

Puzzles of April's Contest

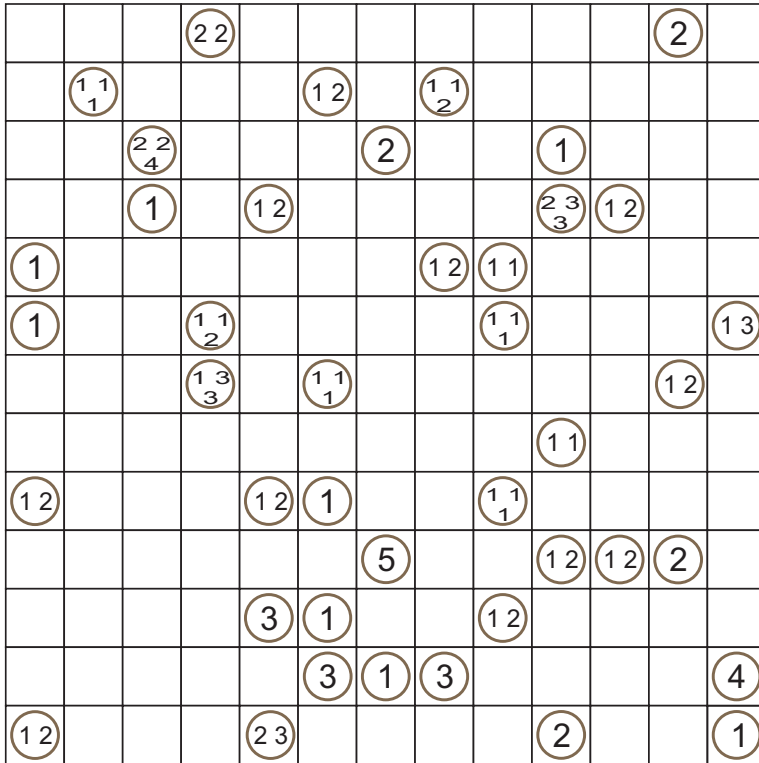
Riad Khanmagomedov

Submissions should be sent with answer page at <http://diogen.h1.ru/cgi-bin/contest/start.pl> not later than 24-00 (of Moscow time) April 10 2009.

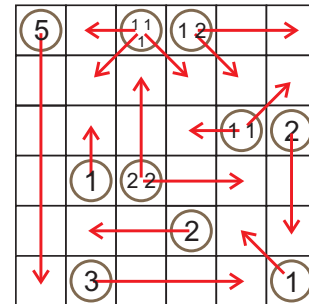
If you have any question write to forum <http://www.forsmart.com/forum/>

1. Watches

Each circle should have 1, 2 or 3 arrows of given lengths. The arrows could point vertically, horizontally or diagonally from the circles. The arrows could not touch to each other or to other circles. Each empty cell of the grid should contain exactly one arrow.



Example:

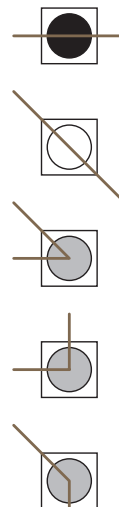
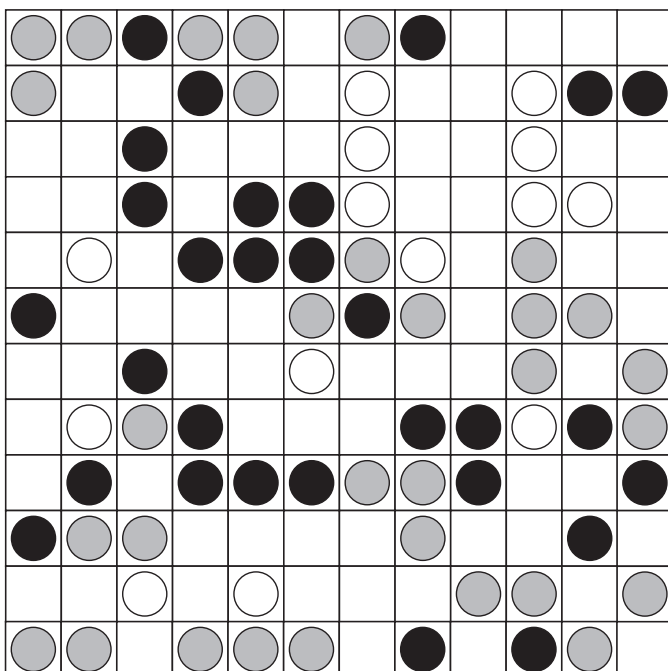


Answer format: write the number of vertical arrows of length 2. For the given example the answer would be: 2.

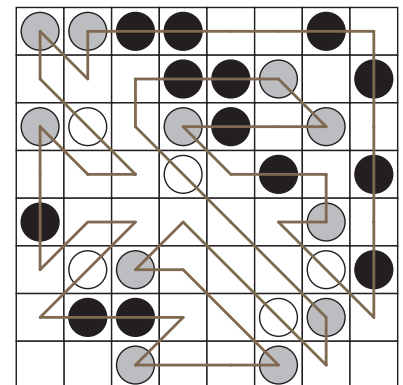
Score: 4 points.

2. Serpentine

Draw a serpentine - a single closed line which cannot touch or intersect itself. The line goes through the centres of the cells and consists of horizontal, vertical or diagonal segments. The serpentine goes through all cells with "confetti" - circles of three colours. In the cells with black circle the line goes vertically or horizontally, in the cells with white circle it goes diagonally, and in the cell with grey circles it makes turn at 45°, 90° or 135°.



Example:



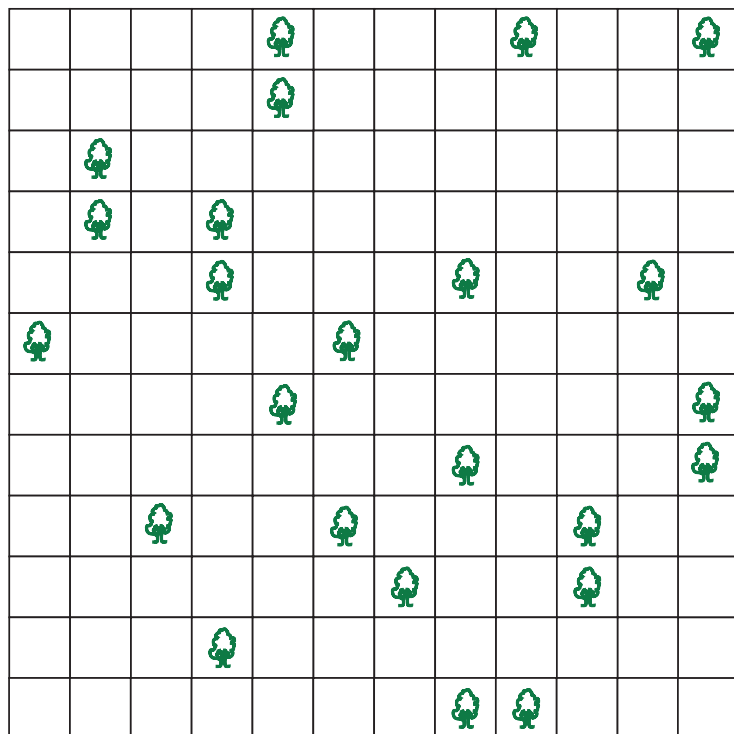
Answer format: write the number of right angles of the serpentine.

For the given example the answer would be: 6.

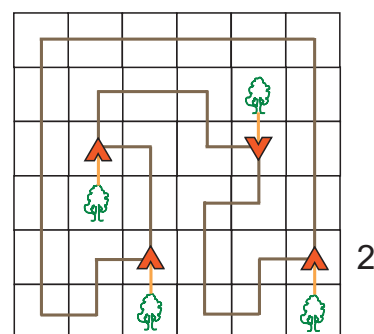
Score: 5 points.

3. Forest orienteering*

There are 24 trees in the forest. Tie one tent to the each tree using a rope (it is in the horizontally or vertically neighbouring cell) . Two tents cannot touch each other even by a corner. Digits “2” at the right and in the bottom show the number of the tents in the corresponding row and column. Draw one closed path going vertically or horizontally through all cells without a tree. Each rope with a tent is an arrow which shows the direction of a path in the cell with the tent.



Example:



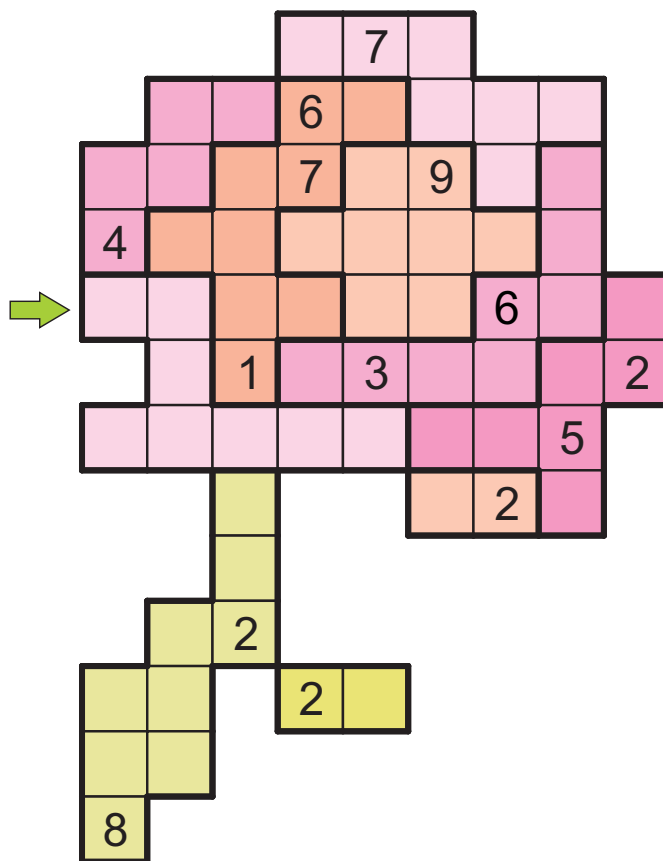
Answer format: write the number of turns of the path.

For the given example the answer would be: 18.

Score: 5 points.

4. Flower

Fill in the empty cells with digits from 1 to 9. Each row, column and outlined area should contain different digits which form consecutive series. For example, 7-cells area could contain all digits from 1 to 7, or from 2 to 8, or from 3 to 9.



Answer format: write the content of marked (fifth from the top) row from left to right.

Score: 6 points.

* The puzzle is devoted to Alexander Pankratov (1961-2009) - the first Russian Puzzle Champion. He also was a participant and an organizer of orienteering competition.

5. Doku-san

Put some dominoes into the grid. The dominoes cannot overlap. All unused cells should form 10 areas of eight cells each. Areas could touch each other only by a corner. Digits cannot repeat in rows, column and in the areas. You can use part of four complete domino sets from 1-1 to 8-8.

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

Example with three areas:

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

Answer format: write the quantity of horizontal dominoes. For the given example the answer would be: 5.

Score: 7 points.

6. Campus

Draw a fence - single closed loop going along the grid lines. Fence cannot touch itself even diagonally. Fill in the cells with digits from 1 to 4. Each row and each column should have exactly four cells inside the fence which contain different digits. Digits outside the fence should also be different in rows and columns. Each digit in the grid represent a building of corresponding height. Digit in the shadowed cell outside the grid shows the number of visible buildings inside the fence in corresponding direction (outside buildings are ignored). Digit in the white cell outside the grid shows the number of visible buildings outside the fence in corresponding direction (inside buildings are ignored).

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

Example:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

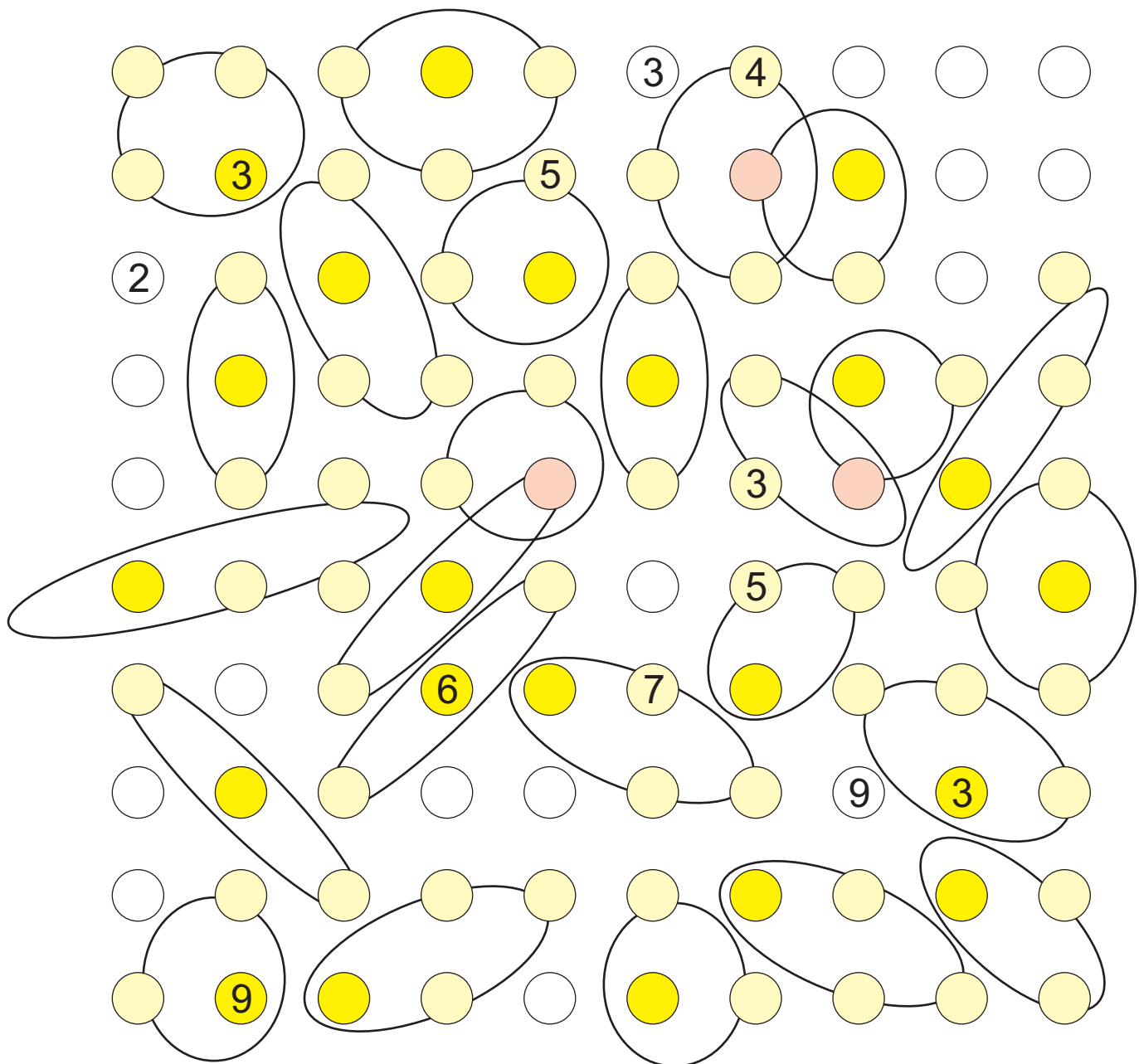
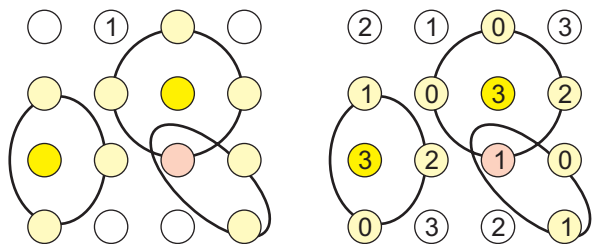
Answer format: write the content of diagonal from the bottom left to the top right corner. For the given example the answer would be: 44422434.

Score: 8 points.

7. Orbits

Write digits from 0 to 9 into the circles. The digits cannot repeat in rows and columns. Digits in the circle-planets should be equal to the sum of digits in their satellites - circles lying at the orbit around the planet.

Example:



Answer format: write the content of diagonal from the bottom left to the top right corner. For the given example the answer would be: 0233.

Score: 9 points.

8. Were you in Mendeleev's dream?

Put the given 26 puzzler names into the cells. Each cell should contain one name and this name should have all letter(s) which are represented in the cell. Then give the number of the cell to the same letter in the name which is in the cell. Different numbers should have different letters. The sum of letters are given for seven names at the bottom.

H ¹							He ²
Li ³	Be ⁴	B ⁵	C ⁶	N ⁷	O ⁸	F ⁹	Ne ¹⁰
Na ¹¹	Mg ¹²	Al ¹³	Si ¹⁴	P ¹⁵	S ¹⁶	Cl ¹⁷	Ar ¹⁸
K ¹⁹	Ca ²⁰	Sc ²¹	Ti ²²	V ²³	Cr ²⁴	Mn ²⁵	Fe ²⁶

Aipkin	Milanovic
Arimatsu	Milojkovic
Bekishev	Quaresima
Buhanevich	Radtke
Fabris	Rao
Fishelev	Romon
Forcolin	Shkolnikov
Guixin	Sugimura
Hrdina	Szeman
Jo	Tanasic
Kawasaki	Tokunaga
Kazmerchuk	Yurekli
Kocaman	Zivanovic

lida54
 Klemic111
 Klyachin79
 Krotkova115
 Rai24
 Wei53
 Yen35

Auxiliary table

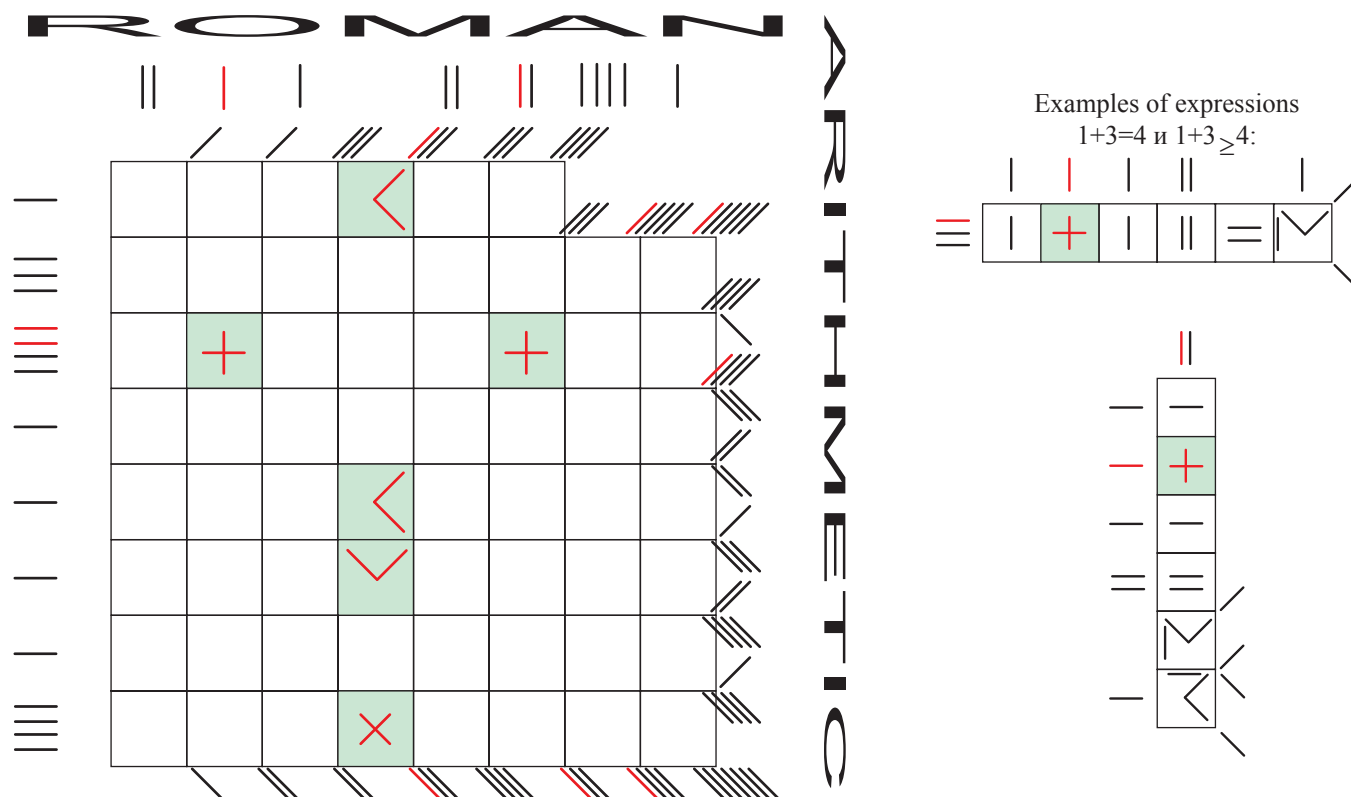
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

Answer format: write the sum of letters for the name Matschke.

Score: 10 points.

9. Roman mirrored arithmetic

Write one of the signs +, -, =, \leq , \geq , \lt , \gt or roman digit I, II, IV, V, VI, X (each digit are formed by rotation of a sign) into each cell of the grid. 6 symbols are already placed. Each row in the original grid and each row after rotating at 90° (the word “arithmetic“ should be read) should have correct arithmetic expression having at least one sign of equality or inequality. Expressions could not start with a sign and could not have two signs in neighbouring cells. Strokes outside the grid show the number of corresponding lines in the corresponding direction. Fourth column does not have vertical lines.

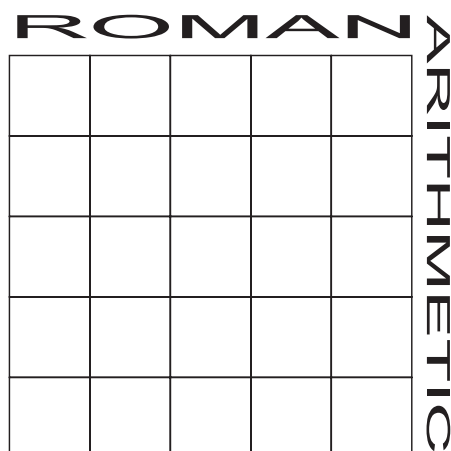


Answer format: write all EQUALITIES in the original grid from top to bottom. For the given example the answer would be: 1+3=4.

Score: 11 points.

10. Roman mirrored opti-arithmetic

Using the rules of the previous puzzle form some expressions in the 5 x 5 grid. Maximize the value of $K+L+3MN$, where K is the number of different digits and signs in the original grid, L is the number of different digits and signs in the rotating grid, M and N are the numbers of correct expressions in the original and rotating grid.



Mini-example:

	+		<	
∩	<	×	∨	
	×	×	=	×

K=10 {1, +, <=, 2, 4, <, 18, x, 10, =},
L=10 {=, x, 6, >, 2, -, 20, +, 5, >=},
M=3, N=1

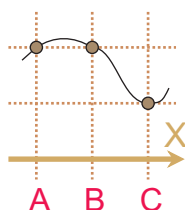
Answer format: first write the value, then all expressions before rotation starting from the top, then all expressions after rotation. For signs “less or equal” and “greater or equal” use “ \leq ” и “ \geq ”, and “?” for meaningless. For the given example the answer would be: 29; $1+1 \leq 2$, $4 < 18$, $1 \times 10 = 10$; $= ?x$, $6 > 2$, -20 , $+5x$, $- \geq -$.

Score: 12, 10, 8, 6, 4, 2 points for six best results.

11. Fidget in the dunes

Choose any of given 10 points to start. The line represent sand surface. The fidget could jump to any of other points. After jump the surface go down in the landing point at the value equals to the jumps length. But it go up in two (or one if jump ends at the border of the grid) neighbouring cells at the same value. Using minimum number of jumps make the surface flat.

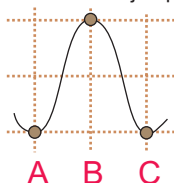
Example:



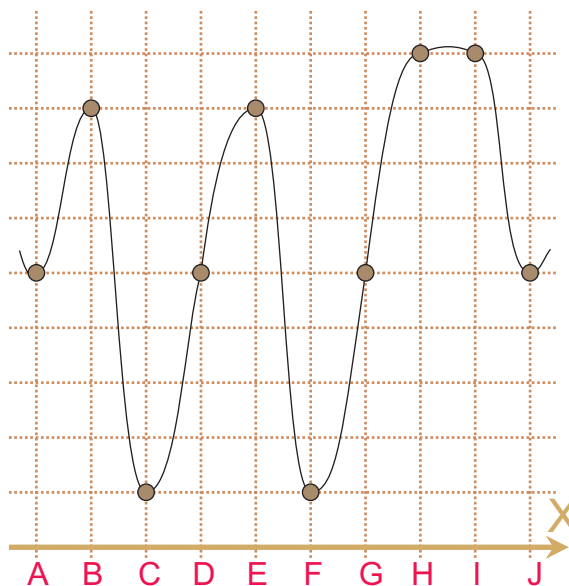
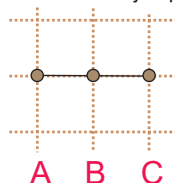
Solution:

First jump from B 1 cell left, then 1 cell right.

After the 1-st jump



After the 2-nd jump



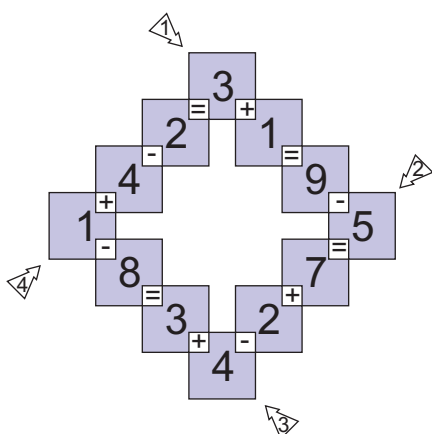
Answer format: first write the starting coordinate and the number of jumps, then the length of jumps using minus sign for lumps to the left. For the given example the answer would be: B, 2; -1, 1.

Score: 12, 9.5, 7, 4.5, 2 points for five best results.

12. Cycled arithmetic

Put a digit from 1 to 9 into each shaded cell and signs $+$, $-$, \times , $/$, $=$ into each white cell. Digits and signs could not repeat in four directions given by arrows and should form correct expressions in these directions. You should use standard priority of arithmetic operation. The same digits and signs could not be in the same horizontal or vertical. Maximize the sum of values for these 4 expressions.

Example:



The values are 4, 5, 7 and 3.

Answer format: first write the sum, then all four expressions.

For the given example the answer would be:

19, $3+1=9-5$, $5=7+2-4$, $4+3=8-1$, $1+4-2=3$.

Score: 12, 11, 10..., 3, 2, 1 points for twelve best results. .

