APRIL CONTEST 2017

by Riad Khanmagomedov

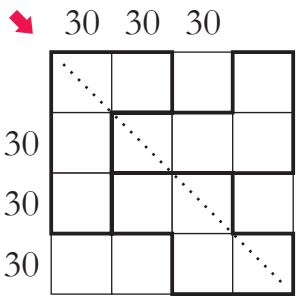
Submissions should be sent on the answer page at LMI not later than 24-00 (of Moscow time) April 19 2017

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

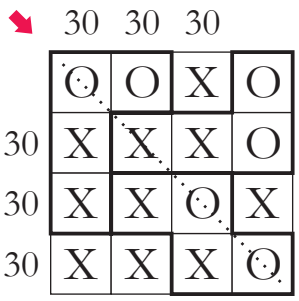
1. ROMAN XO WITH REGIONS — 9 points

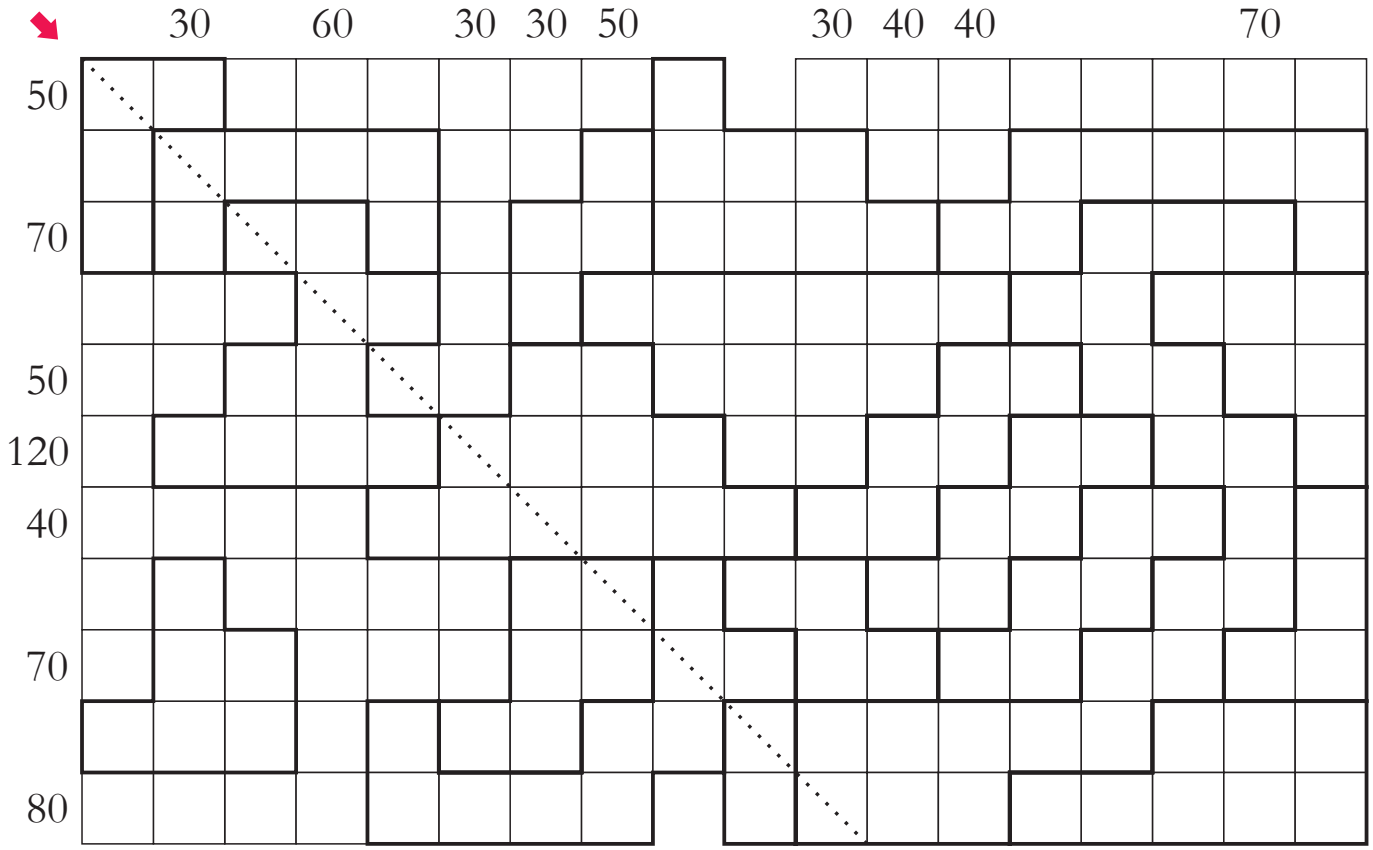
Place either an 'X' or an 'O' into each empty cell such that four consecutive 'X's or 'O's do not appear horizontally, vertically or diagonally. According to the Roman system of numbers X=10. Each number outside the grid represent the sum of all 'X's in the corresponding direction. In each marked region must be the same number 'X's and 'O's.

Example



Solution





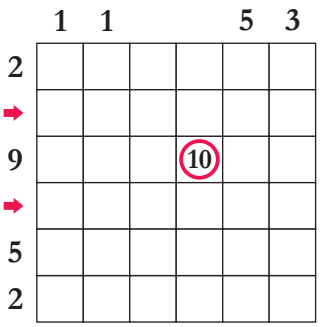
Answer format: Write the content of marked diagonal from top to bottom. For the example: OXOO.

2. MAX-MINI SNAKE

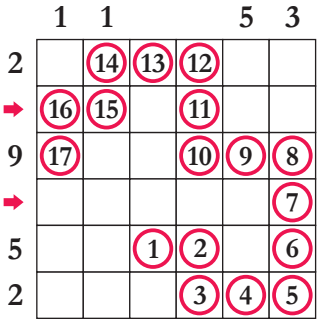
4 points

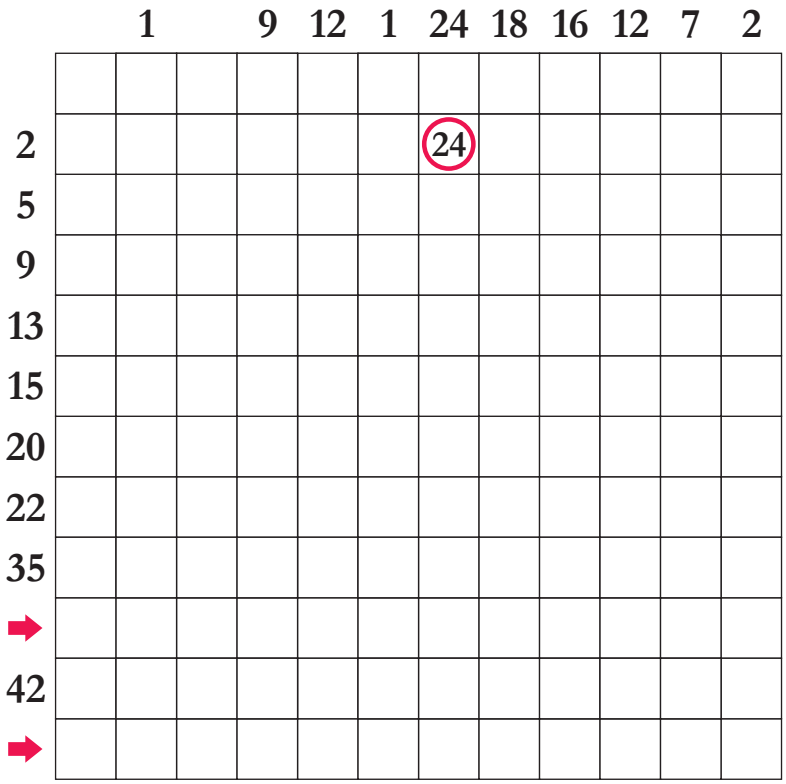
Draw a numeric 45-cells snake – the line width of 1 cell, consisting of horizontal and vertical fragments. The snake cannot touch or cross itself. Its element is marked by circles with number 24. Each number outside the grid represent the difference between the greatest and smallest numbers in the corresponding direction.

Example
with 17-cells snake



Solution





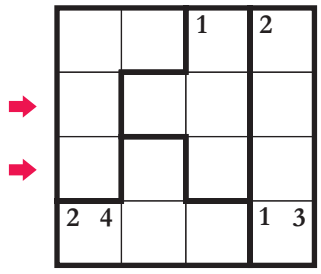
Answer format: Write the content of marked rows from left to right. Use "-" for empty cells. For the example: 1615-11--, -----7.

3. "NON"-SUDOKU

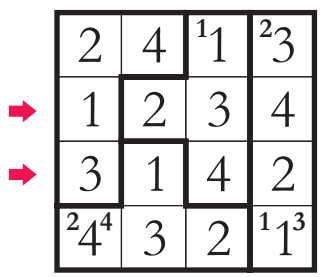
4 points

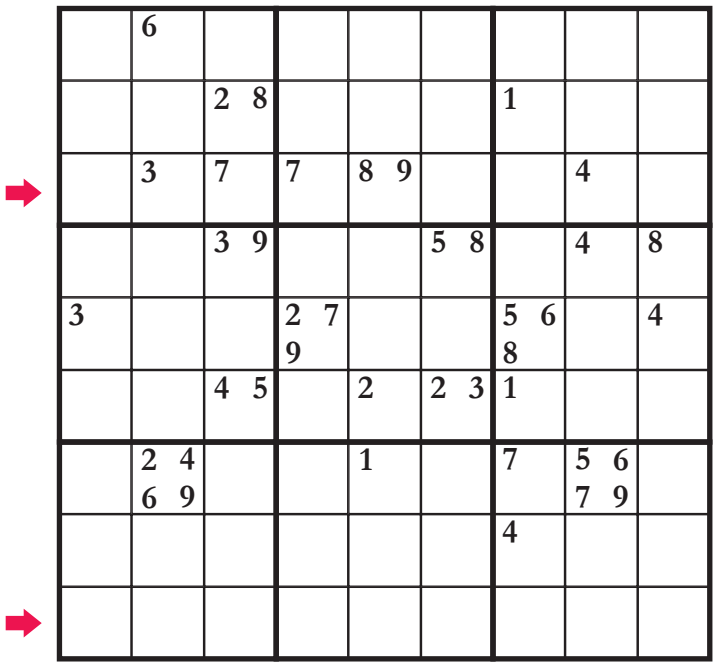
Fill the grid with digits from 1 to 9. Digits must be different in rows, columns and outlined areas. Each small digit indicates that the digit is not present in any of the 8 adjacent cells (including diagonally adjacent cells).

Example



Solution



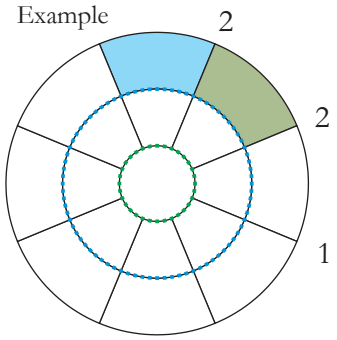


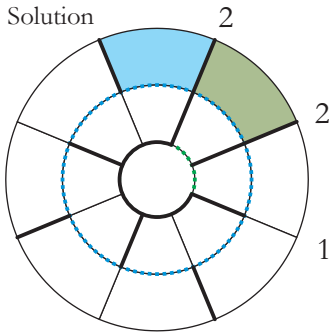
Answer format: Write the content of marked rows from left to right. For the example: 1234, 3142.

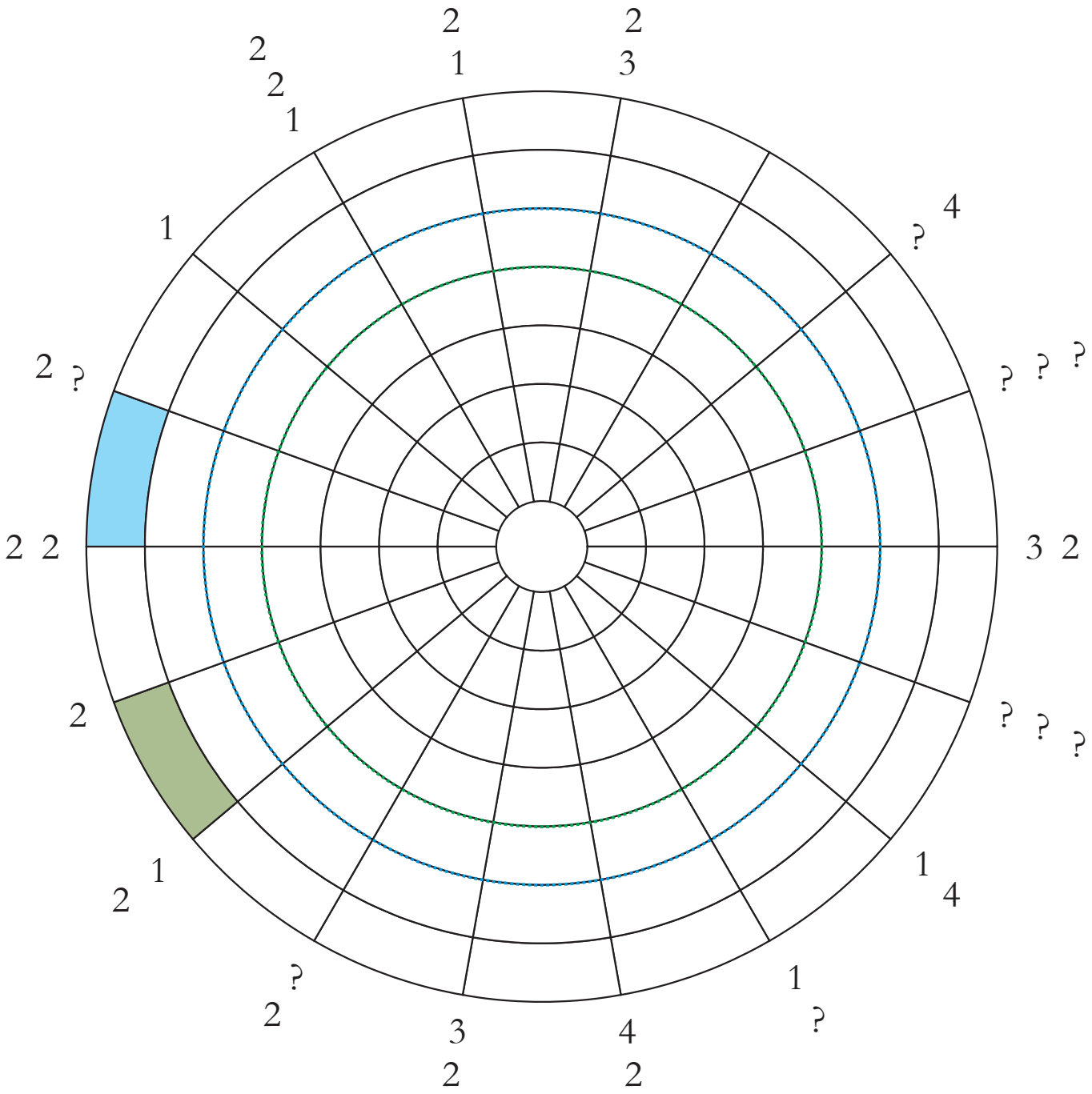
4. BUILD A CIRCULAR MAZE

5 points

Place some walls in the grid, creating a path going from one coloured cell to another and visiting every cell exactly once. Walls are lines/arcs going along grid lines/arcs with their ends at grid nodes. All lines and arcs through which the path passes are the walls. Digits outside the grid sequentially show the lengths of all wall segments in the corresponding radius. There should be at least one empty space between two segments.







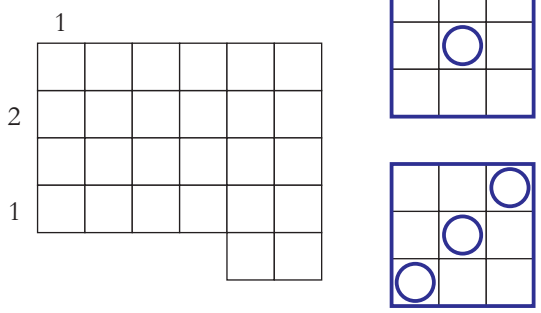
Answer format: Enter in order the lengths of all wall segments on green circle, starting from longest and traveling clockwise around this circle, and then on blue circle. For the example: 6, 0.

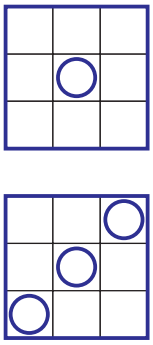
5. DICE LOOP

6 points

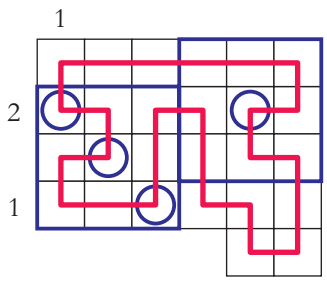
Place all given half-dominoes in white cells. They cannot overlap each other. Half-dominoes can be rotated. Digits outside the grid show the number of circles in the corresponding directions. There should be loop going through the centres of all white cells and formed by horizontal and vertical segments. This loop cannot touch or cross itself. The loop makes a 90° turn in each cell with a circle. The length of the loop segments which form this turn should be equal.

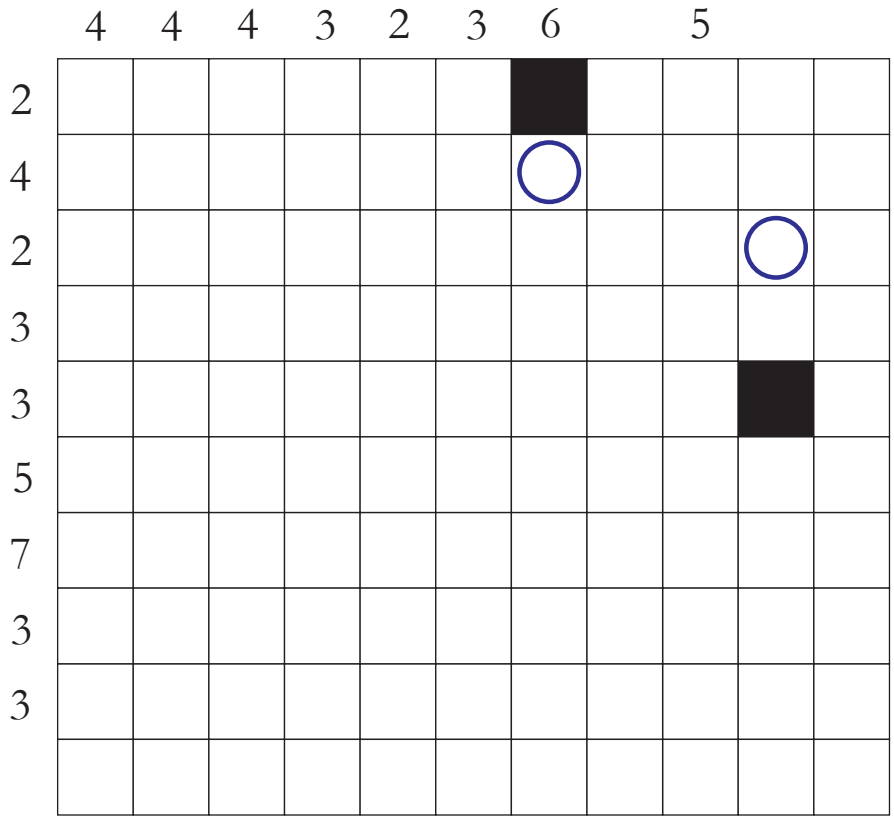
Example

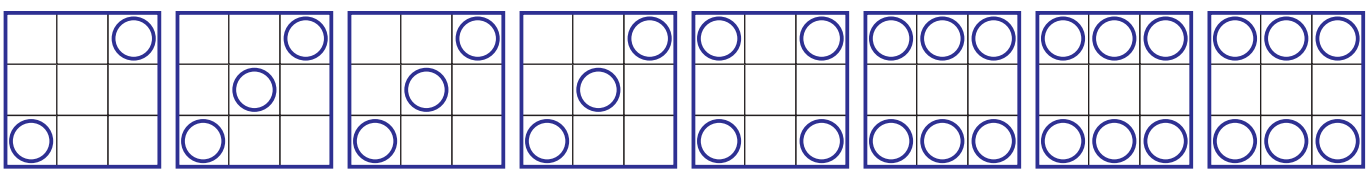




Solution





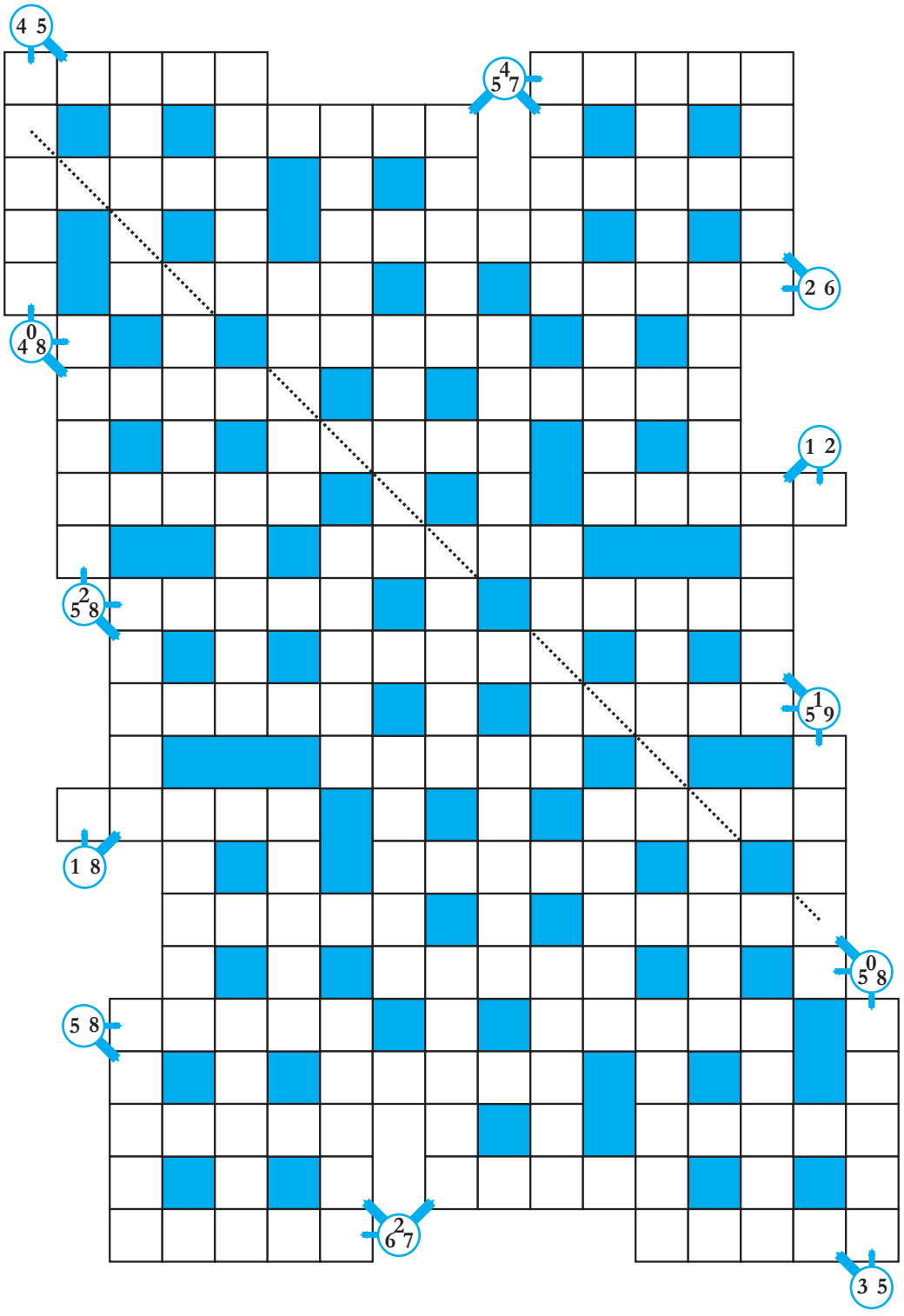


Answer format: Write the number of all turns of the loop. For the example: 18.

6. CROSSNUMBER WITH TIPS

7 points

Place all given numbers in the crossword grid from left to right and top to bottom. Put all digits from each circle into the cells marked with arrows.



10184	63723
13388	66784
14819	67567
17585	69387
24443	71738
28626	73754
32502	74539
35385	74746
36256	74999
38204	75873
38309	76284
38739	76562
40698	76820
40730	79707
41931	79958
44339	80023
44739	80468
45172	81040
48812	81929
49076	82496
49249	82527
49499	83114
49937	83653
51001	83853
52262	85974
53160	87067
53705	90315
54354	93512
56945	94142
57717	94832
58291	95080
59670	95359
59828	95852
59980	96738
60833	98239
61425	99807

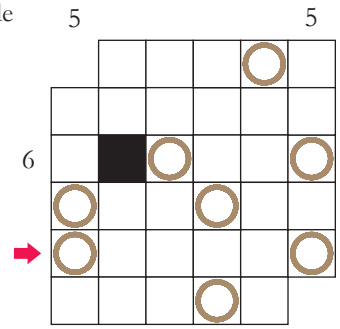
Answer format: Write the content (13 digits) of marked diagonal from top to bottom.

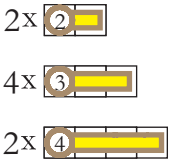
7. MATCH-GRID

8 points

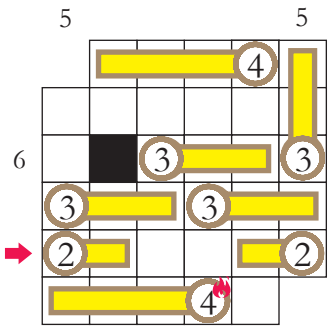
Place 31 given matches in white cells. They cannot overlap each other. Every match must contain exactly one given circle (head) which must be filled in with the length of the match. Numbers outside the grid equal a sum of the digits in the corresponding direction (written into the given heads). Each match light up at the head and burn from there towards the other end. Fire one match that all other matches are burned.

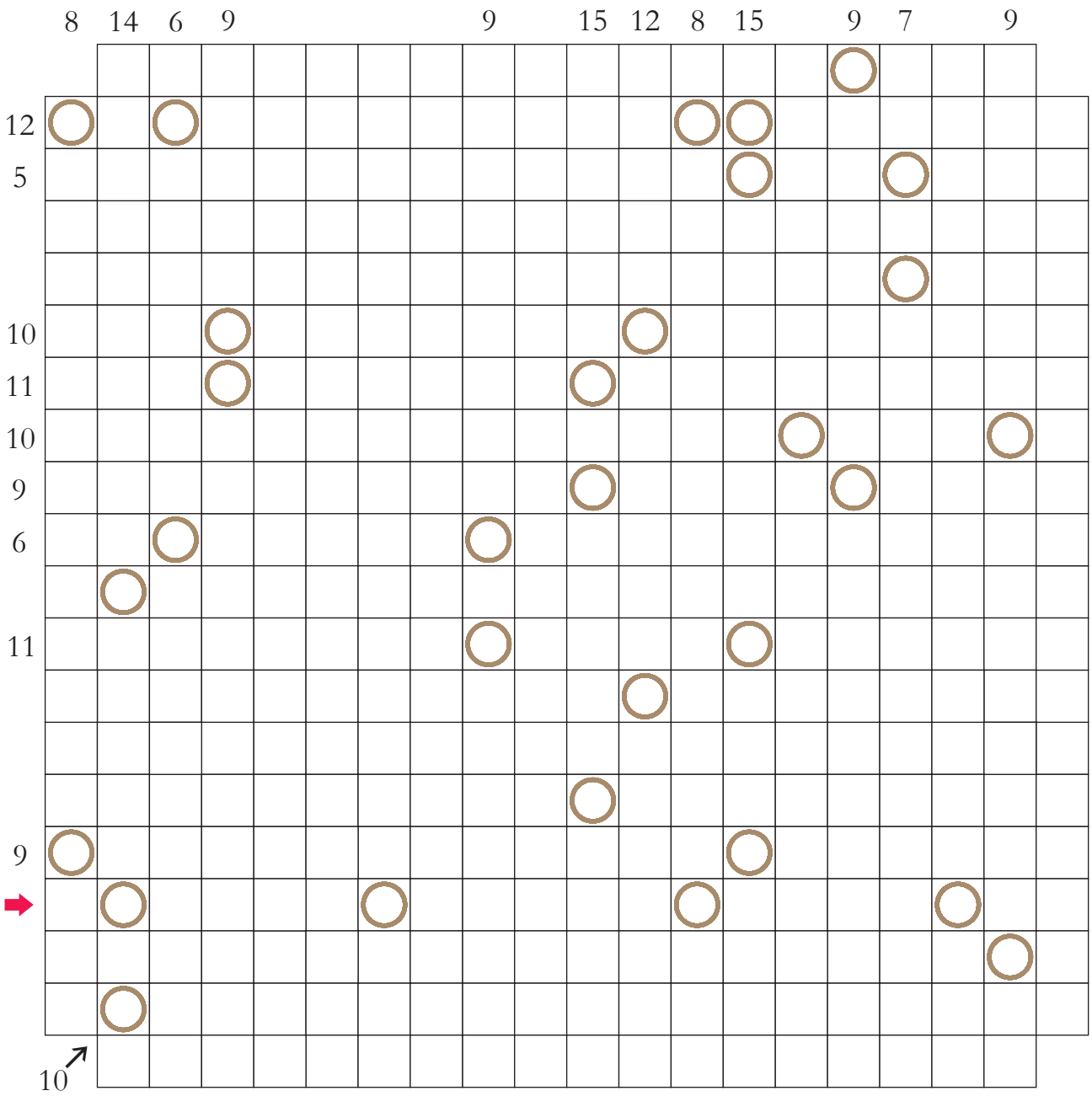
Example





Solution





3x 2 5x 3 8x 4 11x 5 6 3x 7

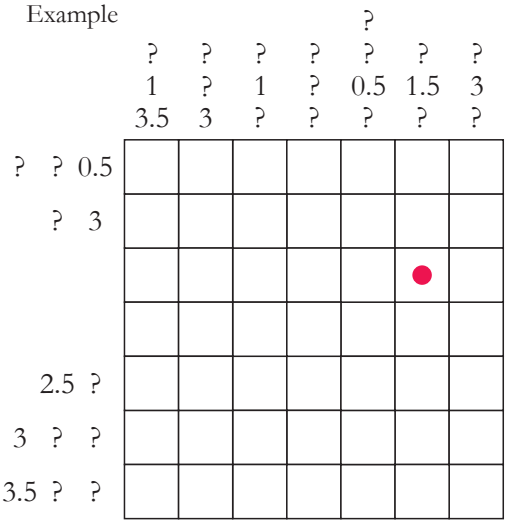
Answer format: Write the content of marked row from left to right. Use digits, "-" for empty cells and "+" for shaded cells. For the example: 2+--+2.

8. ROLLBALL

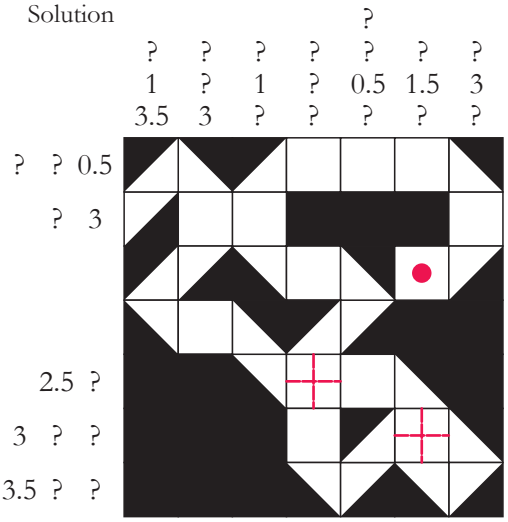
9 points

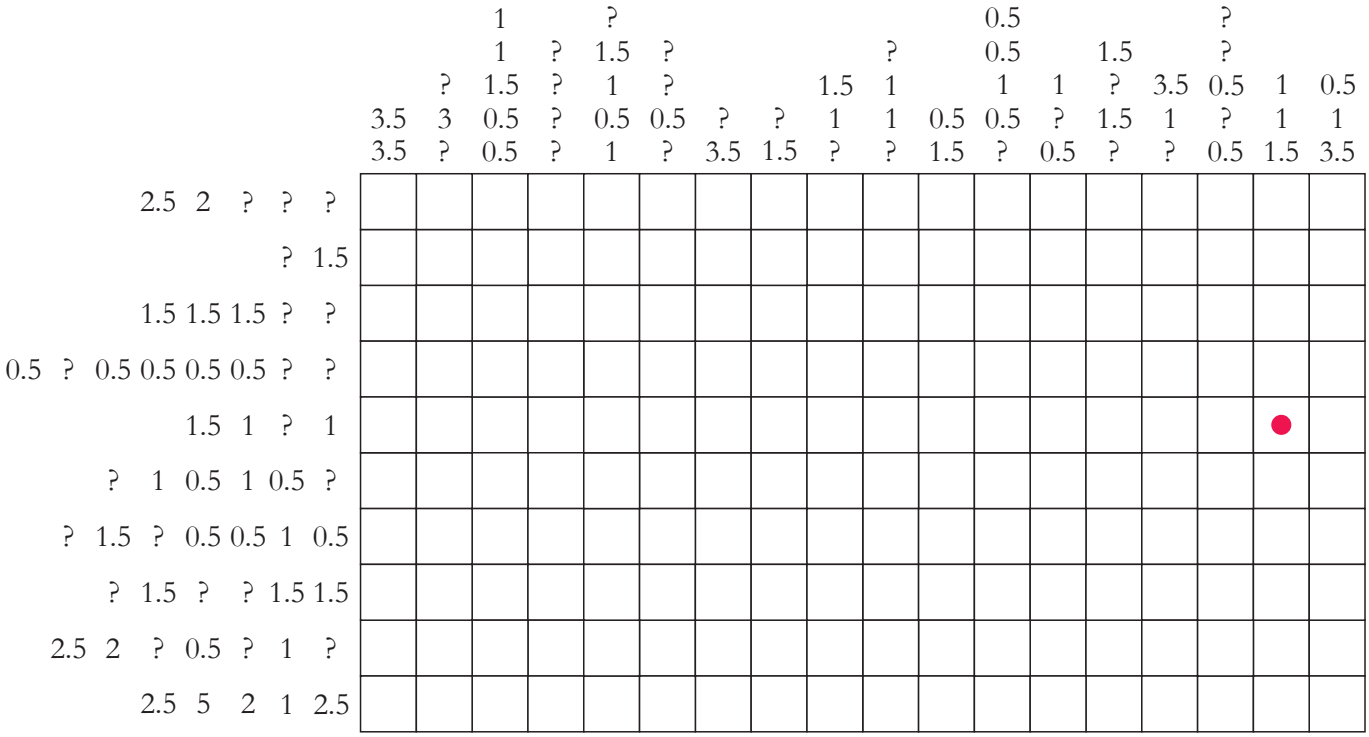
Blacken some cells and half-cells (right-angled triangles) except the cell with the ball. Numbers outside the grid show the lengths of all black blocks in corresponding directions, in the correct order. There should be at least one white half-cell between two black blocks. The sign "?" means any positive number. Push the ball going horizontally and vertically. It change the direction after touching the hypotenuse of half-cell. The ball cannot return back. It must go through the centres of all white half-cells and cells and roll out the grid.

Example



Solution





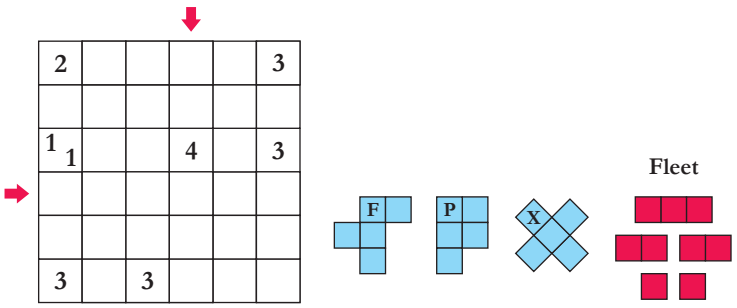
Answer format: Write the number of cells which the ball across twice. For the example: 2.

9. FLEET BETWEEN THE PENTOMINOES

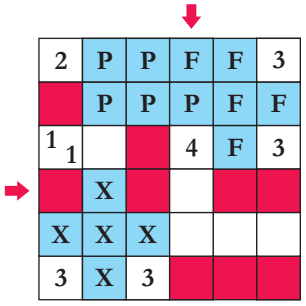
9 points

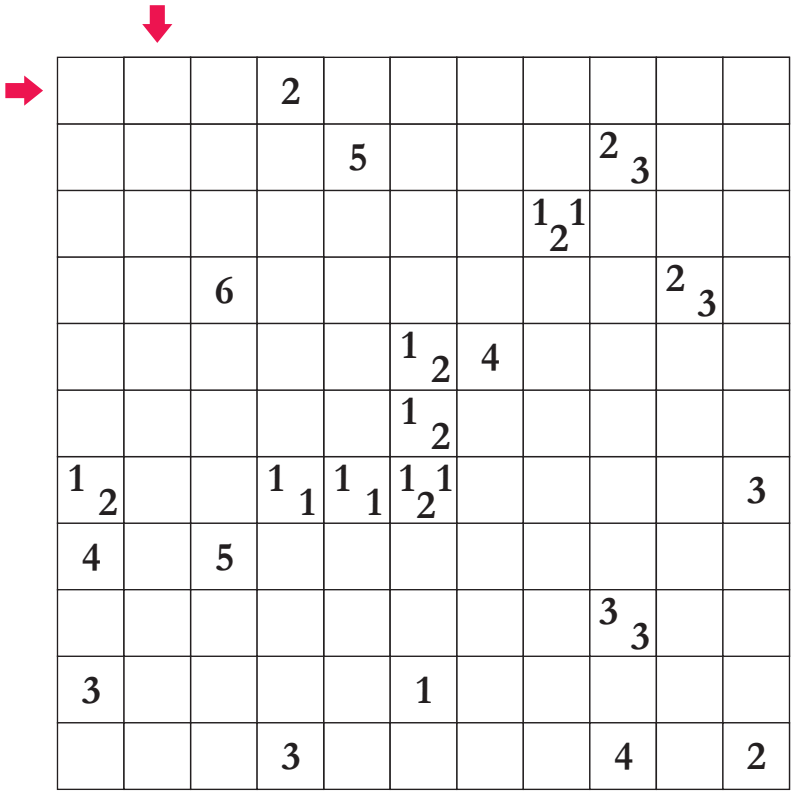
Place 12 given blue pentominoes in the empty cells of the grid. They can be rotated and/or mirrored. The pentominoes cannot overlap (but can touch) each other. Digits in a cell indicate the lengths of blue blocks in its neighbouring cells. If there is more than one digit in a cell, there must be at least one another colour cell between the blue blocks. Put the given red fleet in the empty white cells: the 15 ships cannot touch each other, even diagonally.

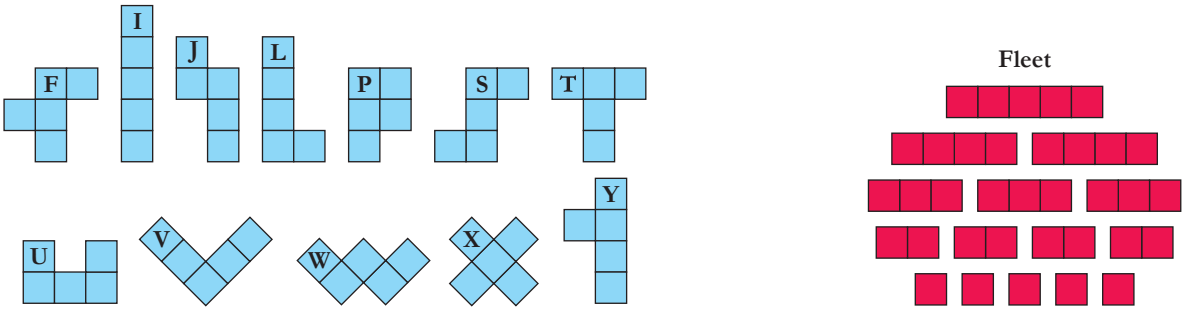
Example



Solution







Answer format: Write the content of marked row from left to right and the column from top to bottom. Use the corresponding letter for cells occupied by pentominoes, "+" for cells occupied by ships, and "-" for other cells. For the example: +X+-++, FP---+.

10. WE WITH MENDELEEV

12, 9, 6, 3 points for best solutions

Write some of the given names into the cells. Each cell can contain one name and this name should have all letters which are represented in the cell. Different cells should have different names. Maximize the number of written names. If the two solutions have the same result then solution with minimum letters in all names is better.

AASHAY	DEEPTI	HIDEAKI	KEVIN	NEERAJ	SARANYA	TANTAN
ADAM	DENIS	HISASHI	KISHORE	NICK	SAUMYE	TARO
ADITHYA	DILLIP	HUGO	KONSTANTIN	NIKOLA	SERGEY	TAWAN
AKSHAYA	DMITRY	IBON	KOSEI	ORION	SERHAT	THOMAS
ALEXEY	DURVA	IGOR	KOTA	PAUL	SERKAN	TIIT
AMIT	ELENA	IVAN	KRYSTIAN	PAVEL	SEUNGJAE	TOMOAKI
ANDERSON	ELIN	JAAN	LAM	PEGGY	SHINICHI	TOMOYA
ANDREY	EUGENE	JAIPAL	LAURA	PLUCKY	SHRIVASANTHA	USEVALAD
ANNA	FATIH	JAKUB	LAURENT	POOJA	SIMONETTA	VARUN
ANNE	FAUSTINA	JAMES	LEGRAND	PRADEEP	SINCHAI	VICTOR
ANUSHKA	FERNANDO	JAN	LORENZO	PRASANNA	SLADJANA	VISHAL
BJOERN	FRANSUA	JAVIER	LUBOS	PRATIK	SONG	VITTORIO
BRAM	FRIEDHELM	JEFF	LUKASZ	RAJESH	STEFANO	VLADIMIR
BRANKO	GAURAV	JEVON	MAREK	RAKESH	STEVEN	VOLXA
BRIAN	GAVRIEL	JIRI	MARLEEN	RAPHAEL	SUMET	WALKER
BYRON	GERDA	JOHN	MATEJ	REMCO	SUNDER	YOSHIAP
CHRIS	GIULIO	JOUNI	MICHAEL	RICARDO	SWAGATAM	YUHEI
CHRISTIAN	HARMEET	JUDYTA	MOREY	ROBERT	TAKUMA	YUKA
DAVID	HATICE	KARTIK	NAGA	ROGER	TAKUYA	YUKI
DEB	HENNA	KEN	NAOYA	RUBEN	TANER	ZUZANA

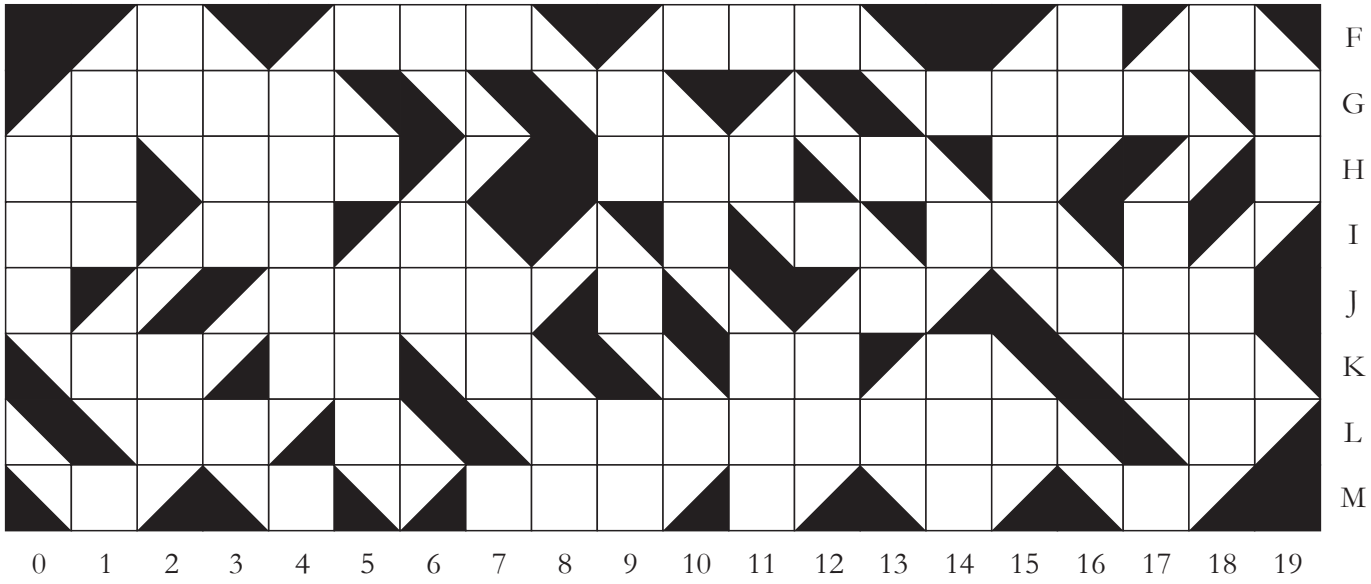
H 1	He 2	Li 3	Be 4	B 5	C 6	N 7	O 8
F 9	Ne 10	Na 11	Mg 12	Al 13	Si 14	P 15	S 16
Cl 17	Ar 18	K 19	Ca 20	Sc 21	Ti 22	V 23	Cr 24
Mn 25	Fe 26	Co 27	Ni 28	Cu 29	Zn 30	Ga 31	Ge 32
As 33	Se 34	Br 35	Kr 36	Rb 37	Sr 38	Y 39	Zr 40
Nb 41	Mo 42	Tc 43	Ru 44	Rh 45	Pd 46	Ag 47	Cd 48
In 49	Sn 50	Sb 51	Te 52	I 53	Xe 54	Cs 55	Ba 56
La 57	Ce 58	Pr 59	Nd 60	Pm 61	Sm 62	Eu 63	Gd 64
Tb 65	Dy 66	Ho 67	Er 68	Tm 69	Yb 70	Lu 71	Hf 72
Ta 73	W 74	Re 75	Os 76	Ir 77	Pt 78	Au 79	Hg 80
Tl 81	Pb 82	Bi 83	Po 84	At 85	Rn 86	Fr 87	Ra 88
Ac 89	Th 90	Pa 91	U 92	Np 93	Pu 94	Am 95	Cm 96
Bk 97	Cf 98	Es 99	Fm 100	Md 101	No 102	Lr 103	Rf 104
Db 105	Sg 106	Bh 107	Hs 108	Mt 109	Ds 110	Rg 111	Cn 112
Fl 114	Lv 116						

Answer format: Write the result, then the atomic number in front of each using name. For example: 4, 3Gavriel, 8Song, 13Alexey, 17Michael.

11. OPTI-ROLLBALL

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

Put the ball in any fully white cell to start. You can put 1, 2 or 3 right-angled triangles in any cells except start cell. Push the ball going horizontally and vertically. It change the direction after touching the hypotenuse of half-cell. The ball cannot return back. It must go through the centres of white half-cells and cells. Maximize the length of balls route. The ball can stay inside the grid, at the side of black cell or at the cathetus of black triangle.



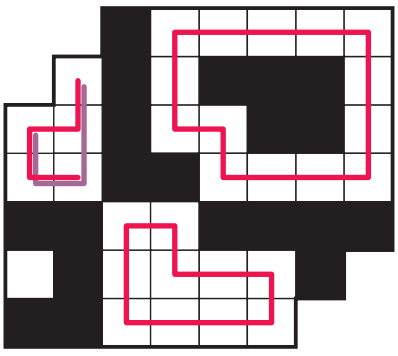
Answer format: Write the length of balls route, the start cell coordinates and push direction (E, Z, W or N), then the type of each putting triangle (A, B, C, D) with the corresponding cell coordinates. For example: 9.5, F2W, DH1, AH0, AK3.

12. PENTOMINOES AND LINES

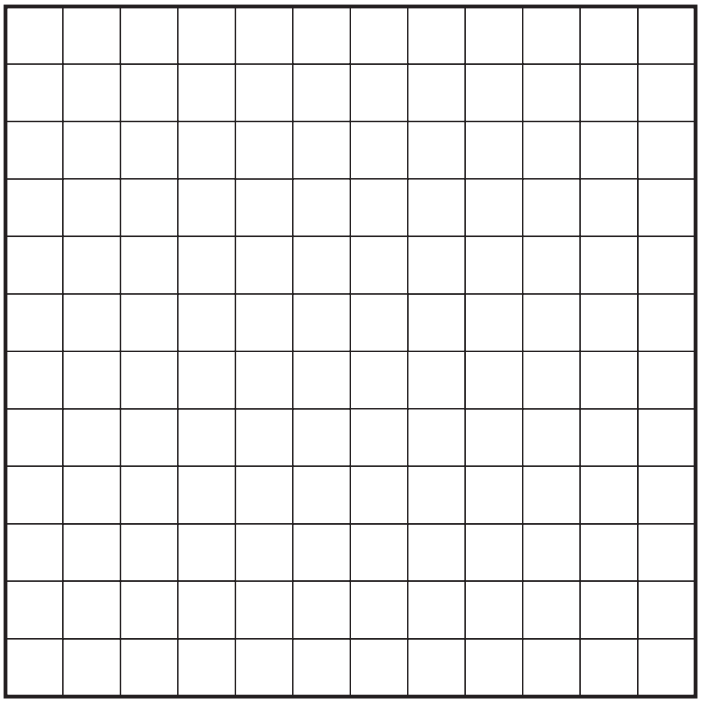
13, 11, 9, 7, 5, 3, 1 points for best solutions

Place 12 different pentominoes into 12x12 grid. They cannot overlap each other. Pentominoes can be rotated and/or mirrored and can touch each other only diagonally. Every 1-cell white region give you 0 mark. In each other white region should be line(s) going through the centres of all cells and formed by horizontal and/or vertical segments. Region where exist a unique loop (closed line) give you 1 mark. White region where may be exist N lines give N marks. Minimize the total marks. If the two solutions have the same result then solution with maximum number of loops is better.

Example



Total 4, 2 loops



Answer format: Write your result, the number of loops, then describe the content of the grid row by row from left to right and from top to bottom. Use "-" for white cells and X for cells occupied by pentominoes. For the example: 4, 2, X-----, -X-XXX-, --X--XX-, --XX----, XX--XXXX, -X----X, XX----.