



# FIFTH ANNIVERSARY

## ONLINE COMPETITION - INSTRUCTIONS

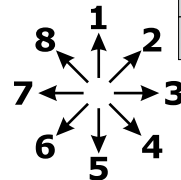
2007, December, 1st, 16:00 GMT

### Arrows Sudoku

Fill the grid with the arrows, pointing in eight directions, so that each row, column and 3x3 box contains each arrow exactly once. Digits show the number of arrows pointing towards them.

3	1	1	2	3	1	3	1	4	1	1
1							↗		3	1
1		↘	←			5	↙			1
3	4			↙	→					2
2	←		2							1
2							0	↙		4
1				4						2
3		4						↑		1
1	→			←	3					1
2					↙			2		4
2	1	1	2	2	2	4	1	1	1	1

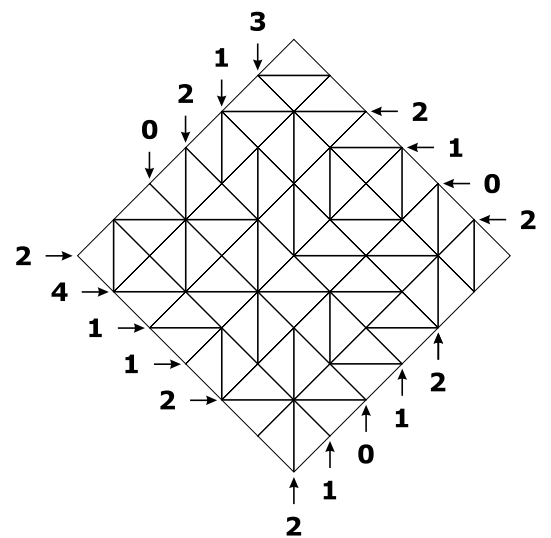
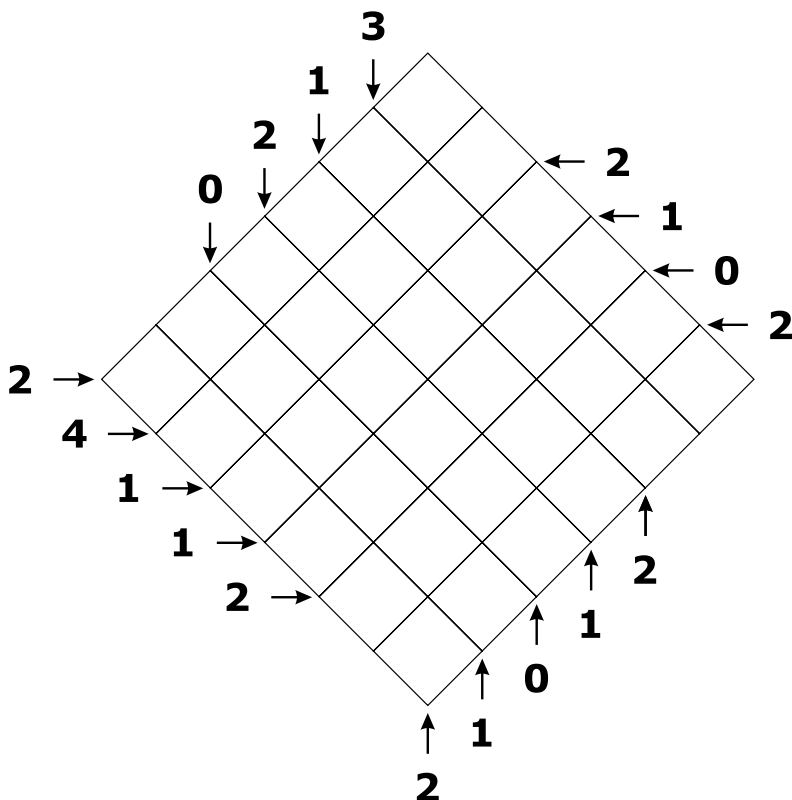
3	1	1	2	3	1	3	1	4	1	1
1	↖	→	↘	↑	←	↘	↗	↓	3	1
1	↓	↘	←	↗	↖	5	↙	→	↑	1
3	4	↑	↗	↙	→	↓	↖	↘	←	2
2	←	↓	2	→	↘	↙	↑	↖	↗	1
2	↘	↖	↑	↓	↗	←	0	↙	→	4
1	↙	↗	→	4	↑	↖	↘	←	↓	2
3	↗	4	↘	↖	↓	→	←	↑	↙	1
1	→	↙	↖	←	3	↑	↓	↗	↘	1
2	↑	←	↓	↘	↙	↗	→	2	↖	4
2	1	1	2	2	2	4	1	1	1	1



*Answer key: write the content of two main diagonals using corresponding numbers for arrows and "X" for non-arrow cells, first - from top left corner (TL) to bottom right corner (BR), then from BL to TR. For the example the answer would be: 842328728, 164X2683X.*

### The longest line

Draw the vertical or the horizontal line in each cell. Number of vertical and horizontal lines in each row must be equal. Numbers outside the grid show the length of the longest line for all the diagonals.



*Answer key: write the number of drawn squares, followed by the number of drawn non-square rectangles (including ones formed by squares). For the example the answer would be: 3,1.*



# FIFTH ANNIVERSARY

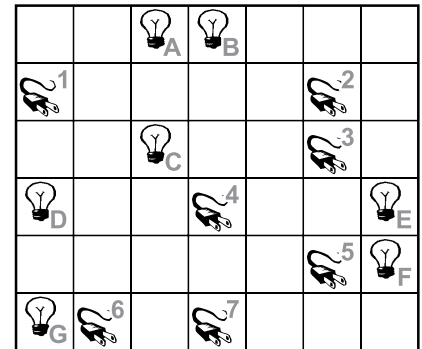
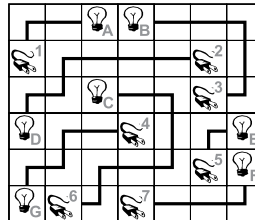
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2007, December, 1st, 16:00 GMT

### Turn me on

Connect the bulbs with the plugs, so that all the cords are of the different lengths. Cords can only go vertically or horizontally, not touching and/or crossing each other, connecting the centers of cells. The bulb and its plug can touch each other only by the corners.

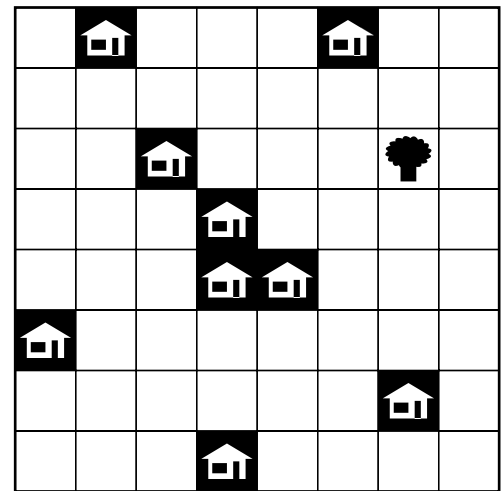
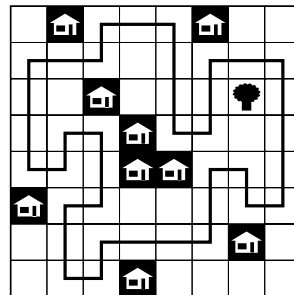
*Answer key: write in pairs symbols corresponding to bulbs and their plugs in order of increasing length of cords. For the example the answer would be: E5,A1,F7,G4,B3,D2,C6.*



### Lawnmower man

Draw the single closed loop, not touching and/or crossing itself, representing the route of the lawnmower man. It must visit exactly four cells around each house and cannot pass through the cell with the tree.

*Answer key: write the number of white cells inside the loop, followed by the number of white cells outside the loop. For the example the answer would be: 6,10.*



### Letterqueens

Place in the grid 3 sets of letters A through H, so that the same letters are not placed in the same row, column or diagonal. Letter outside must be placed in the corresponding rows and columns in given order. All letters outside refer to the different letters in the grid.

*Answer key: write the content of two main diagonals, first - from TL to BR, then from BL to TR. For the example the answer would be: FDBG A,HABCD.*

		C		G		C		E
		E		F		B		A
F	C	F	C	G	B	D		
B	D	B	D			C	E	
G	H	C	G	B	A	H		
A	H	G	E	A	H	G	F	
E	D	H	F	E	D	A		

		C		G		C		E
		E		F		B		A
F	C							
B	D							
G	H							
A	H	G						
E	D							

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

### Fortress Sudoku

Fill in the grid following the standard Sudoku rules. There is a fortress inside the grid. When two cells are divided by the wall then the cell inside the fortress must contain greater number.

*Answer key: write the content of two main diagonals, first - from TL to BR, then from BL to TR. For the example the answer would be: 675647198, 984942962.*

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



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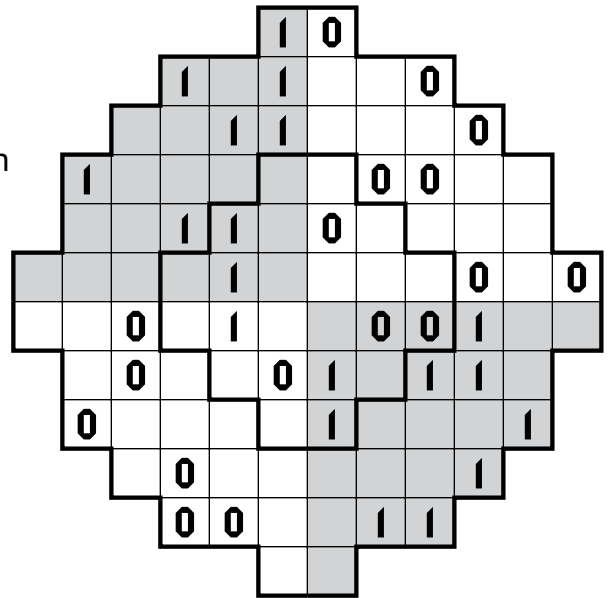
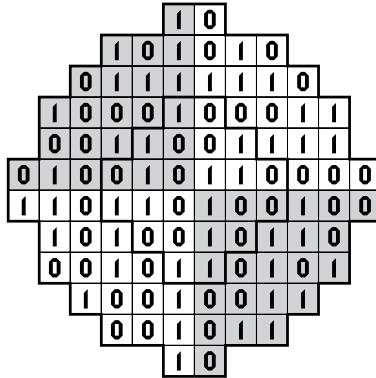
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### Binary areas

Fill in the grid with digits 0 and 1. All 5 areas (four shaded sectors and outlined center area) must contain all numbers from 0 (0000) to 15 (1111) in binary system. Only numbers in 4 consecutive cells appearing top-down and left-to-right are considered. Shorter sequences of cells within the areas have no restrictions.

*Answer key: write the content of two longest rows. For the example the answer would be:*  
 010010110000,  
 110110100100.



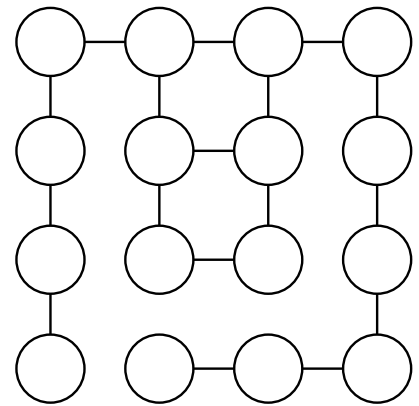
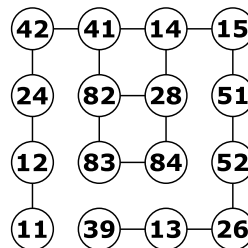
### Topology

Fill in the grid with the given numbers. Two numbers are connected in the next cases:

- if they're consecutive (11 and 12, 39 and 40 etc.)
- if one of them is 2 or 3 times bigger than another (11 and 22, 19 and 57 etc.)
- if their digits are permuted (12 and 21, 38 and 83 etc.)

*Answer key: write the corner numbers in increasing order. For the example the answer would be:*  
 11,15,26,42.

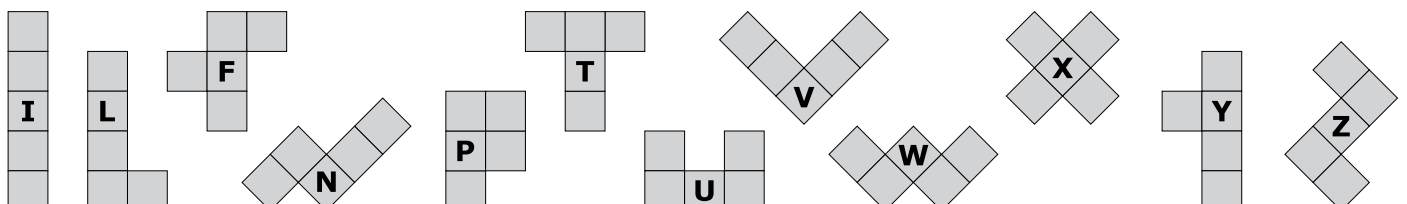
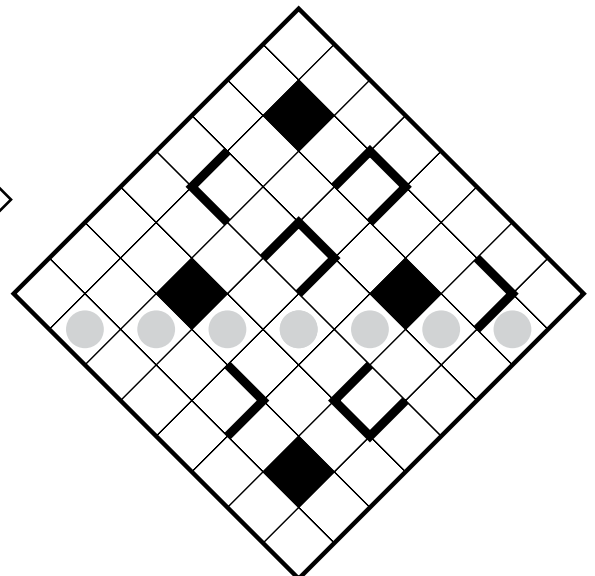
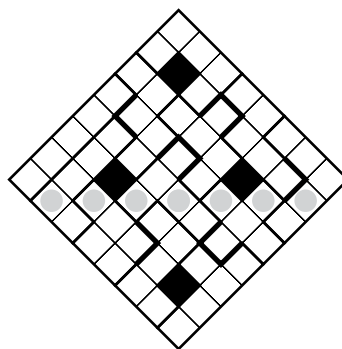
- 11 12 13 14 15
- 24 26 28
- 39
- 41 42
- 51 52
- 82 83 84



### Penta cutting

Divide the given figure into 12 different pentamino elements, which can be rotated, but cannot be reflected. Some cuts are already made.

*Answer key: write the content of highlighted diagonal. For the example the answer would be:*  
 LPTTXXV.





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### Chess Battleships

Place in the grid the full Battleships fleet. Ships cannot touch one another, not even diagonally. Each chess piece must attack exactly one ship of each size. "Waving" cells should stay empty.

*Answer key: write the coordinates of four submarines from top to bottom, from left to right. For the example the answer would be: E1,A7,D7,H7.*

The diagram shows an 8x8 grid with various ships and chess pieces. The ships are: a 1x3 submarine at E1-E3, a 1x3 submarine at A7-A9, a 1x3 submarine at D7-D9, and a 1x3 submarine at H7-H9. Chess pieces include a Bishop at C3, a Knight at E3, a Rook at E4, a King at F6, and a Queen at G7. The grid is labeled with numbers 1-8 on the left and letters A-H at the bottom.

1 3 2 B B

3							
2							
C							
	A	C	2	2			

would be: CA3AAA, 23B11B.

### Easy as skyscrapers

Fill in the grid with the letters A, B, C and digits 1, 2, 3, representing the buildings of these heights, so that they appear in every row and column exactly once. Letters outside the grid show which letter is closest in the corresponding direction. Digits outside the grid show the number of visible buildings in the corresponding direction.

*Answer key: write the content of two main diagonals, first - from TL to BR, then from BL to TR. For the example the answer*

1 3 2 B B

3	C	1	A	2	3	B	
	B	A	2	C	1	3	1
2	A	2	3	1	B	C	
C	3	C	B	A	2	1	3
	1	3	C	B	A	2	
	2	B	1	3	C	A	1
		A	C	2	2		

### Fences

Draw the single closed loop, not touching and/or crossing itself. Digits in the areas show the number of segments, surrounding these areas, used by the loop.

*Answer key: write the number of cells (of any size) left outside the loop, followed by the total of numbers left outside the loop. For the example the answer would be: 14,7.*

The diagram shows a grid with numbers in some cells. A loop is drawn around the cells with numbers 1, 2, 3, 1, 0, 3, 2, 1. The numbers are: 2, 1, 3, 3, 2, 3, 3, 1, 0, 3, 2, 1, 2, 1, 3, 1, 0, 3, 2, 1.

### Penta scrabble

Place in the given grid all 12 pentamino elements, which can be rotated, but cannot be reflected. Elements cannot touch each other, not even diagonally. Basically the elements are "pointless". Each covered white circle adds one point to the element, grey circle adds two point to the element. Each covered white square doubles points of the element, grey square triples points of the element. Maximize the total of all elements.

*Answer key: first write your total, followed by the coordinates of the marked cells for all 12 elements in any order (first write the letter corresponding to the element, then the coordinates). The answer would look something like: 5;IA3,FC4,LJ9 etc.*

### Math trade

Using each digit from 0 to 9 exactly once with the help of unlimited number of arithmetic signs (+, -, x, /) and parentheses construct the expression equal to given number. Usage of each arithmetic sign has its own value (will be given). Usage of monadic signs (i.e. -1, -(2\*3), etc.) is prohibited. Maximize the total of all signs in expression. *Answer key: first write your total, followed by your*