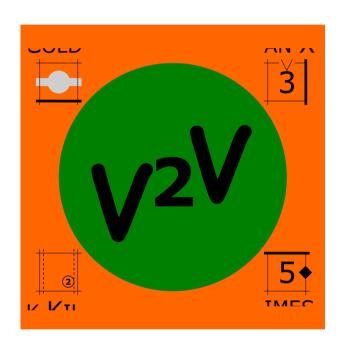# Variations to Variants
LMI Sudoku Test
23RD – 25TH March 2013

By Richard Stolk

Instruction Booklet

LMI Sudoku test 'Variations to Variants'
23RD – 25TH March 2013

Every now and then I am surprised that again a new variant of the famous sudoku appears on the internet or in a contest. There are already uncountable different sudoku variants, but authors keep inventing new types. This gave me the idea to write a test for LMI with again some new types. I took seven variants and created a variation to each type. So that is the theme: Variations to Variants. Every page contains the variant as the first and the variation as the second puzzle. Since the puzzle types in this test are either relatively or completely unknown, I will provide some links to extra practice material in the forum, so solvers can have a decent preparation to this test.

I hope you enjoy solving the puzzles as much as I did thinking about and creating them!

- The duration of the test is 120 minutes;
- Some of the puzzles in the IB will be easier than the corresponding puzzle in the real test while other puzzles in the IB will be harder. This means that the level of difficulty of the puzzles in the IB does not correspond to the distribution of points over the puzzles in the real test.
- The distribution of points is based on the times needed by test solvers. Therefore, you might experience differences due to your own personal skills and preferences;
- Every puzzle has two marked rows or columns or a combination of both as answer key;
- The puzzle booklet will contain 7 pages, without cover page and points table;
- If you submitted all grids and there is at most one wrong solution code (with a maximum of four wrong digits), you can have bonus points. Your final score is then calculated using the formula: Final Score = Total Points / Claim Time * 120 minutes.

Many thanks go to Hans Eendebak, Karin Griffioen, René Gilhuijs, Robert Beärda and Wilbert Zwart for test solving and to LMI for hosting this contest.
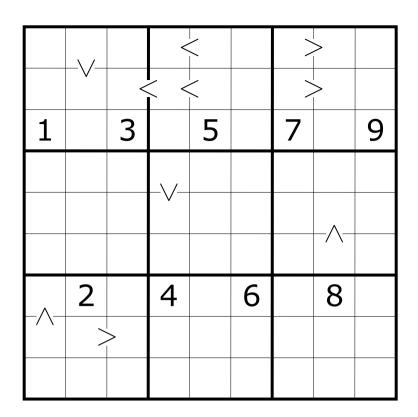
Points Table:

1	V:	GT Consecutive	51
2	V2V:	Greater Than X	120
3	V:	Clones	59
4	V2V:	Shaken Clones	82
5	V:	Perfect Squares	57
6	V2V:	Primes	44
7	V:	Thermometers	58
8	V2V:	Hot/Cold Thermometers	87
9	V:	Rank	90
10	V2V:	Rank killer	100
11	V:	Even Sandwich	89
12	V2V:	Sum Sandwich	30
13	V:	1~9	61
14	V2V:	Frame 1~9	72
		TOTAL	1.000

GT CONSECUTIVE

(51 POINTS)

Apply classic sudoku rules. In all cases where the difference between two neighbouring digits is 1, there is a greater or less sign between those digits. Digits must be placed in accordance with the signs.
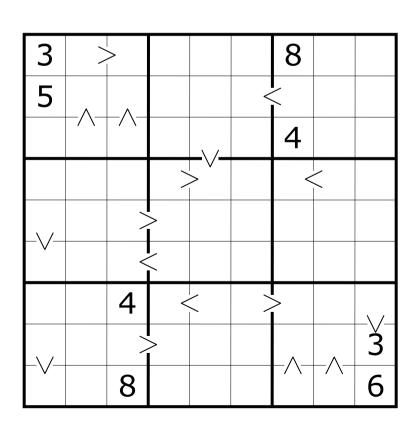
GREATER THAN X

(120 POINTS)

Apply classic sudoku rules. In all cases where the difference between two neighbouring digits is X, there is a greater or less sign between those digits. Digits must be placed in accordance with the signs. Finding the value for X is part of the puzzle.

CLONES

(59 POINTS)

Apply classic sudoku rules. The grid contains five different shapes (four in IB). Each shape is cloned once. Cloned shapes may be rotated (not reflected!), but the position of the digits within them remains fixed. Within a single shape, digits may not repeat.

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

SHAKEN CLONES

(82 POINTS)

Apply classic sudoku rules. The grid contains three (four in IB) different shapes. Each shape is cloned one or more times. The digits in cloned shapes are the same, but their position within the shape may change. Within a single shape, digits may not repeat.

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

PERFECT SQUARES

(57 POINTS)

Apply classic sudoku rules. If two **horizontally** adjacent cells (read from left to right) form a two-digit perfect square, it is marked by a square dot. This constraint is not valid for vertically adjacent cells!

Two-digit perfect squares:
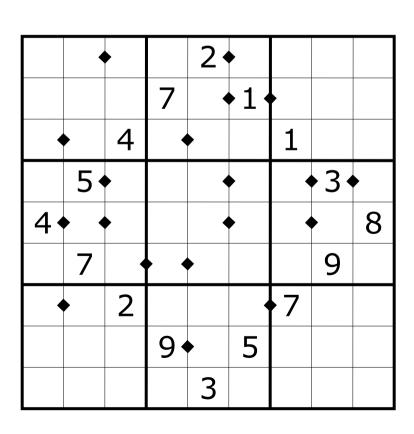
16 25 36 49 64 81

PRIMES

(44 POINTS)

Apply classic sudoku rules. If two **horizontally** adjacent cells (read from left to right) form a two-digit prime, it is marked by a black dot. This constraint is not valid for vertically adjacent cells!
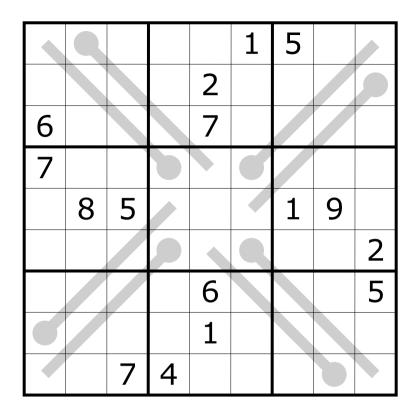
Two-digit primes:
13	31	53	73
17	37	59	79
19	41	61	83
23	43	67	89
29	47	71	97

THERMOMETERS

(58 POINTS)

Apply classic sudoku rules. The digits in each thermometer-shaped region should be in increasing order, from the bulb to the end.

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

HOT/COLD THERMOMETERS

(87 POINTS)

Apply classic sudoku rules. From the bulb to both ends the digits in each thermometer-shaped region should be either in increasing or decreasing order. This increasing or decreasing order has to be the same in both directions.

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

RANK

(90 POINTS)

Apply classic sudoku rules. A digit 'X' in a circle means that the digit in the cell is the X-th smallest number in the corresponding cage. Digits cannot repeat within a cage.

RANK KILLER

(100 POINTS)

Apply classic sudoku rules. The sum of digits inside each cage is given at the upper left cell of the cage. A digit 'X' in a circle means that the digit in the cell is the X-th smallest number in the corresponding cage. Digits cannot repeat within a cage. (In IB this rule is redundant.)

EVEN SANDWICH

(89 POINTS)

Apply classic sudoku rules. Clues outside the grid show **all** the digits that are sandwiched by two even digits in the corresponding row or column. (They have even digits on both sides as neighbours.)

SUM SANDWICH

(30 POINTS)

Apply classic sudoku rules. Clues outside the grid show **all** the digits that are sandwiched in the corresponding row or column by two digits of which the sum is the same as the digit itself.
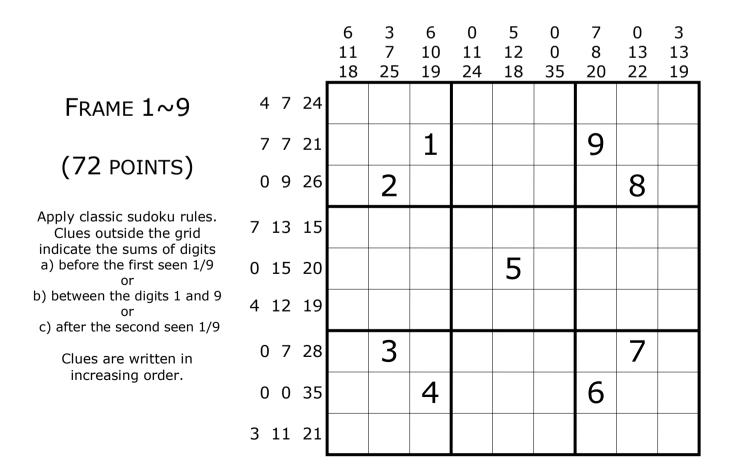
1~9

(61 POINTS)

Apply classic sudoku rules. Clues outside the grid indicate the sum of the digit(s) placed between the digits 1 and 9 in the corresponding row or column.

	19	10	7	11	14	33	0	23	22
15		3							
7	2		8				7		
7		7				3		6	
9							5		
16									
13			6						
28		1		8				2	
27			2				4		8
2								7	

FRAME 1~9

(72 POINTS)

Apply classic sudoku rules. Clues outside the grid indicate the sums of digits
a) before the first seen 1/9
or
b) between the digits 1 and 9
or
c) after the second seen 1/9

Clues are written in increasing order.

	6	3	6	0	5	0	7	0	3
	11	7	10	11	12	0	8	13	13
----------	18	25	19	24	18	35	20	22	19
4 7 24									
7 7 21			1				9		
0 9 26		2						8	
7 13 15									
0 15 20					5				
4 12 19									
0 7 28		3						7	
0 0 35			4				6		
3 11 21									

SOLUTIONS

GT Consecutive
297341658
485679213
163852749
316285974
948137526
572964831
729416385
854793162
631528497

Greater Than X
361745829
542981637
897362415
475619382
689423571
123857964
934276158
756198243
218534796

Clones
528931467
419672358
637458129
945283671
172569843
386714295
291347586
753826914
864195732

Shaken clones
315879426
246153798
789426531
537214869
462598317
198637254
953781642
671342985
824965173

Perfect Squares
631782495
487519263
259364178
916853742
872491356
345276819
763948521
124635987
598127634

Primes
861423957
925761384
734598126
659847231
413259678
278316495
592184763
346975812
187632549

Thermometers
928631547
573824961
614579328
791382456
285746193
436195872
142968735
359217684
867453219

H/C Thermometers
873645291
961782543
254931687
386479125
719523468
542168379
698314752
127856934
435297816

Rank
295738641
368451972
714692538
937584126
821367495
546129783
659273814
172845369
483916257

Rank Killer
796852314
583714269
124396785
312947856
457628931
869531427
275463198
938175642
641289573

Even Sandwich
145389276
763214598
892567134
629478351
458931762
317652489
284793615
571826943
936145827

Sum Sandwich
526789431
897413265
341625897
672534918
985172643
134968572
758346129
263891754
419257386

1~9
634792851
258461793
179583264
397214586
581637942
426958137
715846329
962375418
843129675

Frame 1~9
856329714
341867952
927145386
263418597
789253461
415796823
532684179
194572638
678931245