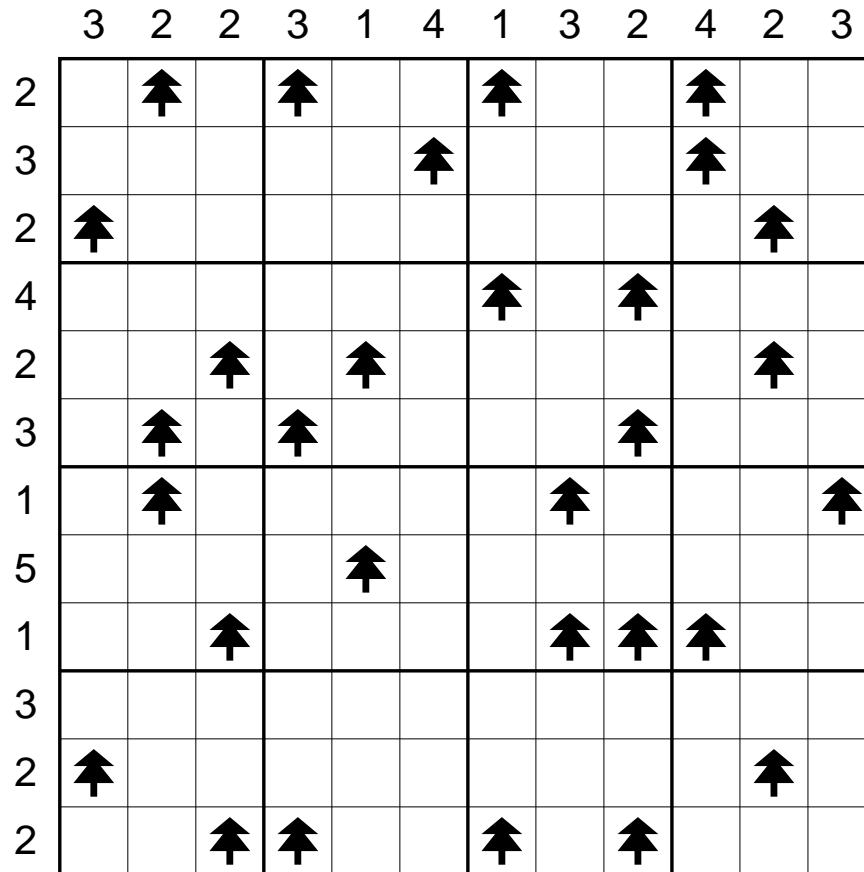
**Answer key:** Enter the contents of the third and eighth row (use +, - and N for neutral halves).

# 4 Tents

15 points

Locate 30 tents in the grid. Each tree is connected to exactly one tent, found in a horizontally or vertically adjacent square. Tents do not touch each other, not even diagonally. The numbers outside the grid indicate the total number of tents in the corresponding row or column.

*For solving purposes, ignore the division into 3x3-squares.*

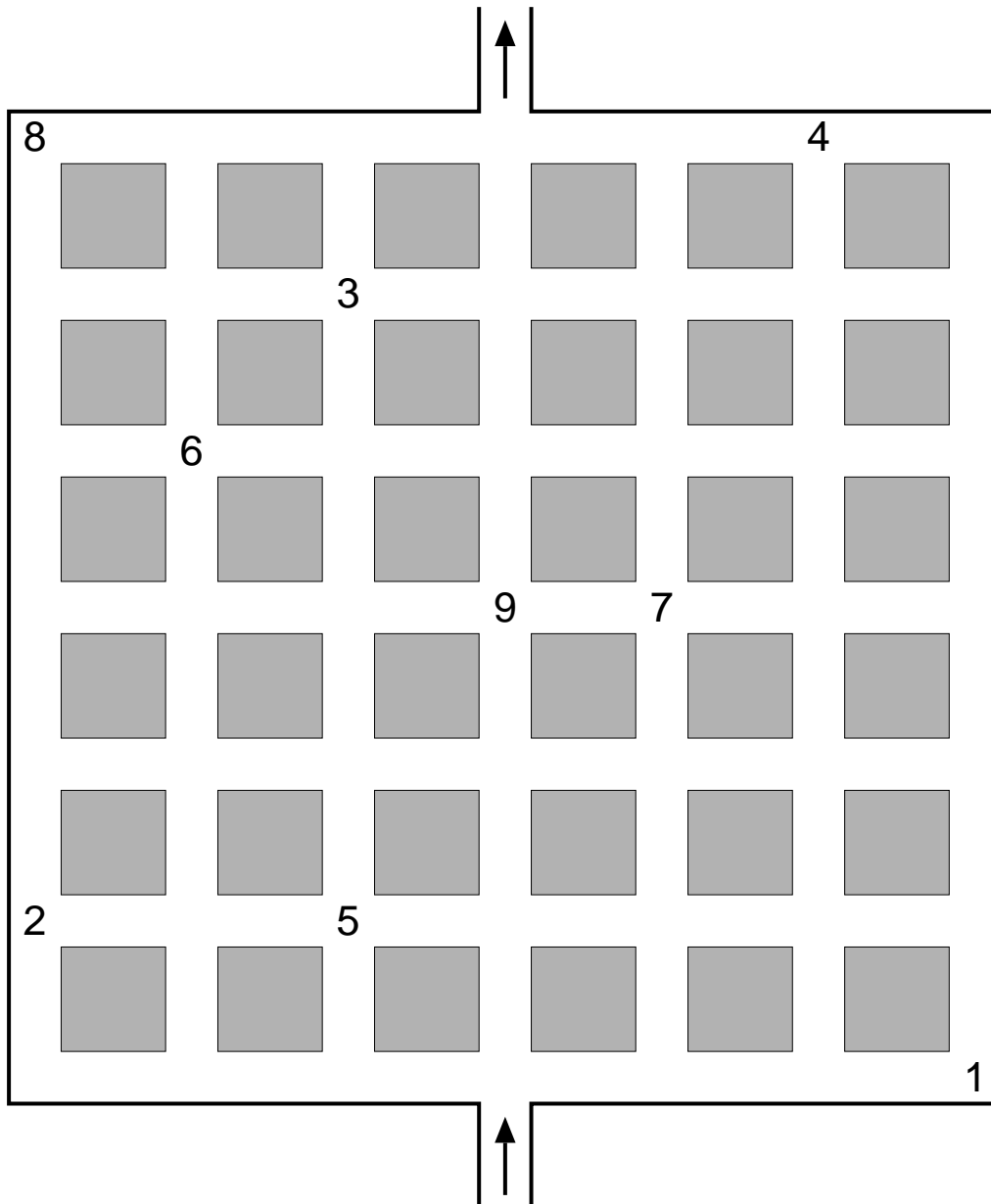


**Answer key:** Enter the number of tents in each 3x3-square.

# 5 Number maze

15 points

Find a way through the maze, passing through the numbers from 1 to 9 in ascending order. The path may not use a line segment more than once. The path may cross itself, but only in two straight lines (horizontally and vertically). The path may not cross itself in a numbered junction.



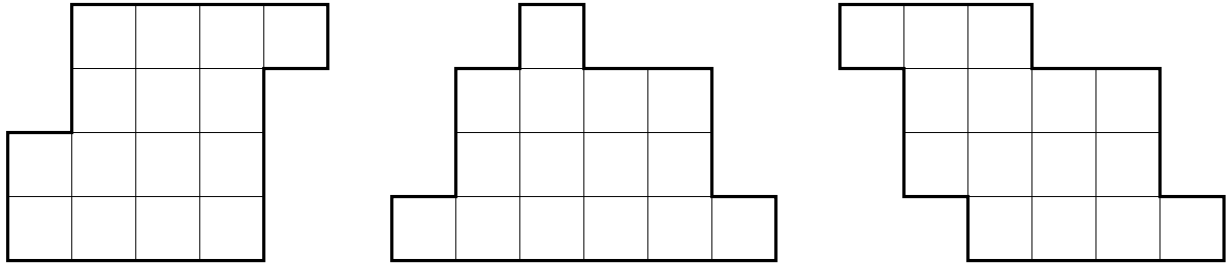
**Answer key:** Answer key: For each of the seven horizontal rows, enter how often the path crosses itself in that row.

# 6 Triplet

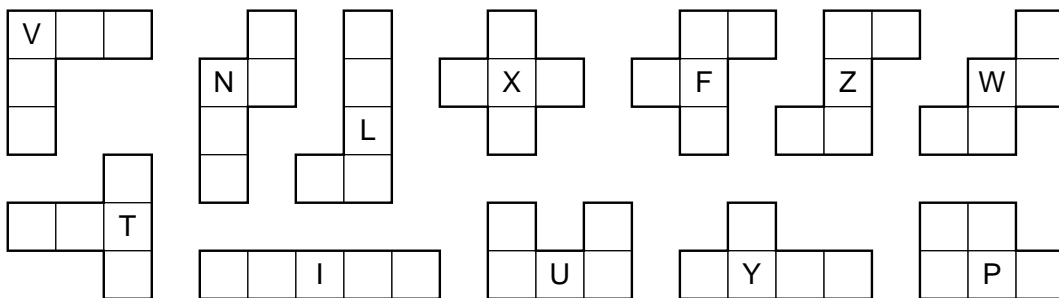
15 points

Choose three of the twelve pentominoes, so that each of the three shown figures can be assembled from the chosen pentominoes. In each figure, the three pentominoes must be used exactly once; they may be rotated and/or reflected.

*For solving purposes, ignore the letters inside the pentominoes.*



The twelve pentominoes:



**Answer key:** Enter the corresponding letters of the chosen pentominoes.

# 7 Dominos

20 points

An 8x7-rectangle has been composed from the shown set of dominoes; the sides of the dominoes have been removed. Restore them, such that each domino is used exactly once.

4	2	3	6	6	1	1	5
6	5	6	0	1	3	0	4
6	0	2	1	4	4	4	2
5	5	5	4	3	1	2	2
4	1	5	0	2	2	6	3
0	0	6	4	0	0	6	5
2	3	3	3	1	1	5	3

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**Answer key:** Enter all digits in horizontally placed dominoes.

# 8 Hexagonal Path

20 points

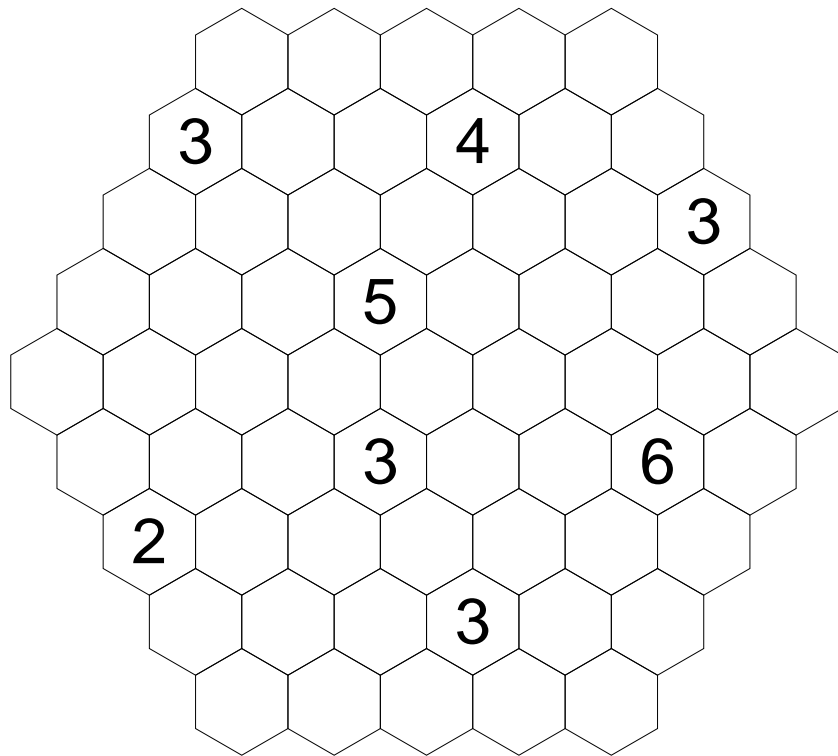
Draw a closed loop into the diagram, fulfilling the following conditions:

The path connects the centers of adjacent cells; it need not pass through all cells.

The path must not pass through the same cell more than once. Cells with numbers must not be passed at all.

The path must not turn in a  $60^\circ$  angle.

Each number indicates how many of the adjacent cells are passed through.



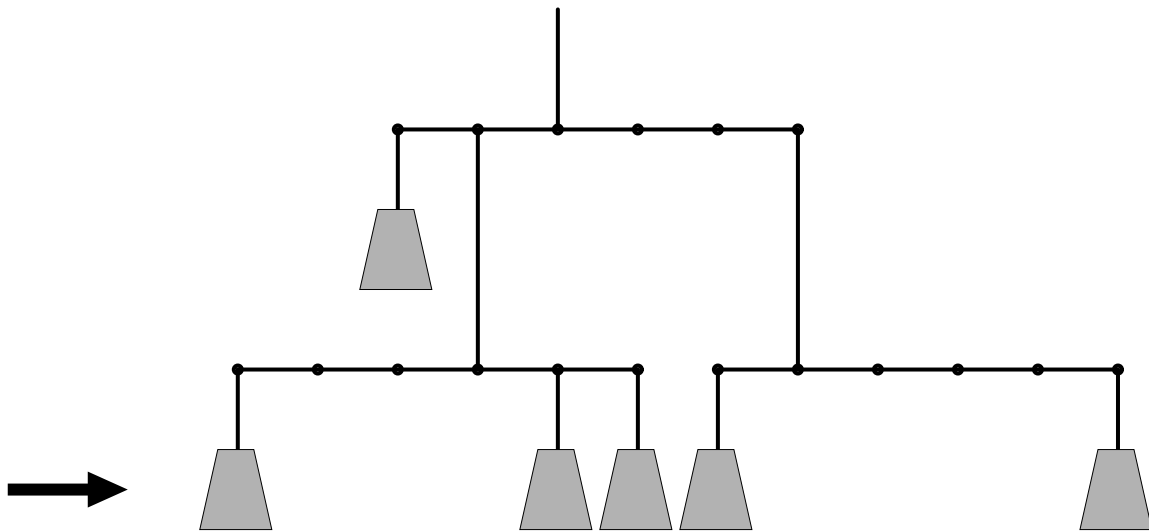
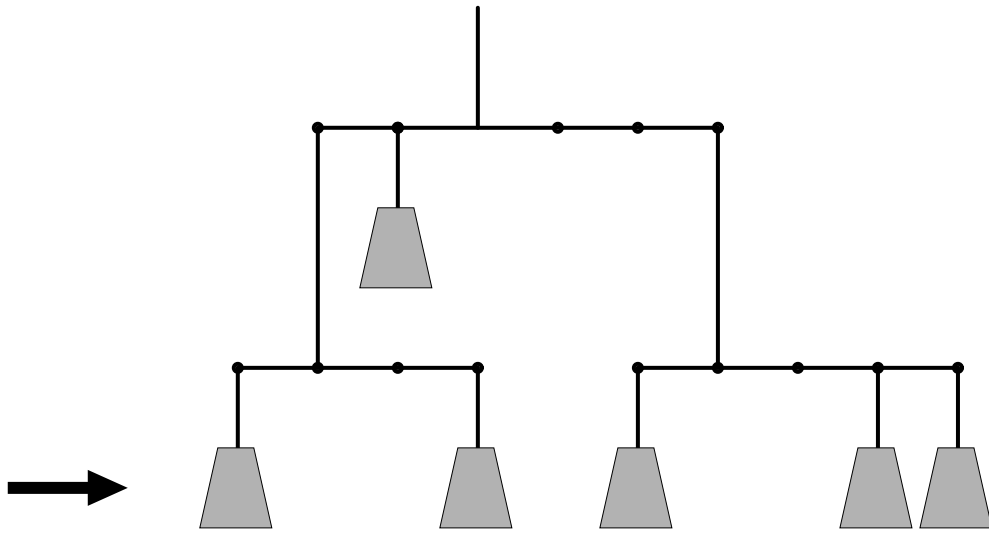
**Answer key:** For each horizontal row, enter the number of empty cells (neither passed through nor containing a number).



# 9 Double Balance

20 points

Assign the values from 1 to 12 to the weights in the diagram so that everything is in perfect balance. Each value must be used exactly once; aside from this, the two systems are completely independent.

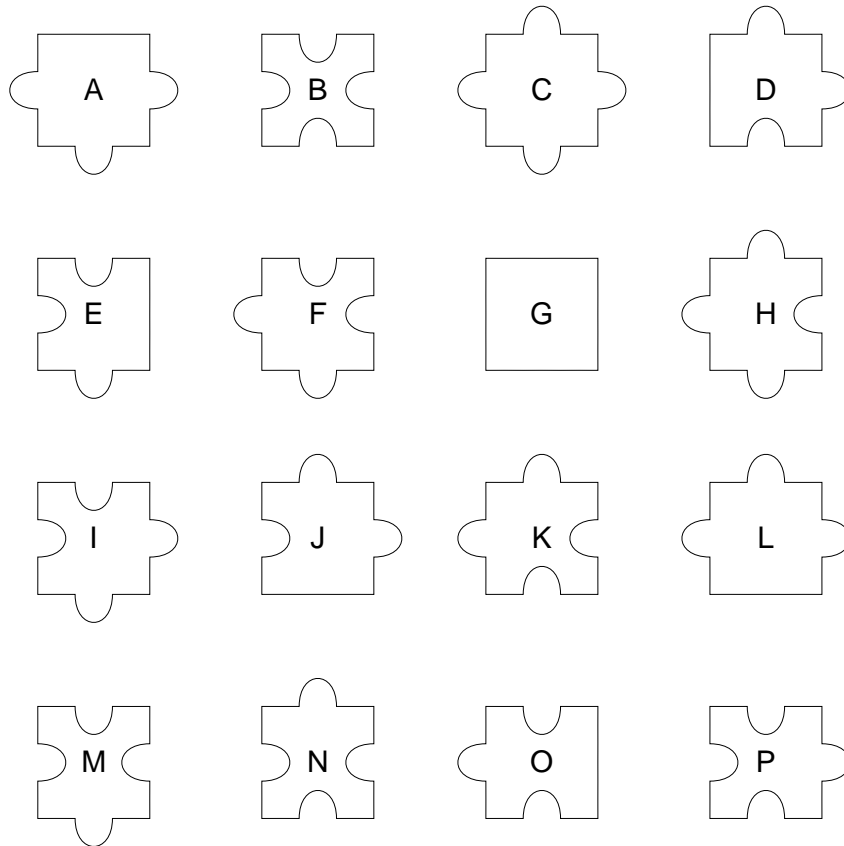
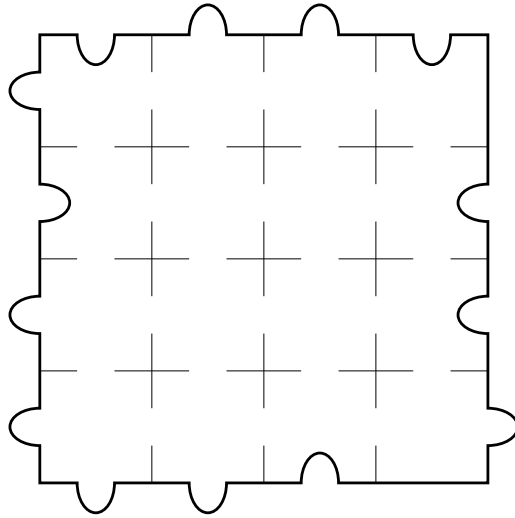


**Answer key:** Enter all weights in the two marked rows.

# 10 Jigsaw Puzzle

20 points

Place the given pieces into the diagram without overlapping. The pieces may not be rotated or reflected.



**Answer key:** Enter the corresponding letters of all 16 pieces (top row from left to right, then second row etc).

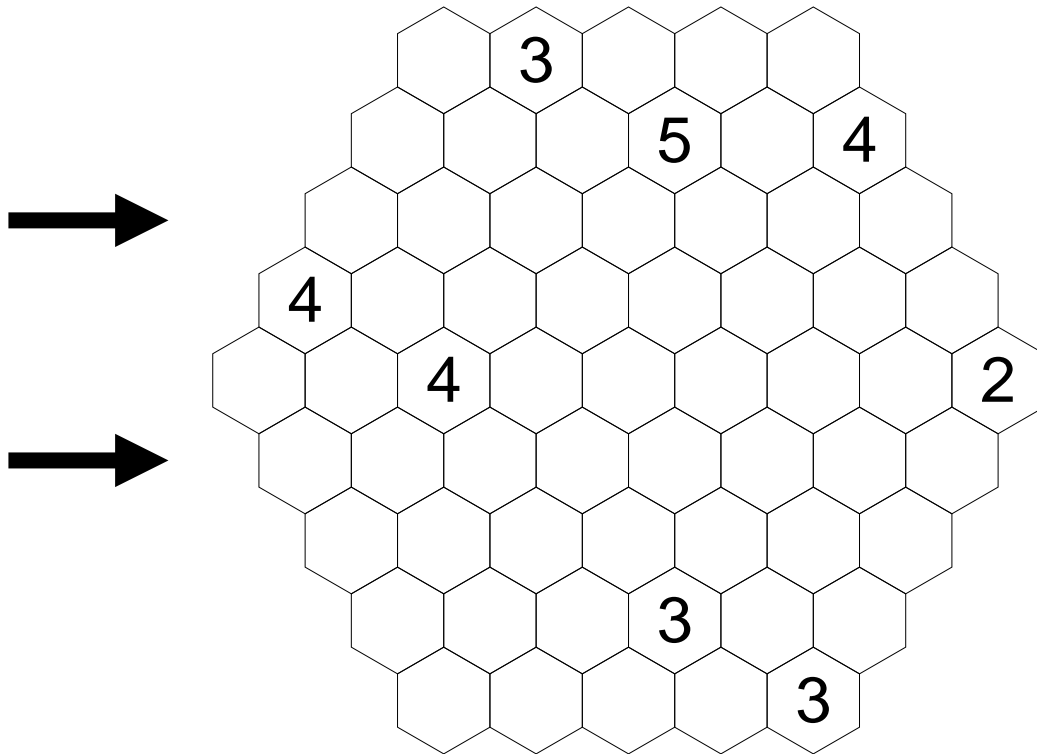
# 11 Hexagonal Islands

20 points

Place some islands into the grid, fulfilling the following conditions:

Each island must contain exactly one number and consists of so many cells that number indicates.

Each island is completely surrounded by water; the water area is completely connected. However, three pairwise adjacent cells (arranged in a triangle) must not be all water.



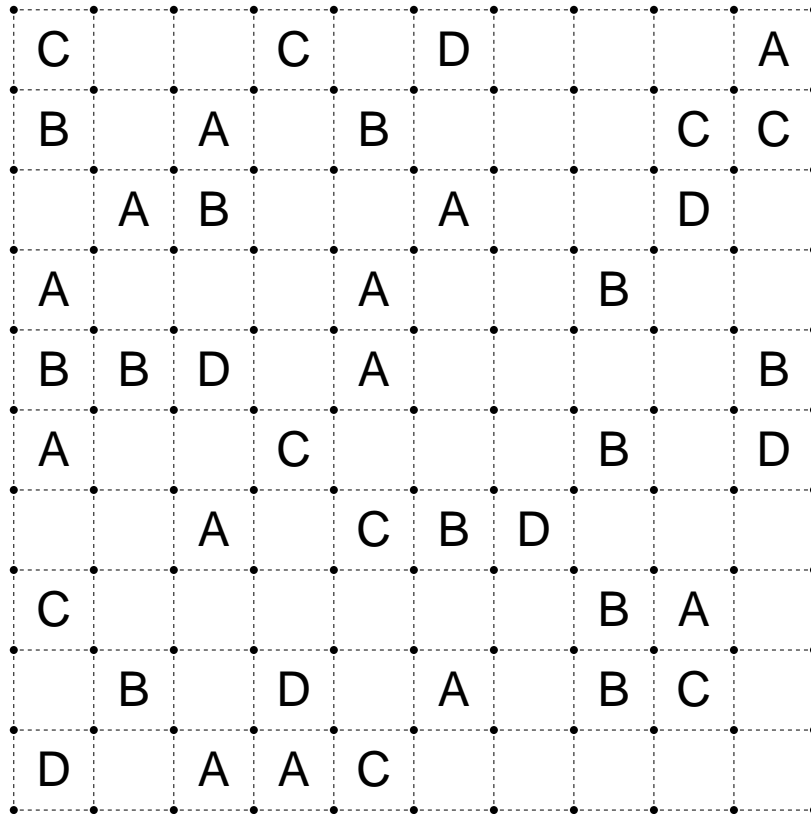
**Answer key:** Enter the contents of the third and sixth row. Use 0 for cells with water and 1 for cells in an island.

# 12 Cryptic Fences

25 points

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

However, instead of numbers, letters are given. Same letters represent same numbers, different letters represent different numbers. You need to identify the meanings of each letter first.



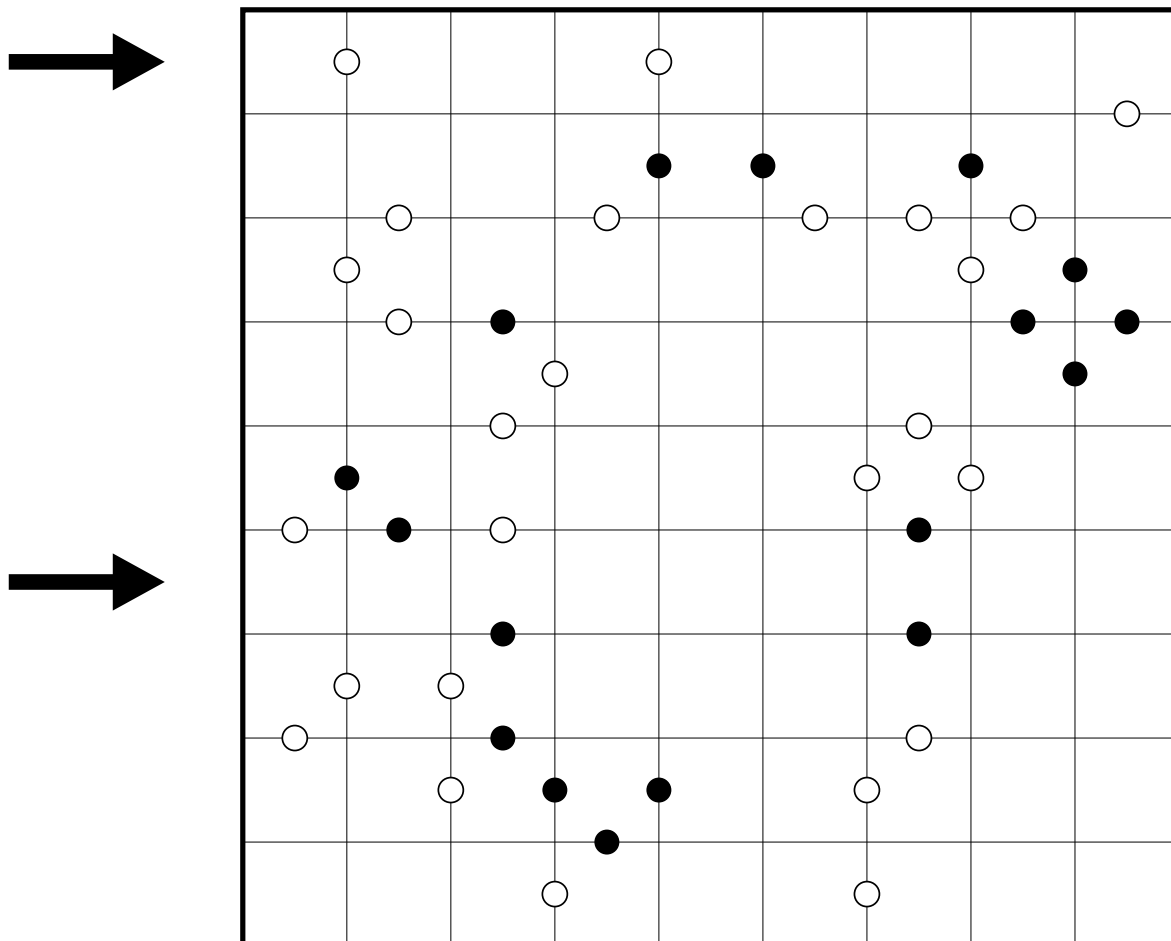
**Answer key:** Enter the number of squares in each connected area that is outside the loop.

# 13 Kropki

25 points

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

Two adjacent digits having a white circle between them must have a difference of 1; a black circle means that one digit is exactly half of the other. If there is no circle, then neither property is true.



**Answer key:** Enter the digits of the first and sixth row.

# 14 Jumping Crossword

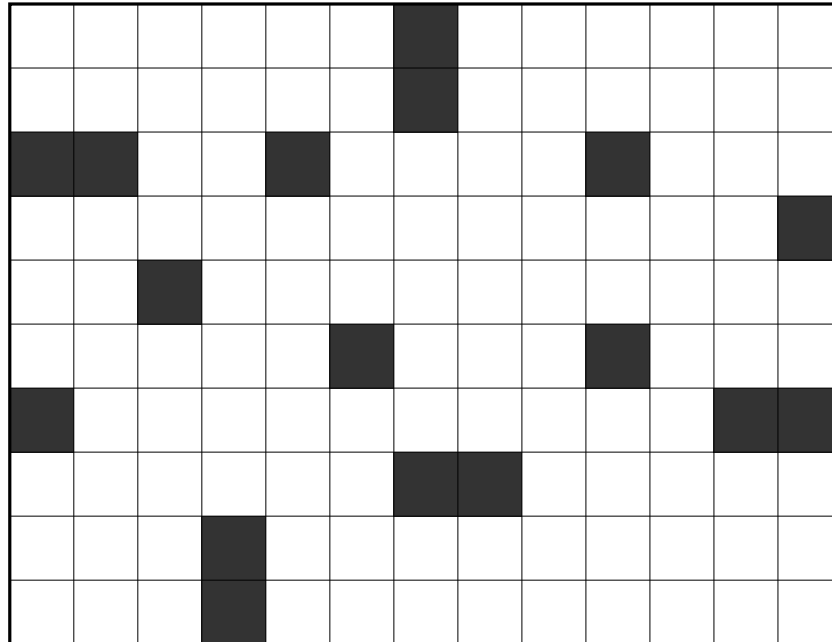
25 points

Place the listed words into the grid, horizontally from left to right or vertically from top to bottom.

Unlike a regular crossword puzzle, some squares may remain empty; before the first letter, between two letters or after the last letter of a word. However, empty squares must not be horizontally or vertically adjacent.

For each word, the length of its area (including all empty squares) is given.

Three words remain unused.



Words in area of length 2:

AS CO DA EA EI IR N OR R ST UR

Words in area of length 3:

AT DRS DU DL EEN OB PS RE REN UE VB

Words in area of length 4:

AU OER OMA RIA

Words in area of length 5:

BOOT BUER EAR MARL WAL

Words in area of length 6:

DIANA HEMD MAPPE SCHUB TORERO VIKAR VISTA

Words in area of length 7:

CRASH DRUIDE VEST

Words in area of length 8 or 9:

HERTEN HUSAREN SAENFTE

Words in area of length 10 or 12:

CASTROP DATTELN HALTERN KNOEPFE WALTROP

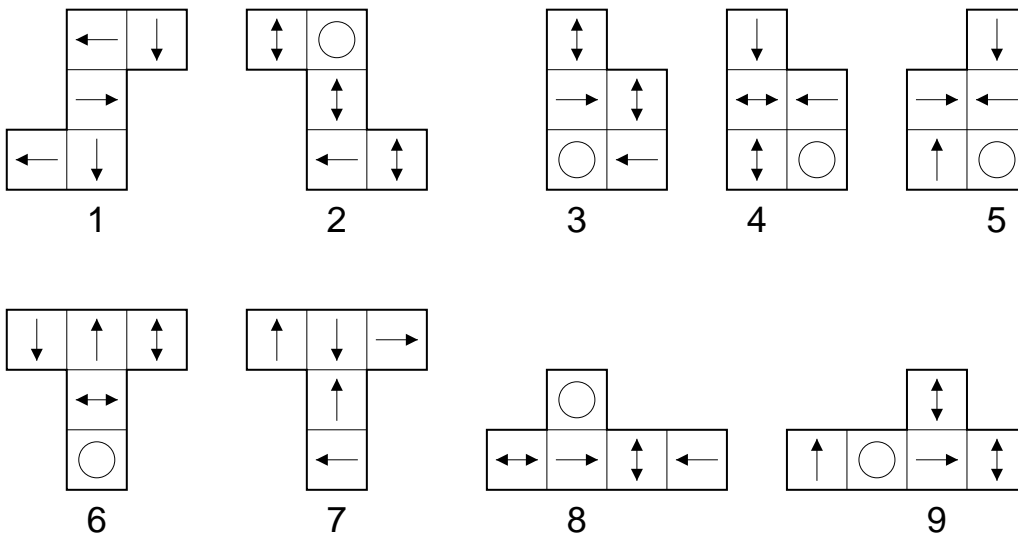
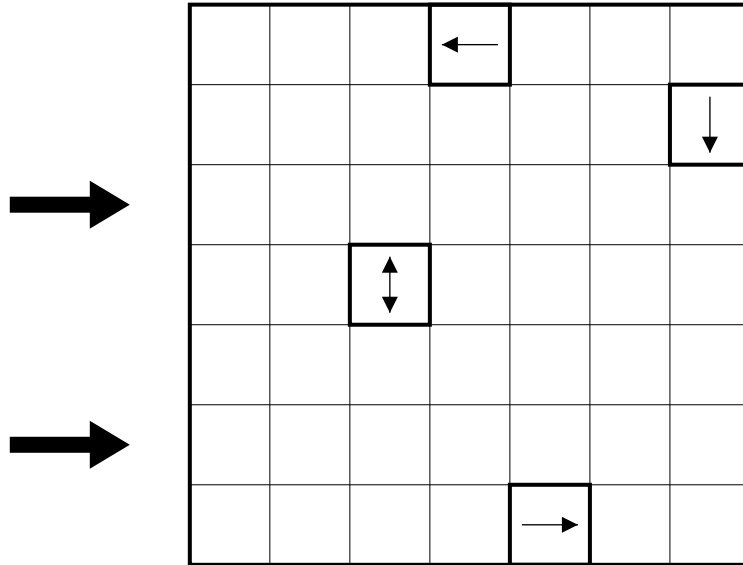
**Answer key:** Enter the unused words.

# 15 Magic Arrows

25 points

Place the nine given pentominoes into the diagram without overlapping, so that each symbol appears in each row and column exactly once. They may not be placed on one of the four symbols already given.

Pentominoes may be rotated (not reflected); however, their symbols will be rotated as well.

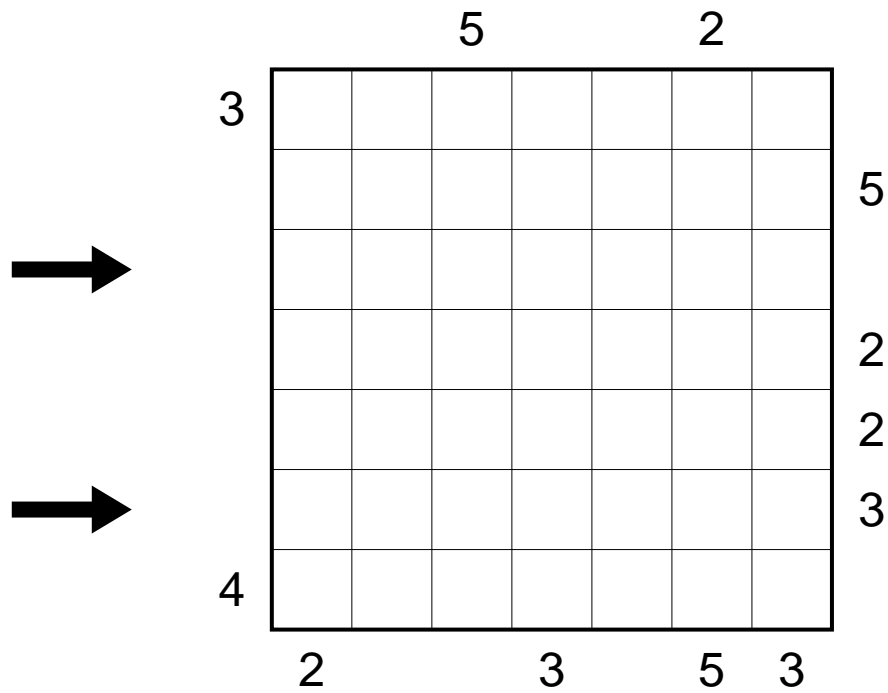


**Answer key:** For each square of the third and sixth row, enter the corresponding number of its pentomino.

# 16 Skyscrapers

30 points

Each row or column contains skyscrapers of different height (from 1 to 7); numbers outside the grid indicate how many skyscrapers are visible from that direction.



**Answer key:** Enter the digits of the third and sixth row.





# 18 Plus or Minus Kakuro

30 points

Enter a single signed digit from 1 to 9 (or -1 to -9) into each empty square so that the sum of the numbers in each Across and Down answer equals the value given to the left or above, respectively. No digit (ignoring sign) is repeated within a single answer. If a clue sum is in a dark gray region, then all corresponding digits have the same sign; if the clue sum is in a light gray region, then the corresponding digits have mixed sign.

	-12	8		3	22	17	15		3	24
→	<u>5</u>		<u>-5</u>					<u>4</u>		
	<u>-16</u>		<u>20</u> <u>10</u>					<u>15</u> <u>11</u>		
	<u>13</u>			<u>17</u> <u>10</u>			<u>23</u> <u>-14</u>			
→		<u>5</u> <u>-4</u>								<u>-3</u>
	<u>14</u>		<u>12</u> <u>-9</u>					<u>3</u> <u>2</u>		
	<u>-1</u>				11	<u>-12</u> <u>19</u>				
		<u>-20</u>	<u>2</u> <u>11</u>						<u>-7</u>	<u>6</u>
	<u>-7</u>			<u>6</u>			<u>11</u>			
→	<u>-12</u>			<u>3</u>			<u>2</u>			
	<u>-7</u>			<u>12</u>			<u>-4</u>			

**Answer key:** Enter the digits in the first, fourth and ninth row (ignoring sign).

# 19 Word Search

25+10 points

Find the 29 listed words in the grid. Words may read forward, backward, or diagonally (in total, eight possible directions). The central 16 letters in the grid have been removed and are for you to determine.

U	H	N	K	E	N	U	E	B	U	A	T
H	C	I	N	A	R	K	E	E	H	H	U
K	W	T	W	G	A	N	S	L	C	C	K
I	E	H	L					I	H	R	A
H	C	A	E					E	U	O	N
S	L	E	S					M	H	T	D
S	R	M	S					P	N	S	O
T	A	E	O	K	E	K	L	A	F	E	H
A	P	D	R	A	S	S	U	B	B	A	L
R	E	L	D	A	M	O	E	W	E	E	O

The words are:

ADLER	DROSSEL	GANS	MEISE	STAR
AMSEL	EMU	HABICHT	MOEWE	STORCH
ARA	ENTE	HUHN	PFAU	TAUBE
BEO	EULE	KEA	PIROL	TUKAN
BUSSARD	FALKE	KIWI	RABE	UHU
DOHLE	FINK	KRANICH	SCHWAN	

**Answer key:** Enter the 16 missing letters, starting with the first line of four letters, then the second, third and fourth (25 points) as well as the total number of unused letters (10 points).

## 20 Arithmetics

35 points

The numbers from 1 to 17 have been assigned to the letters A, B, C, D, E, H, I, J, K, M, N, O, P, R, S, T and Y. Different letters correspond to different numbers.

For some words, the sum of the corresponding numbers of their letters has been given. If any letter appears more than once in a word, it is counted as often as it appears.

$$\text{ANDY} = 25$$

$$\text{BODO} = 25$$

$$\text{JENS} = 49$$

$$\text{KAHN} = 11$$

$$\text{RECK} = 37$$

$$\text{ROST} = 47$$

$$\text{SEPP} = 64$$

$$\text{TONI} = 33$$

$$\text{TIMO} = ??$$

$$\text{ENKE} = ??$$

**Answer key:** Enter the corresponding sums of the two words **TIMO** and **ENKE**.