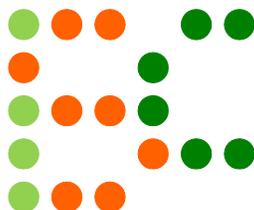


# इयतठकय ललहललललललल



## Instructions Booklet

Episode – 7  
11<sup>th</sup> – 16<sup>th</sup> June 2021

Hybrids  
By  
Gaurav Kumar Jain

Sudoku Mahabharat rounds will also serve as qualifiers for Indian Sudoku Championship for year 2021. Please check <http://logicmastersindia.com/SM/2021sm.asp> for details.

### Important Links

Submission Page : <http://logicmastersindia.com/live/?contest=SM202107>

Discussion Thread : <http://logicmastersindia.com/t/?tid=2853>

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 from the following types

- 4 \* Mini Classic Sudoku
- 4 \* Classic Sudoku
- 2 \* Toroidal Odd Even Sudoku
- 2 \* Arrow Palindrome Sudoku
- 2 \* Coded Consecutive Pairs Sudoku
- 2 \* Little Killer Outside Sudoku
- 2 \* Extra Regions Thermo Sudoku

## Test Duration

The test duration is 90 minutes. Participants get 90 minutes to submit their answers, after they click on “Start” button.

## How to participate?

- Understand the rules of different Sudokus that will appear in this episode. This Instruction Booklet has rules and examples for each Sudoku.
- Download the password protected Sudoku booklet (will be uploaded before the test starts). The Sudoku booklet contains the actual Sudokus to be solved. It is password protected, so you won't be able to open it.
- Any time on or after 11<sup>th</sup> June (but on or before 16<sup>th</sup> June), login at the submission page using your LMI userid and password. Please check the submission page for exact timings.
- Click on “Start”. At this time, password for pdf will be shown and timer will start.
- The Sudoku booklet can be downloaded, printed and solved on paper.
- Each Sudoku will be marked with two lettered arrows (rows and / or columns). These form the answer key for the Sudoku.
- There will NOT be any interface / applet to solve the Sudokus on web browser, but external Penpa links will be provided. The participant is still expected to come back and enter the answer key if solving using the links.
- Most of the Sudokus are designed to be solved faster on paper.
- We advise you to have a printer accessible with enough paper.
- 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/solvers, or tools other than items explicitly permitted.
- You are allowed to use writing implements, eraser, blank paper (including commercial graph paper), ruler, scissors, and tape.

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

## About answer keys and Submission

- Each Sudoku has two lettered arrows outside the grid which serve as answer keys.
- After solving the Sudoku, you need to submit the answer keys.
- You may submit the answer keys anytime during the test duration. You may consider submitting a Sudoku as soon as you solve it.
- 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.
- If horizontal and vertical keys are needed, first enter the horizontal and then the vertical key.
- Uppercase or lower case of answer key does not matter.
- Characters other than alphabets, numbers and comma will be removed while checking the answer.

## Points Table and Scoring

Points typically indicate difficulty of the Sudokus 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.

Mini Classic 1-6	1, 1, 1, 1
Classic 1-9	4, 4, 6, 6
Toroidal Odd Even 1-6,1-9	2, 8
Arrow Palindrome 1-6,1-9	2, 9
Coded Consecutive Pairs 1-6,1-9	3, 10
Little Killer Outside 1-6,1-9	3, 17
Extra Regions Thermo 1-6,1-9	3, 19

This test uses instant grading where a solver can submit any individual Sudoku and receive confirmation that the solution is correct or not. Each incorrect submission reduces the sudoku'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

18. Average - 2	18 points	S 9 digits	T 9 digits	Submit
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### Potential points after 1 incorrect submission

18. Average - 2	16.2 / 18	S 123456789	T 123456789	Submit
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### Potential points after 2 incorrect submissions

18. Average - 2	12.6 / 18	S 111111111	T 222222222	Submit
-----------------	-----------	-------------	-------------	--------

### Potential points after 3 incorrect submissions

18. Average - 2	7.2 / 18	S 999999999	T 777777777	Submit
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### Potential points after 4 incorrect submissions

18. Average - 2	0 / 18	S 135798755	T 142534657	Submit
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## Bonus

If you submitted all Sudokus 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)

## Penpa Usage

This contest will also be solvable on the Penpa-Edit software. Below the rules of each Sudoku will be a link to click to solve on the editor. The editor DOES NOT have a solution enabled so it will not check a solution. Participants must submit the answer key codes as they would with paper solving. It is therefore advisable to enter solution codes one at a time to avoid system lag with too many tabs open.

To practice on the editor, we have given links for solving the example sudokus too.

### Credits

- 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/>

### General Rules

To make the rules less repetitive, you will see following line “Apply classic Sudoku rules” in most Sudoku rules. This means “Place a digit from 1 to N, where N is the size of the grid, in each empty cell so that each digit appears exactly once in each row, column and outlined region.”

These outlined regions could be 3X3 boxes, or other shapes.

Each Sudoku will be marked with 2 lettered arrows. You need to submit the digits in these arrows, in order, including the givens. For example, the answer key for the Sudoku at the right is 162897453, 517698432.

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

### About the Sudoku Booklet

The password protected Sudoku booklet will have 8 pages. If you are planning to solve on paper, we advise you to have a printer accessible with enough paper.

The Sudoku booklet will look similar to the next pages in this instruction booklet. The font sizes, cell sizes, colors, borders, shading, margin will be similar. We recommend you to print a few pages of this instruction booklet and avoid any last-minute surprises during the test.

Solutions and keys to examples are at the end of the booklet.

## 1-4 Mini Classic Sudoku (1+1+1+1 points)

### Mini Classic Sudoku

Penpa Link: <https://git.io/JZGQ5>

Place a digit from 1 to 6 in each empty cell so that each digit appears exactly once in each row, column and 2X3 box.

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

## 5-8 Classic Sudoku (4+4+6+6 points)

### Classic Sudoku

Penpa Link: <https://git.io/JZG7x>

Place a digit from 1 to 9 in each empty cell so that each digit appears exactly once in each row, column and 3X3 box.

	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	

## Toroidal Odd Even Sudoku - 1

2 points

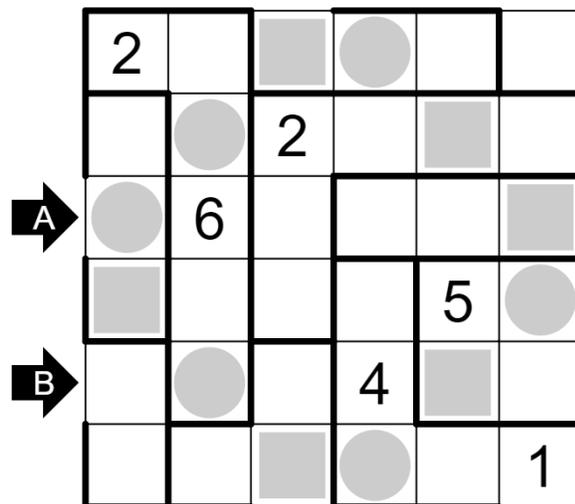
Place a digit from 1 to 6 in each empty cell so that each digit appears exactly once in each row, column and outlined region.

Each outlined region is marked by thick borders.

**Toroidal:** Some of the outlined regions wrap between the top and bottom edges, and/or the left and right edges of the grid.

**Odd Even:** The cells having a grey circle must contain an odd digit, while cells containing a square must contain an even number. If there is no shape in a cell, it can contain a digit of any parity.

Penpa Link: <https://git.io/JZGUC>



## Toroidal Odd Even Sudoku - 2

8 points

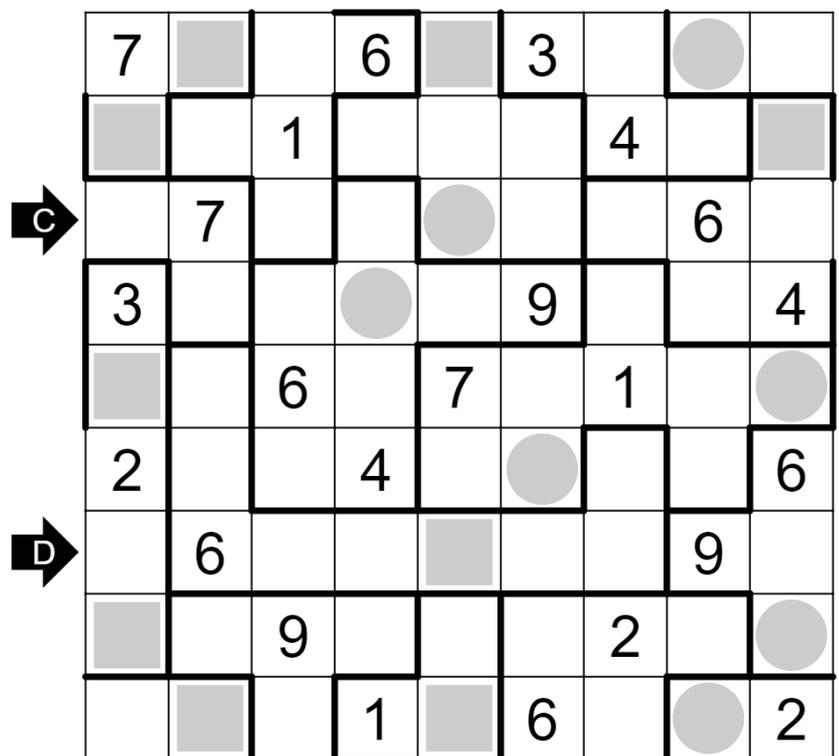
Place a digit from 1 to 9 in each empty cell so that each digit appears exactly once in each row, column and outlined region.

Each outlined region is marked by thick borders.

**Toroidal:** Some of the outlined regions wrap between the top and bottom edges, and/or the left and right edges of the grid.

**Odd Even:** The cells having a grey circle must contain an odd digit, while cells containing a square must contain an even number. If there is no shape in a cell, it can contain a digit of any parity.

Penpa Link: <https://git.io/JZCyT>



## Arrow Palindrome Sudoku - 1

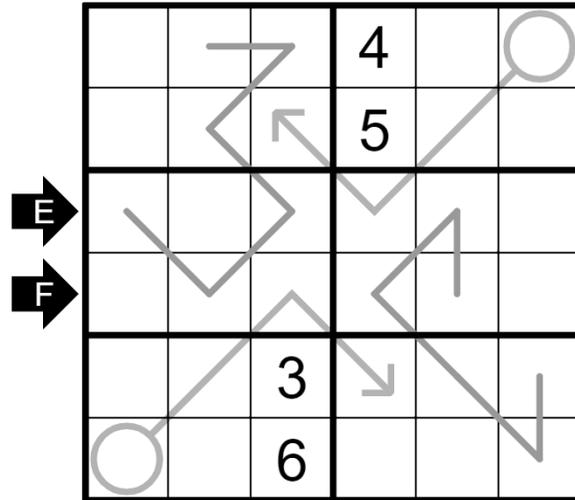
Penpa Link: <https://git.io/JZGTD>

2 points

Apply classic Sudoku rules.

**Arrow:** The sum of the digits along the path of each arrow must equal the digit in the circled cell. Digits can repeat within an arrow shape.

**Palindrome:** The lines which are not connected to circles form palindromes. The digits in the cells on these lines read the same from both the directions.



## Arrow Palindrome Sudoku - 2

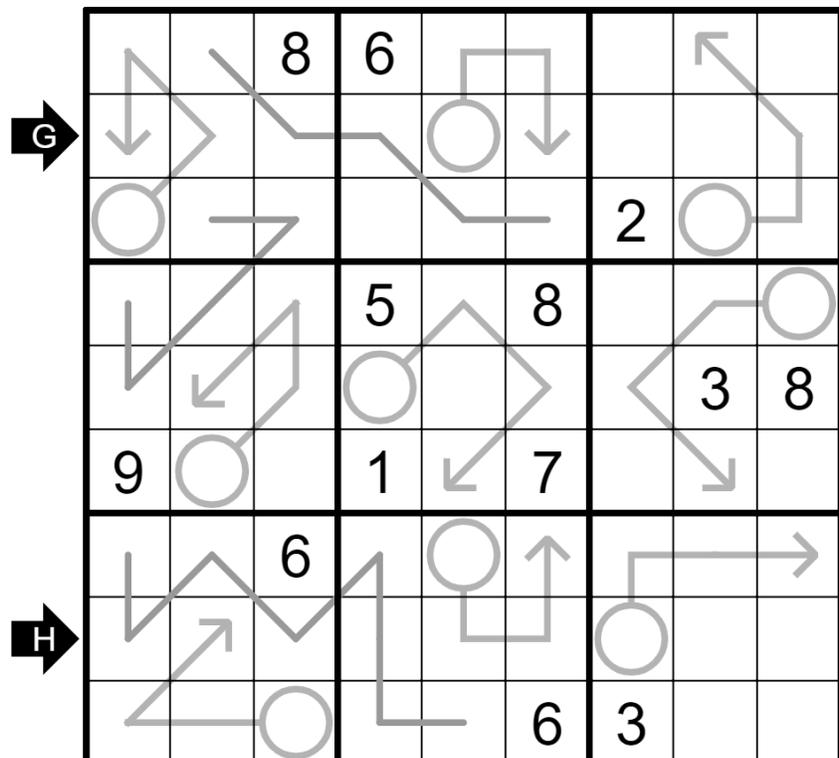
Penpa Link: <https://git.io/JZsXT>

9 points

Apply classic Sudoku rules.

**Arrow:** The sum of the digits along the path of each arrow must equal the digit in the circled cell. Digits can repeat within an arrow shape.

**Palindrome:** The lines which are not connected to circles form palindromes. The digits in the cells on these lines read the same from both the directions.



## Coded Consecutive Pairs Sudoku - 1

Penpa Link: <https://git.io/JZGvA>

3 points

Apply classic Sudoku rules.

**Coded:** Some digits have been substituted by letters. All instances of the same letter must be substituted by the same digit and different letters must be substituted by different digits.

**Consecutive Pairs:** Some circles are marked in the grid. The digits placed in cells on either side of the circle must be consecutive. Not all possible circles are marked.

				C	
1	B	A	D	2	3
					○
F		○			C
A		○			E
		F	B		6

## Coded Consecutive Pairs Sudoku - 2

Penpa Link: <https://git.io/JZsol>

10 points

Apply classic Sudoku rules.

**Coded:** Some digits have been substituted by letters. All instances of the same letter must be substituted by the same digit and different letters must be substituted by different digits.

**Consecutive Pairs:** Some circles are marked in the grid. The digits placed in cells on either side of the circle must be consecutive. Not all possible circles are marked.

3	B	E	G		F			○
C	8			E		A		○
	H	1			C	7	E	
B		H		F				
9				1				4
	○	○	○	○	A		B	○
		6				1	D	
				C			5	
		○	○		G	E	A	6

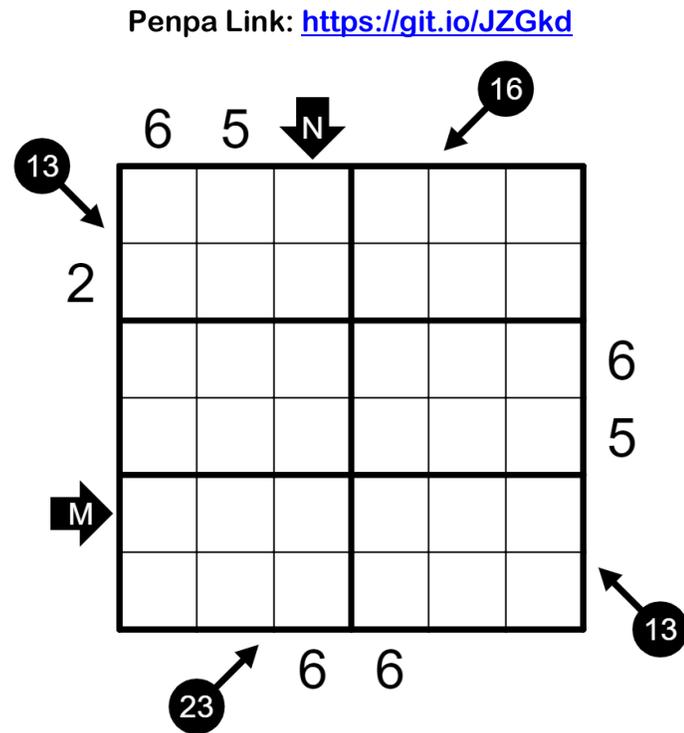
## Little Killer Outside Sudoku - 1

3 points

Apply classic Sudoku rules.

**Little Killer:** The numbers with arrows (in black circles) outside the grid indicate the sum of the digits appearing in the cells in the corresponding direction. Digits can repeat in the direction of the arrow.

**Outside:** The other digits outside the grid must appear in one of the cells in the first box (till the next bold line) seen from that edge of the grid.



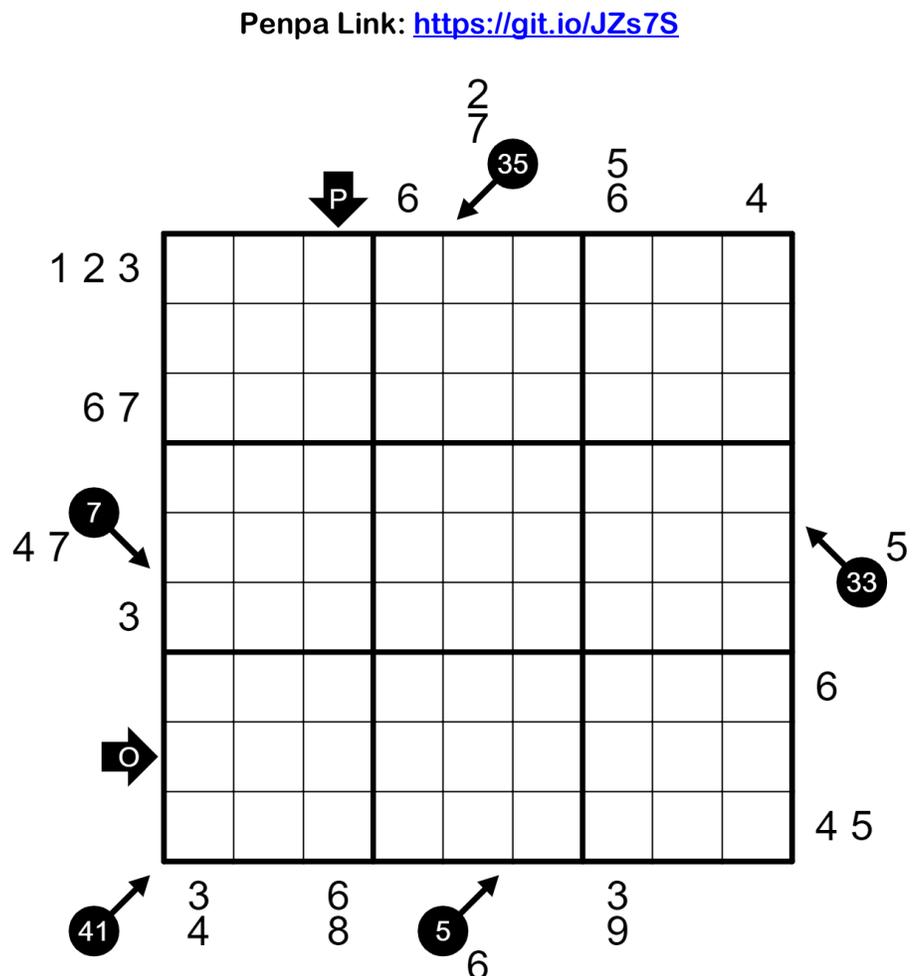
## Little Killer Outside Sudoku - 2

17 points

Apply classic Sudoku rules.

**Little Killer:** The numbers with arrows (in black circles) outside the grid indicate the sum of the digits appearing in the cells in the corresponding direction. Digits can repeat in the direction of the arrow.

**Outside:** The other digits outside the grid must appear in one of the cells in the first box (till the next bold line) seen from that edge of the grid.



## Extra Regions Thermo Sudoku - 1

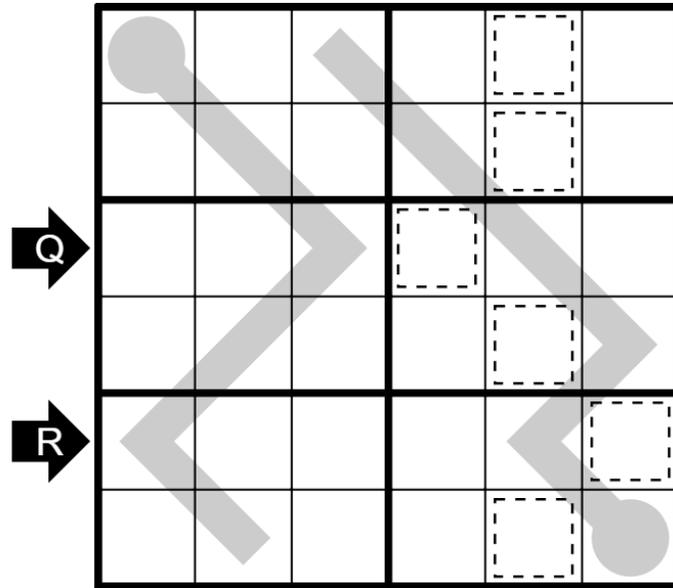
Penpa Link: <https://git.io/JZWmU>

3 points

Apply classic Sudoku rules.

**Extra Regions:** Each extra region must contain digits from 1-6. The extra regions are of 6 cells each (connected by edges and/or corners) and are marked by dotted squares in the grid.

**Thermo:** The digits in each “thermometer” shaped region must be strictly increasing from the circular “bulb” to the other end(s).



## Extra Regions Thermo Sudoku - 2

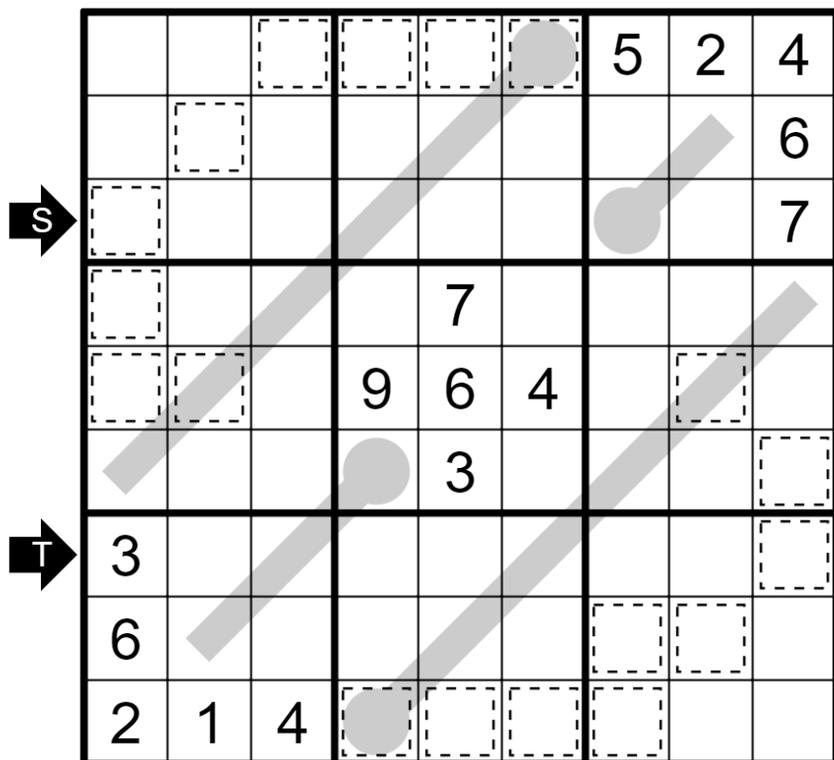
Penpa Link: <https://git.io/JZgSL>

19 points

Apply classic Sudoku rules.

**Extra Regions:** Each extra region must contain digits from 1-9. The extra regions are of 9 cells each (connected by edges and/or corners) and are marked by dotted squares in the grid.

**Thermo:** The digits in each “thermometer” shaped region must be strictly increasing from the circular “bulb” to the other end(s).



**Mini Classic Sudoku**

↓ 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

Answer Key:  
412356, 325461

**Classic Sudoku**

↓ D

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

Answer Key:  
781564329, 718369254

**Toroidal Odd Even – 1**

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

Answer Key:  
563124, 135462

**Toroidal Odd Even – 2**

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

Answer Key:  
974258361, 162384597

**Arrow Palindrome – 2**

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

Answer Key:  
125874693, 234715869

**Arrow Palindrome – 1**

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

Answer Key:  
364152, 251643

**Coded Consecutive Pairs – 1**

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

Answer Key:  
421365, 365241

**Extra Regions Thermo – 1**

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

Answer Key:  
613245, 531624

