

# A N E 2 P O T S 1 R I L C T 4

by Riad Khanmagomedov

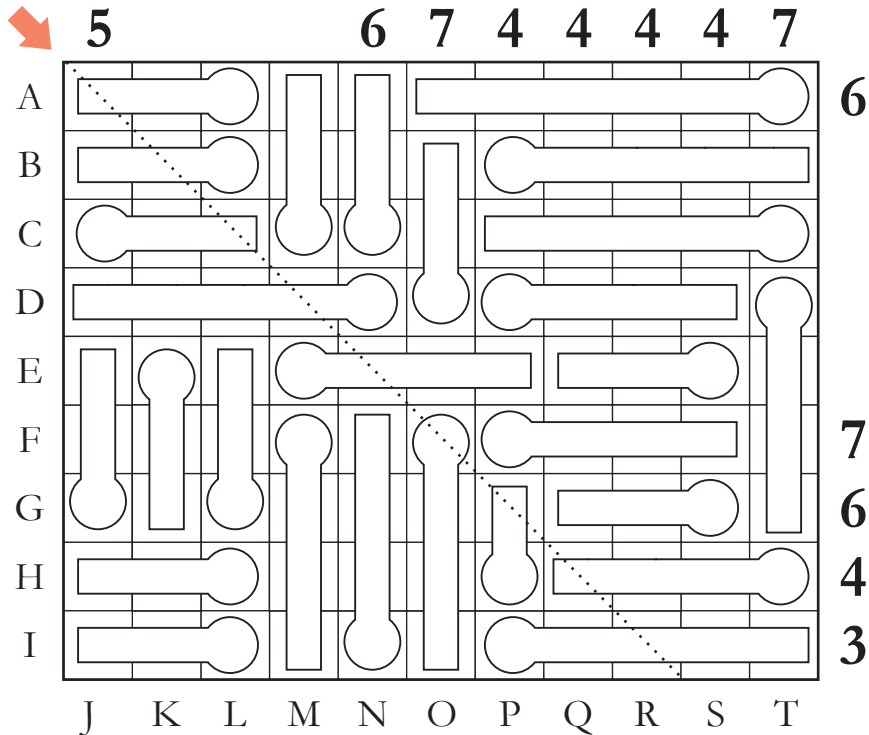
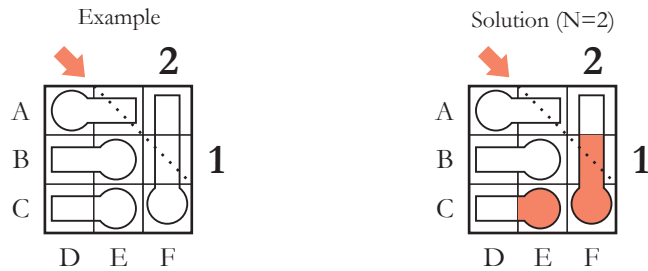
Submissions should be sent with answer page at LMI not later than 24-00 (of Moscow time) April 12 2014

**Thanks to Deb Mohanty and Prasanna Seshadri for support**

## 1. FIRE\*

**6 points**

The figures in the grid are matches, which light up at the rounded end (head) and can burn from there towards the other end (tip). Some match is lighted at its head at first second. Each second for N seconds, the fire spreads. At any second, it'll spread one cell towards the tip of an already burning match, and will also spread to another match if the head is adjacent to the fire's location in the previous second (middle/tip to head transfer is possible). The clues outside the grid show the number of cells that catch fire in that direction, at the end of N seconds. It is up to the solver to determine the end value of N, and the location of the first fired match.



**Answer format:** Write the value of the N, the coordinate of the first fired match, then the content of marked diagonal from top left corner to bottom. Use "X" for cells exposed to burning and "-" for others. For the example: 2, CF, -X.

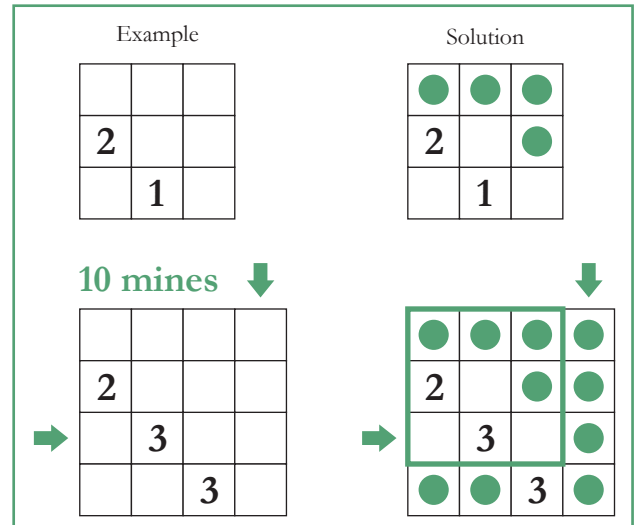
\* Devoted to Cihan Altay

## 2. MINEFIELDS

5 points

Place some mines into the small grid and 62 mines into the large, no more than 1 mine per cell. Each digit shows the number of mines in the empty neighboring (even diagonally) cells. Location and number of mines in a small grid must exactly coincide with location and number of mines in some 8 x 8 area within the large grid. You cannot rotate the grids.

			1				
3		3	1			1	
2	3				2	2	2
	3						
1					2		
				1	2		
		3	4				



62 mines



1			2	2			1			2	2		
	3	3				1				3			2
						1		1		3			1
		2	4		3								1
	3		2	3	2					1			2
	3					3				1	2	3	
1									1				2
			1						2		3		2
				2						3			2
	1						2			1			4
1	2			3		3							6
	2		4				1	2	1		1		
					2							4	6
→		3	4		2		2						
		2	2									3	2
	1								2	1	1		2

**Answer format:** Write the content of marked row from left to right and column from top to bottom. Use "X" for cell with mine and "-" for empty cells. For the example: -3-X, XXXX.

### 3. ENCRYPTED NAMES SEARCH

6 points

Replace the given numbers with letters, so that same numbers correspond to same letters and different numbers correspond to different letters. Find every name from the list of puzzlers in the grid. Names goes along straight line in any of 8 directions (horizontally, vertically, diagonally). One letter can belong to several names.

Example

1	2	3	2	4
1	2	5	5	2
	6	7	8	9
	10	11	12	9
		5	6	

ANNA JOHN  
 JACK KO  
 JAN SINA  
 JAYA VASSO

Solution

J	A	Y	A	V
J	A	N	N	A
	Q	C	I	S
	X	H	K	S
			N	O

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

ALAN NATALIYA  
 BASTIEN PALMER  
 BRAM PRASANNA  
 BRANKO QIU  
 CLAUDINE SARA  
 CLEMENT SATOSHI  
 DIANA SERKAN  
 ENDO SHINICHI  
 GIOVANNI SINCHAI  
 HIDEAKI STEFANO  
 JAAKKO SYLVAIN  
 JAANUS TAKEI  
 JAKUB TARO  
 JIRI TAWAN  
 JOHN TIIT  
 KISHORE TIMOTHY  
 KRYSTIAN ULRICH  
 LUKASZ VESNA  
 MARIUSZ VLADIMIR  
 MARTIN ZORAN

**Answer format:** Write the numeric value of the letter X, number of horizontal names in the grid and then vertical.  
 For the example: 10, 3, 1.

### 4. ACROSS 4 GRIDS

6 points

Draw a loop which goes through the centres of all of the white cells in the 16 x 16 grid. The loop consists of horizontal and vertical segments and cannot touch or cross itself in any way. The grid is divided into 4 equal squares, each of which has 4 different rules. These rules of MY LINE, GRAFFITI, BATTLESHIPS WITH LINE and DIAYAJILIN puzzles familiar to you on my previous contests with minor modifications.

Matching the ruleset to the sub-grid is up to the solver.

#### MY LINE

The line makes a 90° turn in each cell with a digit. This digit shows the length of the line segments which form the turn. Some digits (not necessarily identical) marked with a "?". Line passes through all the white cells in the 8 x 8 grid.

#### GRAFFITI

Paint some cells. The digit outside the grid shows how many dark cells in corresponding row or column of 8 x 8 grid. These dark cells in the row or column next to each other without blanks. In rows/columns without clues, there is no restriction on dark cells and there can be multiple groups of dark cells here.

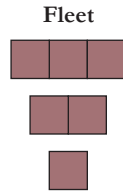
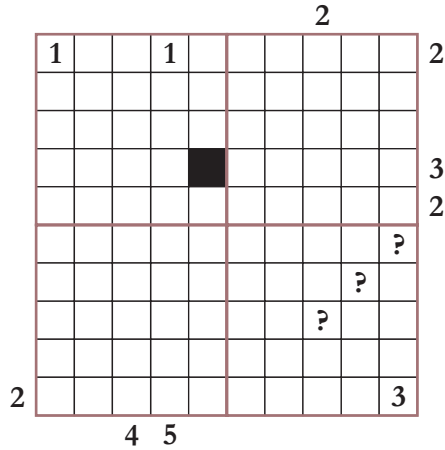
### BATTLESHIPS WITH LINE

Place the standard battleships fleet into the 8 x 8 grid. Ships cannot touch each other even diagonally. Digit at the left or right outside the grid shows the **maximal** length of horizontal line segments in corresponding row of 8 x 8 grid, digit at the top or bottom - the **maximal** length of vertical line segments in corresponding column of 8 x 8 grid.

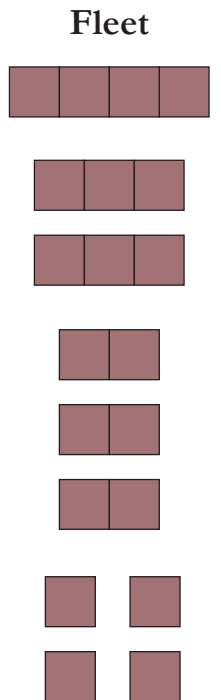
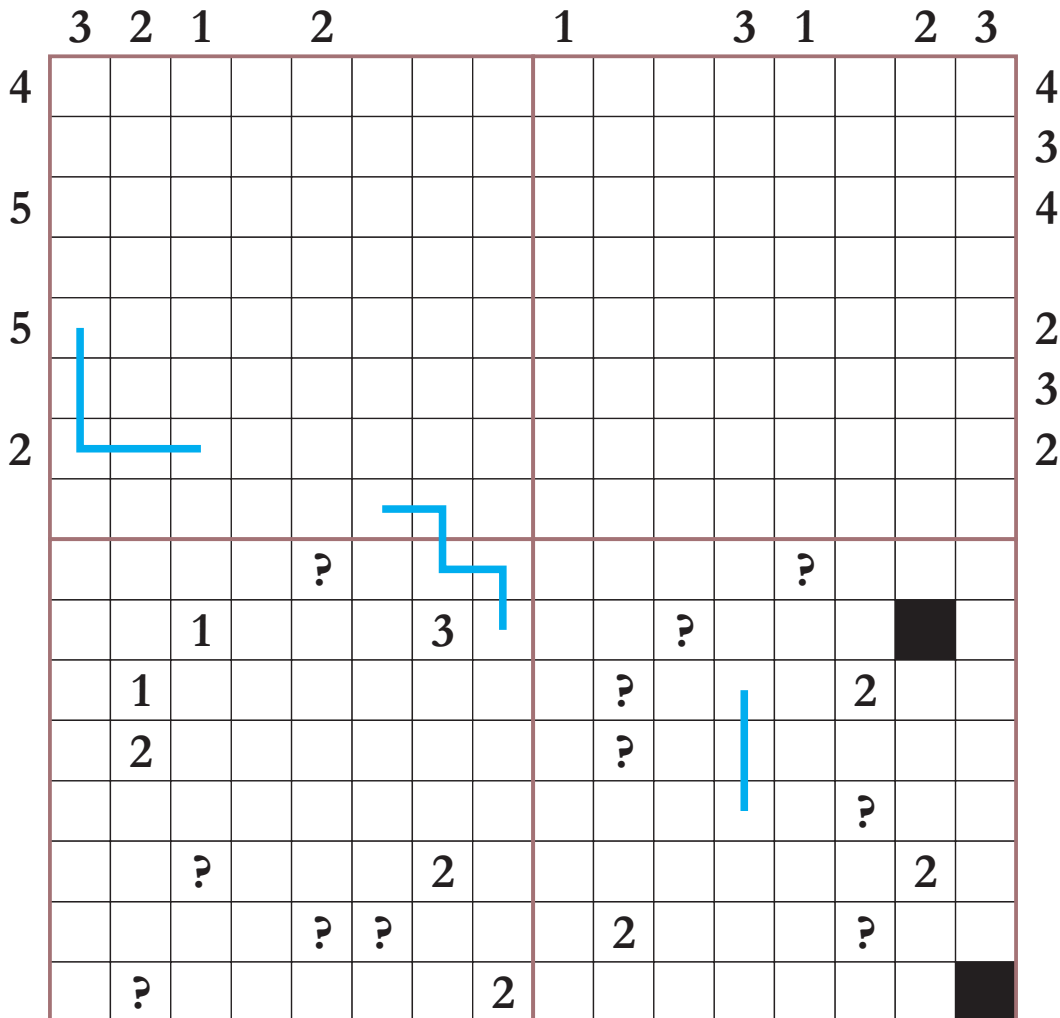
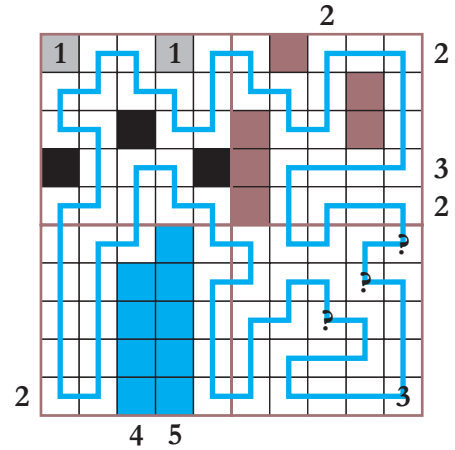
### DIAYAJILIN

Cells with digit and sign "?" paint by grey. Some digits (not necessarily identical) marked with a "?". Blacken some white cells so that they cannot be adjacent to each other. Black cells can be adjacent to the grey cells. Each digit show how many black cells located **on the diagonals (or diagonal)** of 8 x 8 grid passing through this digit.

Example



Solution



Answer format: Write the number of turns of the loop. For the example: 54.

### 5. BORDERLESS PENTOMINO

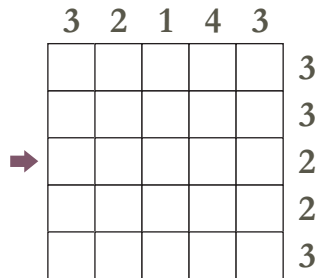
6 points

Outline the 12 x 12 area inside the given 15 x 15 grid and solve standard PENTOMINO puzzle inside this area.

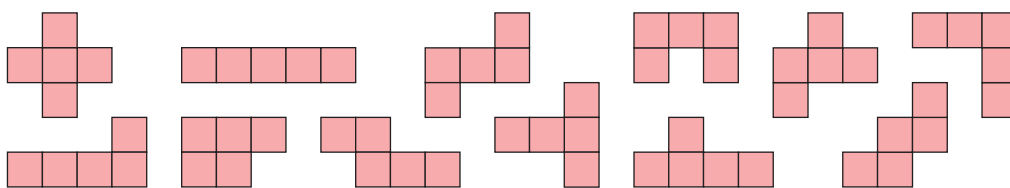
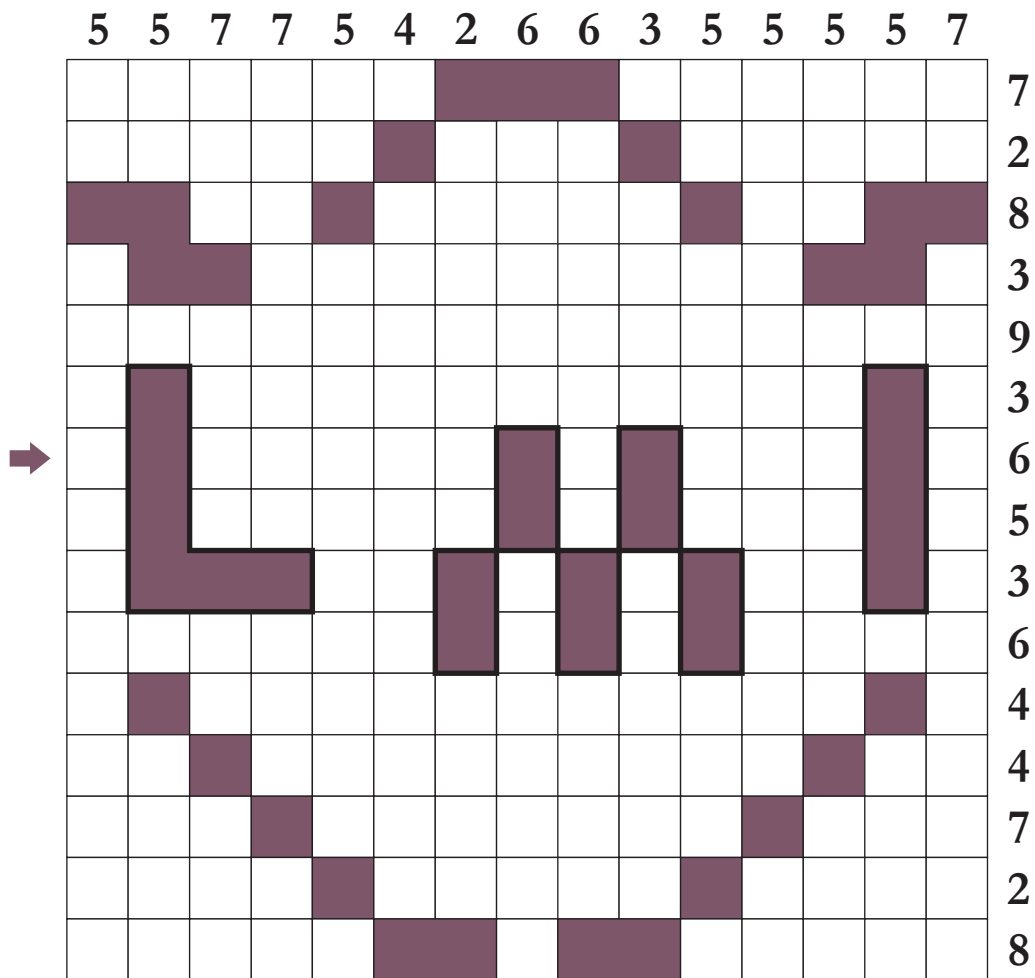
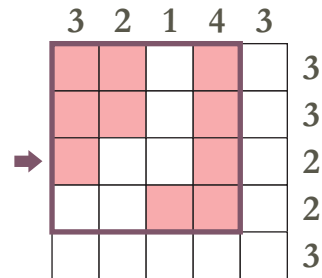
The PENTOMINO rules:

Put the 12 different pentominoes in **white** cells. Figures can be rotated and mirrored. They cannot touch each other even diagonally. Digits outside the grid show how many cells are occupied by pentominoes in corresponding directions.

Example  
(the 4 x 4 area, 2 pentaminoes)



Solution



**Answer format:** Write the content (inside the outlined area) of marked row from left to right. Use "X" for cell occupied by pentomino and "-" for other cells. For the example: X--X.

## 6. SUDOKU WITH STARS

6 points

Fill the grid with digits from 1 to 9 which cannot repeat in rows, columns and outlined areas. Every row, column and outlined area must contain exactly 2 stars (in the cells not occupied by digits). Stars cannot touch each other even diagonally.

Example

						★				
							8			
8			5		9					
1		4								
	3			9			6			
7			3			5		2		
							4		1	2
		8		5						
						1			9	
				6	3			9		5
			7		1		2			

Solution

6	★	7	9	2	8	★	5	3	4	1
3	4	1	6	★	5	7	8	★	2	9
8	2	★	5	4	9	★	1	6	3	7
1	6	4	2	8	7	3	9	★	5	★
★	3	5	★	9	2	8	6	1	7	4
7	9	6	3	1	4	5	★	2	★	8
5	★	9	8	3	★	6	4	7	1	2
9	1	8	★	5	6	2	7	4	★	3
★	8	2	4	7	★	1	3	5	9	6
2	7	★	1	6	3	4	★	9	8	5
4	5	3	7	★	1	9	2	8	6	★

			7							9
1	6		2		4					
						3				
★		7		8	3				6	
					2			9		
9										2
		4			★					
	9				5	8		7		6
				6						
							3	5	2	7
4							5			

**Answer format:** Write the content of top and bottom marked rows from left to right. Use "S" for cell with star. For the example: 6S7928S5341, 4537S19286S.

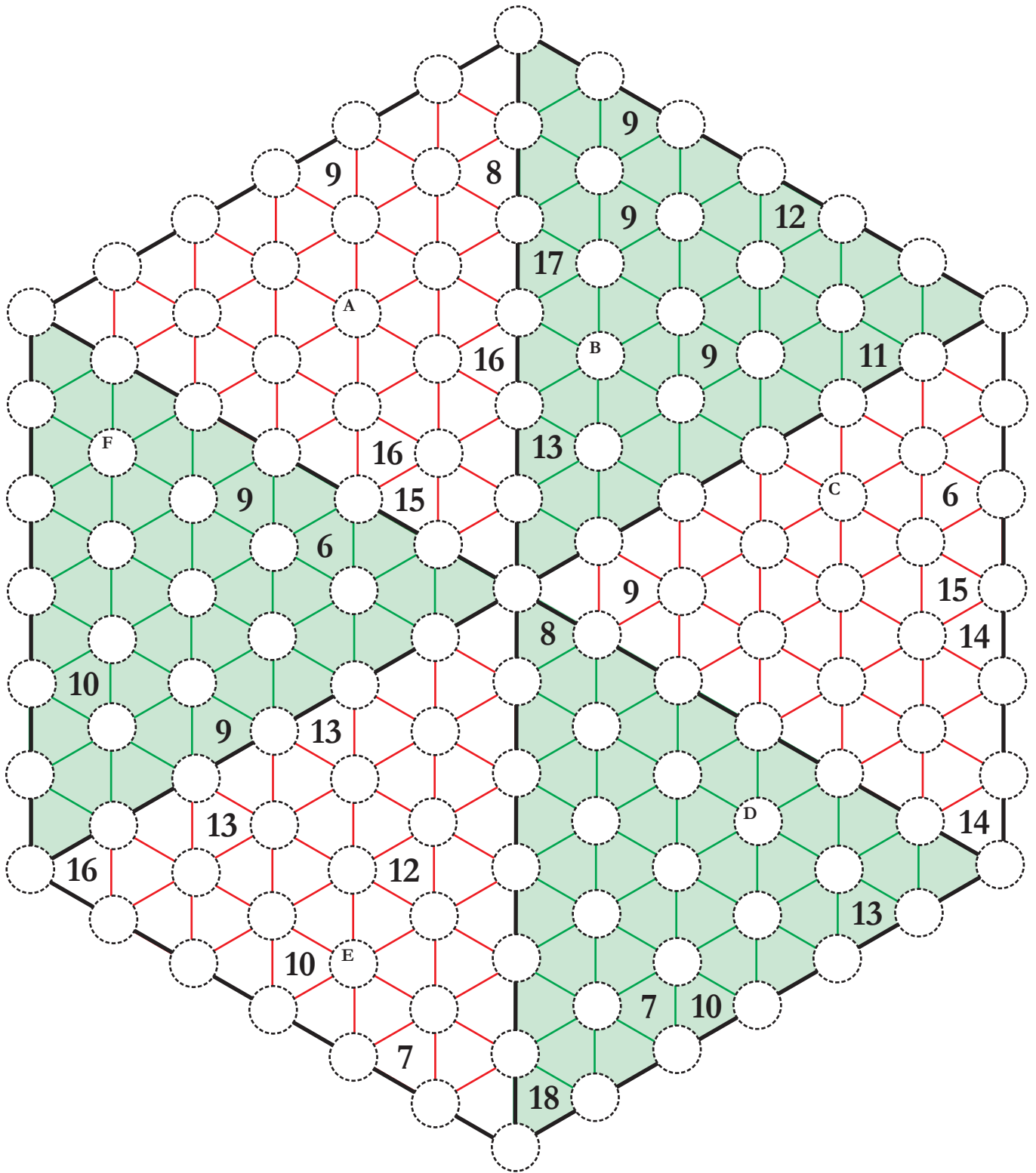
## 7. TRID ON UMBRELLA

7 points

On each of 6 large triangles solve TRID puzzle.

The TRID rules:

Write digits from 1 to 7 into the circles. Digits in one line should be different. Each number in a triangle equals to the sum of digits in the triangles vertices.



**Answer format:** Write the content of circles with A, B, C, D, E, F.

### 8. SUDOKU ON CUBE

9 points

On 6 faces of the cube solve 6 Sudokus. Digits in neighboring cells located on different faces of the cube must be the same. Such cells are connected and the most distant from each other are marked in green (the digits in these rows must also be the same).

The SUDOKU rules:

Fill the 9 x 9 grid with digits from 1 to 9 which cannot repeat in rows, columns and outlined 3 x 3 areas.

								5
	1			7		8		
	<sup>A</sup>				7	5		
	5	7				3	2	
		4	3					
		6		3				1
	9							
9	3		4	7		8		5 9
1		5				3		6
2	7	4						2 8
6		<sup>B</sup>				4	5	
3				5 6		7 5		
			1				5	4
	6		7	9		3 8	<sup>C</sup>	5
						1		
							7	2
						9		6
	6	<sup>E</sup>	8	4	7			
		4		2				
		5	8					
						1		
	6	<sup>F</sup>						9
			6	4				
3			9	1				8
6				3				2
2			7	6				4
1			3	5				7
9	4							5 3

Answer format: Write the content of cells with A, B, C, D, E, F.

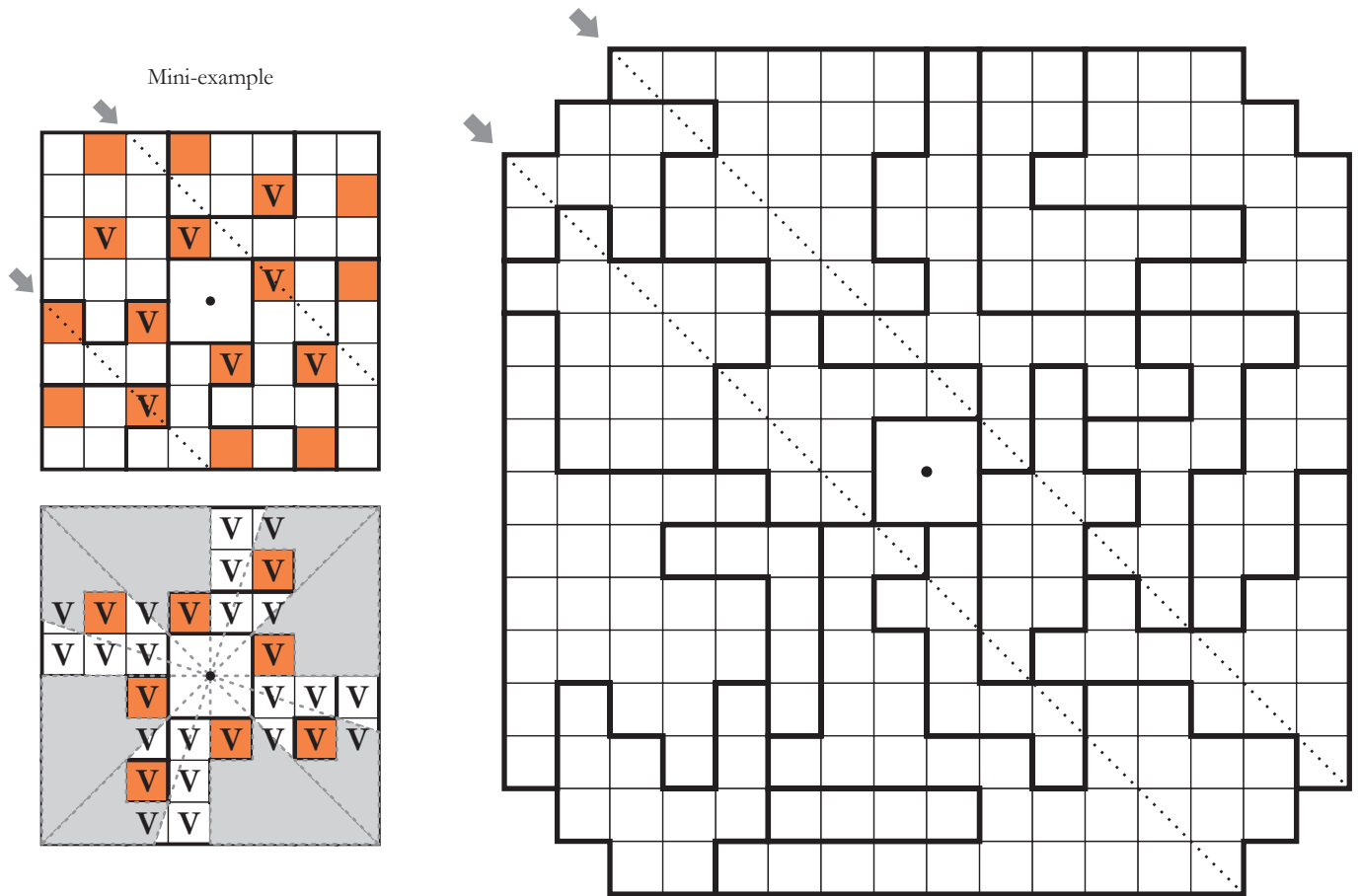


### 9. ASTRONOMER

8 points

Darken 32 cells (32 planets): in every row and column must be 2 colored cells which cannot touch each other even diagonally. The central point of the diagram is the location of an astronomer who cannot see 16 planets - they are entirely hidden behind the other. Each outlined area must contain 1 visible and 1 invisible planets.

In the example, visible cells are denoted by the letter V and invisible cells (part of the sky) and denoted by grey.

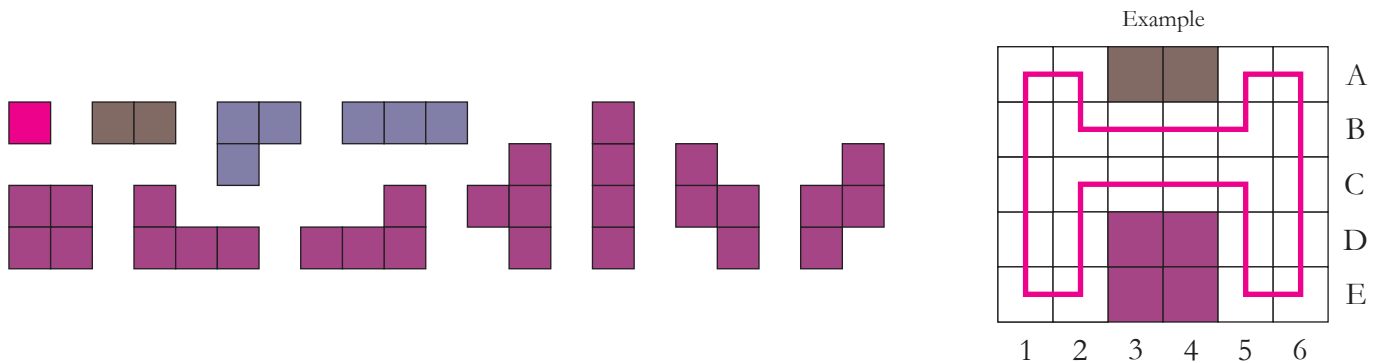


**Answer format:** Write the content of left and right marked diagonals from top left corner to bottom. Use "V" for the visible and "I" for the invisible planets, "-" for others cells. For the example: I-V, ---V--.

### 10. LOOP BETWEEN THE POLYOMINOES

Place all or some of the 11 given figures (monomino, domino, 2 triominoes and 7 tetraminoes) into M x N rectangle (or square), M, N < 27. There should be unique loop going through the centres of all white cells and formed by horizontal and vertical segments. Dimension of any figures cell and any grid cell must be equal. Figures can touch each other only diagonally. They are can be rotated, but not mirrored. Maximize the area of rectangle.

If the two solutions have the same area then solution with maximum number of white cells is better.



**Answer format:** Write the value of M, N and the figures coordinates. For the example: 6, 5, A3-A4, D3-D4-E3-E4.

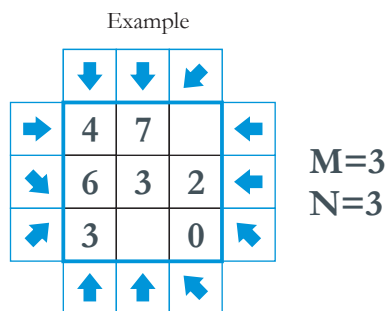
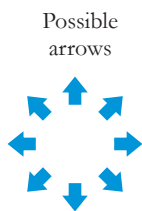
**Score:** 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 points for best solutions.

### 11. ARROWS WITH VOIDS

In some cells of rectangle  $M \times N$  ( $M, N < 10$ ) write the digits from 0 to 8 so that in each row and each column they are not repeated. Empty cells cannot share an edge. This arrangement should form correct ARROWS puzzle with unique solution. Maximize the sum of all digits.

The ARROWS rules:

In each cell that is outside the rectangle  $M \times N$  and having a common side with it draw one arrow. All arrows should point inside the rectangle. Each digit inside the rectangle shows how many arrows point to this digit.



**Answer format:** Write the sum, then the content of the rectangle row by row using "-" for empty cell. For the example: 25, 47-, 632, 3-0.

**Score:** 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 points for best solutions.

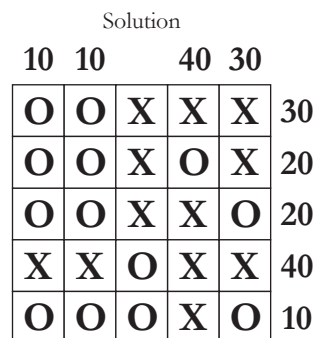
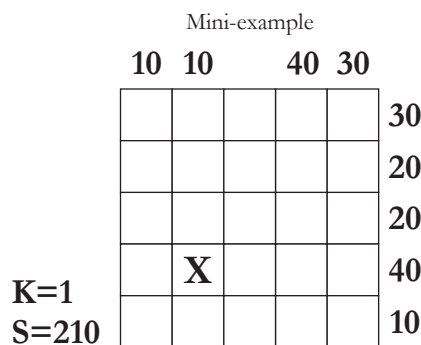
### 12. ROMAN OX

For a  $10 \times 10$  grid, use numbers outside and letters O and X inside, making a ROMAN OX puzzle with unique solution.

The rules of my new puzzle:

Write in each cell of  $10 \times 10$  grid O or X so that four consecutive identical letters in a row, column or diagonal never occur. According to the Roman system of numbers  $X=10$ . Each number outside the row or column must be equal  $10N$  where N a quantity of X in this row or column.

Minimize the value  $S+50K$  where S is a sum of all given numbers and K is a quantity of given letters inside grid.

**Answer format:** First write the value of the expression, then the given numbers from left to right and from top to bottom using "-". Finally describe the content of the grid row by row from left to right and from top to bottom. For empty row is enough to indicate a one "-" sign. For the example: 260, 10, 10, -, 40, 30, 30, 20, 20, 40, 10, -, -, -, -X---, -.

**Score:** 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 points for best solutions.