



इयतरेक्य
लवहववहरत

Episode – 3
3rd – 9th March 2023

Irregular & Math
by
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Sudoku Mahabharat rounds will also serve as qualifiers for Indian Sudoku Championship for year 2023. Please check <http://logicmastersindia.com/SM/2023sm.asp> for details.

Important Links

Submission Page : <http://logicmastersindia.com/live?contest=SM202303>

Discussion Thread : <http://logicmastersindia.com/t/?tid=3127>

F. A. Q. : <http://logicmastersindia.com/t/?tid=2773>

Registration, if required : <http://logicmastersindia.com/register.asp>

About this Episode

This episode has 18 Sudokus with the following breakdown:

- 2* Classic Sudoku 6x6 and 4* Classic Sudoku 9x9
- 1 each of Scattered Sudoku 6x6 and Scattered Sudoku 9x9
- 1 each of Toroidal Sudoku 6x6 and Toroidal Sudoku 9x9
- 1 each of Hex Sudoku 8x8 and Hex Sudoku 9x9
- 1 each of Little Killer Sudoku 6x6 and Little Killer Sudoku 9x9
- 1 each of Remainder Sudoku 6x6 and Remainder Sudoku 9x9
- 1 each of Position Sums Sudoku 6x6 and Position Sums Sudoku 9x9

How to participate?

- Understand the rules of different variants that will appear in this episode. This Instruction Booklet has rules for each of them.
- Any time on or after 3rd Mar (but on or before 9th Mar), login at the submission page using your LMI user-id and password. Please check the submission page for exact timing.
- **If you plan to solve on paper:**
 - a) Download the password protected Puzzle booklet (will be uploaded before the test starts). The Puzzle booklet contains the actual Puzzles to be solved. It is password protected, so you won't be able to open it.
 - b) Click on "Start". At this time, password for pdf will be shown and timer will start. **The contest duration is 90 minutes.**
 - c) The puzzle booklet can be downloaded, printed and solved on paper.
 - d) We advise you to have a printer accessible with enough paper.
 - e) You are allowed to use writing implements, eraser, blank paper (including commercial graph paper), ruler, scissors, and tape.
- **If you plan to solve on LMI's Penpa-Integrated Interface:**
 - a) Click on this link and understand the instructions - <https://logicmastersindia.com/live/faq-online-solving.asp>
 - b) It is noted on the link too, but we note it here as well to be clear – the participants must still input the answer keys in the boxes below the puzzle and submit them to receive credit as given below.
- Outside solving help of any kind is not permitted. This includes but is not limited to: assistance of any kind from any other person; prepared notes, books, calculators, computers, or tools other than items explicitly permitted.
- Participants may use both paper solving and online solving, even interchangeably. Eventually our system will only count anything submitted in the submission boxes in either mode.

If you are participating at LMI for first time, it will be useful to check the F.A.Q. at <http://logicmastersindia.com/t/?tid=2773>.

About answer keys and Submission

- After solving the puzzle, you need to submit the puzzle using the answer keys.
 - You may submit the answer keys anytime during the test duration.
 - Answer keys are always to be entered from left to right or top to bottom
 - Don't enter any separator unless specified in the answer key
 - If one row and one column is marked, enter the row first and then the column
 - If multiple rows are marked, enter from top to bottom for marked rows
 - If multiple columns are marked, enter from left to right for marked columns
-

Points Table and Scoring

Points typically indicate difficulty of the Puzzles and time required to solve them. You will get full points if you enter the correct answer key. While the organizers have made best efforts to match them, **your personal experience and preference may differ.**

Classic Sudoku 6x6	1, 1
Classic Sudoku 9x9	5, 3, 3, 8
Scattered Sudoku 6x6 & 9x9	2, 8
Toroidal Sudoku 6x6 & 9x9	3, 13
Hex Sudoku 8x8 & 9x9	3, 8
Little Killer Sudoku 6x6 & 9x9	4, 11
Remainder Sudoku 6x6 & 9x9	4, 7
Position Sums Sudoku 6x6 & 9x9	6, 10

This test uses instant grading where a solver can submit any individual Puzzle and receive confirmation that the solution is correct or not. Each incorrect submission reduces the puzzle's potential score. The first, second, third, and fourth incorrect submissions reduce the potential score to 90%, 70%, 40%, and 0% respectively. A demonstration for this is shown below.

Original points

04 Araf	50 points	4A	Sum should be 10
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Potential points after 1 incorrect submission

04 Araf	45 / 50	4A	1234
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Potential points after 2 incorrect submissions

04 Araf	35 / 50	4A	23311
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Potential points after 3 incorrect submissions

04 Araf	20 / 50	4A	111111111
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Potential points after 4 incorrect submissions

04 Araf	0 / 50	4A	541
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Bonus and Ranking

If you submitted all Puzzles correctly, you can have bonus points 1 point per minute saved, computed up to seconds.

Ranking will be based on following rules in order:

1. Most total points
2. Earliest final submission time, up to seconds (ignoring incorrect submissions)

Credits

- **Gray Kanarek** for test solving the puzzles and providing invaluable feedback.
- The original creator **opt-pan** for penpa edit - <https://opt-pan.github.io/penpa-edit/>
- **Swaroop Guggilam** for his recent efforts in adding features to Penpa-edit - <https://swaroopg92.github.io/penpa-edit/> and also working to integrate it with our contest engine.

About the Puzzle Booklet

The password protected Puzzle booklet will have 11 pages. This is relevant only for paper solvers.

Solutions to examples are towards the end of the booklet in the Solutions section.

Rules Powered by Sudokuib - <https://github.com/vopani/sudokuib>

All answer keys are the same for all puzzles – enter the contents of the marked rows/columns, including given digits but not outside clues, along the direction of the arrow.

1-2 Classic Sudoku 6x6

Place a digit from 1 to 6 into each empty cell in the grid so that each digit appears exactly once in each row, column and 2x3 outlined box.

Penpa for example:

<https://tinyurl.com/2nvezsrr>

1 + 1 points

↓ B

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

← A

3-6 Classic Sudoku 9x9

Place a digit from 1 to 9 into each empty cell in the grid so that each digit appears exactly once in each row, column and 3x3 outlined box.

Penpa for example:

<https://tinyurl.com/333ntt48>

5 + 3 + 3 + 8 points

↓ B

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

← A

7 Scattered Sudoku 6x6

2 points

Place a digit from 1 to 6 into each empty cell in the grid so that each digit appears exactly once in each row, column, outlined region and the set of shaded cells.

Penpa for example:

<https://tinyurl.com/2mqjgd6z>

A						6
			5			
		3		6		
	1		4			
		2				
	6					
B						

8 Scattered Sudoku 9x9

8 points

Place a digit from 1 to 9 into each empty cell in the grid so that each digit appears exactly once in each row, column, outlined region and the set of shaded cells.

Penpa for example:

<https://tinyurl.com/2fzn5hxx>

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

9 Toroidal Sudoku 6x6

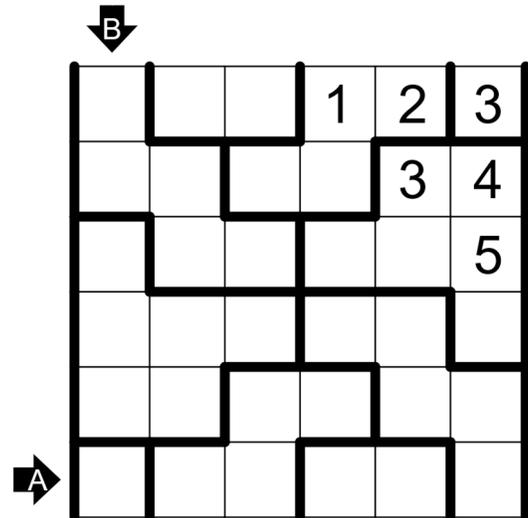
3 points

Place a digit from 1 to 6 into each empty cell in the grid so that each digit appears exactly once in each row, column and outlined region.

Some outlined regions wrap around the grid.

Penpa for example:

<https://tinyurl.com/2prnxddt>



10 Toroidal Sudoku 9x9

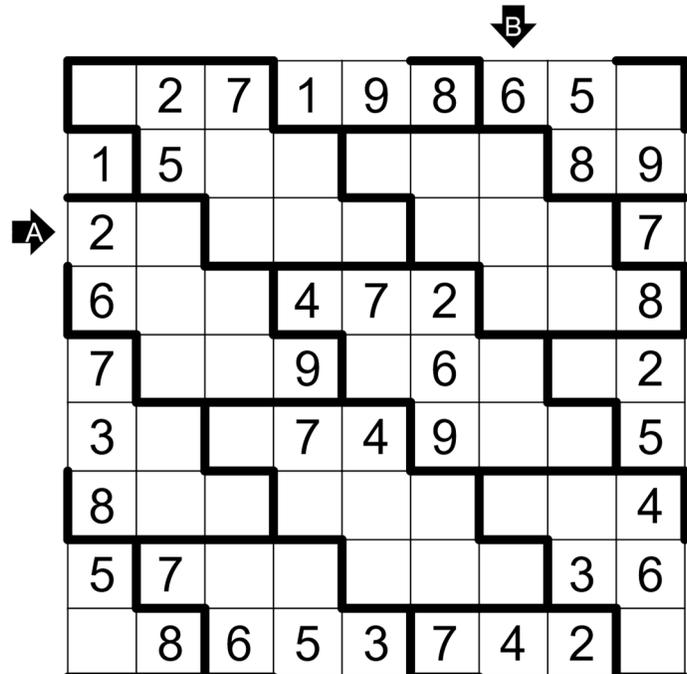
13 points

Place a digit from 1 to 9 into each empty cell in the grid so that each digit appears exactly once in each row, column and outlined region.

Some outlined regions wrap around the grid.

Penpa for example:

<https://tinyurl.com/2ow8hgt4>



11 Hex Sudoku 8x8

3 points

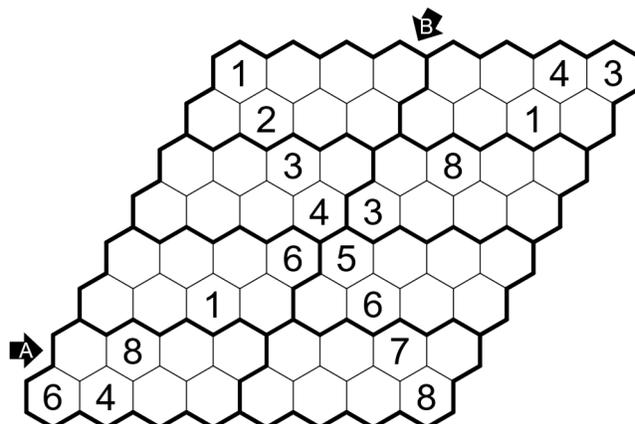
Note: For Online solving, there will be the added white space as seen in the example, because of the way Hex grids work on Penpa.

Place a digit from 1 to 8 into each empty cell in the grid so that each digit appears exactly once in each row, column and 2x4 outlined box.

Digits do not repeat along any of the three directions in which the hexagonal cells share edges.

Penpa for example:

<https://tinyurl.com/2o65be33>



12 Hex Sudoku 9x9

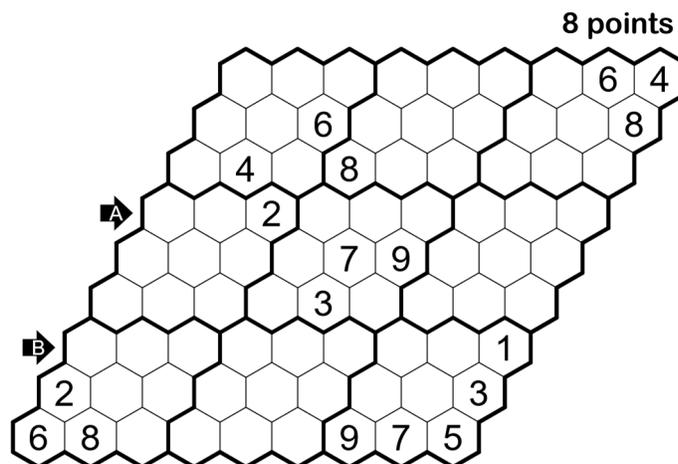
8 points

Place a digit from 1 to 9 into each empty cell in the grid so that each digit appears exactly once in each row, column and 3x3 outlined box.

Digits do not repeat along any of the three directions in which the hexagonal cells share edges.

Penpa for example:

<https://tinyurl.com/2jd6bruo>



13 Little Killer Sudoku 6x6

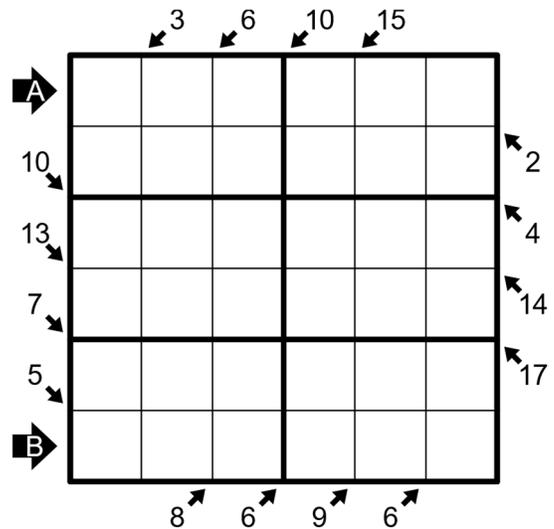
4 points

Place a digit from 1 to 6 into each empty cell in the grid so that each digit appears exactly once in each row, column and 2x3 outlined box.

Each number outside the grid is the sum of digits in the direction pointed by its arrow. Digits can repeat along a sum.

Penpa for example:

<https://tinyurl.com/2nb7kz4f>



14 Little Killer Sudoku 9x9

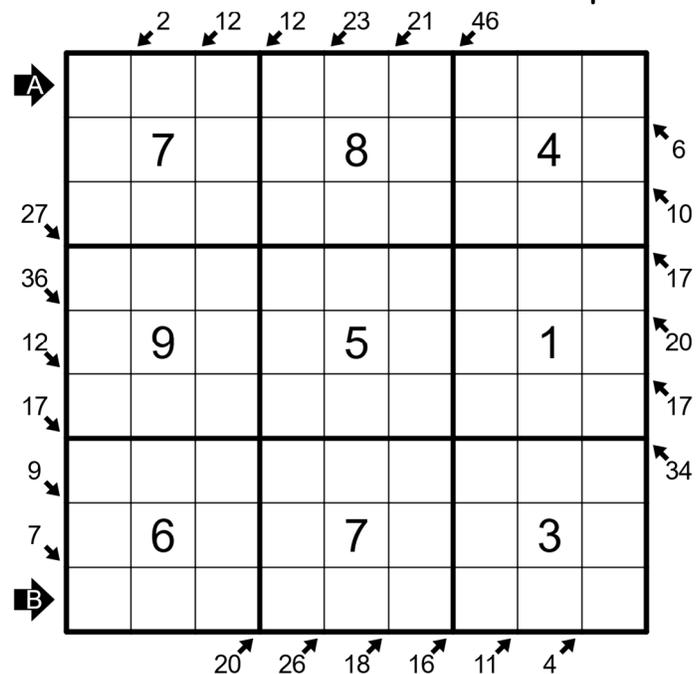
11 points

Place a digit from 1 to 9 into each empty cell in the grid so that each digit appears exactly once in each row, column and 3x3 outlined box.

Each number outside the grid is the sum of digits in the direction pointed by its arrow. Digits can repeat along a sum.

Penpa for example:

<https://tinyurl.com/2he9vyz8>



15 Remainder Sudoku 6x6

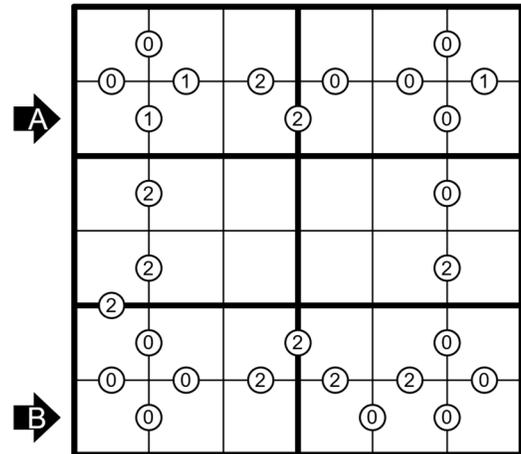
4 points

Place a digit from 1 to 6 into each empty cell in the grid so that each digit appears exactly once in each row, column and 2x3 outlined box.

Each digit between adjacent cells is the remainder of the digits in those two cells when the larger number is divided by the smaller number.

Penpa for example:

<https://tinyurl.com/2p62ghjd>



16 Remainder Sudoku 9x9

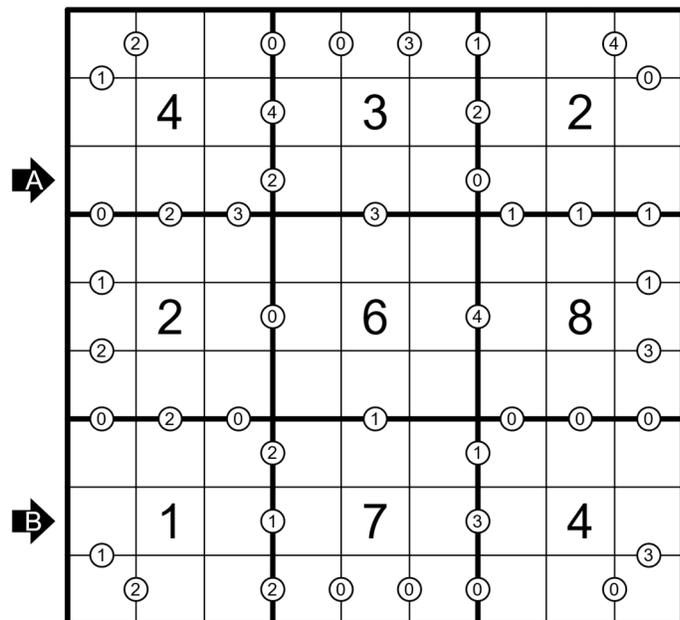
7 points

Place a digit from 1 to 9 into each empty cell in the grid so that each digit appears exactly once in each row, column and 3x3 outlined box.

Each digit between adjacent cells is the remainder of the digits in those two cells when the larger number is divided by the smaller number.

Penpa for example:

<https://tinyurl.com/2ol63g7l>



17 Position Sums Sudoku 6x6

6 points

Place a digit from 1 to 6 into each empty cell in the grid so that each digit appears exactly once in each row, column and 2x3 outlined box.

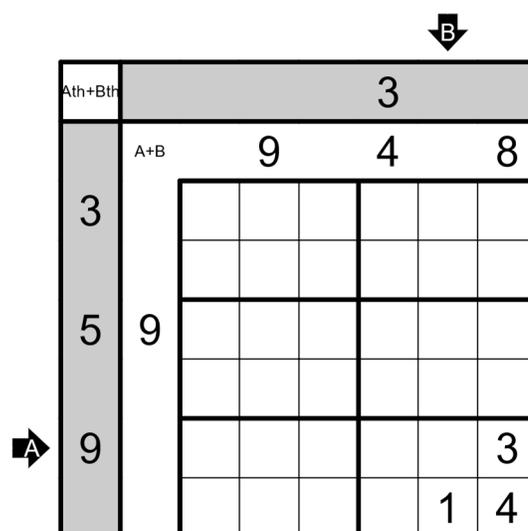
Digits in the first and second cell from the top and from the left are A and B for that column/row. There are two sets of clues outside the grid:

The ones closest to the grid give the sum of A and B.

The ones further out give the sum of the digits in the Ath and Bth positions in that direction.

Penpa for example:

<https://tinyurl.com/2gzqk9gp>



18 Position Sums Sudoku 9x9

10 points

Place a digit from 1 to 9 into each empty cell in the grid so that each digit appears exactly once in each row, column and 3x3 outlined box.

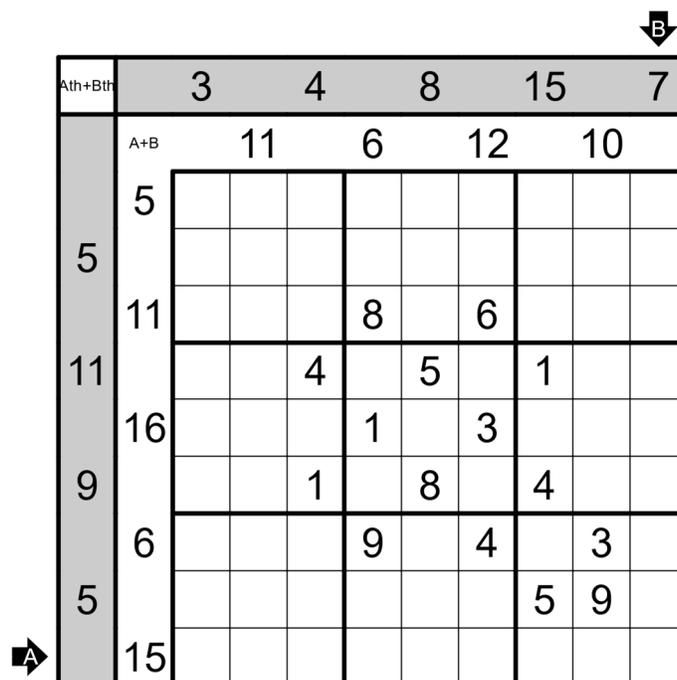
Digits in the first and second cell from the top and from the left are A and B for that column/row. There are two sets of clues outside the grid:

The ones closest to the grid give the sum of A and B.

The ones further out give the sum of the digits in the Ath and Bth positions in that direction.

Penpa for example:

<https://tinyurl.com/2pyoa8o6>



Solutions

Classic Sudoku 6x6

↓ B

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

→ A

Key: 412356,325461

Scattered Sudoku 6x6

→ A

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

→ B

Key: 325146,532614

Toroidal Sudoku 6x6

↓ B

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

→ A

Key: 521346,621345

Classic Sudoku 9x9

↓ B

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

→ A

Key: 781564329,718369254

Scattered Sudoku 9x9

→ A

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

→ B

Key: 694237518,816423975

Toroidal Sudoku 9x9

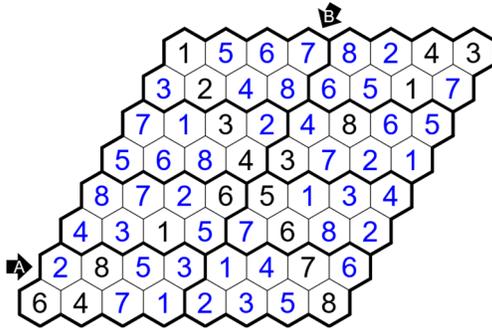
↓ B

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

→ A

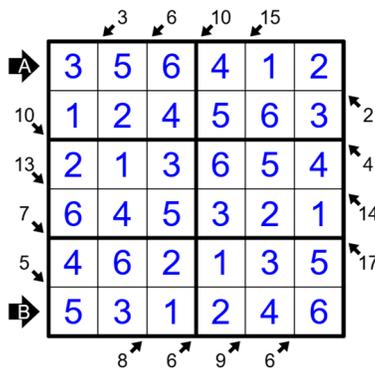
Key: 249813567,675138294

Hex Sudoku 6x6



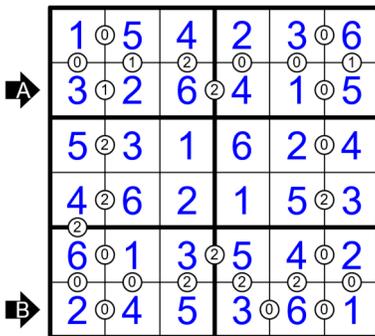
Key: 28531476,78246531

Little Killer Sudoku 6x6



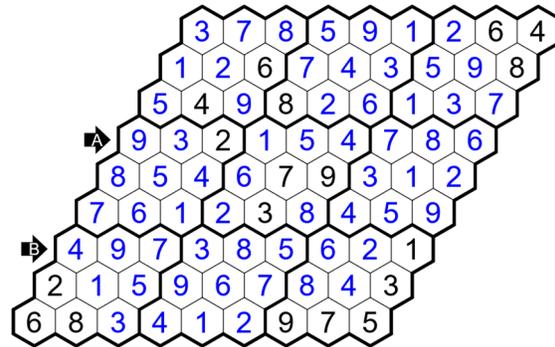
Key: 356412,531246

Remainder Sudoku 6x6



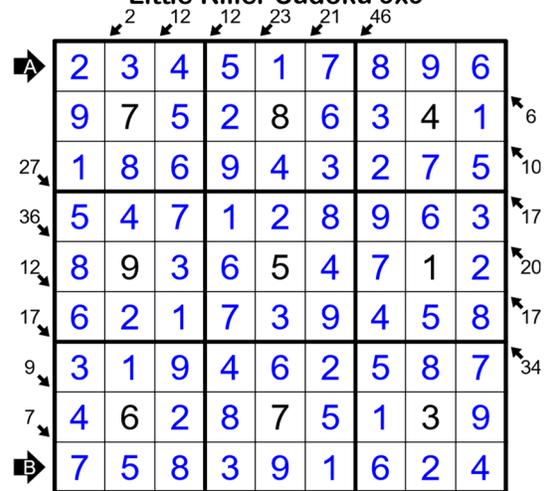
Key: 326415,245361

Hex Sudoku 9x9



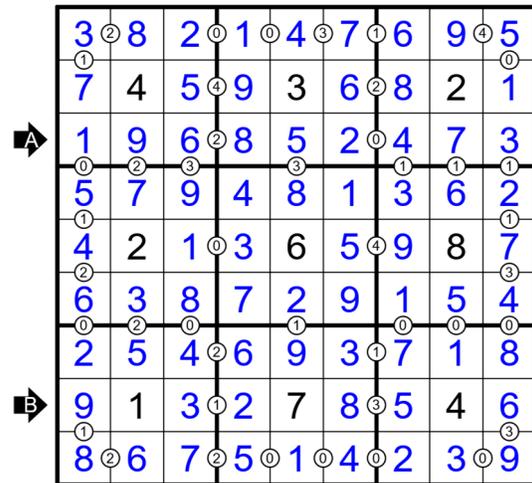
Key: 932154786,497385621

Little Killer Sudoku 9x9



Key: 234517896,758391624

Remainder Sudoku 9x9



Key: 196852473,913278546

Position Sums Sudoku 6x6

		↓ B					
Ath+Bth		3					
	A+B	9	4	8			
3	9	4	3	2	1	5	6
5	9	1	6	5	3	4	2
9	9	5	4	6	2	3	1
		3	2	1	4	6	5
		6	1	4	5	2	3
		2	5	3	6	1	4

Key: 614523,543621

Position Sums Sudoku 9x9

		↓ B						
Ath+Bth		3	4	8	15	7		
	A+B	11	6	12	10			
5	11	2	3	9	4	1	5	7
5	11	1	8	6	2	9	7	3
11	11	7	4	5	8	3	6	9
11	16	8	6	4	7	5	9	1
9	16	9	7	2	1	4	3	8
9	6	3	5	1	6	8	2	4
6	6	5	1	8	9	2	4	6
5	15	4	2	7	3	6	8	5
15	15	6	9	3	5	7	1	2

Key: 693571284,852369714