

Instructions booklet  
for  
Puzzle Ramayan 2020 Finals  
&  
Indian Puzzle Championship 2020



20<sup>th</sup> December 2020  
(This event will be held online)

|  |                                  |                           |
|--|----------------------------------|---------------------------|
| <b>Online Finals:<br/>Starts at 9:00 AM</b><br><br><b>Total Solving Time:<br/>325 minutes</b><br><br><b>Total Points: 3000 +<br/>Bonus + Base points</b> | <b>Round 1 – Familiar Foes</b>   | <b>60 min: 550 points</b> |
|  | <b>Round 2 – Deja Vu</b>         | <b>50 min: 450 points</b> |
|  | <b>Round 3 – Think Different</b> | <b>85 min: 800 points</b> |
|  | <b>Round 4 – Smart Casuals</b>   | <b>70 min: 650 points</b> |
|  | <b>Round 5 – Good Neighbours</b> | <b>60 min: 550 points</b> |

**About this document:**

These are the instructions for the 2020 Puzzle Ramayan + Indian Puzzle Championship Finals, organised by Logic Masters India. Any questions related to these instructions should be raised and discussed at

<http://logicmastersindia.com/forum/forums/thread-view.asp?tid=2721>

## **Schedule on 20<sup>th</sup> December 2020**

09:00 to 10:00 Round 1 – Familiar Foes  
10:15 to 11:05 Round 2 – Deja Vu  
11:20 to 12:45 Round 3 – Think Different  
12:45 to 14:30 Lunch break  
14:30 to 15:40 Round 4 – Smart Casuals  
15:55 to 16:55 Round 5 – Good Neighbours  
17:30 Announcement of Results

### **“Official” Round timings**

Indian participants must start the test during the below time window to be considered for official rankings.

**Round 1 – Familiar Foes – Must start between 09:00 to 09:15**

**Round 2 – Deja Vu – Must start between 10:15 to 10:30**

**Round 3 – Think Different – Must start between 11:20 to 11:35**

**Round 4 – Smart Casuals – Must start between 14:30 to 14:45**

**Round 5 – Good Neighbours – Must start between 15:55 to 16:10**

If a participant starts a round outside the above window, their results for those rounds shall be considered “unofficial”.

### **Authors & Test-Solvers:**

LMI thanks the authors and test solvers for their contributions to IPC 2020:

- Cedomir Milanovic (Serbia) – Author
- Craig Kasper (Canada) – Author
- Ivan Koswara (Indonesia) - Author
- Nikola Zivanovic (Serbia) – Author + Test-Solving
- Priyam Bhushan (India) – Author + Test-solving
- Rakesh Rai (India) - Author + Test-Solving
- Tawan Sunathvanichkul (Thailand) – Author
- Walker Anderson (USA) – Author + Test-Solving
  
- Bram De Laat (The Netherlands) – Test-Solving
- Branko Ceranic (Serbia) – Test-Solving
- Deyan Razsadov (Bulgaria) – Test-Solving
- Ken Endo (Japan) – Test-Solving
- Matej Uher (Slovakia) – Test-Solving
- Rob Vollmert (Germany) – Test-Solving
- Taus Brock-Nannestad (Denmark) – Test-Solving
- Wang Weifan (China) – Test-Solving
- Yanzhe Qiu (China) – Test-Solving
- Yuhei Kusui (Japan) – Test-Solving

## General Structure of the finals

There will be 5 rounds in the finals, of varying lengths and of varying points. Scores from each round, along with bonus if any, will be added up to the base points to determine the final score of the player. This score will be used for ranking in Indian Puzzle Championship 2020.

There will be a separate ranking after these rounds, based on PR eligibility, to determine the Puzzle Ramayan winner.

## How to participate?

- Download the password protected Puzzle booklet for each round. The Puzzle booklets contain the actual puzzles to be solved. It is password protected.
- You must participate in the contest during the “official” round timings on 20<sup>th</sup> December to be included in the official rankings.
- For each round, Click on “Start” button. At this time, password for pdf will be shown and timer will start.
- You can print the pdf and solve on paper. There shall be no online solving interface.
- **Each Puzzle will have an answer key and will be given after the rules. You need to enter the answer key details and click on submit button.**
- **If participants face any technical difficulty during submissions, they can email screenshots of answer keys for solved grids to [logicmasteradmin@gmail.com](mailto:logicmasteradmin@gmail.com) before their timer ends.**

## Scoring

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

## Instant Grading

This test uses instant grading in all five rounds, 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.

## Bonus

It is possible that some players may finish all puzzles in a round before the time allocated. A bonus of **10 points** for each full minute remaining will be awarded to any competitor who correctly solves every puzzle in a round.

## Tie Breaker

Ties will be broken using following rules:

- i) Maximum points in Round 3 (including bonus points in Round 3)
- ii) Maximum points in Round 2 (including bonus points in Round 2)
- iii) Maximum points in Round 5 (including bonus points in Round 5)
- iv) Maximum points in Round 1 (including bonus points in Round 1)
- v) Maximum points in Round 4 (including bonus points in Round 4)
- vi) Higher base point

## **PR Rules:**

The top “inexperienced” players will be ranked according to their scores, to determine the Puzzle Ramayan Winner. Ties will be broken using the above tie breaker rules.

## **Practice Materials**

The online rounds of Puzzle Ramayan will serve as great practice materials for the finals. You can access the puzzles at <http://logicmastersindia.com/lmitests/downloads.asp?testFilter=PR>

## **Prohibited Materials**

Any kind of external help from other persons, mobile, solvers, computers, etc is not allowed. If the organisers feel any kind of unfair means has been used, they can review/discard individual submissions.

## **Puzzle rules**

The remaining pages in this booklet explain the rules of the types that will appear in the finals..

## **Example Credits**

- Arithmetic Square, Letter Pairs, Tom Tom - WPF Puzzle GP 2020 - Round 2 (India) – <http://gp.worldpuzzle.org>
- Kurotto - WPF Puzzle GP 2020 - Round 5 (Hungary) – <http://gp.worldpuzzle.org>
- Top Heavy - WPF Puzzle GP 2019 - Round 3 (Serbia) – <http://gp.worldpuzzle.org>
- Sukoro - WPF Puzzle GP 2020 - Round 3 (Switzerland) – <http://gp.worldpuzzle.org>
- Fuzuli - WPF Puzzle GP 2019 - Round 5 (Poland) – <http://gp.worldpuzzle.org>
- Castle Wall - <http://puzzleparasite.blogspot.com>

## PR Eligibility and Base Points:

This year the competition is open to all.

Below is the tentative list of players who took part in the online episodes of Puzzle Ramayan 2020 and their base points, and eligibility for PR.

| NAME                      | ID              | BASE POINTS | PR ELIGIBILITY |
|---------------------------|-----------------|-------------|----------------|
| Prasanna Seshadri         | prasanna16391   | 139         | NO             |
| Rohan Rao                 | Vopani          | 123         | NO             |
| Ashish Kumar              | ashaash11ash    | 113         | NO             |
| Amit Sowani               | amitsowani      | 103         | NO             |
| Kishore Kumar             | kishy72         | 96          | NO             |
| Pranav Kamesh S           | pranavmanu      | 92          | NO             |
| Jaipal Reddy Mogiligundla | mjaipal         | 84          | NO             |
| Rajesh Kumar              | rajeshk         | 79          | NO             |
| Priyam Bhushan            | priyambhushan   | 77          | YES            |
| Swaroop Guggilam          | swaroop2011     | 74          | NO             |
| Harmeet Singh             | harmeet         | 60          | NO             |
| Lenson Andrade            | lenson          | 53          | YES            |
| Gaurav Kumar Jain         | gaurav.kjain    | 52          | YES            |
| Devarajan D               | devarajand      | 49          | YES            |
| Anubhav                   | ABcDexter       | 47          | YES            |
| Avinash                   | avinash175      | 46          | YES            |
| Sonu Sharma               | SN Sam          | 42          | YES            |
| Vishal                    | Vishal          | 38          | YES            |
| Sravani Sripada           | scampy          | 37          | YES            |
| Anurag                    | anurag          | 31          | YES            |
| R K Swarnakar             | RameshLMI       | 30          | YES            |
| Swagatam Islam Sarkar     | Swagatam        | 30          | YES            |
| Rajib                     | rajibrborah     | 25          | NO             |
| Arunesh Varade            | KyaFarkPadtaHai | 22          | YES            |
| Anithra P Janakiraman     | anithra         | 22          | YES            |
| Daniel Victor             | DanAvi          | 22          | YES            |
| Gayatri Phadnis           | GAYATRIP20      | 22          | YES            |
| Kartik Reddy              | mkartik         | 21          | YES            |
| Deepak Kumar              | dipkmr          | 20          | YES            |
| Jash Panchmatiya          | Jash            | 20          | YES            |
| Vivek Jain                | vjain9          | 19          | YES            |
| Anil Khosla               | khuski          | 18          | YES            |
| Anuj Shetty               | anuj42          | 16          | YES            |
| Samata                    | sam_hegde       | 16          | YES            |
| Kumaresan R               | Kumaresan R     | 15          | YES            |

| NAME                    | ID                   | BASE POINTS | PR ELIGIBILITY |
|-------------------------|----------------------|-------------|----------------|
| T. N. Venkatesh         | tnv                  | 14          | YES            |
| Harsh Poddar            | hpoddar08            | 14          | YES            |
| Sai Karthik Burra       | carburra             | 12          | YES            |
| Varun R                 | rvarun               | 12          | YES            |
| Aakarshan Gupta         | mugiwaaraLuffy       | 12          | YES            |
| Apurva                  | apurva101            | 11          | YES            |
| Vijaya Rajan            | vijaya_rajana        | 11          | YES            |
| Vishnu Nandakumaran     | vishnu97             | 11          | YES            |
| sumedha thakur          | sumedha234           | 11          | YES            |
| Aashimi Bhatia          | aashimii             | 9           | YES            |
| Anuradha Ganesh         | Anu G                | 8           | YES            |
| Afsal Salu              | Sal                  | 7           | YES            |
| Swati singh             | avni                 | 7           | YES            |
| Kshitiz Gagaj           | chotushang           | 7           | YES            |
| Aashish Ghogre          | ashishghogre         | 7           | YES            |
| Ayush Agrawal           | ayushagr             | 7           | YES            |
| Dhruvarajsinh Puwar     | dhruvarajsinhpuwar06 | 7           | YES            |
| nilesh gala             | nilesh22             | 6           | YES            |
| Amit Kumar Mallik       | Amit_IITB            | 6           | YES            |
| Madhav Sankaranarayanan | Madmahogany          | 6           | YES            |
| Saloni Singla           | Sally                | 6           | YES            |
| Anurag Mundra           | anurag30mnit         | 6           | YES            |
| Abhishek Chaudhary      | abhi265645           | 5           | YES            |
| Dhanush K P             | dhanushkp            | 5           | YES            |
| Ishita K                | ish4                 | 5           | YES            |
| Ritaban Datta           | Reetoo               | 5           | YES            |
| Priya Banthia           | Priya Banthia        | 5           | YES            |
| Prathamesh Baheti       | prathameshb          | 4           | YES            |
| Hamma Singh             | hamham               | 4           | YES            |
| Dinesh K Jain           | DKJ                  | 4           | YES            |
| N. Rengaswamy           | Renga                | 4           | YES            |
| Chirag                  | terekokya            | 4           | YES            |
| Tarush Garg             | tarushgarg           | 3           | YES            |
| Rajavel                 | rpmlrv               | 3           | YES            |
| Debapriyo               | DebLuck              | 3           | YES            |
| Mihir Yadav             | mihiryadav           | 3           | YES            |
| Nityant Agarwal         | Nityant              | 3           | YES            |
| Kelvin                  | Samurai#11           | 2           | YES            |
| Prabha Doshi            | prabhadoshi          | 2           | YES            |
| trisha                  | trisha               | 2           | YES            |
| Falak                   | fal_94               | 2           | YES            |

| <b>NAME</b>        | <b>ID</b>      | <b>BASE POINTS</b> | <b>PR ELIGIBILITY</b> |
|--------------------|----------------|--------------------|-----------------------|
| P. Mohan Prashanth | mohanprashanth | 2                  | YES                   |
| Sitanshu Sah       | sitaswag       | 2                  | YES                   |
| Prathima           | prathima.13    | 2                  | YES                   |
| Madhumathi Raman   | mathcrazy      | 2                  | YES                   |
| Vividh Bansal      | bansaviv       | 1                  | YES                   |
| Raman Malik        | Raman1         | 1                  | YES                   |
| Bathri Narayanan   | GBathri        | 1                  | YES                   |
| malika sikka       | malikasikka    | 1                  | YES                   |
| Rohit Prabhakar    | RoGeRrr        | 1                  | YES                   |
| Namrata Soni       | namratasoni    | 1                  | YES                   |

**List of IPC Winners (2015-2019)**

| <u>Year</u> | <u>1st</u>        | <u>2nd</u>   | <u>3rd</u>       |
|-------------|-------------------|--------------|------------------|
| 2019        | Prasanna Seshadri | Amit Sowani  | Rohan Rao        |
| 2018        | Prasanna Seshadri | Rohan Rao    | Amit Sowani      |
| 2017        | Rohan Rao         | Ashish Kumar | Rajesh Kumar     |
| 2016        | Amit Sowani       | Rohan Rao    | Rakesh Rai       |
| 2015        | Rohan Rao         | Amit Sowani  | Swaroop Guggilam |

**List of PR Winners (2016-2019)**

| <u>Year</u> | <u>1st</u>    | <u>2nd</u>     | <u>3rd</u>        |
|-------------|---------------|----------------|-------------------|
| 2019        | Pranav Kamesh | Priyam Bhushan | Gaurav Kumar Jain |
| 2018        | Pranav Kamesh | Vishal Jain    | Kartik Reddy      |
| 2017        | Ashish Kumar  | Varun R        | Lenson Andrade    |
| 2016        | Ashish Kumar  | Kishore Kumar  | Varun R           |

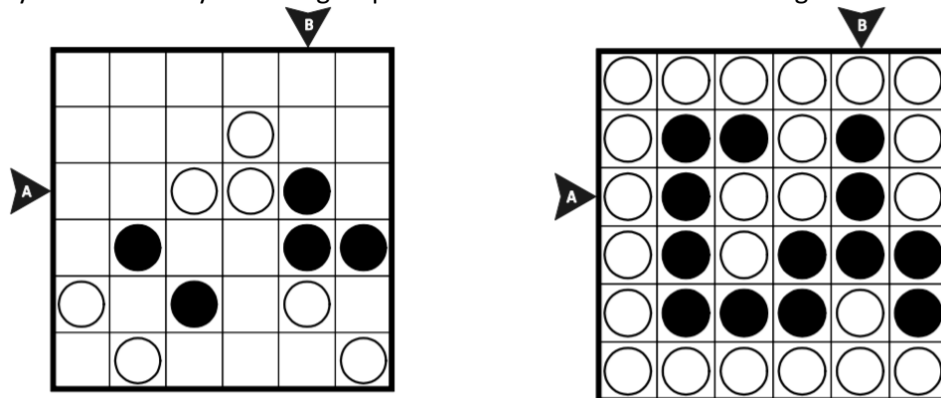


This round contains ten puzzle types from some of the categories that appeared in online rounds of Puzzle Ramayan 2020. These puzzle types were part of the online PR rounds.

| Category         | Puzzle Type   | Points     |
|------------------|---------------|------------|
| Classics         | Yin yang      | 20 points  |
| Evergreens       | Tents         | 25 points  |
| Object Placement | Battleships   | 35 points  |
| Shading          | Nurikabe      | 35 points  |
| Loops            | Yajilin       | 40 points  |
| Made in India    | Rassi Silai   | 55 points  |
| Number Placement | Ripple Effect | 55 points  |
| Regions          | Pentominous   | 75 points  |
| Classics         | Kakuro        | 100 points |
| Evergreens       | Magnets       | 110 points |

### 1. Yin Yang (20 points)

Place either a black or a white circle in each empty cell, so that the grid is divided into two areas of black and white. All circles of same colour should be connected to each other, vertically or horizontally. No 2X2 group of cells can contain circles of a single colour.



Answer Key: For each marked row/column, enter the lengths of continuous white and black circle blocks - from left to right / top to bottom.

Example: 11211, 132

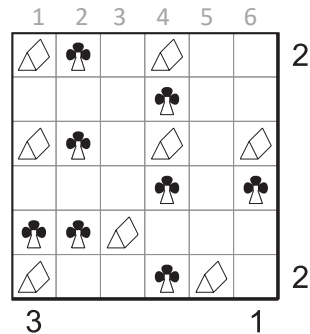
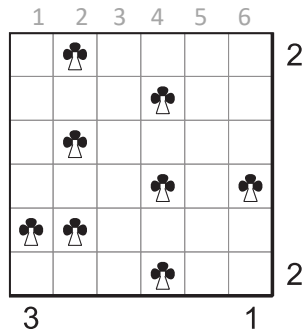
60 min

550 points

Familiar Foes

### 2. Tents (25 points)

Place one tent horizontally or vertically next to each tree. Tents do not touch each other, not even diagonally. The numbers outside the grid indicate the number of tents in that row or column.

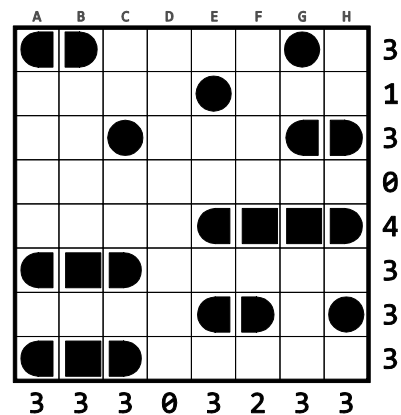
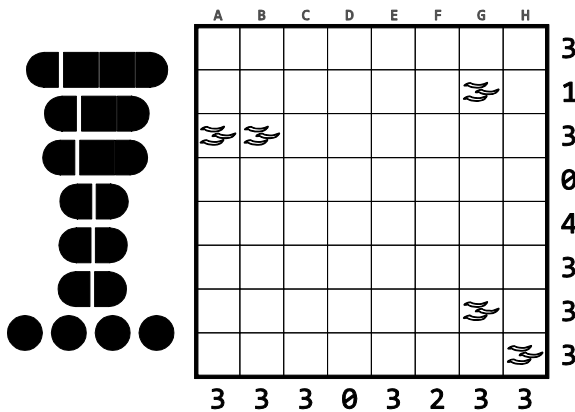


Answer Key: Enter the column number for the leftmost tent in each row, from top to bottom. Enter 0 if there are no tents in a row.

Example: 101031

### 3. Battleships (35 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.



Answer Key: Enter the coordinates of ships of size 1 from top bottom (and left to right within each row).

Example: G1E2C3H8

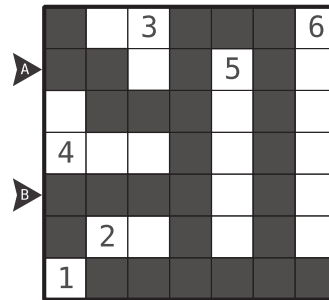
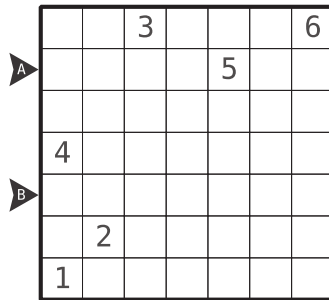
60 min

550 points

Familiar Foes

### 4. Nurikabe (35 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 2x2 group of cells can be entirely shaded black.

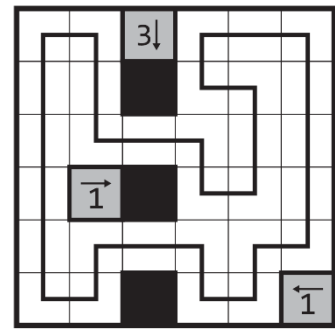
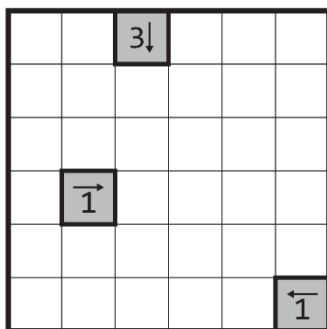


Answer Key: For each marked row/column, enter the lengths of continuous shaded and unshaded cells - from left to right / top to bottom

Example: 211111, 4111

### 5. Yajilin (40 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.



Answer Key: Enter the length of longest horizontal loop segment for each row from top to bottom. Enter 0 for a row, if there are no horizontal loop segments in that row.

Example: 212121

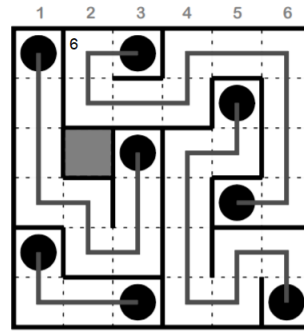
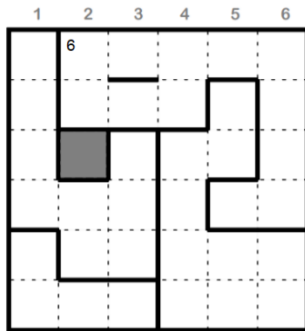
60 min

550 points

Familiar Foes

### 6. Rassi Silai (55 points)

Thread a rope in each region. A rope is a path that passes through all cells of the region, between two cells that are end-points. End-points do not touch each other, even diagonally, even across regions. Some bars are given within some regions; there cannot be a path between the two cells on both sides of the bar. Numbers inside regions indicate the number of turns in that region.

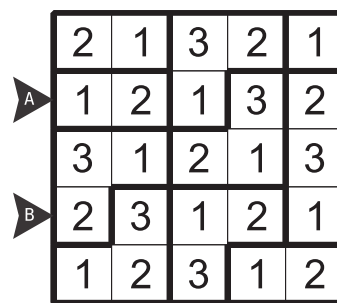
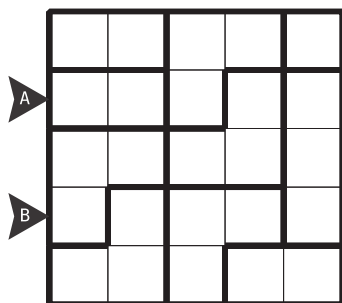


Answer Key: For each row, enter the column number of the leftmost end-point. Enter 0 if there are no end-points in a row.

Example: 153513

### 7. Ripple Effect (55 points)

Place digits 1 to N in each thickly outlined region, where N equals the size of the region. Same digits in the same row or column must be separated by at least a number of cells equal to that digit.



Answer Key: For each marked row (or column), enter the contents of the row (or column) from left to right (or top to bottom).

Example: 12132, 23121

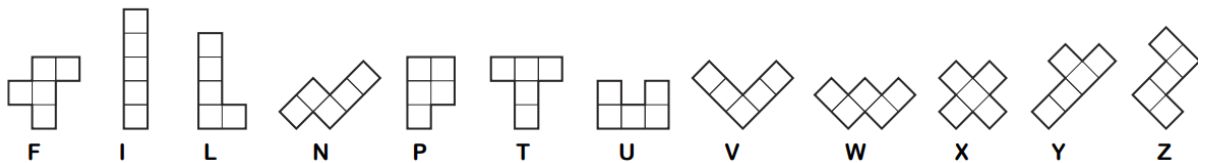
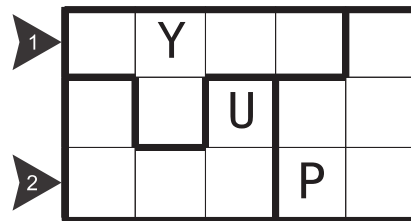
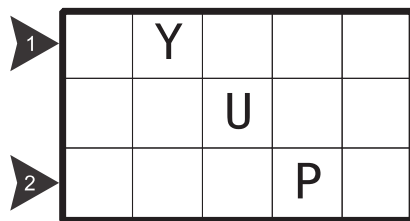
60 min

550 points

Familiar Foes

### 8. Pentominous (75 points)

Divide the grid into pentominoes so that no two pentominoes of the same shape (including rotations/reflections) share an edge. A cell with a letter in it must be part of the pentomino shape associated with that letter. An inventory of pentominoes is given below the puzzle but all shapes may or may not be used. Shaded cells will not be part of any pentominoes. All other cells must be part of a pentomino.

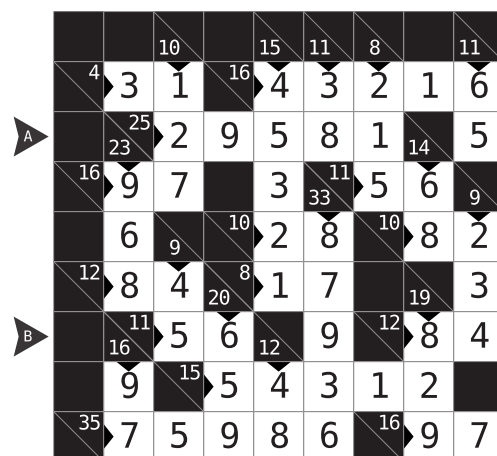
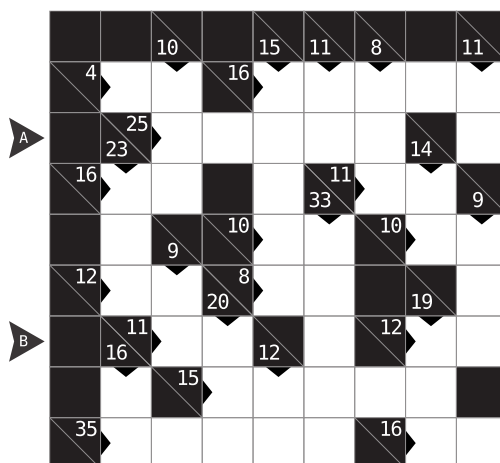


Answer Key: For each marked row or column, enter the letter of the pentomino to which each cell belongs (from left to right or top to bottom).

Example: YYYYP, UUUPP

### 9. Kakuro (100 points)

Fill in the white cells in the grid with digits from 1 to 9. The sum of digits in each horizontal / vertical group of cells is given on its left/top. Digits do not repeat within any set of consecutive white cells.



Answer Key: For each marked row (or column), enter the contents of the row (or column) from left to right (or top to bottom).

Example: 295815, 56984

60 min

550 points

Familiar Foes

### 10. Magnets (110 points)

The grid is made up of magnetic and non-magnetic plates. Each magnetic plate has 2 halves: positive (+) and negative (-). Halves with the same polarity cannot touch each other vertically / horizontally. The clues outside the grid indicate the number of magnetic halves with a particular polarity in each row/column. Not all outside clues may be given.

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   | 2 | 2 |
|   |   |   |   |   |   | 2 | 2 |
|   |   |   |   |   |   | 3 | 2 |
|   |   |   |   |   |   | 2 | 3 |
|   |   |   |   |   |   | 2 | 2 |
|   |   |   |   |   |   | 3 | 3 |
| 2 | 3 | 3 | 1 | 2 | 3 | + |   |
| 3 | 2 | 2 | 3 | 1 | 3 |   | - |

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   | 2 | 2 |
| - | + | - |   |   | + | 2 | 2 |
|   |   | + | - | + | - | 2 | 2 |
| - | + | - | + |   | + | 3 | 2 |
| + | - | + | - |   | - | 2 | 3 |
| - | + |   |   | - | + | 2 | 2 |
| + | - | + | - | + | - | 3 | 3 |
| 2 | 3 | 3 | 1 | 2 | 3 | + |   |
| 3 | 2 | 2 | 3 | 1 | 3 |   | - |

Answer Key: Enter the contents of marked rows/columns. Use + for positive plate, - for negative plate and X for non-magnetic plate. Alternatively, you can use P for positive plate, N for negative plate and X for non-magnetic plate.

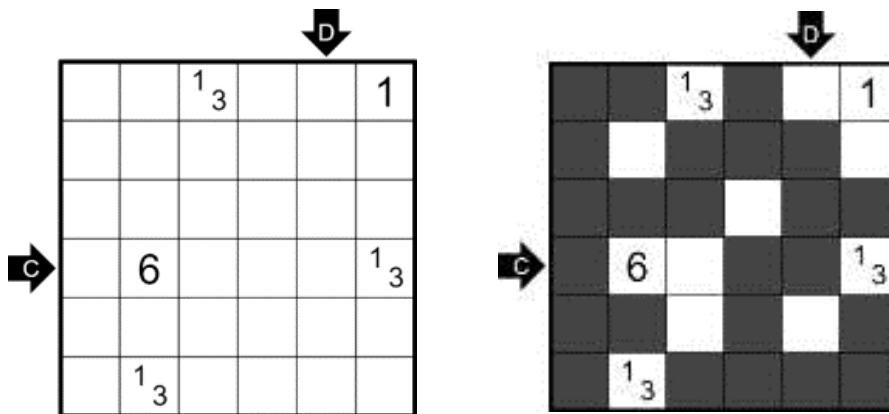
Example: --XX+,-X--+ OR NPNXXP,NXNPNP

This round contains ten puzzle types from some of the categories that appeared in online rounds of Puzzle Ramayan 2020. These puzzle types couldn't make it to the online PR rounds.

| Category         | Puzzle Type     | Points    |
|------------------|-----------------|-----------|
| Shading          | Tapa            | 20 points |
| Loops            | Masyu           | 20 points |
| Shading          | Cave            | 25 points |
| Area Division    | Spiral Galaxies | 35 points |
| Shading          | LITS            | 45 points |
| Area Division    | Fillomino       | 50 points |
| Loops            | Maxi Loop       | 55 points |
| Area Division    | Compass         | 60 points |
| Object Placement | Statue Park     | 70 points |
| Area Division    | Araf            | 70 points |

**1. Tapa (20 points)**

Paint some cells black to create a continuous wall. Number/s in a cell indicate the length of black cell blocks on its neighbouring cells. If there is more than one number in a cell, there must be at least one white cell between the black cell blocks. Painted cells cannot form a 2x2 square or larger. There are no wall segments on cells containing numbers.



Answer Key: For the marked rows/columns enter the lengths of contiguous shaded/unshaded cells.

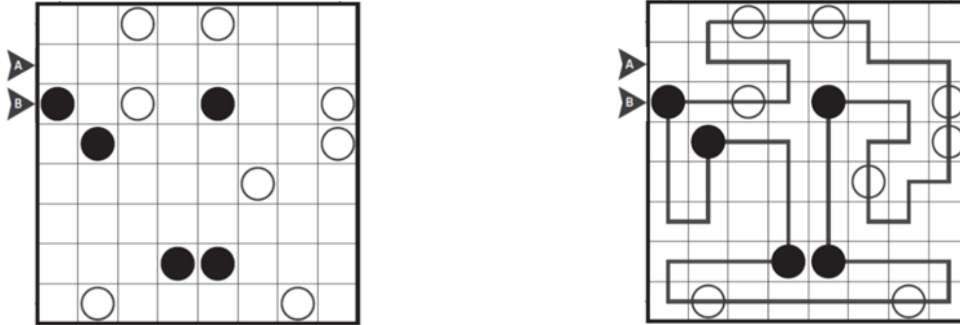
Example: 1221,1311

50 min

450 points

### 2. Masyu (20 points)

Draw a single, non-intersecting loop that passes through all circled cells. The loop must go straight through the cells with white circles, with a turn in at least one of the cells immediately before/after each white circle. The loop must make a turn in all the black circles, but must go straight in both cells immediately before/after each black circle.



Answer key: Enter the lengths of loop segments in the marked rows/columns, along the marked direction. Enter '0' if there are no line segments along the marked direction.

Example: 22, 32

### 3. Cave (25 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. 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.



Answer Key: For the marked rows/columns enter the lengths of contiguous shaded/unshaded cells.

Example: 24, 1113, 6, 11112

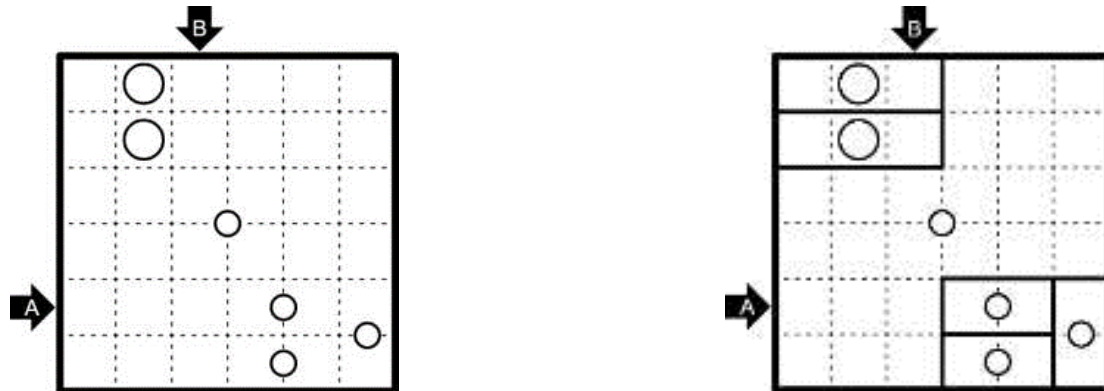


50 min

450 points

### 4. Spiral Galaxies (35 points)

Divide the grid into 180 degree symmetrical regions along the gridlines, so that each cell is part of exactly one region. Each region must contain exactly one circle, which represents the central symmetry point of the region. All circles are given. The Puzzle Booklet will contain black circles.

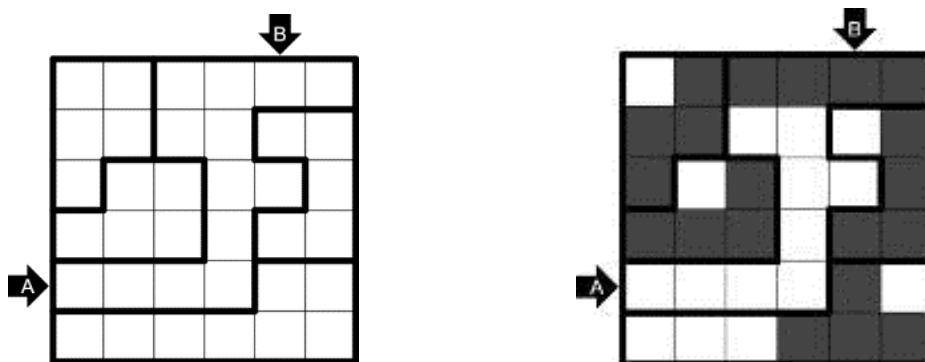


Answer Key: For the marked rows/columns, enter the number of consecutive cells in each region from left to right/top to bottom. Enter only the unit's digit for double digit numbers.

Example: 321, 114

### 5. LITS (45 points)

Shade exactly four connected cells in each outlined region, to form an L, I, T, or S tetromino, so that the following conditions are true: (1) All shaded cells are connected with each other; (2) No 2x2 group of cells can be entirely shaded black; (3) When two tetrominoes in adjacent regions share an edge, they must not be of the same type regardless of rotations or reflections.

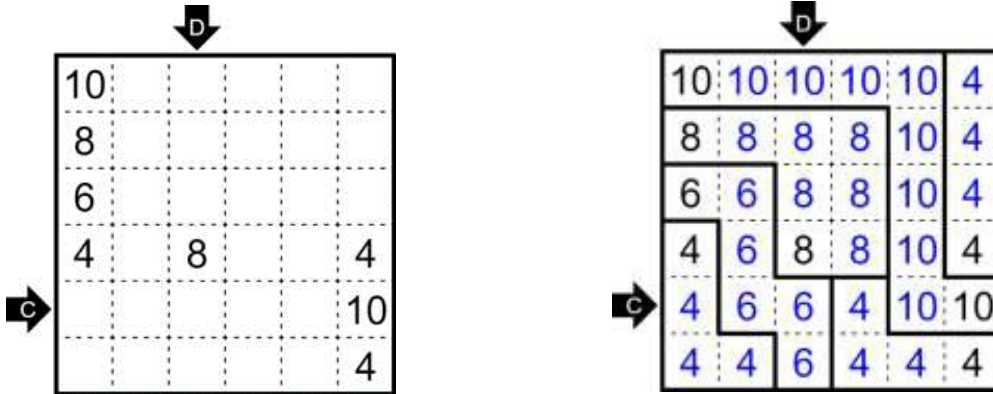


Answer Key: For the marked rows/columns enter the lengths of contiguous shaded/unshaded cells.

Example: 411, 123

6. **Fillomino (50 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.

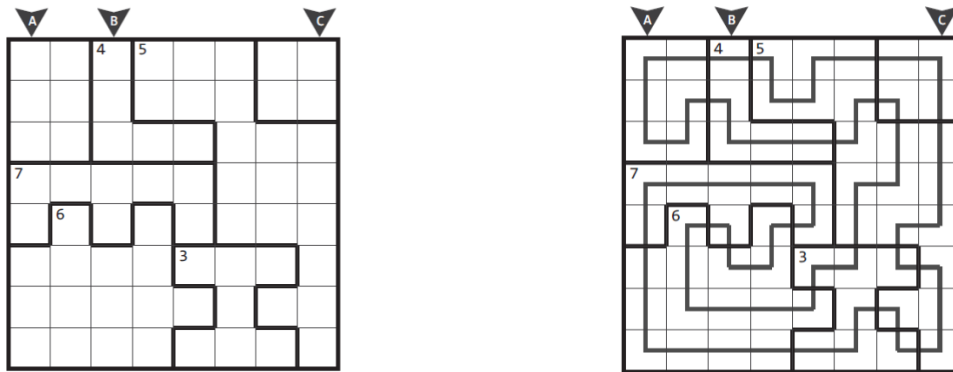


Answer Key: Enter the digits along marked arrows. Enter unit's digit only for two-digit regions.

Example: 466400,088866

7. **Maxi Loop (55 points)**

Draw a closed loop through all cells by connecting the centers horizontally and vertically. The loop can't cross or touch itself. The numbers in the boldly marked area indicate the highest number of cells that the loop goes through consecutively in that area.



Answer key: Enter the lengths of loop segments in the marked rows/columns, along the marked direction. Enter '0' if there are no line segments along the marked direction.

Example: 24,11,42

50 min

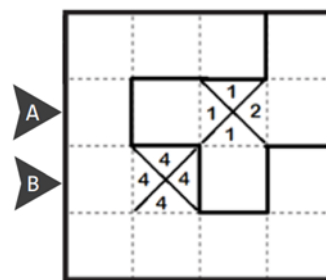
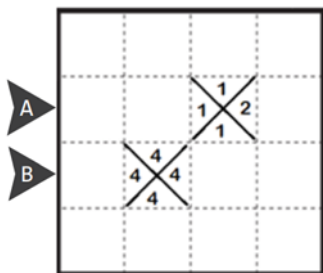
450 points

### 8. Compass (60 points)

Divide the grid along the dotted lines into regions (groups of cells connected orthogonally). Each cell must be in exactly one region, and each region must contain exactly one clue.



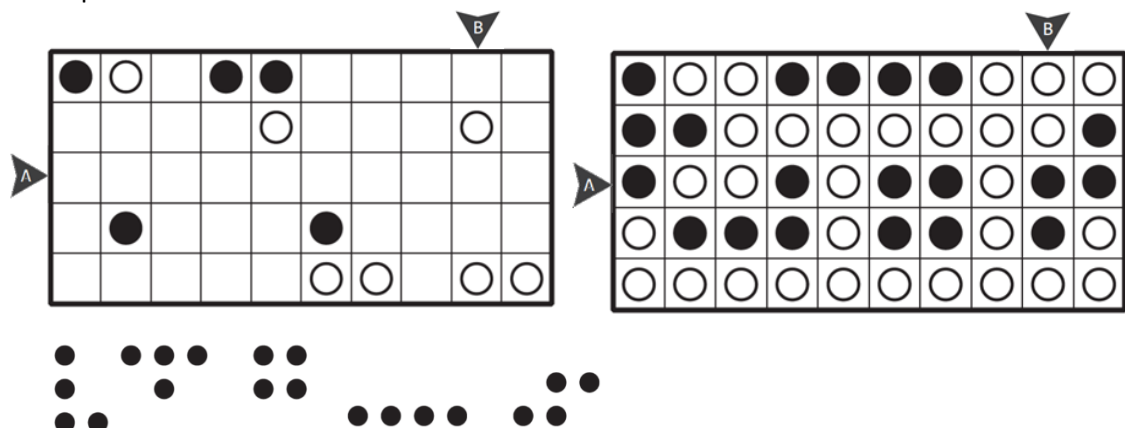
A clue cell is of the form as shown here. The number T denotes the number of cells of that clue's region located above the clue cell. The number B denotes the number of cells of that clue's region located below the clue cell. The number R denotes the number of cells of that clue's region located to the right of the clue cell. The number L denotes the number of cells of that clue's region located to the left of the clue cell. Not all clues may be given for each clue cell.



**Answer Key:** For the marked rows/columns, enter the number of consecutive cells in each region from left to right/top to bottom. Enter only the unit's digit for double digit numbers.  
Example: 13,211

### 9. Statue Park (70 points)

Place each of the shapes from the given bank into the grid, with rotations and reflections allowed. Shapes must be placed exactly as many times as they appear in the bank. No two shapes can overlap or touch each other by a side, and all of the space not occupied by shapes must form a single connected area. Black circles in the grid indicate cells that must be contained in one of the shapes, and white circles represent cells that must not be contained in a shape.

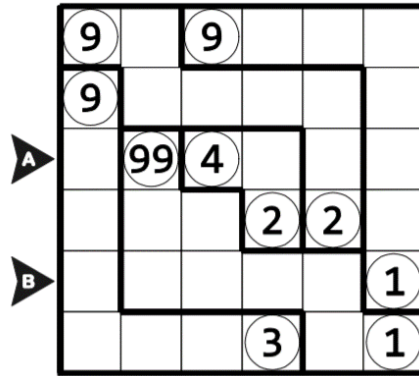
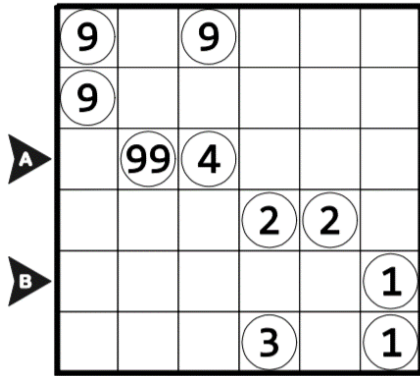


**Answer key:** For the marked rows/columns enter the lengths of contiguous black/white circles in that direction.

Example: 1211212, 221

10. Araf (70 points)

Divide the grid into some regions containing two circles each. Each cell of the grid is part of one region. Each region must have an area that is strictly between the numbers in the circles contained in it.



Answer Key: For the marked rows/columns, enter the number of consecutive cells in each region from left to right/top to bottom. Enter only the unit's digit for double digit numbers.

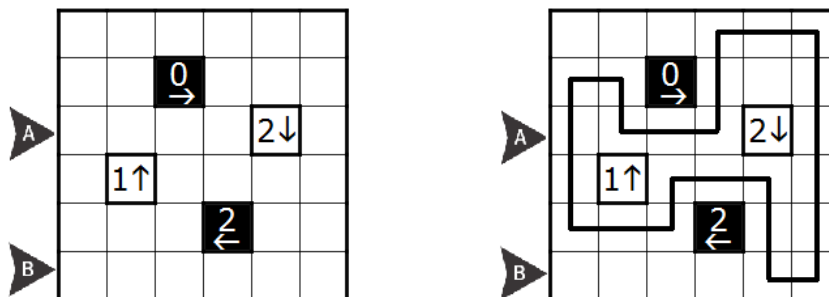
Example: 11211, 141

This round contains eleven assorted puzzle types, some of which are either well-known puzzle types or their variants, a few others have been encountered frequently recently, and there are some that have occurred very rarely in competitive contests.

| Puzzle Type           | Points     |
|-----------------------|------------|
| Castle Wall           | 30 points  |
| Sukoro                | 45 points  |
| Decryption            | 55 points  |
| Kurotto               | 55 points  |
| Doppelblock           | 55 points  |
| Double Chocolate      | 55 points  |
| Top Heavy             | 85 points  |
| Domino Search         | 105 points |
| Fuzuli                | 105 points |
| Aquarium              | 105 points |
| Products (Off by one) | 105 points |

### 1. Castle Wall (30 points)

Draw a single closed loop (without intersections or crossings) passing through some empty cells in the grid. The grid contains some bordered or colored cells that cannot be part of the loop. Black cells must be outside the loop; white cells (with heavy borders) must be inside the loop. Numbers and arrows refer to the total sum of the lengths of loop segments in the given direction.



Answer Key: Enter the length of horizontal loop segments in the marked rows (vertical loop segments in the marked columns). Enter 0 if there are no loop segments in a marked row/column.

Example: 2,1

## 2. Sukoro (45 points)

Fill some cells with a number from 1 to 4. All numbered cells must be orthogonally connected. Orthogonally adjacent cells cannot contain the same number. Each number must indicate the number of orthogonally adjacent numbered cells. Some numbers are given to you.

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| A |   |   |   |   |   |
|   | 2 |   |   | 3 |   |
| B |   |   |   |   |   |
|   |   | 4 | 1 |   |   |
|   |   |   |   |   | 1 |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| A | 1 |   |   |   |   |
|   | 2 | 3 | 2 | 3 | 2 |
| B |   | 2 |   | 2 | 3 |
|   | 1 | 4 | 1 |   | 2 |
|   |   | 1 |   |   | 1 |

Answer Key: For each marked row (or column), enter the contents of the row (or column) from left to right (or top to bottom). Use X for empty cells.

Example: 1XXXX, X2X23

## 3. Decryption (55 points)

Replace the given letters with numbers from 0 to 9 (0 to 5 in the example) such that the results of the operations are correct. Same letter should always be replaced by the same number, and different letter should always be replaced by a different number. A multi-digit number cannot start with zero.

$$TH = I \times S$$

$$I = S - A$$

$$T \times E = S - T$$

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| A | E | I | H | S | T |
|   |   |   |   |   |   |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| A | E | I | H | S | T |
| 3 | 4 | 2 | 0 | 5 | 1 |

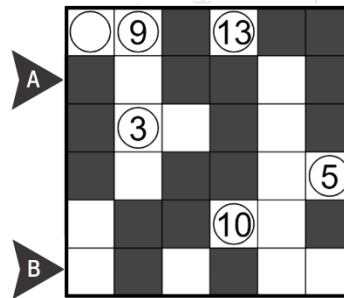
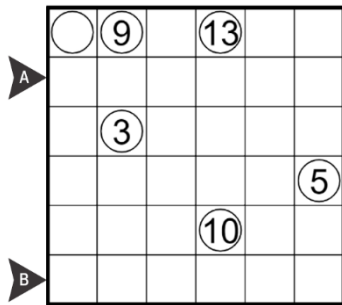
(+ denotes addition, - denotes subtraction, x denotes multiplication and / denotes division)

Answer Key: Enter the numbers for the given letters in the table from left to right.

Example: 342051

4. Kurotto (55 points)

Shade some empty (non-circled) cells black (leaving the other cells white) so that the grid is divided into non-overlapping regions; cells of the same colour are considered in the same region if they are adjacent along edges. For each given number, the total size of all black regions orthogonally adjacent to that number must match the number.

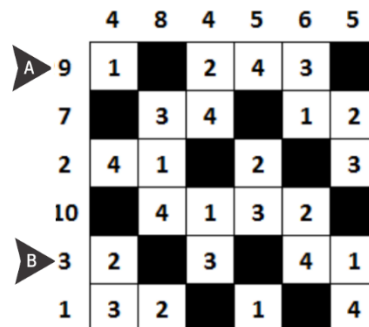
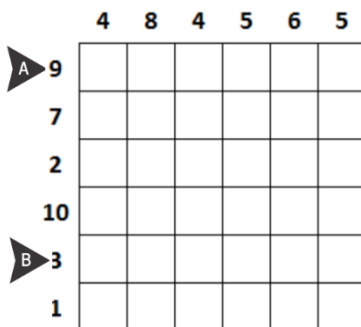


Answer Key: Enter the length of continuous areas of shaded and unshaded cells in the marked rows/columns.

Example: 11211, 11112

5. Doppelblock (55 points)

Colour 2 squares black in every row and column. Fill the remaining white squares with the digits 1~N, so that each digit appears once in every row and column. N equals the size of the grid minus 2. The numbers on the outside indicate the sum of the digits in between the 2 black squares in that row or column.



Answer Key: For each marked row (or column), enter the contents of the row (or column) from left to right (or top to bottom). Use X for black cells.

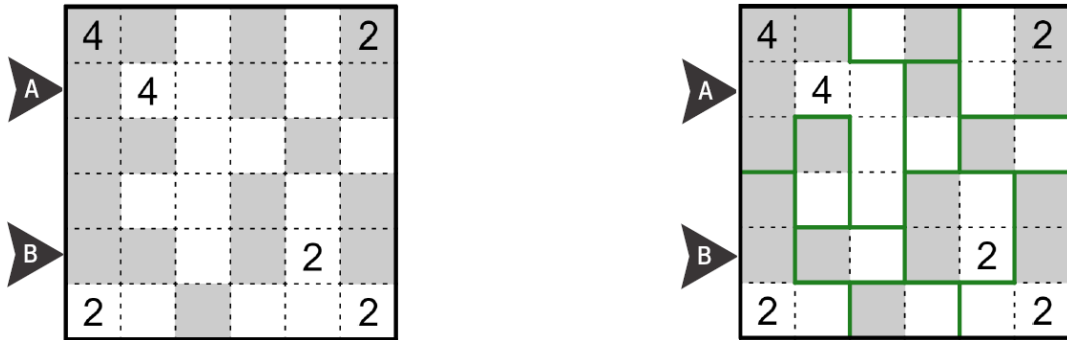
Example: 1X243X, 2X3X41

85 min

800 points

### 6. Double Chocolate (55 points)

Divide the grid into regions along cell boundaries. Each region must contain one connected group of light cells, and one connected group of dark cells. These groups must be the same shape, but may be rotated and/or reflected. Numbers inside a cell indicate the number of cells in the single-colored shape they are contained in.



Answer Key: Enter the length of cells in different regions in the marked rows/columns.

Example: 312,1221

### 7. Top Heavy (85 points)

Place numbers into some cells so that each number in the provided range (1-3 for the example) appears exactly once in each row and column. Cells may remain empty. A cell cannot contain more than one number. Some numbers are already given for you. Some cells are marked with an 'X'; you may not put a number in those cells. If two cells touch vertically, the number on top must be greater than the number on the bottom.



Answer Key: For each marked row (or column), enter the contents of the row (or column) from left to right (or top to bottom). Use X for cells without a number.

Example: 1X32X, 2X1X3



**8. Domino Search (105 points)**

Divide the grid into a full set of dominoes. Each domino should be used exactly once. The orientation of the letters does not matter. Empty cells are not part of a domino. A checklist of the full set is provided for your convenience.

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
|   | 0 | 0 | 4 | 2 | 2 | 3 |
| A | 0 | 1 | 2 | 3 | 4 | 4 |
|   | 1 | 2 | 1 | 3 | 2 | 1 |
| B | 3 | 0 | 0 | 2 | 3 | 4 |
|   | 0 | 3 | 1 | 1 | 4 | 4 |

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 2 | 3 |
| 0 | 1 | 1 | 2 | 2 | 4 |
| 0 | 2 | 1 | 3 | 3 | 3 |
| 0 | 3 | 1 | 4 | 3 | 4 |
| 0 | 4 | 2 | 2 | 4 | 4 |

|   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|
|   | 0 | 0 | 4 | 2 | 2 | 3 |
| A | 0 | 1 | 2 | 3 | 4 | 4 |
|   | 1 | 2 | 1 | 3 | 2 | 1 |
| B | 3 | 0 | 0 | 2 | 3 | 4 |
|   | 0 | 3 | 1 | 1 | 4 | 4 |

Answer Key: For each marked row (or column), enter the contents of the row (or column) from left to right (or top to bottom). Use H for horizontal domino and V for vertical domino.

Example: VHHVVV, VVVHHV

**9. Fuzuli (105 points)**

Place numbers from the given range (1-3 for the example) into some cells, no more than one number per cell, so that each number appears exactly once in each row and column. No 2x2 group of cells can be entirely filled with numbers.

|   |   |   |  |   |   |
|---|---|---|--|---|---|
| A |   |   |  |   | 3 |
|   |   | 1 |  | 2 |   |
| B |   |   |  |   |   |
|   | 1 | 2 |  |   |   |
|   |   |   |  | 3 |   |

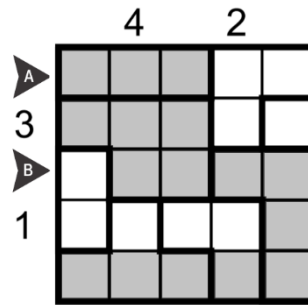
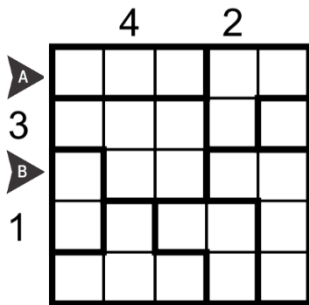
|   |   |   |   |   |   |
|---|---|---|---|---|---|
| A | 2 |   | 1 |   | 3 |
|   | 3 | 1 |   | 2 |   |
| B |   | 3 |   | 1 | 2 |
|   | 1 | 2 | 3 |   |   |
|   |   |   | 2 | 3 | 1 |

Answer Key: For each marked row (or column), enter the contents of the row (or column) from left to right (or top to bottom). Use X for empty cells.

Example: 2X1X3, X3X12

**10. Aquarium (105 points)**

Fill some cells with water so that the numbers at the borders indicate how many cells in the corresponding row or column contain water. Within an area, the cells must be filled up from the bottom up. Within a row of an area, all cells must always be filled with water or none (even if there are other areas in between).

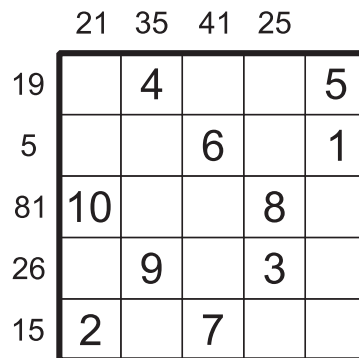
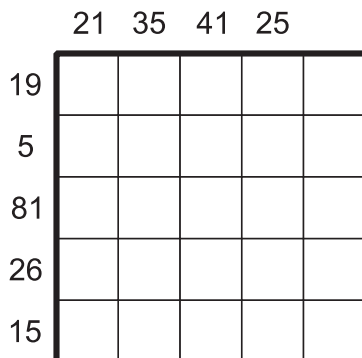


Answer Key: Enter the length of continuous areas of water and non-water cells in the marked rows/columns.

Example: 32,14

**11. Products (Off by one) (105 points)**

Place the specified list of numbers (1-10 for the example) into some cells so that each number is in exactly one cell, and no cell has more than one number. (Most cells will remain empty). Each row and each column must contain exactly two numbers. Numbers outside the grid, when given, are 1 more or 1 less than the product of the two numbers in that row or column.



Answer Key: Enter all the numbers from top to bottom, and left to right for each row. Enter only the one's digit for two-digit numbers.

Example: 4561089327

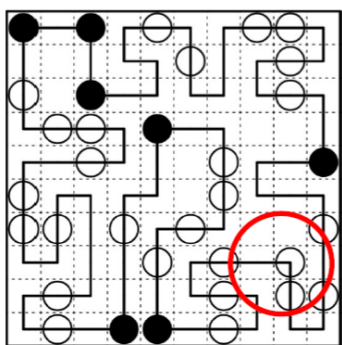
This round contains eleven puzzle types, which can be classified as visual, casual, basic arithmetic, word and intuitive types. Some of the types are known types while others are new types.

| Puzzle Type        | Points     |
|--------------------|------------|
| Mark My Puzzles    | 20 points  |
| Tom Tom            | 20 points  |
| Banners            | 25 points  |
| Letter Weights     | 35 points  |
| Arithmetic Square  | 45 points  |
| Tote Bag           | 50 points  |
| Three Steps        | 55 points  |
| Curve Data         | 55 points  |
| Meteor Shower      | 85 points  |
| Numerical Jigsaw 1 | 40 points  |
| Numerical Jigsaw 2 | 100 points |
| IPC Criss-Cross    | 120 points |

## 1. Mark My Puzzles (20 points)

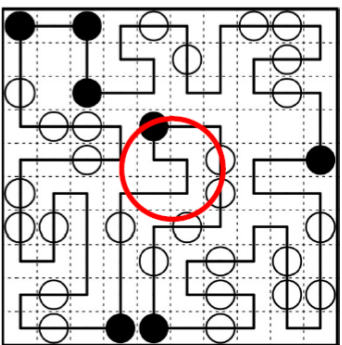
Let us take a break from solving, and mark papers instead! For each given puzzle solution, mark whether the solution/answer is correct or incorrect. The puzzle types that will be used are LITS, Masyu, Nurikabe. The below examples are for Masyu.

Please refer to the earlier rounds for the rules of these puzzle types.



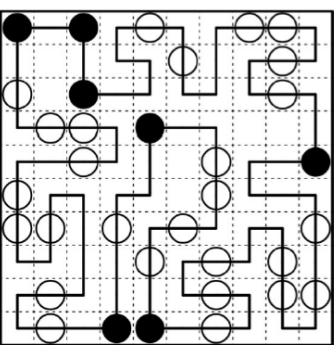
CORRECT

INCORRECT



CORRECT

INCORRECT



CORRECT

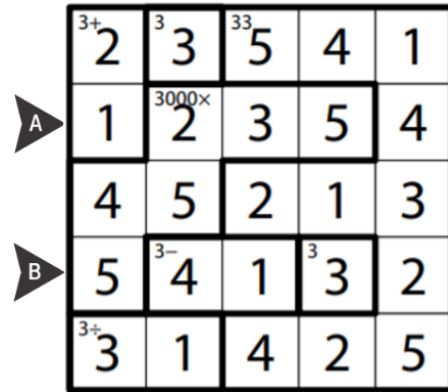
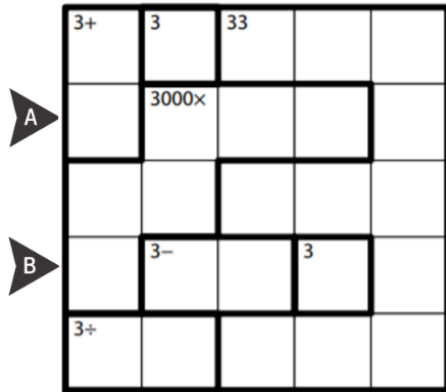
INCORRECT

Answer Key: Enter C if puzzle is correct, and I if puzzle is incorrect.

Example: IIC

**2. Tom Tom (20 points)**

Insert a digit from 1 to N into each cell in the N by N grid so that no digit repeats in any row or column. Also, the number in the upper-left corner of each bold cage indicates the value of a mathematical operation (addition, subtraction, multiplication, division) applied successively to all digits in the cage, starting with the largest digit for subtraction and division (e.g. 1,2,4 with subtraction is a 1- clue as  $4-2-1 = 1$ ). The operation may or may not be given in the cage, but at least one of the four operations must apply. Digits can repeat within a cage.



Answer Key: For each marked row (or column), enter the contents of the row (or column) from left to right (or top to bottom).

Example: 12354, 54132

**3. Banners (25points)**

Several banners have been obscured and possibly reflected. Figure out which of the listed words belongs to which banner. All listed words appear exactly once each.



- DOLL = 3**
- FLAG = 4**
- FROG = 2**
- GOLF = 1**

Answer Key: Enter the banner numbers for the given words from top to bottom. Use the one's digit for two-digit numbers.

Example: 3421

**70 min**

**650 points**

**4. Letter Weights (35 points)**

Write a number under each letter so that the numbers corresponding to the letters in each given word have the given sum. Different letters must correspond to different numbers. The range of allowed numbers is given below the puzzle.

|   |   |   |   |   |
|---|---|---|---|---|
| A | B | C | D | E |
|   |   |   |   |   |

|   |   |   |   |   |
|---|---|---|---|---|
| A | B | C | D | E |
| 2 | 5 | 4 | 3 | 1 |

Numbers:      1    2    3    4    5

CAB = 11  
BEE = 7  
ABE = 8

Answer Key: Enter the numbers for the letters from left to right.

Example: 25431

**5. Arithmetic Square (45 points)**

Place each digit from 1 through 9 into the white boxes (a different digit per box) so that the indicated equations or relations are correct when evaluating from left to right or top to bottom (ignore the usual order of operations).

$$\begin{array}{r} \square + \square + \square > 23 \\ + \quad - \quad + \\ \square \times \square \div \square = 8 \\ \times \quad \times \quad - \\ \square \times \square + \square = 11 \\ = \quad = \quad = \\ 75 \quad 8 \quad 9 \end{array}$$

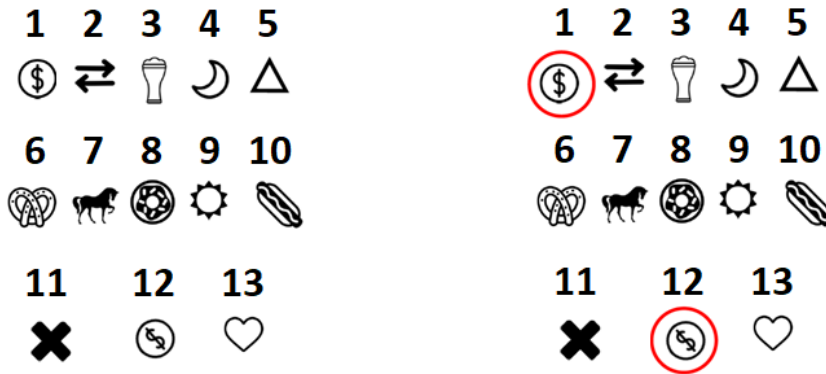
$$\begin{array}{r} \square 9 + \square 8 + \square 7 > 23 \\ + \quad - \quad + \\ \square 6 \times \square 4 \div \square 3 = 8 \\ \times \quad \times \quad - \\ \square 5 \times \square 2 + \square 1 = 11 \\ = \quad = \quad = \\ 75 \quad 8 \quad 9 \end{array}$$

Answer Key: Enter the numbers in the boxes from top to bottom, and left to right for each row.

Example: 987643521

6. Tote Bag (50 points)

Find the two identical pictures. Differences will be reasonably clear and will not be due to colour, gradient or pixelation. Ignore rotations of pictures when comparing. The pictures are numbered. This information is used for the answer key, and can be ignored when comparing.

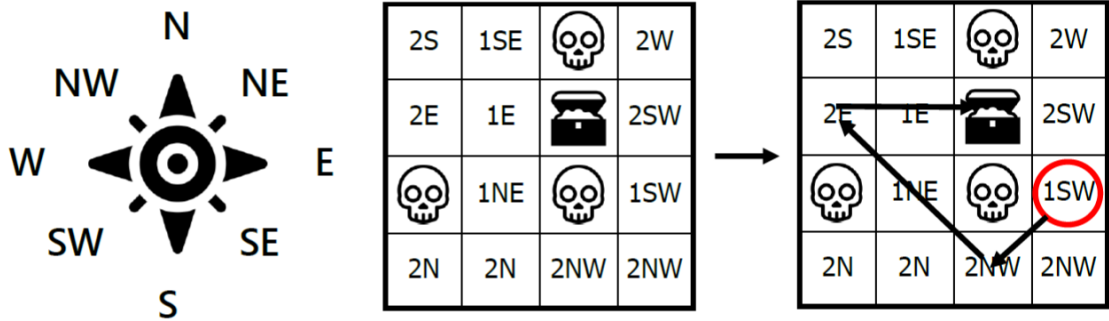


Answer Key: Enter the picture numbers of the two identical pictures in an increasing order.

Example: 112

7. Three Steps (55 points)

Find the starting cell, such that, if the directions on the cell are followed, you will reach the treasure in exactly three steps. The correct path will NOT pass through any skulls.

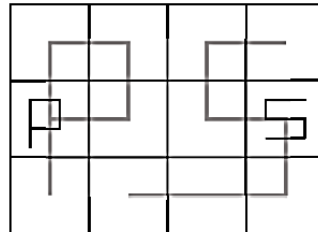
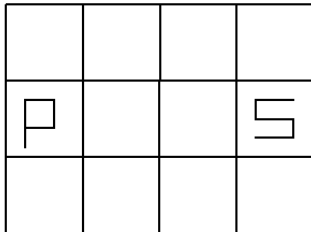


Answer Key: Enter the three coordinates in sequence.

Example: 1SW,2NW,2E

8. **Curve Data (55 points)**

Make some figures by drawing lines through the centre of cells so that each figure goes through just one clue. All cells are visited by lines. A clue shows how the line passing through it turns and connects with itself, without any rotation or reflection. However, the clue does not specify length of each straight segment of the line in any way - the lengths of straight segments may vary, but must not be 0.

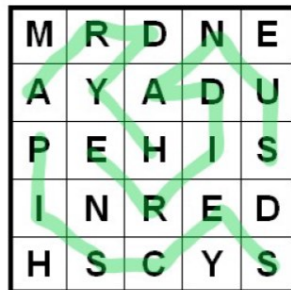


Answer Key: Enter the length of the longest vertical segment for each column from left to right. Enter 0 if there are no vertical segments in a column.

Example: 2111

9. **Meteor Shower (85 points)**

Find all listed words in the grid. The words will be found in a snake-like shape. This means that it won't be found in a straight line. All words will turn at each step, and will never share letters or cross paths with other words.



ERIDANUS  
HYDRA  
PISCES



Invalid examples:

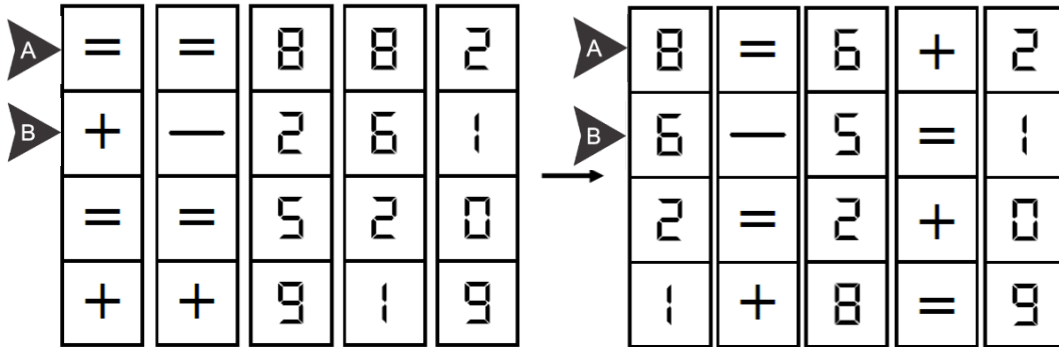
- Path cannot go straight, must always turn
- Paths cannot cross each other

Answer Key: Enter all the unused letters from top to bottom, and from left to right for each row.

Example: MENDHY

10. Numerical Jigsaw (40+100 points)

Rotate and rearrange the given vertical strips so that they form four valid equations. Operations are done from left to right. Reflection is NOT allowed.

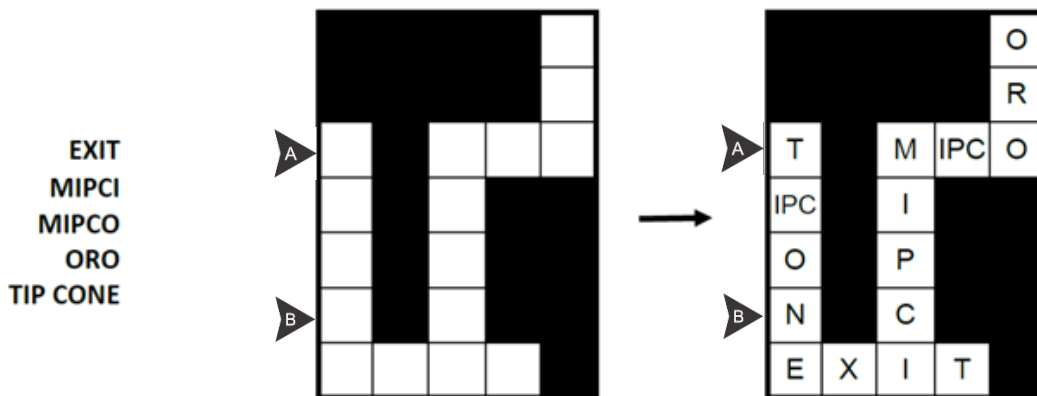


Answer Key: Enter all the characters (numbers and operators) in the marked rows from left to right. **If there is a division symbol, use /.**

Example: 8=6+2, 6-5=1

11. IPC Criss Cross (120 points)

Fill in the listed words into the criss-cross, one letter per box, so that each word is read from top to bottom or left to right. A consecutive string of I-P-C may sometimes be compressed into a single box.



Answer Key: Enter all the letters appearing in the marked rows from left to right

Example: TMIPCO, NC



# puzzle Ramayah

60 min

550 points

Round 5  
Good Neighbours

This round consists entirely of puzzles which have areas of two existing compatible puzzle types (neighbours) combined in a single grid. Each puzzle has a single solution satisfying all of the constraints of each area, as well as the global constraints shared by both puzzle types.

For each puzzle, the areas of the two puzzle types are adjacent to each other and part of a larger single puzzle, and there will be interactions between areas of each type.

The round contains six puzzles, two for each of the hybrids listed below.

| Puzzle Types              | Points     |
|---------------------------|------------|
| Railroad Tracks - Masyu 1 | 50 points  |
| Railroad Tracks - Masyu 2 | 100 points |
| Ayeheya - YajiKazu 1      | 70 points  |
| Ayeheya - YajiKazu 2      | 100 points |
| Tapa - Nurikabe 1         | 75 points  |
| Tapa - Nurikabe 2         | 155 points |

**1-2 Railroad Tracks - Masyu (50 + 100 points)**

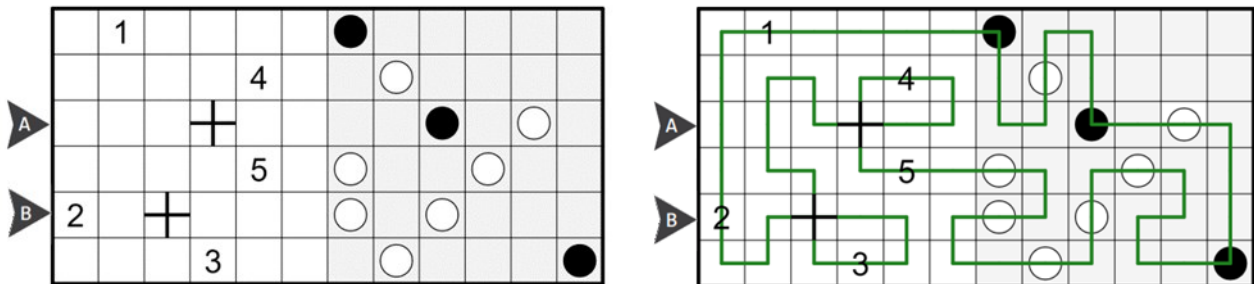
The solution to the entire puzzle will contain a single closed loop. Traversing the loop in the correct direction starting from 1 will traverse all of the numbers in ascending order.

In any **Railroad Tracks area** of the grid, every grid cell must be part of the loop; the path may only cross itself in the grid cells where a crossing is already in place; and the path cannot turn when it passes through any of the numbers (stations).

In any **Masyu area** of the grid, the path may not cross itself; the path must not turn when it passes through a black pearl and must travel to at least the second grid cell beyond the pearl before turning again; and the path may not turn when travelling through a white pearl but must turn in the grid cell immediately before it passes through the white pearl and/or the grid cell it passes through immediately after.

**Any Masyu area of the puzzle will have a light gray background color.**

Example-



(Light gray shading in right half of the grid)

Answer Key: Enter the lengths of loop segments in the marked rows/columns, along the marked direction. Enter '0' if there are no line segments along the marked direction.

Example: 313, 321

60 min

550 points

**Round 5**  
**Good Neighbours**

### 3-4 Ayeheya – YajiKazu (70 + 100 points)

The solution to the entire puzzle will contain a set of shaded grid cells which are neither horizontally nor vertically adjacent to each other. The grid cells which are not shaded will form a single horizontally and vertically interconnected group.

In any **Ayeheya area** of the grid, specific areas of the grid will have borders (marked with heavier lines than the grid lines). Shaded grid cells within a specific bordered area must be placed in rotationally symmetric positions within that bordered area, and if the bordered area contains a number in the upper left, the area must contain precisely that many shaded grid cells.

In addition to this, the uninterrupted group of unshaded grid cells in a row or column which an Ayeheya cell is a part of can cross a maximum of one border. Borders, for the purposes of this rule, include all borders between Ayeheya areas of the grid and Yajisan-Kazusan areas of the grid.

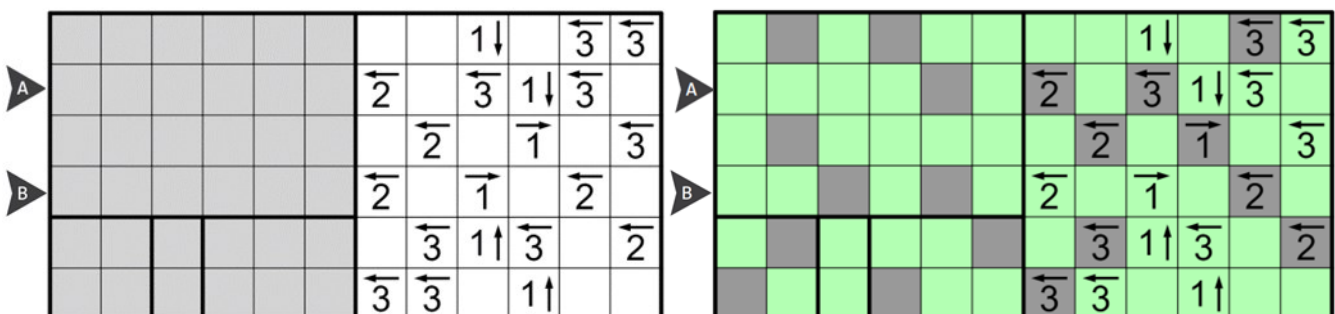
In any **Yajisan-Kazusan (Yajikazu)** area of the grid, some of the grid cells will have a number and an arrow in them.

If a grid cell contains a number and arrow, and that grid cell is unshaded, then the number of shaded cells pointed at by the arrow, including any shaded cells in the Ayeheya areas, must be equal to the number in that grid cell.

If a grid cell contains a number and arrow, and that grid cell is shaded, then the number of shaded cells pointed at by the arrow, including any shaded cells in the Ayeheya areas, may or may not be equal to the number in that grid cell.

**Any Ayeheya area of the puzzle will have a light gray background color.**

Example-



(Light gray shading in left half of the grid)

**Answer Key:** For the marked rows/columns enter the lengths of contiguous shaded/unshaded cells.

Example: 4111113, 2111511

## 5-6 Tapa - Nurikabe (75 + 155 points)

The solution to the entire puzzle will contain a single group of shaded grid cells interconnected with each other by horizontal and vertical adjacency, in which no set of four grid cells which share a corner is completely shaded. Grid cells which contain numbers cannot be shaded.

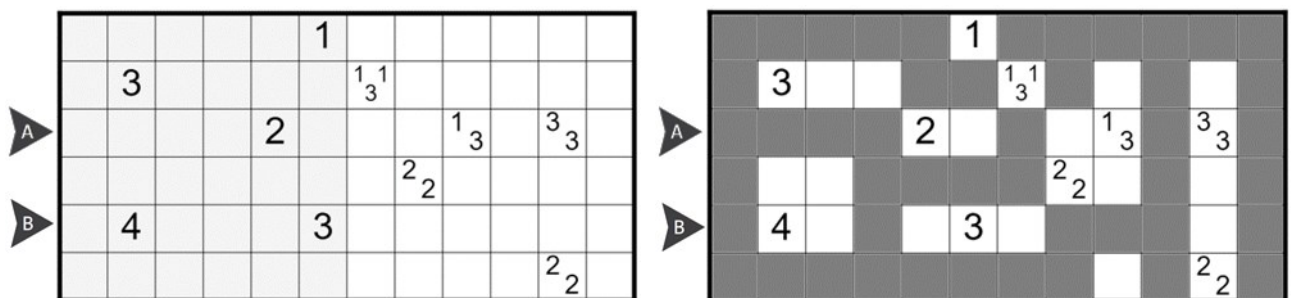
In any **Tapa area** of the grid, the number(s) in any numbered grid cells describe the contents of the squares immediately surrounding the numbered grid cell (and only those cells). Numbers in a numbered grid cell will be listed in ascending order and correspond to the areas of connected shaded cells in the eight squares surrounding the numbered grid cell. If a numbered grid cell contains the number 0, none of the squares surrounding the numbered cell are shaded.

In any **Nurikabe area** of the grid, any unshaded grid cell is part of a group of one or more unshaded connected grid cells which contains exactly one numbered cell, which is equal to the area in grid cells of the group. (These unshaded connected grid cells are referred to as islands) All grid cells in the group must be interconnected via horizontal or vertical adjacency only.

**Nurikabe islands can extend into Tapa areas, and the sole numbered cell for the island may be a Tapa clue.**

**Any Nurikabe area of the puzzle will have a light gray background color.**

Example:



(Light gray shading in left half of the grid)

Answer Key: For the marked rows/columns enter the lengths of contiguous shaded/unshaded cells.

Example: 4212111, 1213311



There shall be no playoffs this year.

The final scores among the eligible participants after five rounds, including base points and bonus points, shall be used to determine the PR Winners.

Ties will be broken using following rules:

- i) Maximum points in Round 3 (including bonus points in Round 3)
- ii) Maximum points in Round 2 (including bonus points in Round 2)
- iii) Maximum points in Round 5 (including bonus points in Round 5)
- iv) Maximum points in Round 1 (including bonus points in Round 1)
- v) Maximum points in Round 4 (including bonus points in Round 4)
- vi) Higher base points