Episode – 4
27th – May 01st June 2022

Math & Irregular
by
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Sudoku Mahabharat rounds will also serve as qualifiers for Indian Sudoku Championship for year 2022. Please check http://logicmastersindia.com/SM/2022sm.asp **for details.**

Important Links

Submission Page : http://logicmastersindia.com/live?contest=SM202204

Discussion Thread : http://logicmastersindia.com/t/?tid=3030

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 Arithmetic Pairs Sudoku 6x6 and Arithmetic Pairs Sudoku 9x9
- 1 each of Killer Sudoku 6x6 and Killer Sudoku 9x9
- 1 each of Arrow Sudoku 6x6 and Arrow Sudoku 9x9
- 1 each of Irregular Sudoku 6x6 and Irregular Sudoku 9x9
- 1 each of Sudokurve 6x6 and Sudokurve 9x9
- 1 each of Parquet Sudoku 6x6 and Parquet 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 27th May (but on or before 1st June), 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.
- Irregular 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	4, 3, 7, 7
Arithmetic Pairs Sudoku 6x6 & 9x9	3, 13
Killer Sudoku 6x6 & 9x9	4, 10
Arrow Sudoku 6x6 & 9x9	5, 10
Irregular Sudoku 6x6 & 9x9	2, 13
Sudokurve 6x6 & 9x9	3, 4
Parquet Sudoku 6x6 & 9x9	2, 8

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

Potential points after 1 incorrect submission

04 Araf	45 / 50	4A	1234

Potential points after 2 incorrect submissions

04 Araf	35 / 50	4A	23311

Potential points after 3 incorrect submissions

04 Araf	20 / 50	4A	1111111111

Potential points after 4 incorrect submissions

04 Araf	0 / 50	4A	541

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
- **Jacob Cohen (A.K.A. Conflux), Niverio & Yosh (rand_yosh314)** 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 10 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, along the direction of the arrow.

1-2 Classic Sudoku 6x6

1 + 1 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.

Penpa for example:
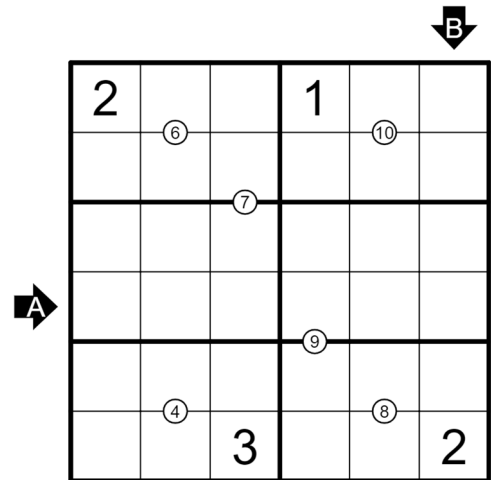https://tinyurl.com/2nvezsrr

3-6 Classic Sudoku 9x9

4 + 3 + 7 + 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.

Penpa for example:
https://tinyurl.com/333ntt48

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7 Arithmetic Pairs 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.

Circled numbers are a result of applying one of the basic mathematical operations (+, -, *, /) between the digits on each side of the circle. It may be possible to achieve the result using more than one of them, but at least one should be applicable.

Penpa for example:
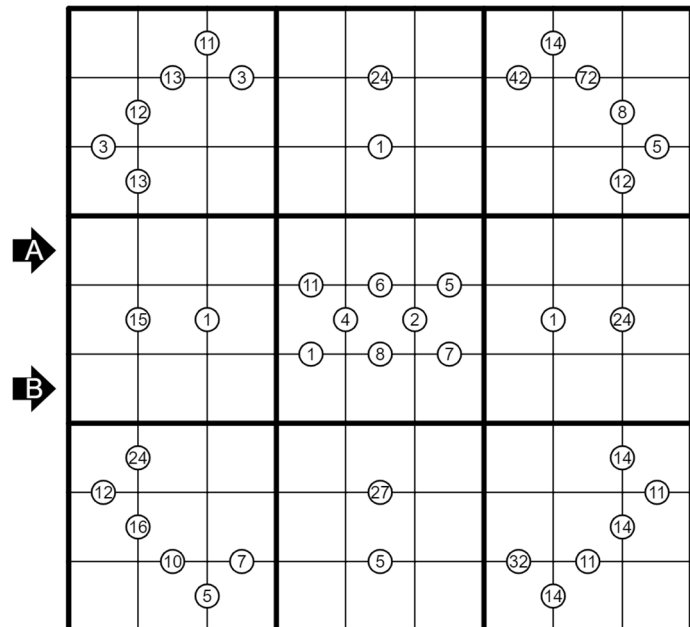https://tinyurl.com/yynpvwqk

8 Arithmetic Pairs 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.

Circled numbers are a result of applying one of the basic mathematical operations (+, -, *, /) between the digits on each side of the circle. It may be possible to achieve the result using more than one of them, but at least one should be applicable.

Penpa for example:
https://tinyurl.com/y3e37fvl

9 Killer 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.

The number at the top-left corner of each cage is the sum of digits inside the cage. Digits do not repeat within a cage.

Penpa for example:
https://tinyurl.com/yxld64vj

10 Killer 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.

The number at the top-left corner of each cage is the sum of digits inside the cage. Digits do not repeat within a cage.

Penpa for example:
https://tinyurl.com/yylpz6wn

11 Arrow Sudoku 6x6

5 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.

The digit in each circled cell is the sum of digits along the path of its arrow. Digits can repeat within an arrow shape.

Penpa for example:
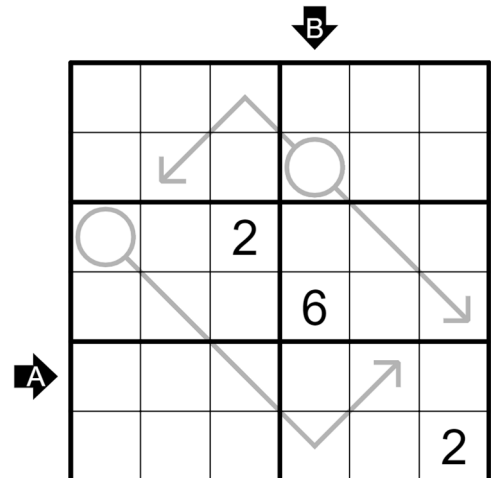https://tinyurl.com/y5l92sdg

12 Arrow 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.

The digit in each circled cell is the sum of digits along the path of its arrow. Digits can repeat within an arrow shape.

Penpa for example:
https://tinyurl.com/yxdcafa2

13 Irregular 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 outlined region.

Penpa for example:
https://tinyurl.com/yxzhpmwc

14 Irregular 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 outlined region.

Penpa for example:
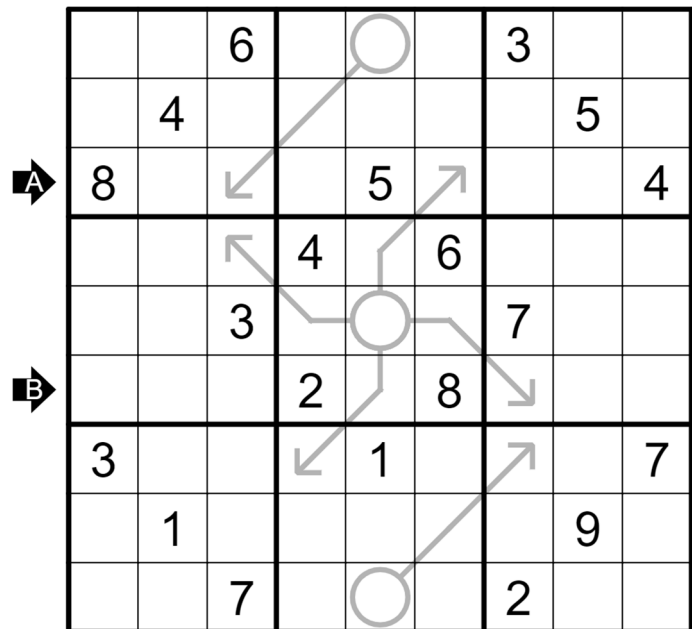https://tinyurl.com/yxhb8q9n
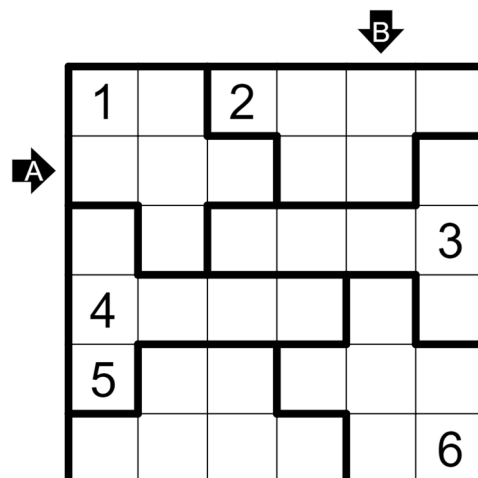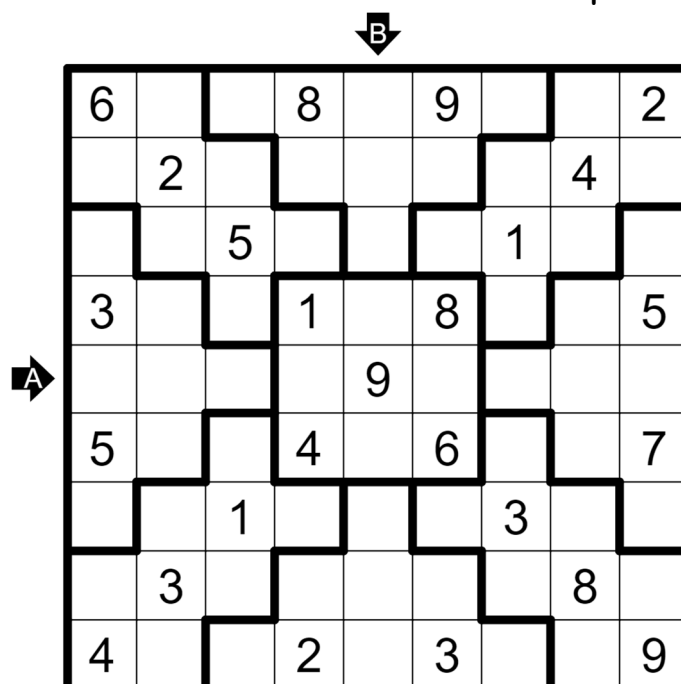
15 Sudokurve 6x6

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 2x3 outlined box.

Some rows and columns are bent, marked by curved lines.

Note: The answer key should contain the digits in the direction of the arrow, ignoring any gaps or curved lines.

Penpa for example:
https://tinyurl.com/y4xaxa42

16 Sudokurve 9x9

4 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.

Some rows and columns are bent, marked by curved lines.

Note: The answer key should contain the digits in the direction of the arrow, ignoring any gaps or curved lines.

Penpa for example:
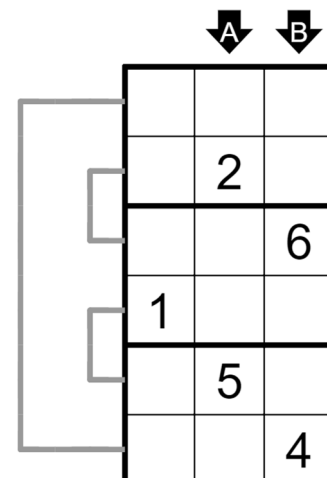https://tinyurl.com/y4pkboxa

17 Parquet 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 and 2x3 outlined box.

Some cells belong to multiple rows and/or columns.

Penpa for example:
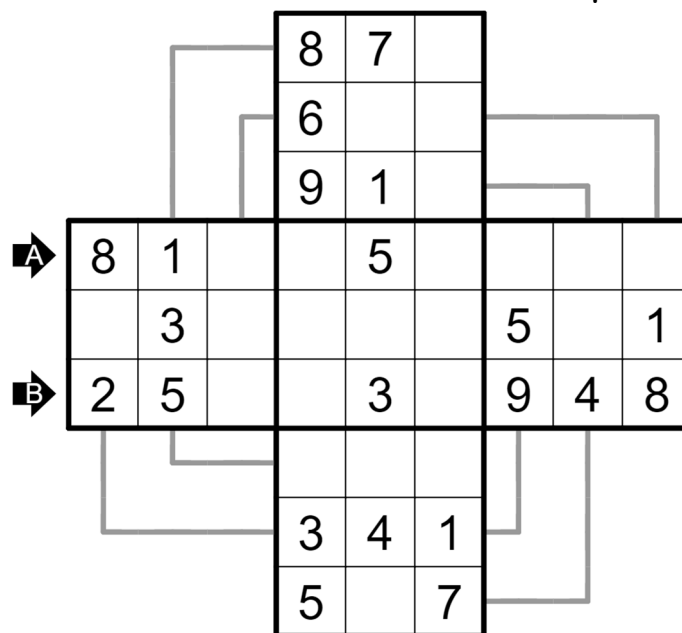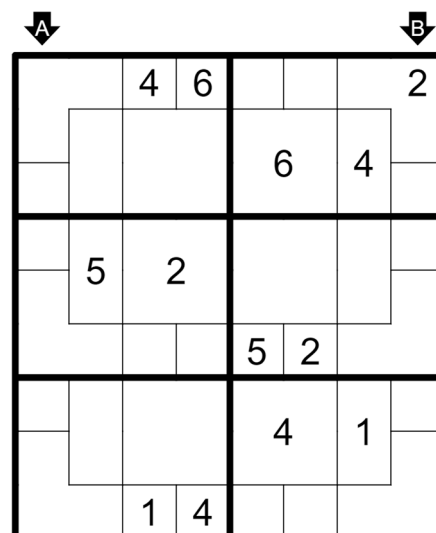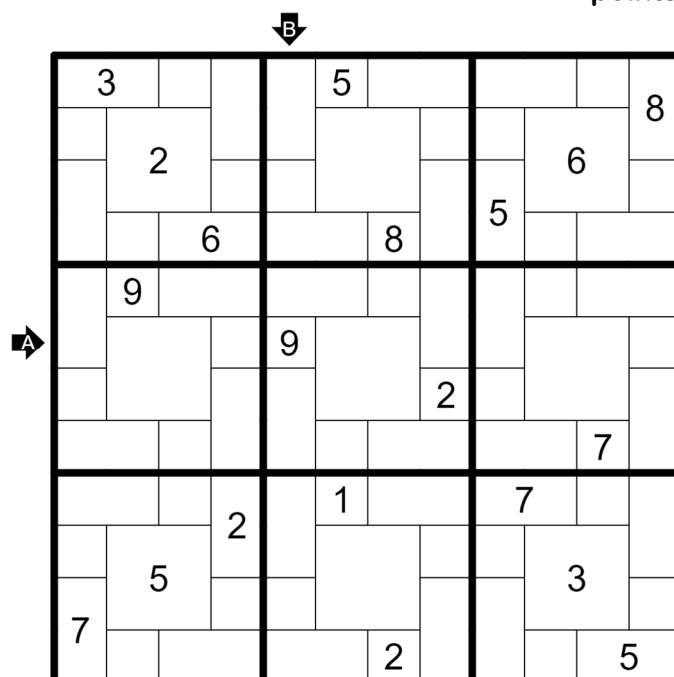https://tinyurl.com/y5l8o4xx

18 Parquet 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.

Some cells belong to multiple rows and/or columns.

Penpa for example:
https://tinyurl.com/yxzmhdny

Solutions

Classic Sudoku 6x6

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

Key: 412356,325461

Classic Sudoku 9x9

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

Key: 781564329,718369254

Arithmetic Pairs Sudoku 6x6

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

Key: 542316,354612

Arithmetic Pairs Sudoku 9x9

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

Key: 514673928,236489517

Killer Sudoku 6x6

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

Key: 153642,164523

Killer Sudoku 9x9

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

Key: 925634718,671943852

Arrow Sudoku 6x6

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

Key: 251436,253641

Arrow Sudoku 9x9

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

Key: 831952674,975238461

Irregular Sudoku 6x6

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

Key: 625134,631524

Irregular Sudoku 9x9

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

Key: 847592631,162793548

Sudokurve 6x6

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

Key: 623451,516234

Sudokurve 9x9

8	7	4
6	2	5
9	1	3

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

2	6	9
3	4	1
5	8	7

Key: 819452763,257136948

Parquet Sudoku 6x6

Key: 123456,214365

Parquet Sudoku 9x9

Key: 215974683,712895463