PARALLEL UNIVERSE

14th – 19th August 2020

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Important Links

Submission Page : http://logicmastersindia.com/2020/08P/

Discussion Thread : http://logicmastersindia.com/t/?tid=2752

F. A. Q. : http://logicmastersindia.com/t/?tid=381

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

About this Contest

(**Author's note** – *The other Instruction Booklet that is posted with this, as well as the "storyline" below, are for thematic purposes only. There is only one set of puzzles, including 10 6x6 Sudokus, and 20 puzzles. There will only be one Puzzle Booklet, and it will be consistent with this Instruction Booklet and not the other one.*)

Hello dear participants! If you are not familiar with this series, please check
Parallel Universe (https://logicmastersindia.com/lmitests/?test=M201404S) , and
Parallel Universe II (https://logicmastersindia.com/lmitests/?test=M201404P2).

After those two contests in 2014, I have been searching for more parallel Earths with differing threads of history in the field of puzzle innovations. In between, some of you may have seen a short cameo of a Logical Optimizers universe at WPC 2017.

After more searching, I found an interesting place in the Multiverse – an Earth where Sudoku had never been invented! The interesting fact is, while Sudoku hadn't been invented, many of the variants that we associate with Sudoku here, were actually originated along with common puzzle styles, as Classic Puzzles!

Obviously there were many other Puzzle types that didn't have this property, but I, together with this weird Earth's Prasanna, have put together 10 puzzles where it did happen. This contest is in a way, our communication – I showed him our Sudoku variant and Classic puzzle type that got fused together on his Earth, and he in turn showed me that "Classic Puzzle" on his Earth.

We welcome you to join us on this, the third chapter of seeing how things could easily have been different in the world of puzzles.

How to participate?

- Understand the rules of different Puzzles that will appear in this test. This Instruction Booklet has rules and examples for each Puzzle. **The solutions of the examples along with the answer key codes for them are given at the end of the booklet.**
- 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.
- Any time on or after 14th August (but on or before 19th August), login at the submission page using your LMI user-id and password.
- Please check the submission page for exact timing.
- Click on "Start". At this time, password for pdf will be shown and timer will start.
- You can either solve online using the Penpa interface (details below) or print the pdf and solve on paper.
- Some Puzzles will be marked with arrows
- After solving a Puzzle
  - Fill the answer form as per the answer key format given in the Instruction booklet, along the marked arrow(s)
  - Click submit button

If you are participating at LMI for first time, you must check the F.A.Q. at:
http://logicmastersindia.com/t/?tid=381.

Points Table and Scoring

Points typically indicate difficulty of the Puzzles and time required to solve them. While the organizers have made best efforts to match them, your personal experience and preference may differ.

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.

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Contest Duration & Bonus

The contest duration is 90 minutes. Participants will be awarded a bonus of 10 points per minute saved, computed up to seconds, for submitting all puzzles correctly within 90 minutes.

Penpa Usage

This contest will also be solvable on the Penpa-Edit software. Below the rules of each puzzle 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 some of the example puzzles too.

Author's Note – This is something new I am trying out. If the feature was useful, please let us know in the discussion thread.

Credits

(*On behalf of the other Earth's Prasanna too*) I sincerely thank the following people for their contributions to this contest:
- **Murat Can Tonta, Philipp Weiß, Edderiofer** and **Rakesh Rai** 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/
- Logic Masters India team for hosting the competition.

About the Puzzle Booklet

The password protected Puzzle booklet will have approximately 12 pages. The last page is just Penpa Links. If you are planning to solve on paper, we advise you to have a printer accessible with enough paper.
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01 Anti Knight Sudoku

## 20 points

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.

No cell that is a knight-step away can contain the same digit. In chess, a knight moves two squares forward followed by one sideways.
Penpa Link: https://git.io/JJDI7
Answer Key: Digits along marked arrows.

02 Nurikabe

5 points

Shade some cells black so that the grid is divided into non-overlapping white regions. Cells are considered to be in the same region if they are adjacent horizontally or vertically. Each given number must be in a white region that has the same area in cells as that number. Each white region must have exactly one given number.

All black cells must be connected with each other, but no 2×2 group of cells can be entirely shaded black.
Penpa Link: https://git.io/JJDLs
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows.

03 Anti Knight Nurikabe

37 points

Standard Nurikabe Rules as above.

Additionally, if two white cells are a knight step away from each other, they cannot belong to different regions.
Penpa Link: https://git.io/JJDIV
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows. Enter the unit's digit only in case of two-digit groups.

04 No Even Neighbours Sudoku

10 points

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.

Even digits cannot be orthogonally adjacent.
Penpa Link: https://git.io/JJDtG
Answer Key: Digits along marked arrows.
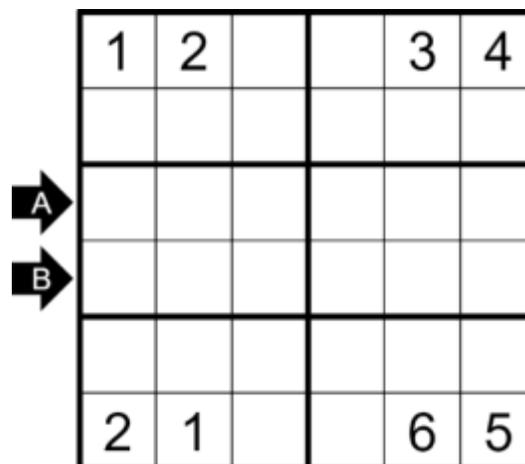
05 Tapa

4 points

Shade some cells to form a continuous wall. Number/s in a cell indicate the length of shaded cell blocks on its neighbouring eight cells. If there is more than one number in a cell, there must be at least one white cell between the shaded cell blocks.

Shaded cells cannot form a 2x2 area. There are no wall segments on cells containing numbers.
Penpa Link: https://git.io/JJDtz
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows.
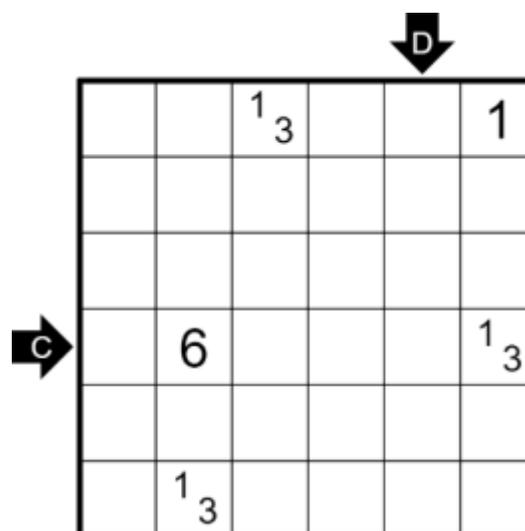
06 No Even Neighbours Tapa

69 points

Follow regular Tapa rules as above.

Additionally, if there is an unshaded cell orthogonally adjacent to a given clue that contains an even digit, then there can be no even digits in that unshaded cell if it were represented as a Tapa clue in the final solution. No such restriction applies for two unshaded cells without givens that are orthogonally adjacent.
Penpa Link: https://git.io/JJDLD
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows. Enter the unit's digit only in case of two-digit groups.
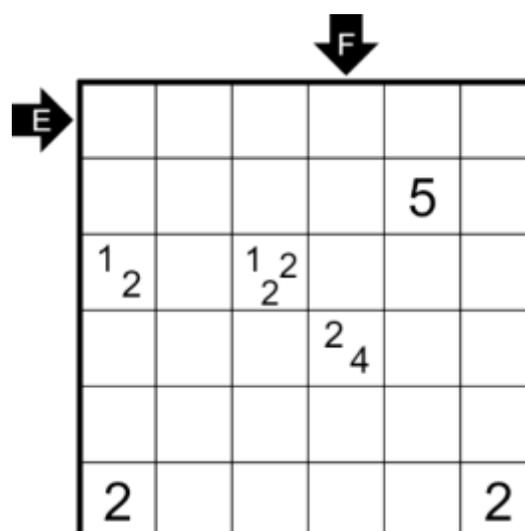
07 Non Consecutive Sudoku

10 points

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.

No adjacent cell pairs (sharing an edge) can contain digits which are consecutive to each other.
Penpa Link: https://git.io/JJDqP
Answer Key: Digits along marked arrows.
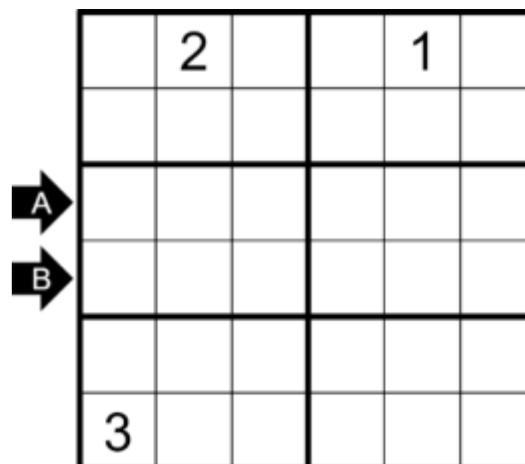
08 Nanro

6 points

Label some cells with numbers to form a single connected group of labeled cells; no 2×2 group of cells may be fully labeled. Each bold region must contain at least one labeled cell. Each number (including any given numbers) must equal the total count of labeled cells in that region. When two numbers are orthogonally adjacent across a region boundary, the numbers must be different.
Penpa Link: https://git.io/JJDqS
Answer Key: Content along marked arrows. Digits and X for blank cells.
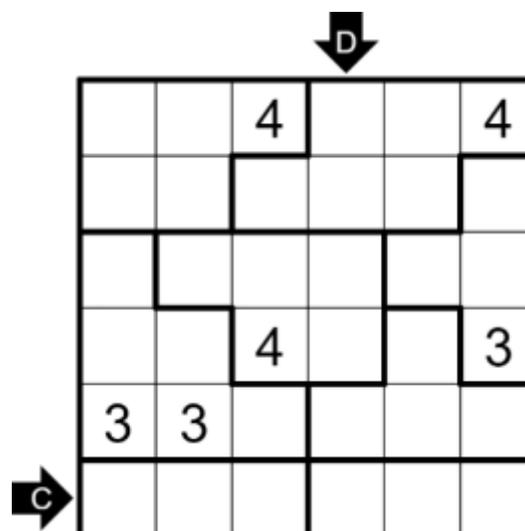
09 Non Consecutive Nanro

45 points

Follow regular Nanro rules as above.

Consecutive digits cannot touch orthogonally. A '?' stands for any nonzero digit, and just means that that cell must contain a digit.
Penpa Link: https://git.io/JJDqv
Answer Key: Content along marked arrows. Digits and X for blank cells.
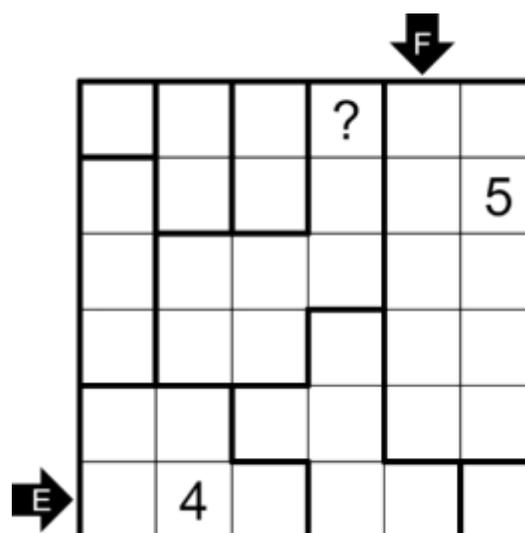
10 Odd Even Sudoku

13 points

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.

Additionally, shaded squares contain Even digits (2,4,6) while shaded circles contain Odd digits (1,3,5).
Penpa Link: https://git.io/JJDmO
Answer Key: Digits along marked arrows.
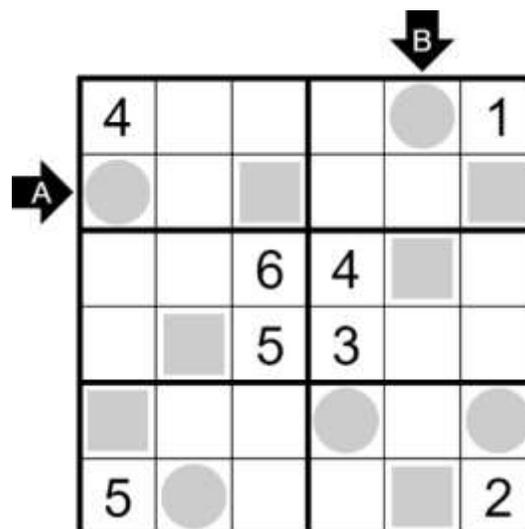
11 Fillomino

19 points

Divide the grid along the dotted lines into polyominoes so that no two polyominoes with the same area share an edge. Each given number must represent the area of the polyomino it belongs to. A polyomino may contain zero, one, or more of the given numbers.
Penpa Link: https://git.io/JJDYL
Answer Key: Digits along marked arrows.
Enter unit's digit only for two-digit regions.
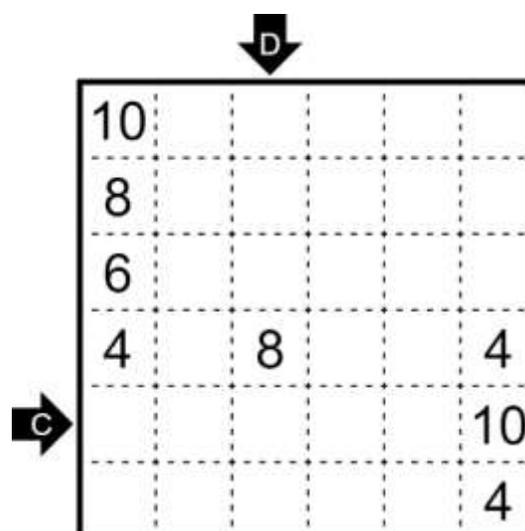
12 Odd Even Fillomino

36 points

Follow regular Fillomino rules as above.

Additionally, shaded squares contain Even digits while shaded circles contain Odd digits.
Penpa Link: https://git.io/JJDmK
Answer Key: Digits along marked arrows. Enter unit's digit only for two-digit regions.
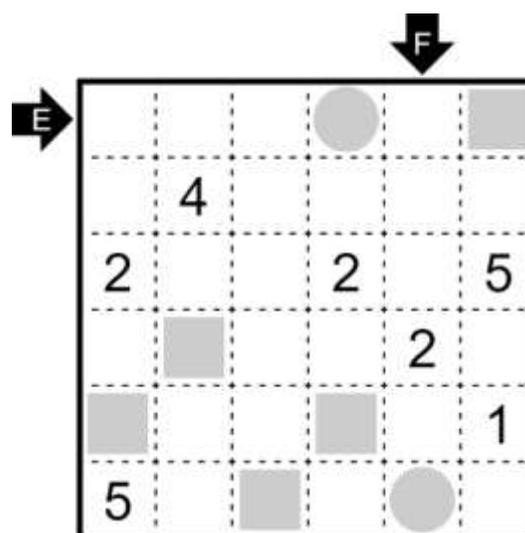
13 Skyscraper Sudoku

16 points

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.

Consider each number to be the height of a building. The numbers outside the grid indicate how many buildings can be seen when looking in that direction (taller buildings conceal smaller buildings behind them).
Penpa Link: https://git.io/JJDOv
Answer Key: Digits along marked arrows.
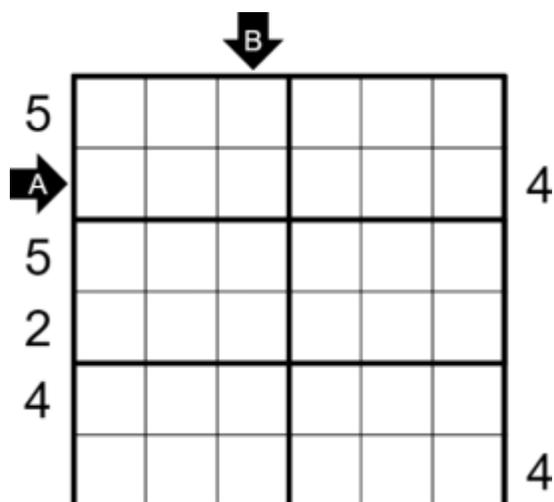
14 Snake

15 points

Locate a snake (a 1 cell-wide single continuous path) in the grid. The snake does not touch itself, even diagonally. Numbers outside the grid indicate the number of snake cells in that row/column.

The length of the Snake is fixed and will be given below the puzzle. The Snake's head is given.
Penpa Link: https://git.io/JJDOM
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows. Enter the unit's digit only in case of two-digit groups.
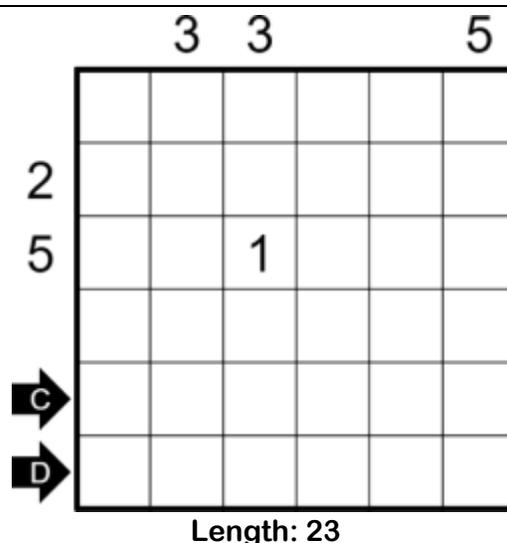
Length: 23

15 Skyscraper Snake

48 points

Locate a snake (a 1 cell-wide single continuous path) in the grid. The snake does not touch itself, even diagonally.

The lengths of shaded blocks along a row are considered as "heights" and the clues outside are skyscraper clues that give the number of heights that can be observed from that direction. Heights are blocked by other heights of same or higher value

The snake's length is unknown & neither head nor tail are given.
Penpa Link: https://git.io/JJD3O
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows. Enter the unit's digit only in case of two-digit groups.
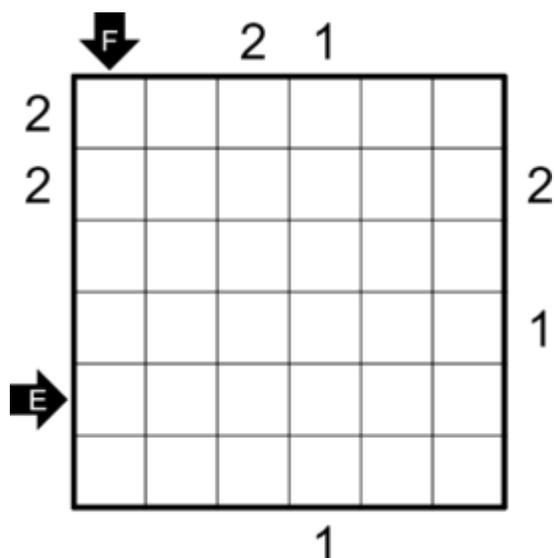
16 Clock Faces Sudoku

40 points

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.

Around white dots, the digits increase in a clockwise direction, and around black dots the digits increase in a counter clockwise direction. Not all such dots are given.
Penpa Link: https://git.io/JJDGE
**Answer Key: Digits along marked arrows.**
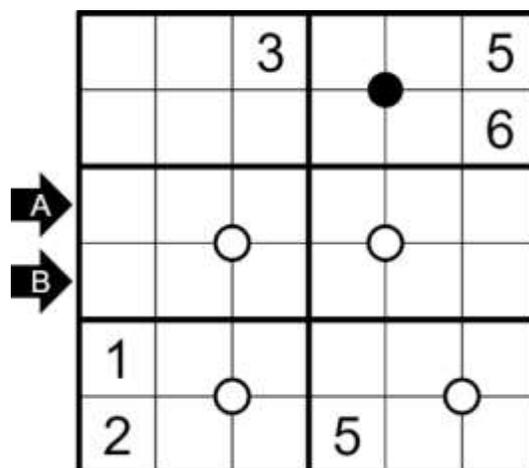
17 Loop the Loops

6 points

Draw a single, non-intersecting loop by connecting dots horizontally and vertically. The loop passes through all given dots. The loop must go straight through the white dots, with a turn in at least one of the cells immediately before/after each white dot. The loop must make a turn in all the black dot, but must go straight in both cells immediately before/after each black dot.

The numbers indicate how many of the segments around it are used by the loop.
Penpa Link: https://git.io/JJDGq
Answer Key: Lengths of loop segments along marked arrows.
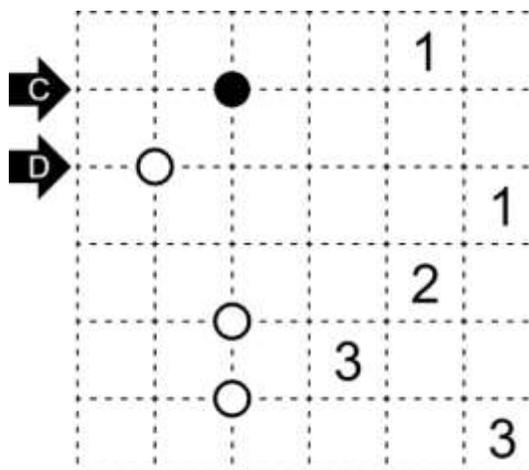
18 Clock Faces Loop the Loops

65 points

Follow regular Loop the Loops rules as above.

Additionally, the 3s are all replaced by grey and black circles. Grey circles mean the loop must turn around it in a clockwise direction, black circles mean the loop must turn around it in a counter clockwise direction. They must also still behave like Slitherlink 3 clues.
The direction of the loop is not given.
Penpa Link: https://git.io/JJDsC
Answer Key: Lengths of loop segments along marked arrows.
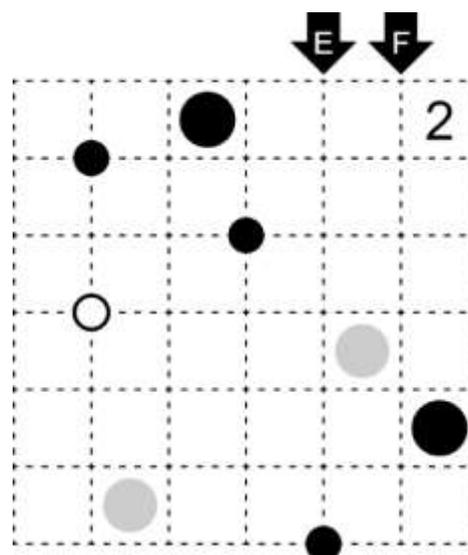
19 Diagonal Sudoku

15 points

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.

Additionally, each main diagonal (marked by dotted lines) must contain digits from 1-6.
*Penpa Link: https://git.io/JJDZt*
Answer Key: Digits along marked arrows.
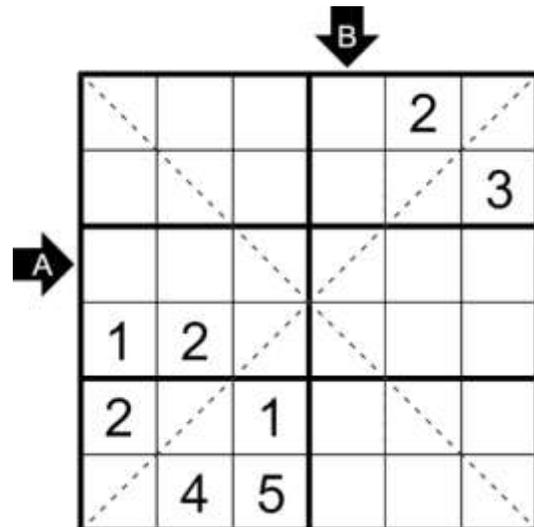
20 Kurotto

7 points

Shade some empty cells so that each circled number indicates the total number of shaded cells in connected groups sharing an edge with that number.

Cells with circles cannot be shaded.
Penpa Link: https://git.io/JJDnb
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows. Enter the unit's digit only in case of two-digit groups.
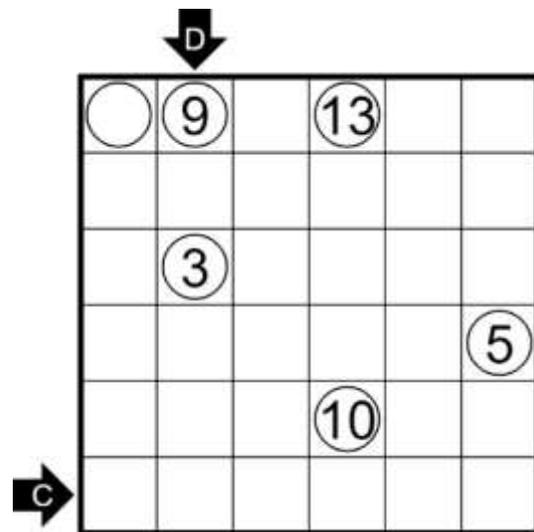
21 Diagonal Kurotto

78 points

Follow regular Kurotto rules as above.

For each shaded group, label each cell with the total number of cells covered by that group. In doing this no digit can repeat along each of the marked diagonals, even if it belongs to the same group.
Penpa Link: https://git.io/JJDZG
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows. Enter the unit's digit only in case of two-digit groups.
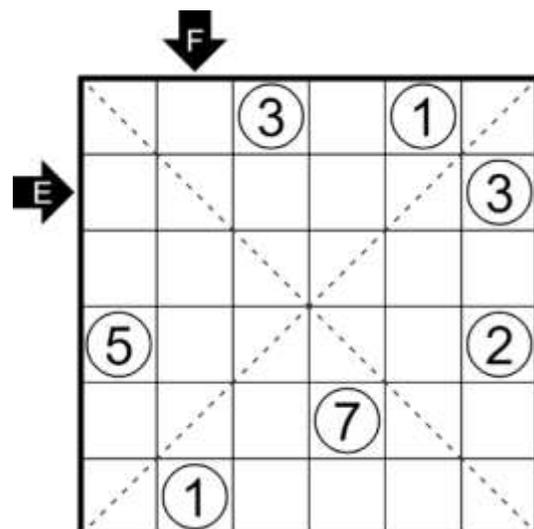
22 Palindrome Sudoku

32 points

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.

Additionally, the digits in the cells with the line form palindromes, i.e. they read the same from both the directions.
*Penpa Link: https://git.io/JJDc0*
Answer Key: Digits along marked arrows.
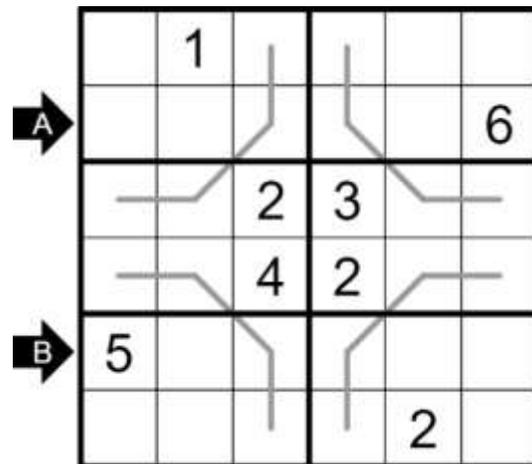
23 Höhle

33 points

Shade some cells to leave behind a single connected group — the cave — with no enclosed shaded cells. In other words, all shaded cells must be connected by other shaded cells to an edge of the grid.

The cave cannot fully cover any 2x2 area.

All numbered cells must be a part of the cave, with each number indicating the total count of cells connected vertically and horizontally to the numbered cell including the cell itself.
Penpa Link: https://git.io/JJDcO
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows. Enter the unit's digit only in case of two-digit groups.
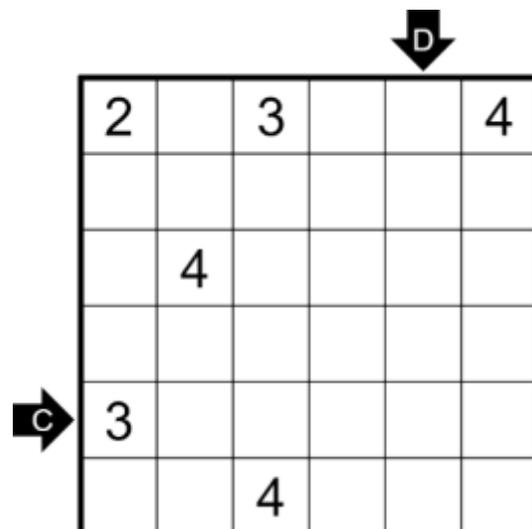
24 Palindrome Höhle

67 points

Follow regular Höhle rules as above.

Additionally, for each grey line, all cells along it must be a part of the Cave and the digits placed there by visibility rules must form a palindrome i.e. Read the same from both sides.

Penpa Link: https://git.io/JJDZ4
Answer Key: Contiguous Groups of Shaded & unshaded cells along marked arrows. Enter the unit's digit only in case of two-digit groups.
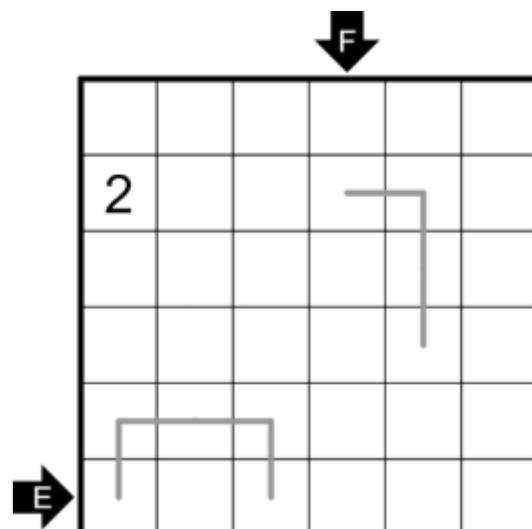
25 Even Sandwich Sudoku

44 points

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.

Wherever there is exactly one digit sandwiched between two even digits, that single digit is given outside as a clue. If there is no clue this does not occur at all in that row/column.

Clues are given in the order in which they appear along that direction.

Penpa Link: *https://git.io/JJ7Et*

Answer Key: Digits along marked arrows.
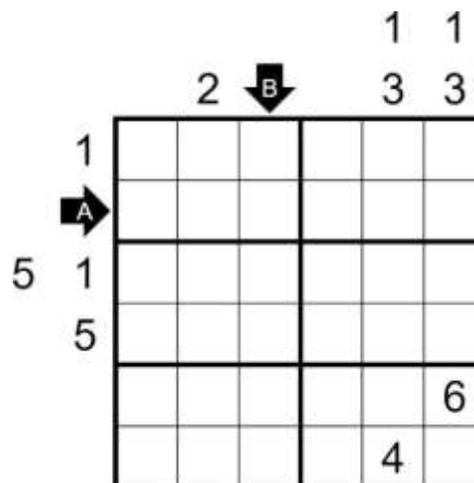
26 Battleships

19 points
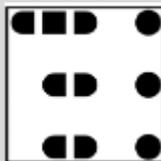
Place the given fleet of ships with the shapes of the ships as shown. Each segment of a ship occupies a single cell. Ships can be rotated. Ships cannot touch each other, not even diagonally. Some cells are known to be water and are indicated by waves. Some ship segments may already be given.

The numbers outside the grid indicate the number of cells occupied by ships in that row or column.

Penpa Link: *https://git.io/JJD8E*

Answer Key: Enter the column number of the left most ship segment for each row from top to bottom, 0 if there is no ship segment.
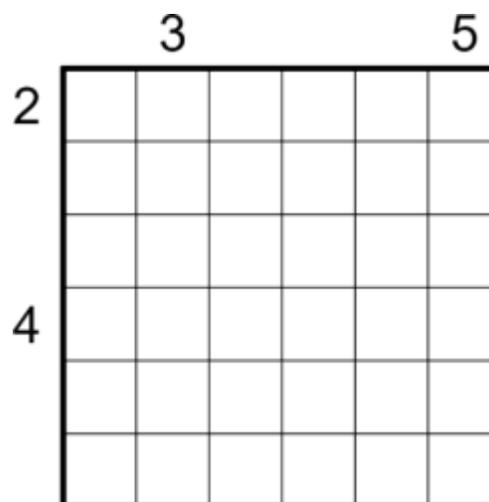
27 Even Sandwich Battleships

25 points
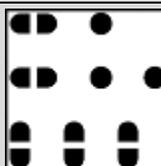
Follow regular Battleship rules as above, except for the part about the numbers outside.

Instead, the clues outside give the number of non-ship cells between two even-cell ship segments in that direction. In case of multiple clues, they are not necessarily in order. All outside clues are NOT necessarily given.

Penpa Link: *https://git.io/JJD8t*

Answer Key: Enter the column number of the left most ship segment for each row from top to bottom, 0 if there is no ship segment.
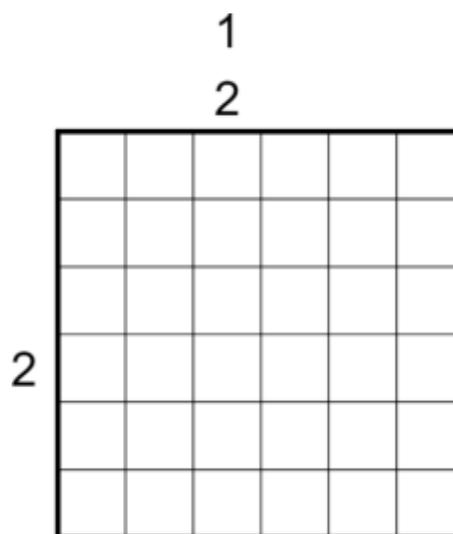
28 Irregular Doppelblock Sudoku

50 points

Place 1-4 and two shaded cells in each row, column and each outlined region marked by thick borders.

Numbers outside give the sum of digits between the shaded cells in that row or column.
Penpa Link: https://git.io/JJD4X
**Answer Key: Digits along marked arrows. X for shaded cells.**
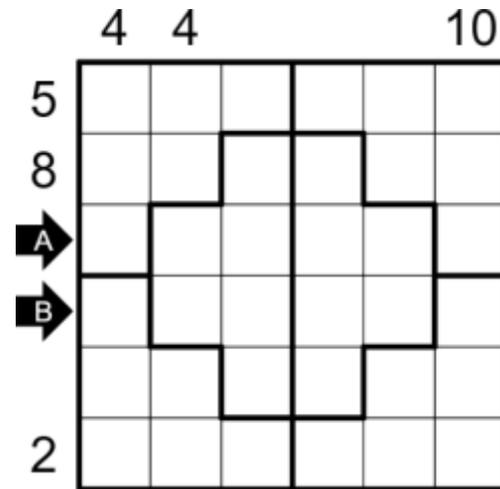
29 Yajilin

16 points

Blacken some white cells and draw a closed loop passing through centres of all remaining white cells horizontally or vertically. Blackened cells cannot share an edge with each other. Some cells are outlined and in grey and cannot be part of the loop. Numbered arrows in such cells indicate the total number of blackened cells in the direction pointed at by the arrow.
Penpa Link: https://git.io/JJD4t
Answer Key: Lengths of loop segments along marked arrows.
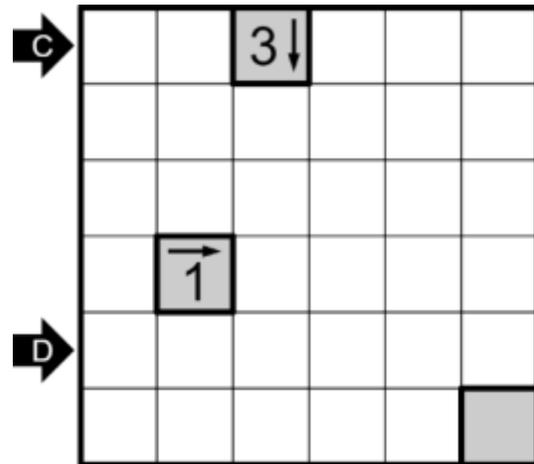
30 Irregular Doppelblock Yajilin

50 points

Place two black cells in each outlined region and then draw a loop passing through the remaining white cells as in regular Yajilin. An arrowed clue means that A) there are exactly two black cells in that direction and B) the number gives the sum of lengths of loop segments between those two black cells along that direction. Arrowed clues do not block sight of other arrowed clues.
Penpa Link: https://git.io/JJD4u
Answer Key: Lengths of loop segments along marked arrows.
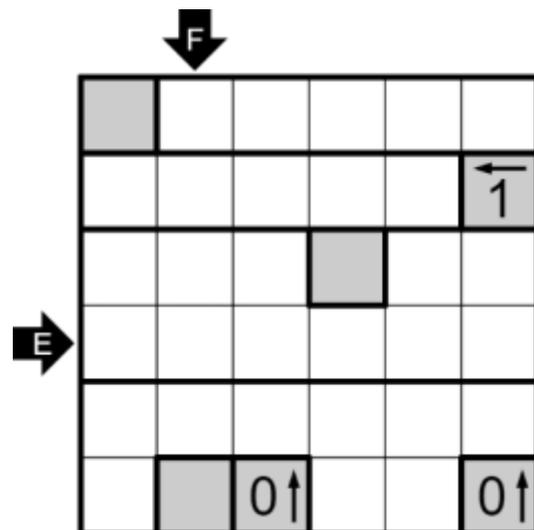
01 Anti Knight Sudoku

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

Answer Key: 341265,146235

02 Nurikabe

Answer Key: 221,1112

03 AntiKnight Nurikabe

Answer Key: 141,11121

04 No Even Neighbours Sudoku

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

Answer Key: 341256,652143

05 Tapa

Answer Key: 1221,1311

06 No Even Neighbours Tapa

Answer Key: 132,3111

07 Nonconsecutive Sudoku

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

Answer Key: 531426,264153

08 Nanro

Answer Key: X22333,X4X423

09 Nonconsecutive Nanro

Answer Key: 4442X1,XXXX5X

10 Odd Even Sudoku

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

Answer Key: 152634,532146

11 Fillomino

10	10	10	10	10	4
8	8	8	8	10	4
6	6	8	8	10	4
4	6	8	8	10	4
4	6	6	4	10	10
4	4	6	4	4	4

Answer Key: 466400,088866

12 Odd Even Fillomino

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

Answer Key:444552,555233

### 13 Skyscraper Sudoku
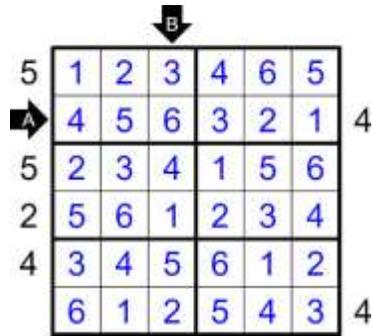
Answer Key: 456321,364152

14 Snake
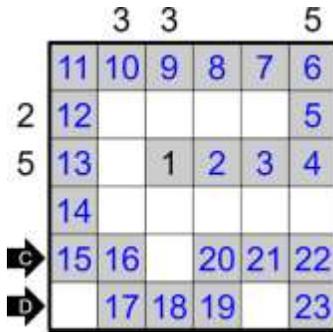
Answer Key: 213,1311

15 Skyscraper Snake
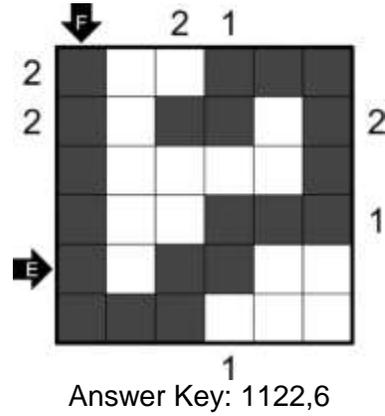
Answer Key: 1122,6

16 Clock Faces Sudoku
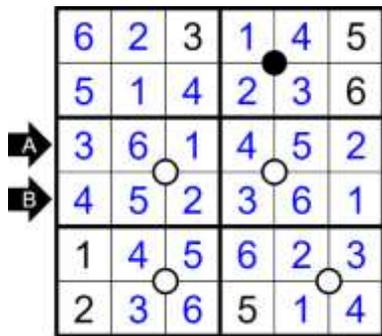
Answer Key: 361452,452361

17 Loop the Loops
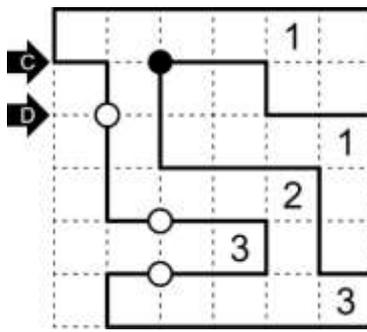

Answer Key: 12,2

18 Clock Faces Loop the Loops
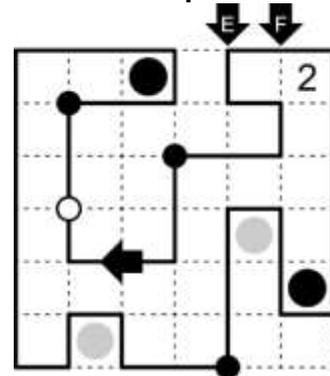

Answer Key: 13,12

19 Diagonal Sudoku
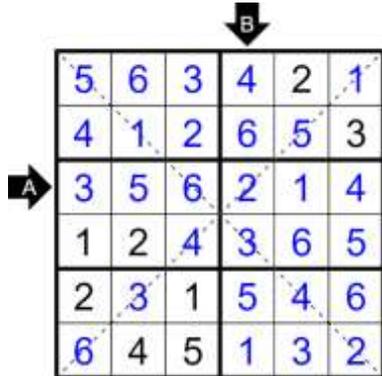
Answer Key: 356214,462351

20 Kurotto
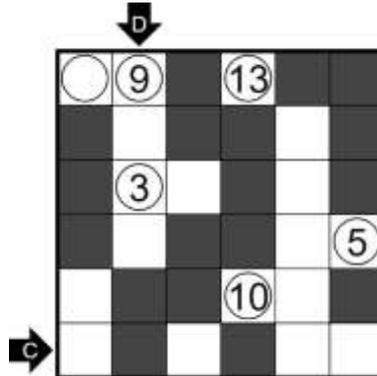
Answer Key: 11112,42

21 Diagonal Kurotto
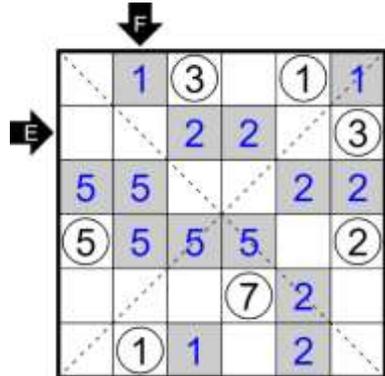
Answer Key:222,1122

22 Palindrome Sudoku
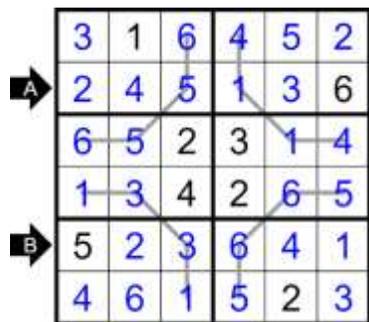

Answer Key: 245136,523641

23 Höhle
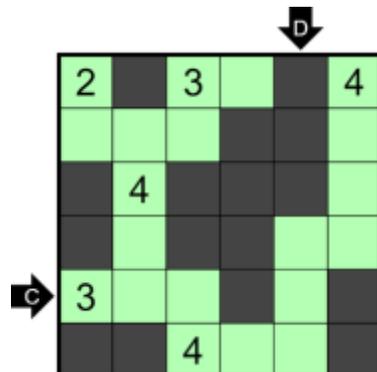
Answer Key: 3111,33

24 Palindrome Höhle
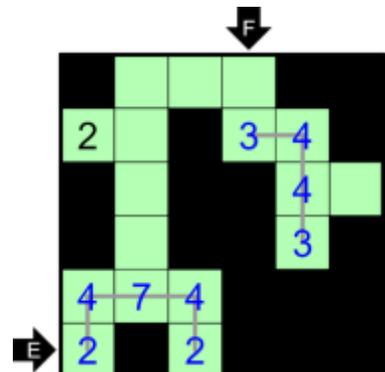
Answer Key: 1113,24

25 Even Sandwich Sudoku

Answer Key: 453621,635421

26 Battleships

Answer Key: 260162

27 Even Sandwich Battleships

Answer Key: 116201

28 Irregular Doppelblock Sudoku

Answer Key: 4XX213,X423X1

29 Yajilin

Answer Key: 12,21

30 Irregular Doppelblock Yajilin

Answer Key: 21,11