

SEPTEMBER A G I CONTEST 2014

by Riad Khanmagomedov

INSTRUCTION BOOKLET

1. EVEN ODD MAGIC	27 pt
2. SEQUENCE CHAINS	15 pt
3. EASY AS SUM	24 pt
4. LETTERS CHAINS	15 pt
5. HEXA SKYSCRAPERS	45 pt
6. EASY AS HEXA	15 pt
7. BARRELS	9 pt
8. ON GROWTH	51 pt
9. THERMOMETERS IN BOXES	30 pt
10. SUDOKU BUILDER	48 pt
11. CALCULATING SQUARE	45 pt
12. MICRO-DISTRICT	66 pt
13. HEXA SKYSCRAPERS WITH VOIDS	33 pt
14. DOMINO MAGIC	27 pt
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TOTAL	450 pt

TIME

150 minutes

BONUS

3 points per each saved minute if all the puzzles are solved correctly

ANSWER KEY

For all puzzles is two rows (left-to-right), indicated by an arrows.
When submitting the answer key, ignore outside clues. Use “-” for each empty cell.
Use “F” for filled cells in puzzle THERMOMETERS IN BOXES.

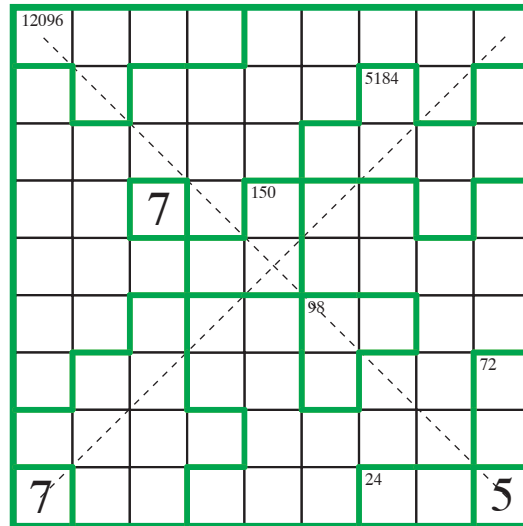
Thanks for support to Deb Mohanty and Prasanna Seshadri

This puzzle was invented by me and included in IPST'2004-09

1. EVEN ODD MAGIC

27 pt

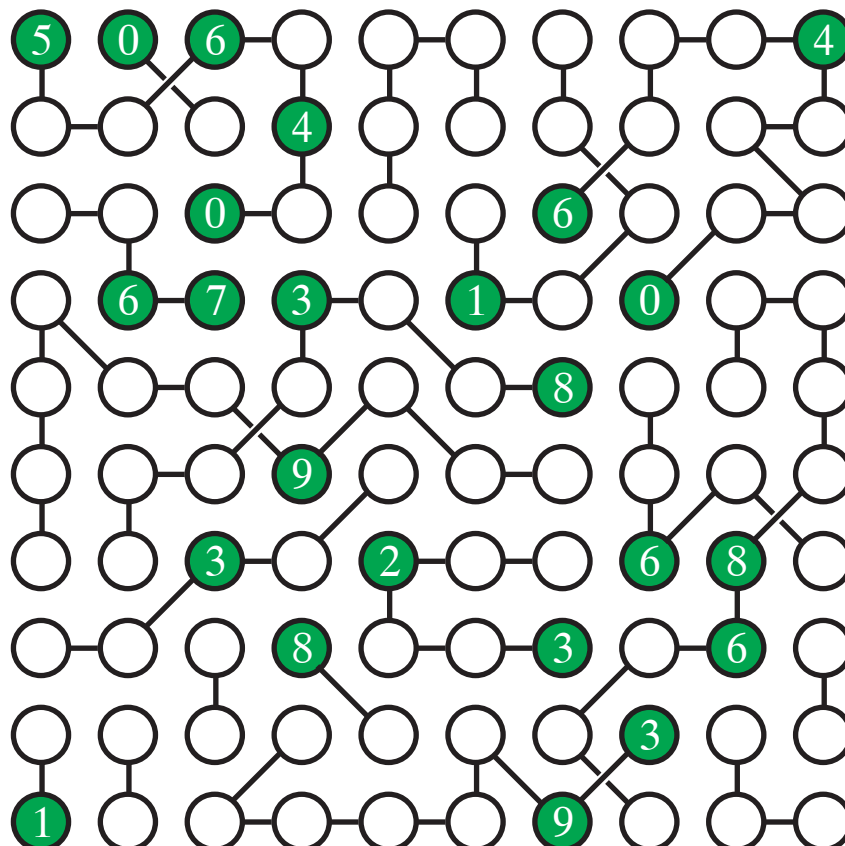
Fill the grid with digits from 1 to 9. Each row, column and two main diagonals should contain different digits. All digits with the same parity are divided by bold edge. Bold edges form the area: the number in area is a products of all digits in this area. Digits can repeat within bold areas as long as other rules are followed.



2. SEQUENCE CHAINS

15 pt

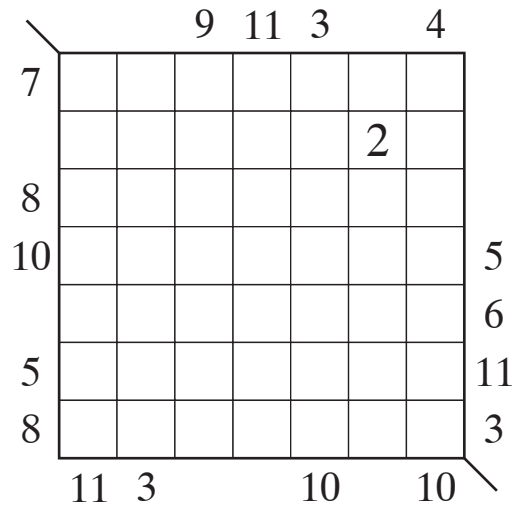
Write digits from 0 to (N - 1) into the grid N x N. Each row and column should contain every digit exactly once. Digits of one chain should be different and form consecutive sequence in arbitrary order (for example, chain with 9 circles can contain either all digits from 0 to 8 or all from 1 to 9).



3. EASY AS SUM

24 pt

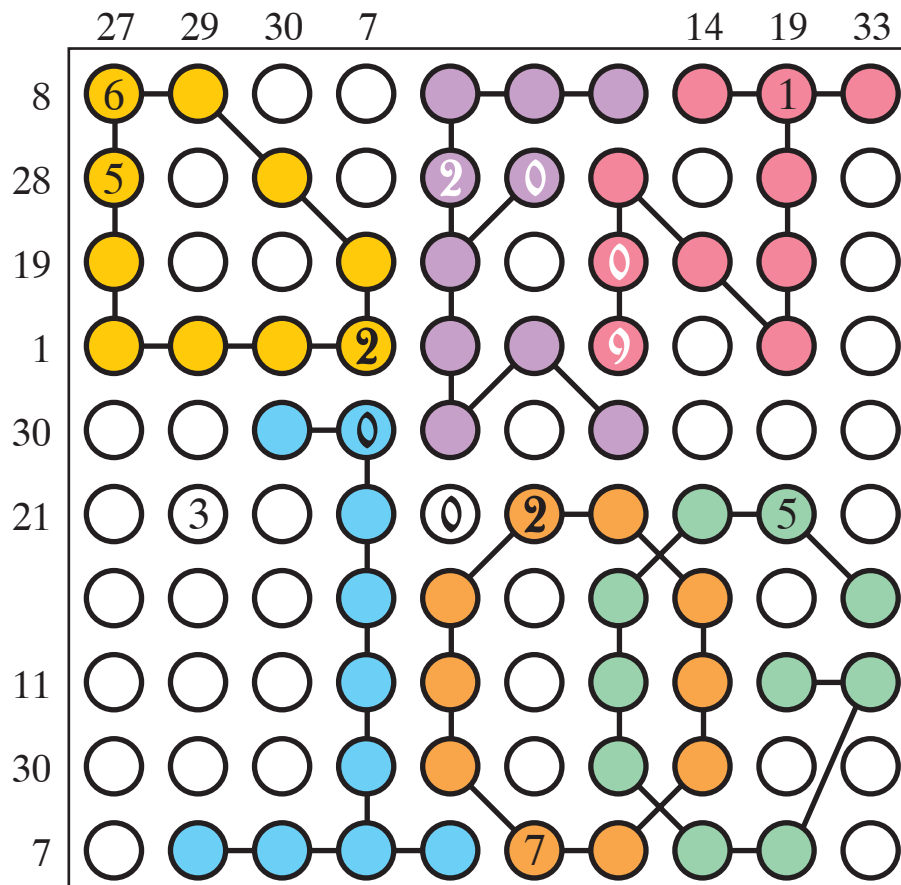
Fill the grid with digits from 1 to 6 so that every row and column contain each digit exactly once, 1 cell is empty. Numbers at right and top show the sum of first and last digits in corresponding row or column (first from both directions). Numbers at left and bottom show the sum of second and fifth digits (second from both directions).



4. LETTERS CHAINS

15 pt

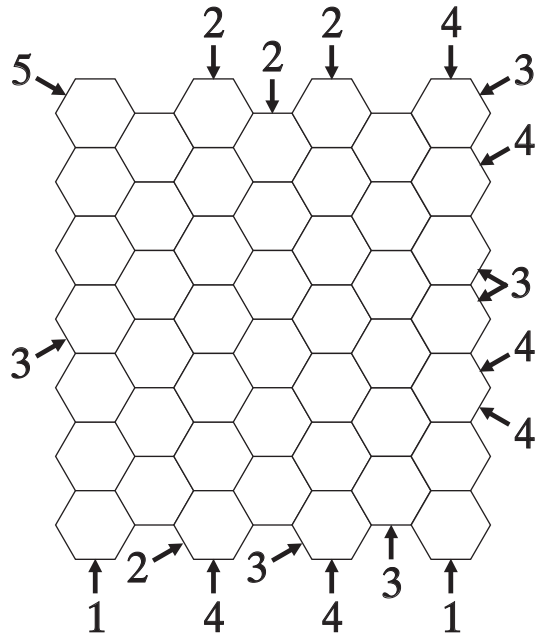
Write digits from 0 to (N - 1) into the grid N x N. Each row and column should contain every digit exactly once. Circles of each chain which form letters should also contain different digits. Number outside the grid is a sum of digits in the circles of corresponding row or column which do not belong to any chain.



5. HEXA SKYSCRAPERS

45 pt

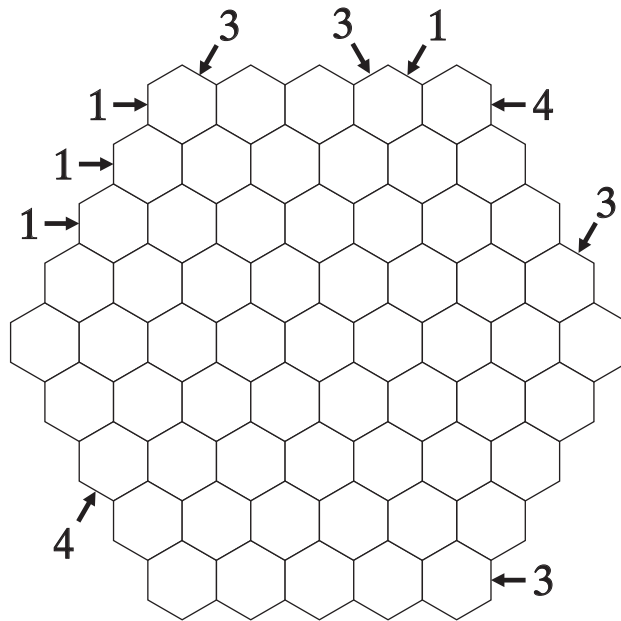
Write digits from 1 to 7 (buildings with height 1-7) in each hexagons so that every row in all three directions contains only building with different height. Digits outside the grid show how many buildings seen in corresponding direction of the arrow.



6. EASY AS HEXA

15 pt

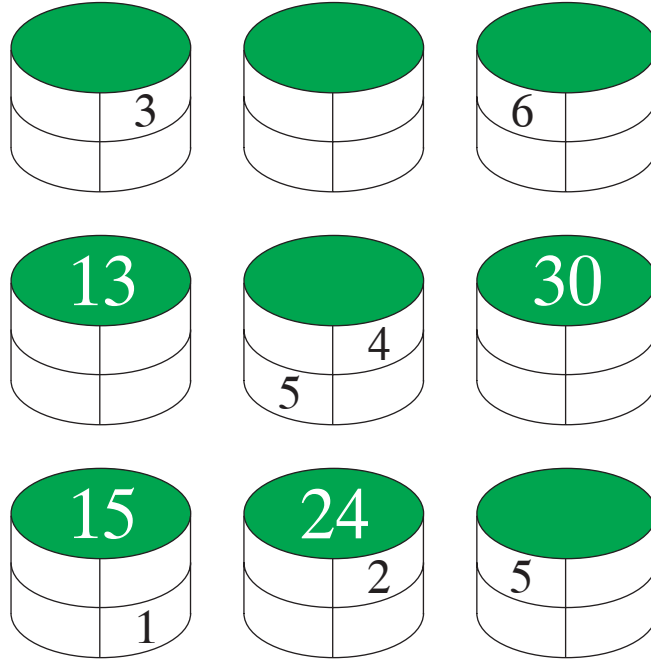
Write digits from 1 to 4 in some hexagons in the grid so that each row in all three directions contains each digit exactly once. Digits outside the grid indicate the second digit seen in corresponding direction of the arrow.



7. BARRELS

9 pt

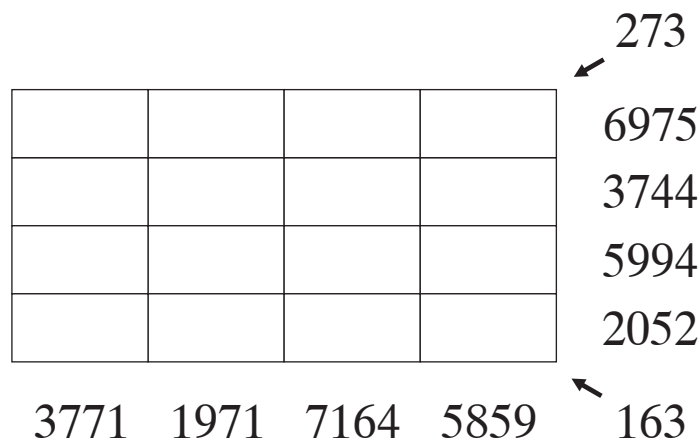
Fill the white cells on the each barrels side with different digits from 1 to 6. Digits cannot repeat in every horizontal and vertical directions. Each number on the barrels top must be equal to the sum or product of the four different digits in the barrel. All top numbers are different and less than 91.



8. ON GROWTH

51 pt

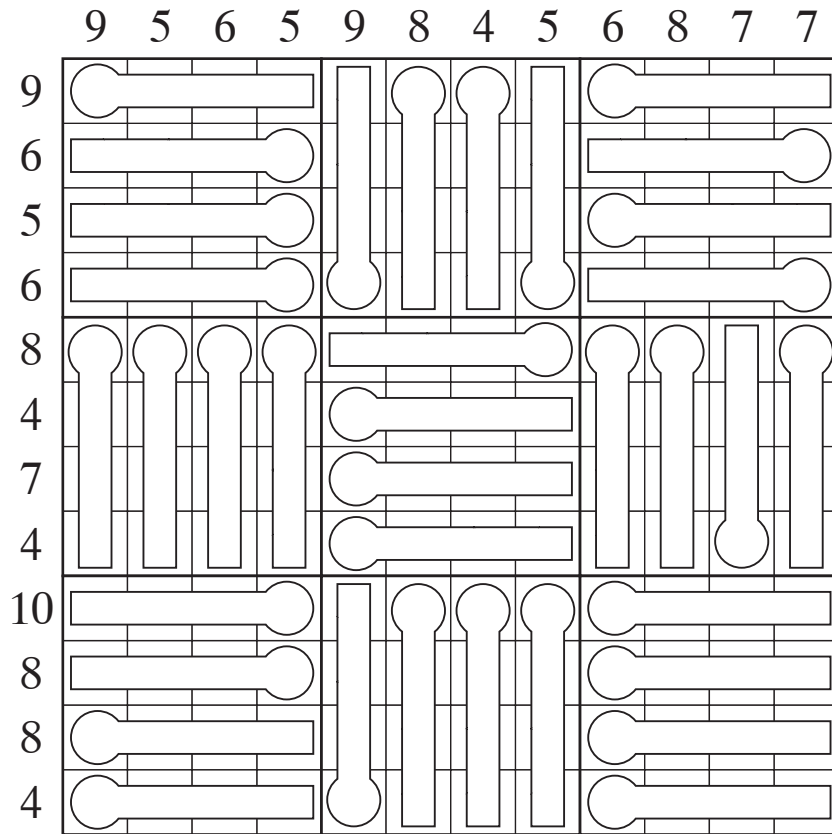
Each row and column must contain all digits from 0 to 9 spread over the 4 cells in the following way – one 4-digit number, one 3-digit number, one 2-digit number, and one 1-digit number. The numbers containing 0 will always have the 0 last (0 as a single digit is not allowed), but other than 0, all numbers have their digits arranged in increasing order. Numbers outside the grid show the sum of numbers in corresponding direction.



9. THERMOMETERS IN BOXES

30 pt

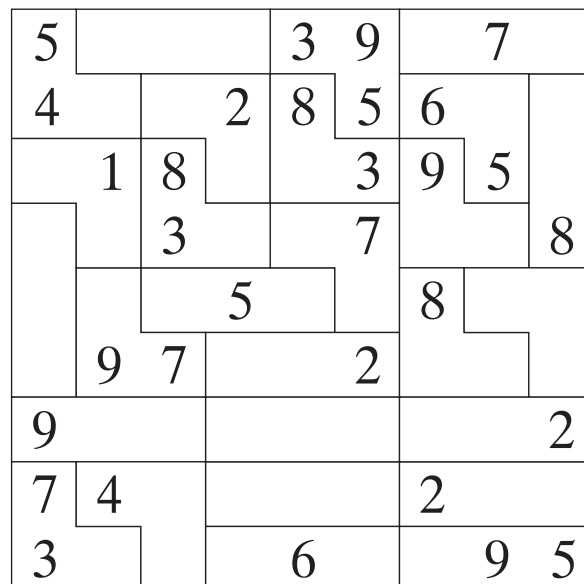
The figures in the grid are thermometers. Mercury in each thermometer (if it is not empty) occupies round part and continues towards the other end of the thermometer shape. Numbers outside the grid show how many cells with mercury in corresponding row or column. Find the filling of all thermometers. Thermometers in every outlined 4 x 4 box should have different mercury quantity (from 0 to 4).



10. SUDOKU BUILDER

48 pt

Make 9 nine-cells areas by joining 3 given areas and obtain the Irregular Sudoku. Then fill the grid with digits from 1 to 9. Digits must be different in every row, column and nine-cell area.



11. CALCULATING SQUARE

45 pt

Fill the grid with digits from 1 to 8 so that every row, column and main diagonals contain each digit exactly once. Replace the letters outside the grid with digits so that same letters correspond to same digits and different letters correspond to different digits. All given equations should be correct. Letter with subscript "n" means that the digit which corresponds to this letter is located at the n-th cells in direction of the arrow. An extra grid will be provided for solver's convenience.

$B = E + 2$
 $C + D = 7$

Extra grid

12. MICRO-DISTRICT

66 pt

Place into the grid objects having zero height - playgrounds, parkings, pond, dog-walking grounds, which cannot touch each other even diagonally. Every row/column must contain buildings of different heights from 1 to N ($N < 7$, for each row/column must be own N). Digits outside the grid show how many objects (including objects of zero height) seen in corresponding direction. Green cells belongs to the objects of zero height.

$N < 8$ in the example

	3	4	4	3	5	2	4	1	
2									1
2									2
4									3
2									5
2									5
4									3
3									4
4									2
	3	5	2	6	3	3	1	6	

5
playgrounds

3
parkings

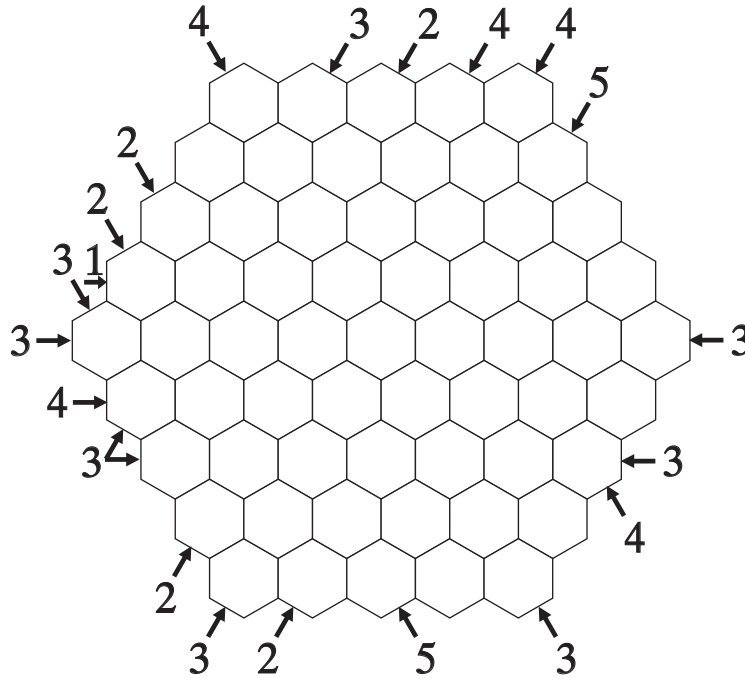
1
pond

0
dog-walking grounds

13. HEXA SKYSCRAPERS WITH VOIDS

33 pt

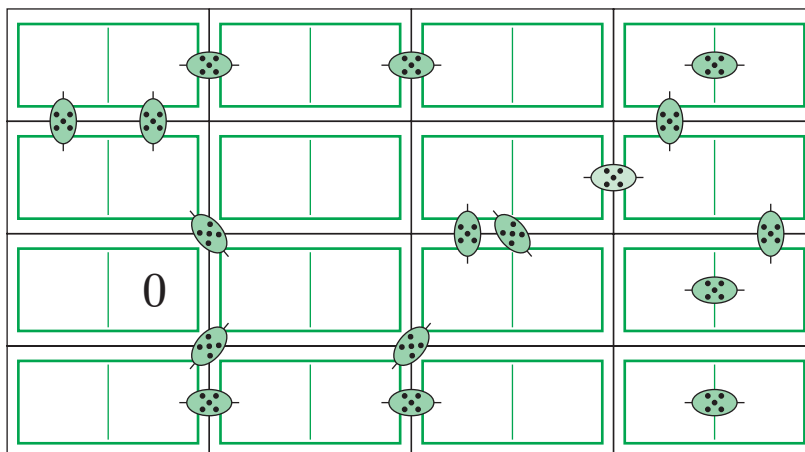
Write digits from 1 to 6 (buildings with height 1-6) into the grid so that every row in all three directions contains only building with different height from 1 to N (for each row must be own N). Digits outside the grid show how many buildings seen in corresponding direction of the arrow.



14. DOMINO MAGIC

27 pt

Using two sets of domino from 0-0 to 5-5 put some dice in every 2 x 1 white cell. Each dice show the two-digits number which can start with zero. All numbers must be different and the sum of numbers in each row, column and both main diagonals must be equal. Every pair of neighbouring digits with sum equals to 5 is marked. After rotating this page in 180° the grid will present the magic square again (the sum can be another).

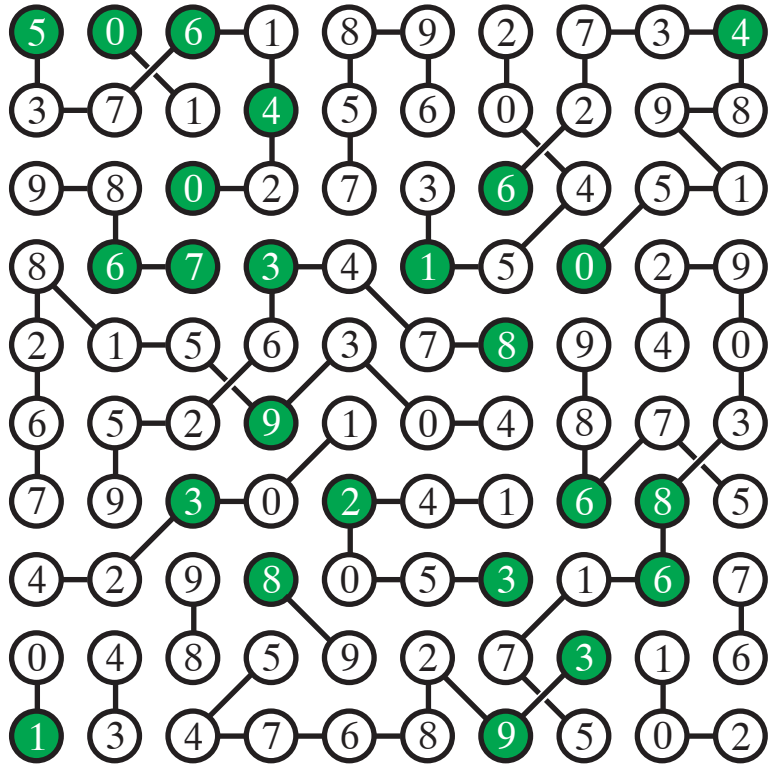


SOLUTIONS

EVEN ODD MAGIC

8 ¹²⁹⁹⁶	7	6	9	3	4	5	2	1
6	4	8	7	2	1	9 ⁵¹⁸⁴	5	3
5	6	9	8	7	3	4	1	2
2	3	7	1	5 ¹⁵⁰	9	6	8	4
9	2	3	5	6	8	1	4	7
4	1	5	3	8	2 ⁹⁸	7	9	6
1	5	2	4	9	7	3	6	8 ⁷²
3	8	1	6	4	5	2	7	9
7	9	4	2	1	6	8 ²⁴	3	5

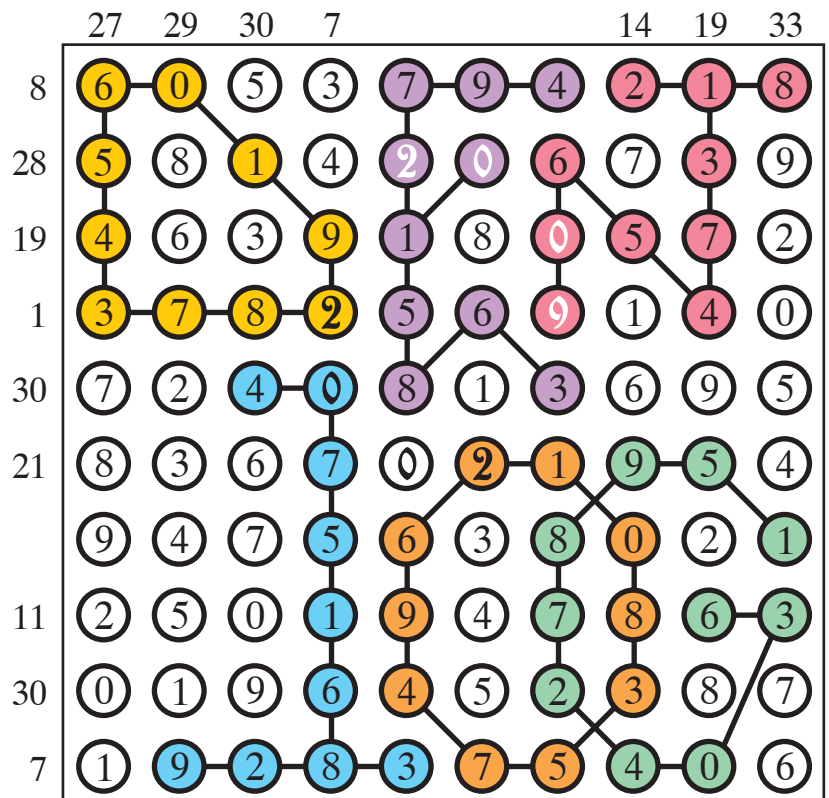
SEQUENCE CHAINS



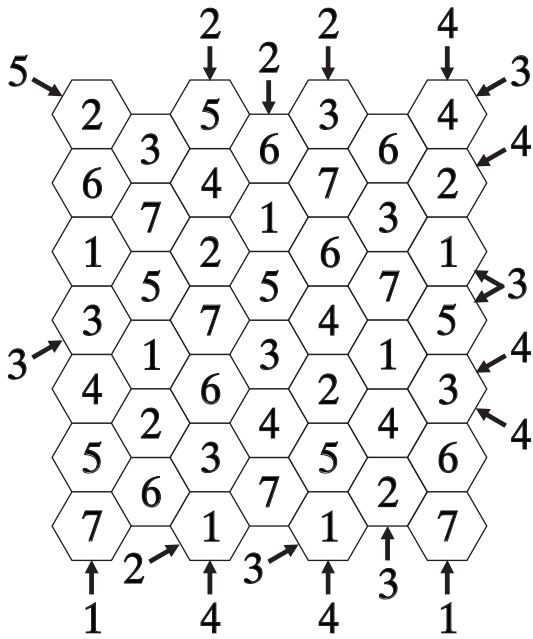
EASY AS SUM

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

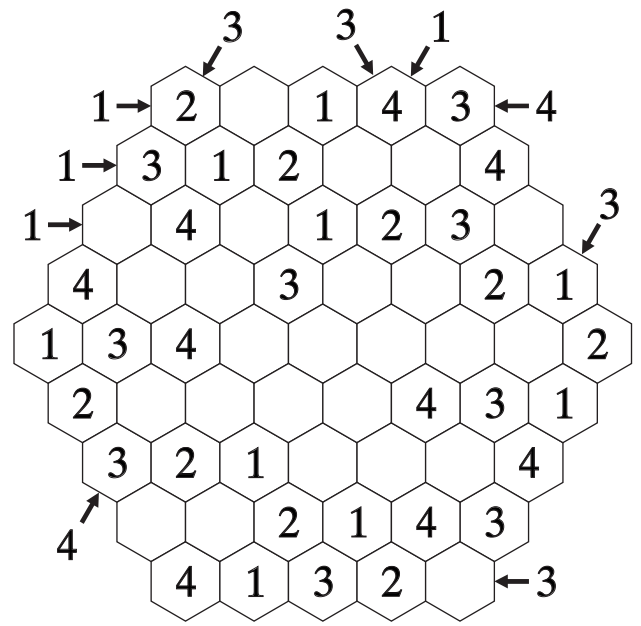
LETTERS CHAINS



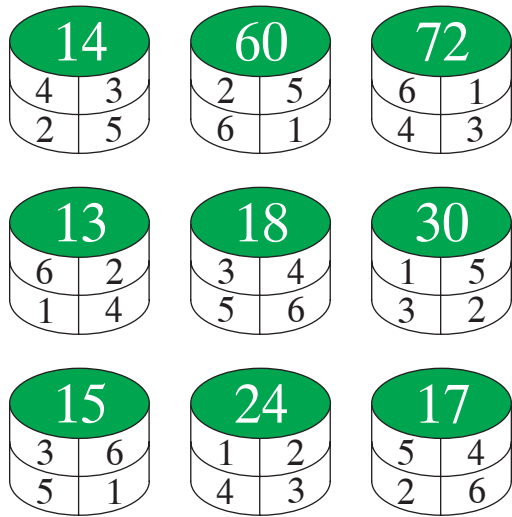
HEXA SKYSCRAPERS



EASY AS HEXA



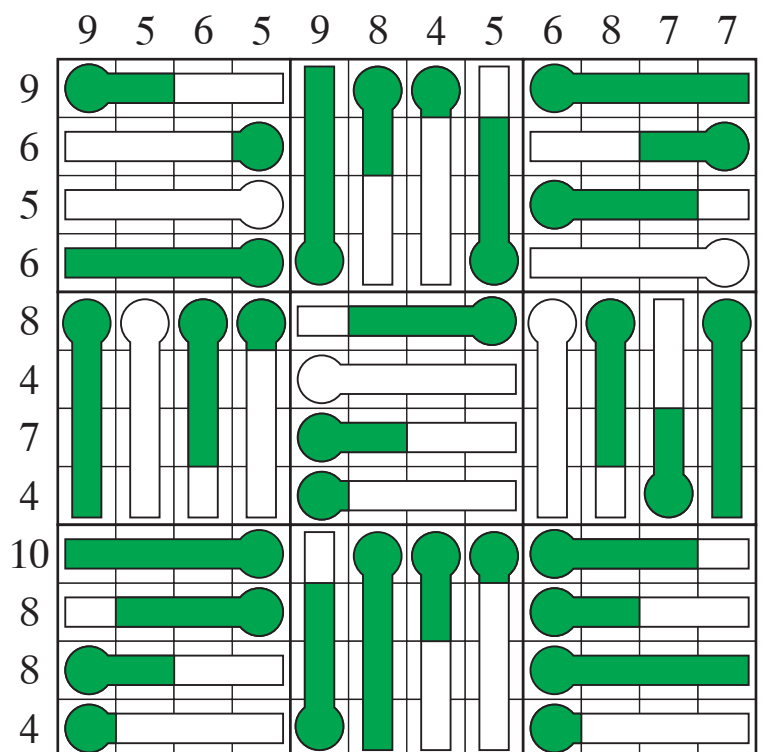
BARRELS



ON GROWTH

124	58	6790	3	273
3560	9	28	147	6975
79	234	1	5680	3744
8	1670	345	29	5994
3771	1971	7164	5859	2052
				163

THERMOMETERS IN BOXES



SUDOKU BUILDER

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

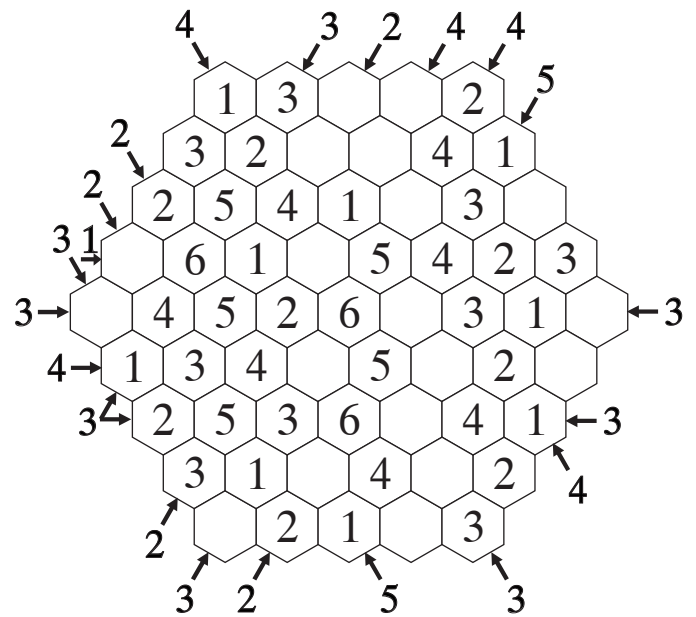
CALCULATING SQUARE

		A_4	D_3	A_1				
		↓	↓	↓				
C_1 →	3	2	5	7	1	4	8	6
	8	1	6	2	7	3	5	4
	5	7	2	4	6	8	3	1
B_1 →	7	6	1	8	4	5	2	3
D_2 →	6	4	3	1	5	2	7	8
D_1 →	4	5	7	3	8	6	1	2
A_1 →	1	3	8	6	2	7	4	5
	2	8	4	5	3	1	6	7
			↑	↑				
			B_3	C_3				

MICRO-DISTRICT

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

HEXA SKYSCRAPERS WITH VOIDS



DOMINO MAGIC

