

A N N E P O T S R I L C O T 2020

by Riad Khanmagomedov

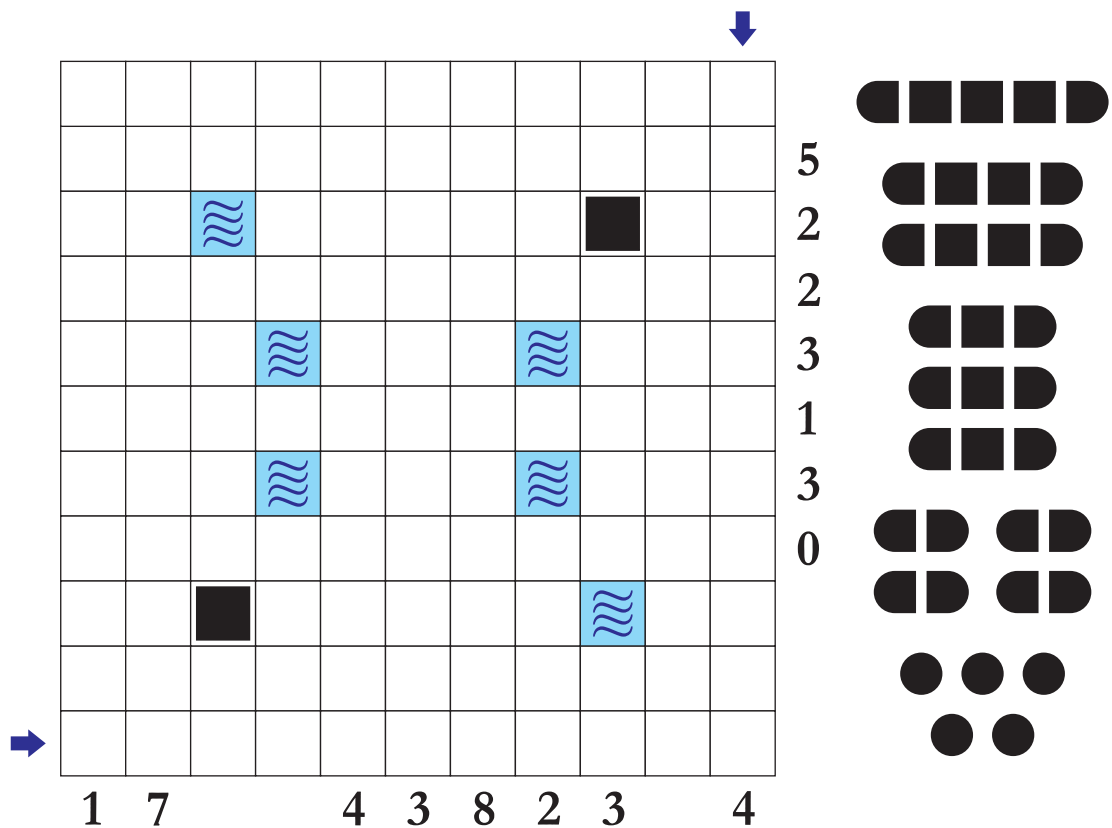
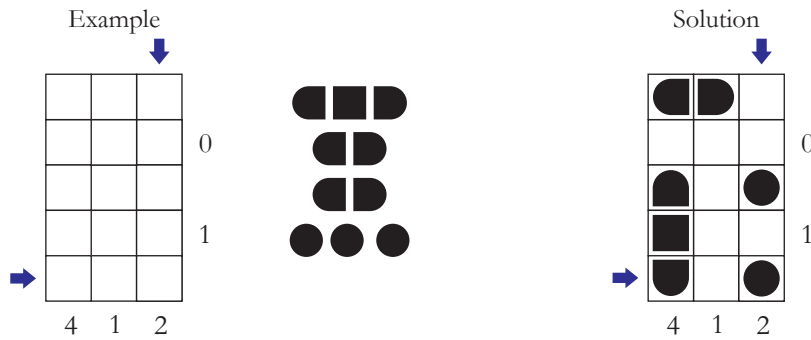
Submissions should be sent on the answer page at LMI not later than 24-00 (of Moscow time) April 18 2020

Thanks to Deb Mohanty, Kota Morinishi, Rakesh Rai and Prasanna Seshadri for support

1. BATTLESHIPS WITH LOSSES

3 pt

Place some ships from the given flotilla in some of the white cells. One or more ships should be excluded from consideration. Ships cannot touch each other, not even diagonally. Fragments of two ships, and some water cells are already marked. Each digit outside the grid shows how many cells are occupied by ships in the corresponding row or column.



Answer format: Write the content of the marked row from left to right and column from top to bottom. Use B for the cell occupied by the ship and "-" for the other cells. For the example: B-B, --B-B.

2. KEYWORD WITH NAMES

4 pt

Place some names from the list into the crossword grid. Words should read from left to right, or top to bottom. Each digit from 1 to 8 corresponds to three different letters. A total of 24 different letters are used. No name can be used more than once.

- AASHAY
- ALEXEY
- ALYONA
- ANDREW
- ANDREY
- ANITEI
- ANNICK
- ANURAG
- ASHISH
- ATILA
- BJOERN
- BOJANA
- BRANKO
- CHENYU
- DANIEL
- DEEPTI
- DILLIP
- DINESH
- DMITRY
- DMYTRO
- DRAGAN
- ESTHER
- EUGENE
- EVGENY
- GAURAV
- GEORGE
- GEORGI
- GIULIA
- GIULIO
- GULCIN
- HATICE
- HELENA
- HOWARD
- ICHIRO
- ISTVAN
- JAAKKO
- JAANUS
- JAIPAL
- JASPAL
- JAVIER
- JAYANT
- JEANNE
- JELENA

- JEROME
- JHONNY
- JUDYTA
- KARTIK
- KAZUYA
- LASZLO
- LEONID
- LEVENT
- LUKASZ
- MAKSIM
- MARCEL
- MARKKU
- MARKUS
- MARTIN
- MEHMET
- NEERAJ
- NIKOLA
- ONDREJ

- PALMER
- PIERRE
- PIHUNG
- PLUCKY
- PRANAV
- PRATIK
- PUNEET
- RAINER
- RAJESH
- RAKESH
- RASHMI
- ROBERT
- SABINE
- SACHIN
- SAMUEL
- SAUMYE
- SERGEY
- SERHAT

- SERHIY
- SERKAN
- SHANTA
- STEFAN
- STEVEN
- SUNDER
- TAKEYA
- TAKUMA
- TAKUYA
- TANTAN
- THOMAS
- TOMASZ

- TOMOYA
- ULRICH
- VICTOR
- VIKTOR
- VISHAL
- WALKER
- WEIFAN
- YOICHI
- YUJIRO
- ZOLTAN
- ZRINKA
- ZUZANA

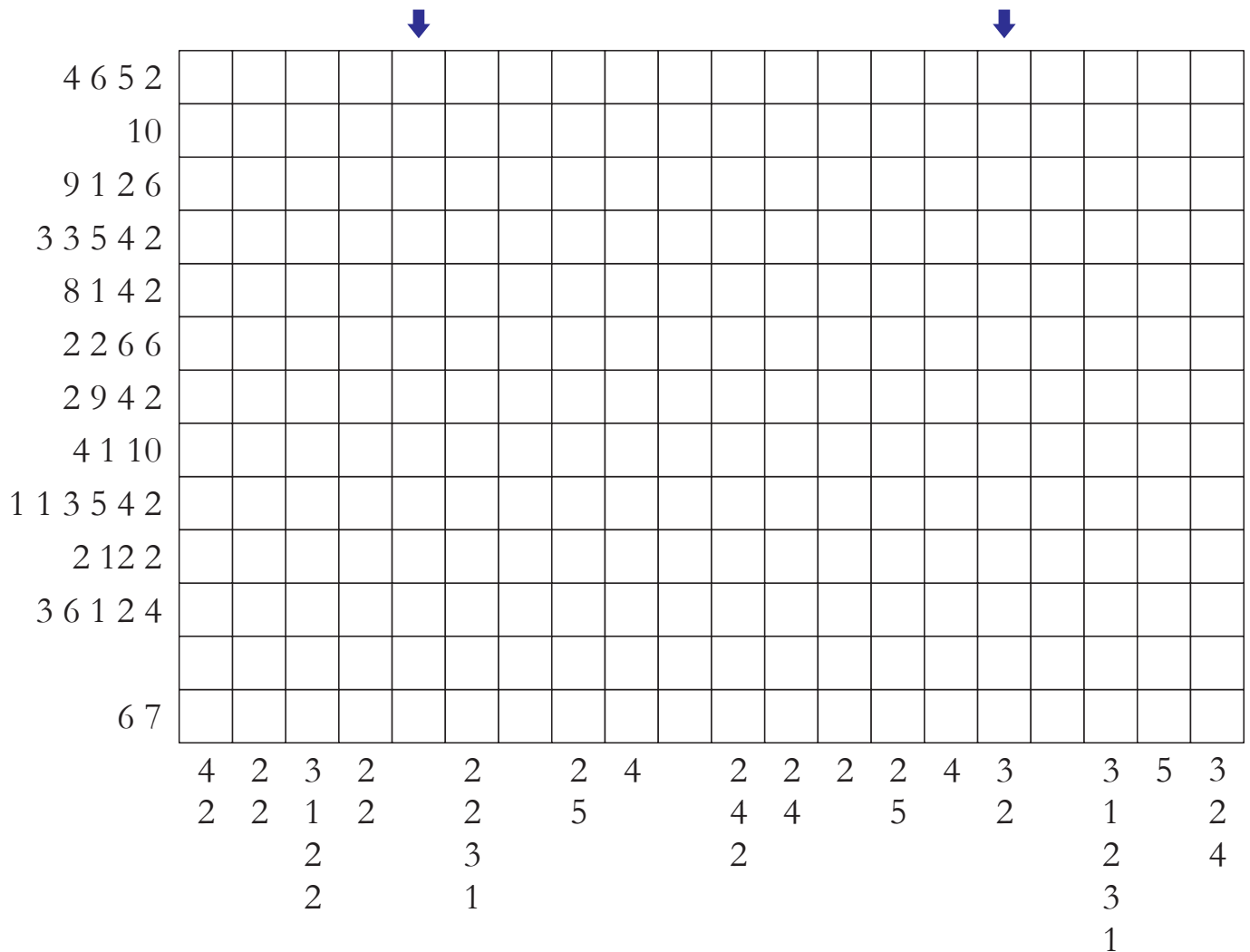
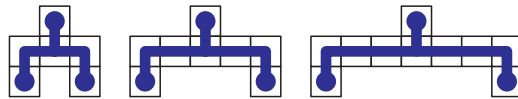
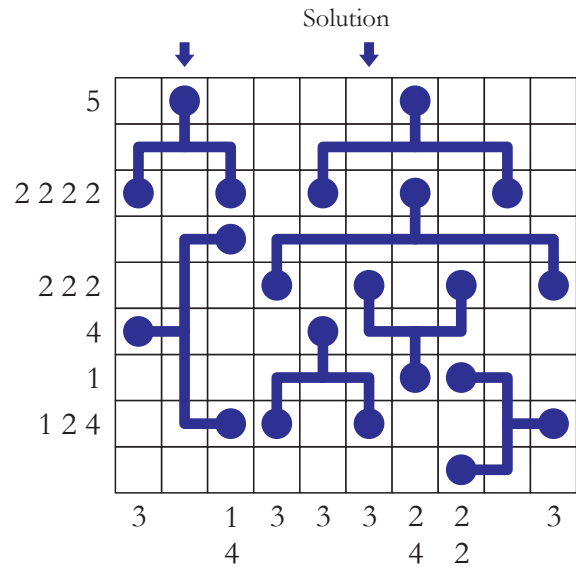
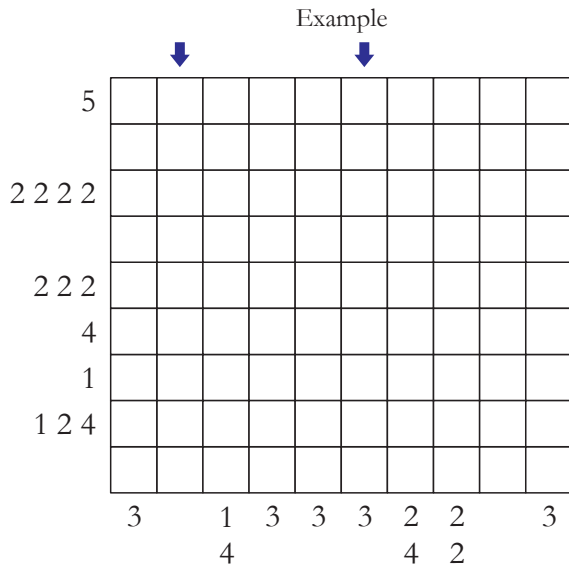
1	2	3	4	5	6	7	8
A							
P							
R	I	L					

Answer format: Write 10 letters on the first diagonal and 13 on the second from right to left.

3. HANGERS

4 pt

Draw some hangers of three possible sizes in the grid. The lines and circles should not intersect or overlap each other. Clues outside rows (and columns) give all distances between circles of hangers consecutively from left to right (or top to bottom). If there are less than two circles in a row or column, there shall be no clue in that row or column.



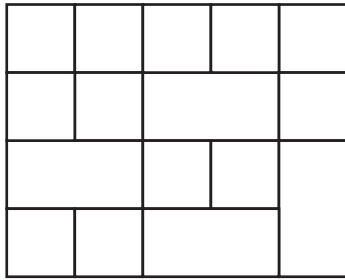
Answer format: Write the content of the marked columns from top to bottom. Use X for cell occupied by the hanger and "-" for the other cells. For the example: XX-XXXXX-, -X-XXXXX-.

4. PAVED ROAD

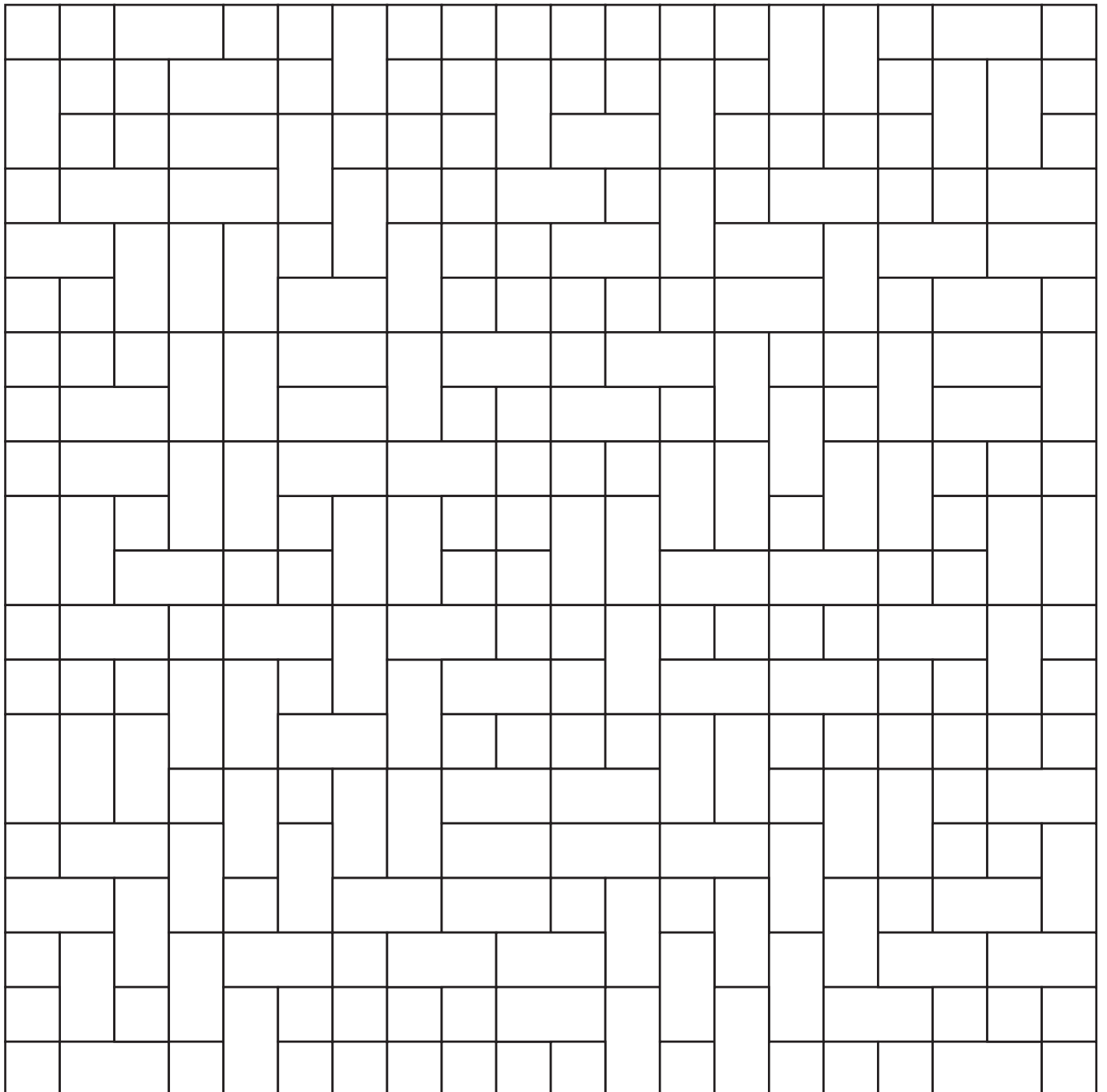
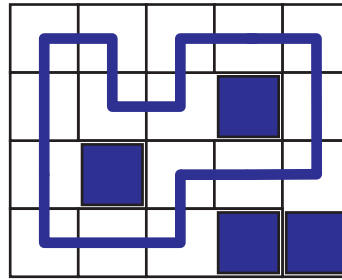
4 pt

Shade one-half of all double cells (cells with size 2) and draw a loop consisting of horizontal and vertical segments through the centers of all the white cells.

Example



Solution

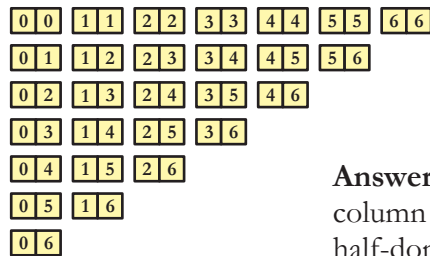
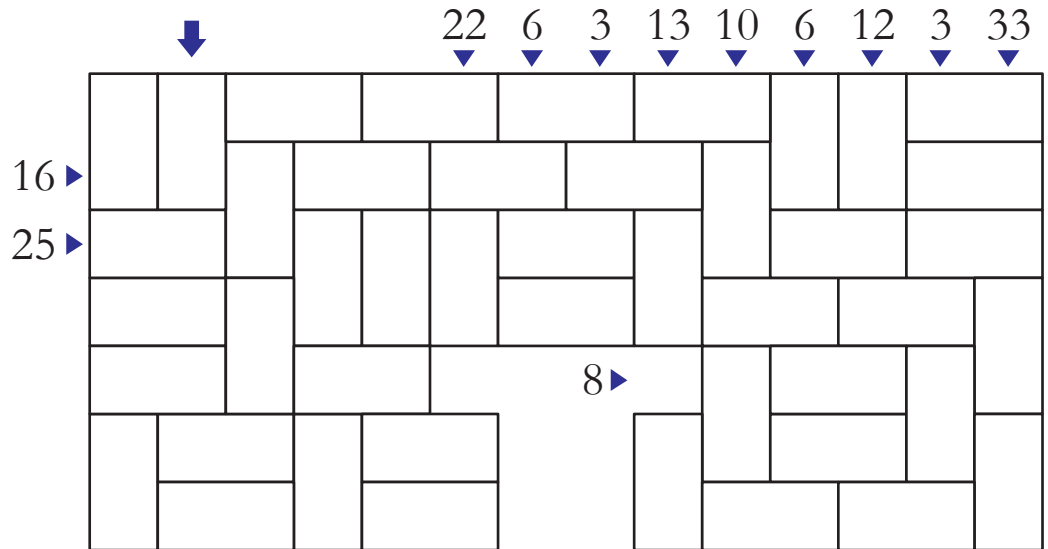
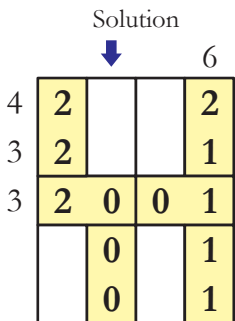
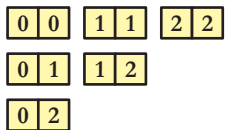
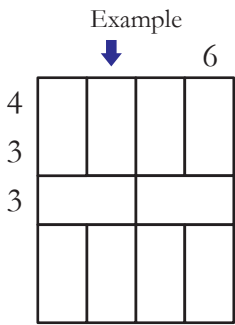


Answer format: Write the number of turns of the path. For the example: 10.

5. BUILD A DOMINOES

7 pt

Place all the given dominoes in some of the rectangles. If two dominoes touch each other by a side, the digits on the touching cells must be equal. There should be no 2x2 areas filled with digits. The clues outside the grid indicate the sum of all digits in the corresponding direction.

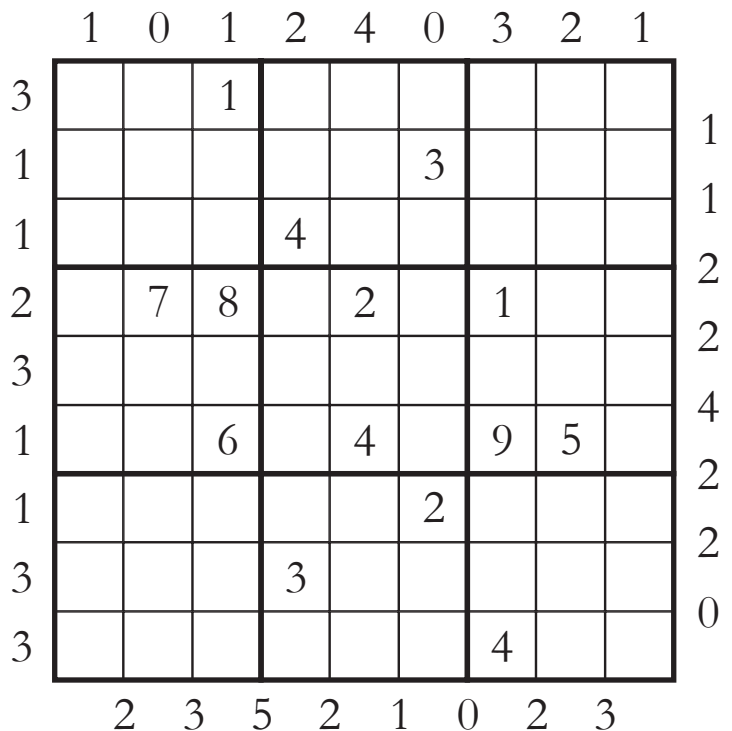
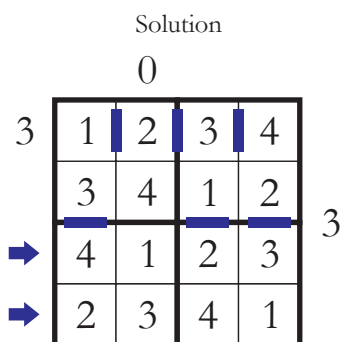
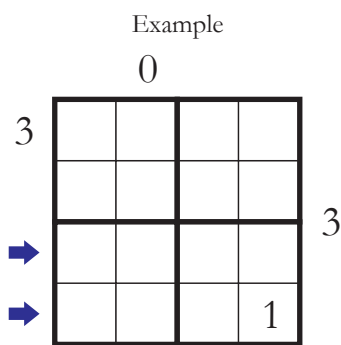


Answer format: Write the content of the marked column from top to bottom. Use "-" for the empty half-dominoes.. For the example: --000.

6. SUDOKU WITHOUT BARRIERS

8 pt

Fill the grid with digits from 1 to 9. Digits must be different in rows, columns and 3x3 boxes. A barrier must be placed between two vertically or horizontally adjacent cells if they contain consecutive digits. Each digit outside the grid shows how many barriers are placed in the corresponding direction. Clues on the top and right count horizontal barriers. Clues on the left and bottom count vertical barriers.

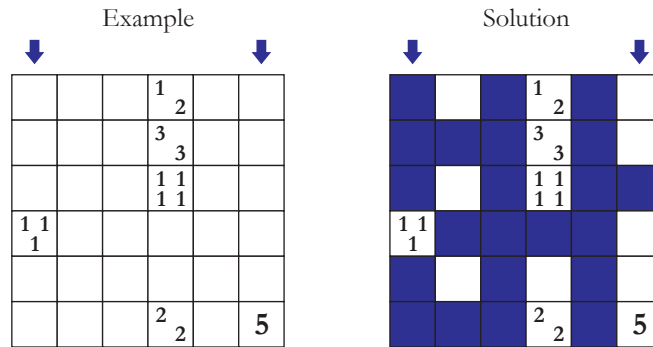
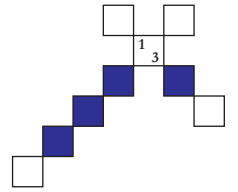


Answer format: Write the content of the marked rows from left to right. For the example: 4123, 2341.

7. DIATAPA

Shade some empty cells to create a continuous wall. There should not be any 2x2 shaded areas. Digits in a cell can indicate one of the following two cases: (a) The lengths of black cell blocks on its neighbouring cells. If there is more than one digit in a cell, there must be at least one white cell between the black cell blocks.

(b) The lengths of black diagonal blocks. For example, the digits 1 and 3 in the cell indicate that two of the four diagonally adjacent cells are black and two are white, and the lengths of the black blocks are 1 and 3 when viewed from that cell diagonally.



			1	3						1	2							3
					5			1	1	1	1				1	2		
			3	3			2	2				4					1	1
	3	3				5												
							2	3		1	4	1	1		5	1	1	4
				1	4													
1	1		1	2				5		1	1			1	1			
						1	1	1							3	3		
4							2	3										4
		1	1		1	2				3		5						
							1	2										
			1	3						1	1			4	2			2
4																		
			1	1		1	1			1	2							
							1	1	1	1			1	1			1	1
			3	3													1	1
1	1								1	1		1	1					
			1	2							2	2					1	2
						1	2		1	1				1	2		1	2
	1				2	2						2	2					

Answer format: Write the content of the marked columns from top to bottom. Use B for each black cell and W for other cells. For the example: BBBWBB, WWBWWW.

8. BUILD A HEX MAZE

10 pt

Place all possible walls in the grid, creating a path going from one yellow cell to the other and visiting every cell exactly once. Walls are lines going along the hex sides. Digits outside the grid sequentially show the lengths of all continuous wall segments in the corresponding direction (directions are marked by dotted lines). Unit length denotes wall segment of length equal to one side of a hex cell. There should be at least one empty space between two wall segments in corresponding direction.

The main grid is a large hexagonal shape with numbers around it indicating wall lengths. The numbers are as follows:

- Top row: 1, 2, 1, 2, 1, 1
- Row 2: 1, 1, 3, 2, 3, 3, 2
- Row 3: 1, 2, 2, 1, 1, 1, 1, 1
- Row 4: 1, 5, 1, 1, 1, 1, 1, 1
- Row 5: 1, 2, 2, 2, 2, 1, 1, 1, 3
- Row 6: 1, 1, 1, 2, 1, 3, 2, 2, 2
- Row 7: 1, 4, 2, 2, 3, 3, 2, 2, 2
- Row 8: 2, 1, 1, 1, 3, 1, 2, 1, 1
- Row 9: 1, 1, 1, 1, 2, 1, 1, 1, 1

Left side numbers (from top to bottom): 211111131, 14211111112, 4131551, 4152113311, 1215115422, 3131141372, 16121102111, 112612111541, 113146123, 2215121411, 951212, 146331, 132521

Right side numbers (from top to bottom): 1, 2, 4, 4, 6, 1, 1, 1, 2, 1, 4, 2, 4, 3, 3, 6, 2, 1, 1, 1, 4, 1

Bottom numbers (from left to right): 1, 8, 1, 2, 2, 3, 2, 4, 5, 1

Below the grid are two smaller diagrams:

- Example:** A 3x3 hexagonal grid with two yellow cells at the bottom. Numbers around it: 2, 2, 4, 5, 2, 1, 152.
- Solution:** The same 3x3 grid with a path drawn through all cells. Numbers around it: 2, 2, 4, 5, 2, 1, 152.

Answer format: Write the total number of obtuse angles of the path. For the example: 6.

9. CHAIN BETWEEN POLYOMINOES

12 pt

Place a few numbered polyominoes (dominoes, triminoes, tetraminoes, pentominoes and hexaminoes) in the grid. The digit in each of its cells indicates the area of the polyomino. Outside the grid, all digit values in the corresponding row or column are sequentially indicated. At the same time, starting from the black circle, draw a loop along the lines of the grid, passing through all rows and columns. The loop does not cross or touch itself, and it does not cross any polyomino. The lengths of the horizontal and vertical segments that make up the loop must alternate in the sequence 1-2-2-1-2-2...1-2-2. It is possible for two consecutive loop sequences to be horizontal or vertical. Some loop fragments are already given.

Example

		3	3	
		4	3	2
4	4	4	4	2

Solution

				4																			
3	3									5													5
3	3																						5
4	4								4														5
4	4																						5

3	3																							
4	4																							
4	4																							
4	4																							
2																								
3	3					3	3																	
4	4					4	4																	
4	4																							
4	4																							

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

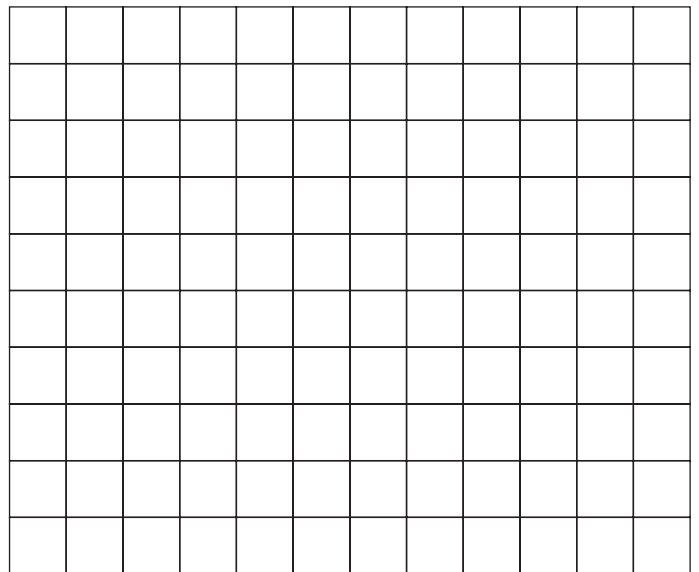
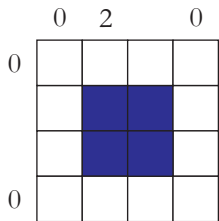
Answer format: Write the content of the dotted column from top to bottom. Use fragments lengths (1 or 2) and 0 for grid lines that the loop does not pass through. For the example: 10001.

10. TOWN

Place some dark rectangles, that are at least two cells wide and two cells high. They cannot touch each other, not even diagonally. The numbers outside the grid show the number of dark cells in the corresponding row or column. Make a puzzle with a unique solution in the 12x10 grid. That unique solution cannot have any 2x2 white areas. The white cells must form streets – the any stretches with a width of one cell and length at least 2. Maximize N, the number of streets. If two solutions have the same N, then the solution with the smaller sum of the given numbers is considered better.

13, 11, 9, 7, 5, 3, 1 pt for best solutions

Mini-example



Answer format: Write the number of streets and the sum of the given numbers. Then consecutively write the numbers above the grid and the left. Use "-" for columns and rows without a number.

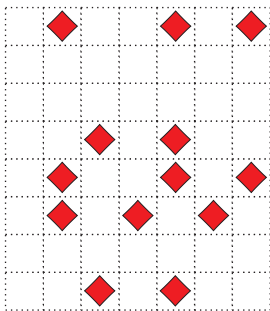
For the example: 4, 2, (0,2,-,0), (0,-,-,0).

11. DIAMONDS

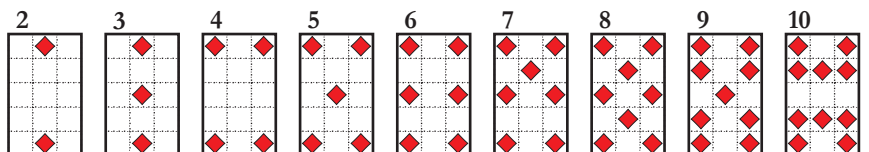
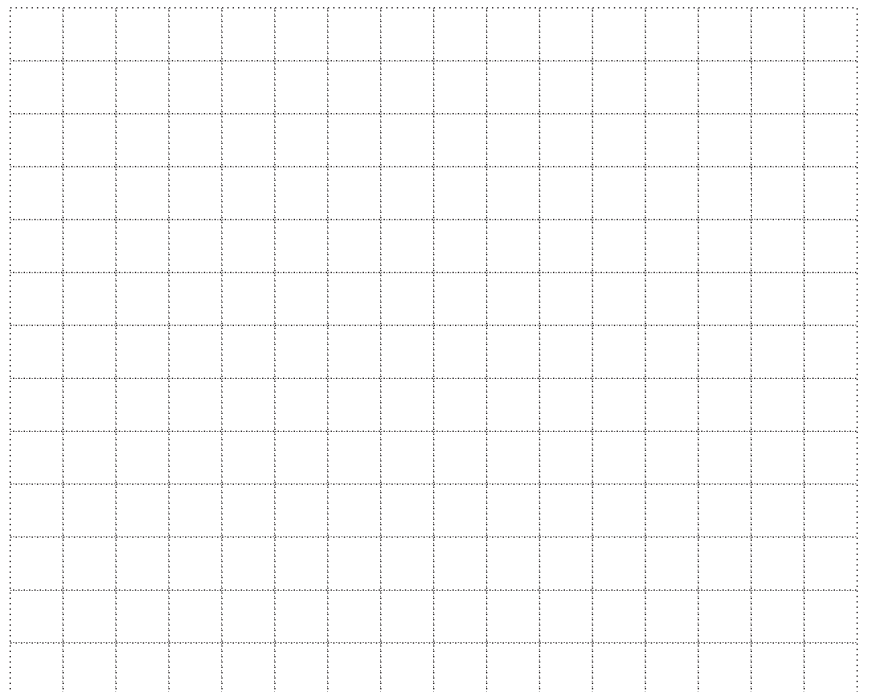
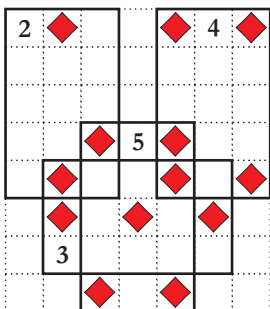
Draw a rectangular table in the 16x13 grid. All transparent cards from 2 to 10 of the given form are put on the table so that then it is possible to uniquely restore their contours. Borders of cards cannot have common segments. Minimize N – the number of diamonds in the grid. If two solutions have the same N, then the solution with the smaller table area is considered better.

13, 11, 9, 7, 5, 3, 1 pt for best solutions

Mini-example



Solution



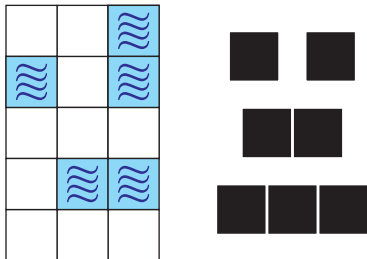
Answer format: Write the result and the table area. Then describe the table row by row from left to right. Use R for cell with diamond and W for other cells. The whole white row can be described by one letter W. For the example: 13, 56, WRWWRWR, W, W, WWRWRWW, WRWWRWR, WRWRWRW, W, WWRWRWW.

12. OPTI-BATTLE WITH LOSSES

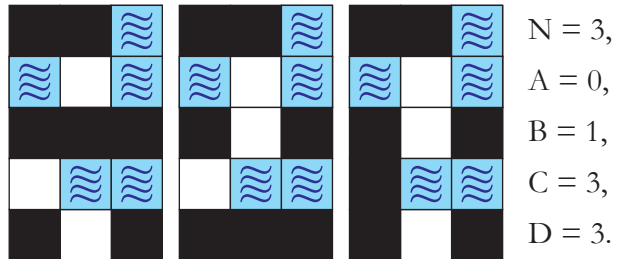
13, 11, 9, 7, 5, 3, 1 pt for best solutions

You have given sets: blue (fragments of the sea) and black (flotilla). Place all or some of the blue elements in the 7x7 grid so that they do not touch each other, not even diagonally. Then select all or some black ships, which will operate. Place your flotilla in the white squares of the grid so that the ships do not touch, not even diagonally. N denotes the number of solutions of the Battleships puzzle without given digits. N should not be greater than 10. Maximize the value of the expression $(7A+5B+3C+D)/N$, where A, B, C, D denote the number of 4-cell elements (blue and black) in your solution, 3-cell, 2-cell and 1-cell correspondingly.

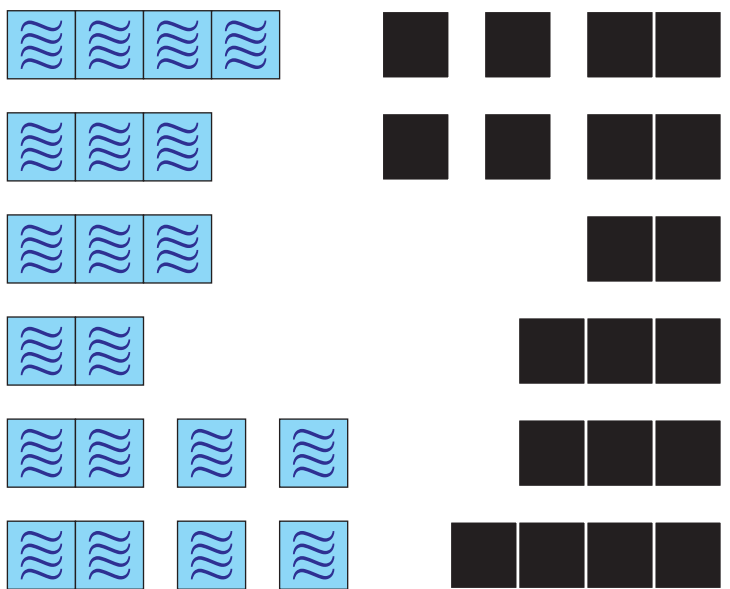
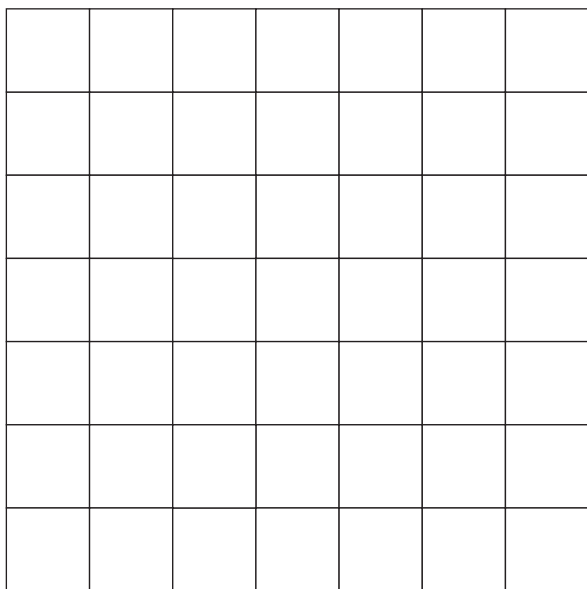
Mini-example



Solutions



N = 3,
A = 0,
B = 1,
C = 3,
D = 3.



Answer format: Write the result by rounding it to hundredths and the numeric values A, B, C, D. Then describe the grid row by row from left to right. Use S for blue cell and W for other cells. The whole white row can be described by one letter W. For the example: 5.67, 0, 1, 3, 3, WWS,SWS, W, WSS, W.