
31st World Puzzle Championship

# Rules & Puzzle Instructions

Version 2.1 (last updated 2024/10/14)

WORLD PUZZLE FEDERATION

北京市数独运动协会

31st World Puzzle Championship

# Competition Schedule

## Day 1 (Thursday, 17th October)

*Morning — Assorted Puzzles*

| | | | |
|---|---|---|---|
| 09:00 — 09:35 | Individual Round 01: Welcome | 35 min | **350** pts |
| 09:45 — 10:25 | Individual Round 02: Classic Dozen | 40 min | **400** pts |
| 10:40 — 11:25 | Individual Round 03: Miscellaneous | 45 min | **450** pts |
| 11:40 — 12:30 | Individual Round 04: Puzzle Chain | 50 min | **500** pts |

*Afternoon — Cultural Themes*

| | | | |
|---|---|---|---|
| 14:00 — 14:40 | Individual Round 05: Elemental Cycles | 40 min | **400** pts |
| 14:55 — 16:40 | Individual Round 06: Solar Terms | 105 min | **1050** pts |
| 17:00 — 18:00 | Individual Round 07: Duality | 60 min | **600** pts |

## Day 2 (Friday, 18th October)

*Morning — Uncommon Puzzles*

| | | | |
|---|---|---|---|
| 09:00 — 10:00 | Individual Round 08: Eleven Years Later | 60 min | **600** pts |
| 10:15 — 11:15 | Individual Round 09: Variants | 60 min | **600** pts |
| 11:30 — 12:30 | Individual Round 10: Irregular | 60 min | **600** pts |

*Afternoon — Special Themes*

| | | | |
|---|---|---|---|
| 14:00 — 14:20 | Individual Round 11: Little Happiness | 20 min | **200** pts |
| 14:30 — 15:35 | Individual Round 12: Quadruple Happiness | 65 min | **650** pts |
| 15:55 — 16:55 | Individual Round 13: Secret Symmetry | 60 min | **600** pts |
| 17:10 — 18:00 | Individual Round 14: Brain Power | 50 min | **1000** pts |

## Day 3 (Saturday, 19th October)

*Morning — Teamwork Time*

| | | | |
|---|---|---|---|
| 09:00 — 09:50 | Team Round A: Chinese Knot | 50 min | **4000** pts |
| 10:05 — 11:15 | Team Round B: Octahedron | 70 min | **5600** pts |
| 11:30 — 12:30 | Team Round C: Reunion | 60 min | **4800** pts |

*Afternoon — Grand Finale*

| | | | |
|---|---|---|---|
| 14:00 — 15:10 | Team Round D: Marathon | 70 min | **5600** pts |
| 15:30 — 17:00 | Individual Rounds X/Y/Z: Playoffs | 90 min | **Champion** |

# Competition Overview

## Individual Competition

There are 14 “preliminary” individual rounds over the course of the first two days, numbered 01~14. The rounds are grouped into four half-days, each with a vague overarching theme.

The top 10 official players (A-team members or players from countries with less than 4 players) with the highest sum of scores over all 14 individual rounds will advance to the individual playoffs on Day 3, where the world champion will be determined. In case of a tie involving the top 10, the tie will be broken by looking at the scores of each round in numerical order (01, 02, …), where a higher score on an earlier round is better. If the tie *somehow* persists, a Classic Sudoku will be used as tiebreaker. (The tiebreaker will happen immediately before playoffs, with the same rules as playoffs.)

The top 3 players (official or unofficial) that are Under 18 (born in year 2006 or later), Over 50 (born in year 1974 or earlier), and First-time Participants (never participated in WPC before, either officially or unofficially) will also be recognized, subject to the same tiebreaking rules. There will be no playoffs in these categories.

## Team Competition

There are 4 team rounds over the course of Day 3, labeled A~D. The first three rounds are each focused on a specific category (Loop, Shading, Division), while the last round has a mixed variety of puzzles.

The point values of puzzles as well as time bonuses for team rounds have been doubled compared to individual rounds, in order to make the team rounds a more significant portion of the team competition (~40% instead of ~25%).

There will be no team playoffs. The top 3 A-teams with highest sum of individual round and team round scores will be awarded. In case of a tie involving the top 3, the tie will be broken by looking first at the total of 4 team round scores, then the scores of each team round in alphabetical order (A, B, C, D), then the 4 individual scores in decreasing order (subject to the same tiebreaking rules as individual competition), where a higher score on an earlier criteria is better.

## Scoring and Bonuses

For individual rounds, a bonus of **10** points for each full remaining minute (**5** points per full half-minute for Round 11, **20** points per full minute for Round 14) will be awarded to any competitor who correctly solves all puzzles in a round. For team rounds, a bonus of **80** points for each full remaining minute will be awarded to any team who correctly solves all puzzles in a round.

A partial bonus can be awarded to an individual or team if there is only one (or two) “minor” mistake(s), where the puzzle is solved almost completely and the competitor(s) may have reasonably believed their solution to be correct. The partial bonus is 60% for one mistake in most rounds; for rounds with at least 20 puzzles (Rounds 06, 11, 14, D), the partial bonus is 80% for one mistake and 40% for two mistakes. If there is a major mistake or several minor mistakes, no bonus will be awarded.

In general, a minor mistake is considered to be at most two incorrect cells or equivalent units. In case of doubt, the decision will be made in favor of the competitor(s); the decision of the judges is final. Regardless of whether the mistake is considered minor, no points will be given to the incorrect puzzle.

## Individual Playoffs

The playoffs proceeds in three rounds (labeled X, Y, Z). In Round X, players in rank 7~10 participate. The winner of Round X progress to Round Y, competing with players in rank 4~6. The winner of Round Y progress to Round Z, competing with players in rank 1~3. The results of Round Z will determine the podium positions of this WPC.

Each round will have a pool of 8 puzzles prepared, but only 4 to be solved. Starting from the highest-ranked player, each player chooses a puzzle from the pool, determines its order among the 4 puzzles, and then discards another puzzle so it cannot be chosen by later players. The average difficulty of the pools increases over the three rounds; each puzzle will be given a point value in the same way as the individual round puzzles as an estimate of difficulty.

In each round, the highest-ranked player starts first, and the other three players will start after a time offset. The offsets are proportional to the point differences between them and the highest-ranked player from the preliminary rounds, and the lowest-ranked player's offset (in seconds) is scaled to be equal to the total point value of the 4 chosen puzzles. For Rounds Y and Z, the lowest-ranked player (i.e. the winner of the previous round) automatically assumes the preliminary point total of the rank-7 and rank-4 player respectively for the purpose of offset calculation, regardless of their original rank from the preliminary rounds. The offsets are rounded to the nearest second.

The 4 chosen puzzles for each round must be solved in the order determined by the players. When a player completes a puzzle, they must raise their hand to request a judge to check their submission. Over the next minute, the judge will check the puzzle and indicate to the player if their submission is correct. At the end of the minute, the player may start the next puzzle if the submission is correct, or must correct their current puzzle otherwise. The player is allowed to re-submit the puzzle any number of times, subject to the one-minute period with each submission.

Each round will end as soon as one (for Rounds X and Y) or three (for Round Z) players finish all puzzles, or the time limit for the round is reached, whichever happens earlier. The three rounds will each have a time limit of 20, 25, and 45 minutes respectively, although we do not expect the limit to be reached in any round.

The rank of each playoff round is determined by the number of correctly solved puzzles, then the time of the last correct submission, then the rank from the preliminary rounds. (Round X determines rank 8~10, Round Y determines rank 5~7, Round Z determines rank 1~4.)

In an unlikely event of a wrong puzzle being discovered in one of the playoff rounds, the time for each player is paused at the moment they correctly solve the puzzle they were solving during the wrong puzzle discovery or at the moment when the time limit ends, whichever is earlier. (If the player was solving the wrong puzzle, the time is paused at the moment when they solve the previous puzzle.) The player who chose the wrong puzzle will choose the new one that will replace it from the set of puzzles that were neither chosen already nor discarded by a higher-ranked player. All competitors will continue with time offsets adjusted accordingly.

# Competition Rules

(These rules have been mostly taken from prior World Puzzle Championships, with some re-organization and minor modifications. Some important additions/changes/clarifications for this year are underlined.)

## Permitted Items

1. The following items are permitted to be brought to the competition hall: pens and pencils (in any color except for red), pencil sharpeners, erasers, rulers, a printed copy of this Instruction Booklet (annotation and notes allowed), and additional paper for notes or scratch work.
2. Drinks and snacks are also permitted as long as they do not disturb other competitors with a strong smell or rustling packet.
3. All electronic devices are strictly forbidden during rounds, including music players, headphones, cameras, cell phones, or any type of calculator. Use of such equipment may lead to the disqualification of the competitor.
4. Items that are not used or permitted for competition must be kept in a bag on the floor under the competitor's desk, so as to not block the aisles. Phones must be turned off.

## Before Each Round

1. All competitors (individuals and teams) have to sit at their pre-allocated desk(s). Competitors should make sure that all non-permitted items are not on the table before each round.
2. Competitors must ensure that they are at their desks ready for the start of the round. Late arrivals may not be permitted to enter the competition hall to take part in a round (at the discretion of the organizers).
3. Competitors must clearly write their name and team (e.g. "CHN-C") on the front page of their competition booklet into the allocated space. If this information is not complete, then the organizers reserve the right not to award any points to that competitor for that round. Competitors must not open their booklets before the official start of the round.

## During Each Round

1. When the signal for the start of the round has been given, competitors may open their booklets and begin solving the puzzle(s). A timer with the round's remaining time will be visible for all competitors.
2. During individual rounds, competitors must keep silent, unless declaring completion of a round. During team rounds, team members may communicate with each other (unless otherwise specified), but should do this with respect to other teams.
3. To declare a round complete, a competitor must close their booklet, clearly state "Finished" (preferably in English) and raise their arm with the booklet. The competitor's arm must be raised until the booklet is collected. The same rules apply for the team competition.
4. Competitors who complete a round with at least five minutes left are allowed to leave the competition hall quietly, and should avoid making excessive noises outside the hall. Those who complete with less than five minutes left should stay in their seats to avoid disturbing fellow competitors.
5. When a competitor leaves the competition hall for any reason, they may not be allowed to continue in that round (at the discretion of the organizers).

## Solving Puzzles

1. The competition booklets for individual rounds will contain one or multiple puzzles per page. The puzzle number, point values, and the rules of each puzzle are always written next to the puzzle, but there will not be puzzle examples. Team round booklets might not contain puzzle rules for space reasons.
2. Unless otherwise specified, competitors are allowed to solve the puzzles in any order.
3. The point value for each puzzle is an indication of its expected difficulty (in terms of solving time), although individual solving experience may differ. The difficulty of the example puzzles do not correlate with the difficulty of the competition puzzles.
4. Competitors are allowed to use different notations from what is suggested in the rules and example puzzles, as long as it is clear how the chosen notation translates into the given task. Examples of some acceptable notations will be described in the "Puzzle Glossary & Conventions" section, as well as some individual puzzle instructions or examples; these example notations are not meant to be exhaustive.
5. Competitors must use a notation consistently throughout the solution. If two different notations are used for a puzzle, the more "complete" or "prominent" one will usually be considered (at judge's discretion), but the judge reserves the right to not give credit if the two notations are inconsistent with each other.
6. Unless otherwise specified, each puzzle is intended to have a unique solution; some puzzles may have equivalent ways to represent the same solution, this will be clarified in the individual instructions.
7. When a competitor believes that there is a problem with a puzzle (e.g. either multiple or no solutions), they must clearly state that the puzzle is wrong by clearly writing "WRONG PUZZLE" next to the puzzle. The competitor must not notify the organizers during the round. This will be investigated upon completion of the round.

## After Each Round

1. When the signal is given that the round is finished, competitors have to stop solving immediately, close their booklets, put their pens or pencils down and their hands up with their booklets for collecting.
2. At the end of a round, competitors have to remain seated until all booklets have been collected. The signal to get up and leave will be given by the supervisor.

## Non-Competitors

1. Only team captains and official observers equipped with a name tag are allowed to enter the competition hall while either individual or team rounds are taking place. Other non-competing participants may enter the competition hall at the discretion of the organizers.
2. Only official observers may use cameras or other recording devices during rounds, at the discretion of the organizers. They have to respect the competitors and not use flash photography or cameras with excessive sounds.

## Marking

1. Unless otherwise specified, points will be awarded only for fully and correctly solved puzzles; there is no partial credit.
2. Puzzles may be photographed during the marking phase to prevent subsequent interventions.
3. In case of a major mistake in one of the rounds, organizers reserve the right to cancel the round, either by removing it from the time schedule, or by not awarding any points for it to any of the competitors.
4. For a wrong puzzle with multiple or no solutions, any competitor who found any one of the solutions will be awarded full credit, as well as any competitor who wrote "WRONG PUZZLE" next to the puzzle. (This is only relevant if the round with the wrong puzzle is not canceled.) If a puzzle is not wrong, a competitor who wrote "WRONG PUZZLE" will not get any credit, even if they have a complete solution.

## Queries

1. When a round has been evaluated, fully marked booklets are returned to a team member equipped with a country tag at a given location in a given time.
2. In case of any query after a booklet has been evaluated and returned to a competitor, the query must be raised through a team member with country tag to the organizers in the specified time. The schedule for the queries will be published before the competition. The booklet should be left with the organizers for investigation.
3. Team captains are responsible for ensuring that any information given to them related to the competition is effectively relayed to their team.

## Breach of Rules

1. Any breach of the rules above may lead to penalty points, or in severe cases to a competitor or team disqualified from a round or the entire competition.
2. The decision of the WPC tournament director (Qiu Yanzhe) is final.

## Miscellaneous Remarks

1. In case of any inconsistency between this Instruction Booklet and the competition booklets, such as point values, the information on the newest version of this instruction booklet published before the competition will be considered valid.

# Credits

The puzzles of this WPC were written and tested by the following individuals (in alphabetical order by surname): Cai Ji (蔡基), Qin Jiaqi (覃家祺), Qiu Yanzhe (邱言哲), Sun Cheran (孙彻然), Wang Mingyi (王明意), Xu Chenhao (徐晨皓), Yao Yuan (姚远). The author of each individual puzzle will remain anonymous until the solution booklets are distributed.

Many of the example puzzles were taken from past WPF Puzzle Grand Prix (PGP) instruction booklets, rule pages on puzz.link (both open-source), and the instruction booklet of WPC 2013 (available via https://ectoplsm.github.io/wpc-unofficial.org/pdfs/WPC%202013.pdf), some with minor adaptations. The remaining examples were made by the writing team listed above. Each example puzzle will be attributed more precisely alongside the instructions.

Most of the puzzle graphics were made with Penpa+ (https://swaroopg92.github.io/penpa-edit/), created by Opt-Pan and maintained by Swaroop Guggilam, with some manual SVG post-processing.

The icons on round page covers are from Noun Project (https://thenounproject.com/) via CC BY 3.0 License. The individual icons, in round order, were made by:

- Chinese Gate by Arunika: https://thenounproject.com/icon/chinese-gate-6526700/
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- shapes by Yoyon Pujiyono: https://thenounproject.com/icon/shapes-3187905/
- Chain by Alum Design: https://thenounproject.com/icon/chain-7098761/
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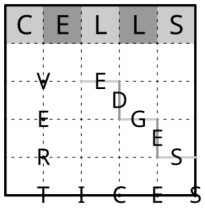
- Irregular hexagon by Bellowen: https://thenounproject.com/icon/irregular-hexagon-5691652/
- Apps by Nidhi: https://thenounproject.com/icon/apps-3993550/
- Layout quadrants by Adam Robinson: https://thenounproject.com/icon/layout-quadrants-4238638/
- Symmetry by murmur: https://thenounproject.com/icon/symmetry-6204395/
- Brain by Meaghan Hendricks: https://thenounproject.com/icon/brain-454654/
- Chinese knot by Andi Nur Abdillah: https://thenounproject.com/icon/chinese-knot-6413691/
- Octahedron by Flowicon: https://thenounproject.com/icon/octahedron-5738907/
- Jigsaw by Azam Ishaq: https://thenounproject.com/icon/jigsaw-6764930/
- Travel by Jems Mayor: https://thenounproject.com/icon/travel-1314480/
- Champion by Rudez Studio: https://thenounproject.com/icon/champion-1712561/

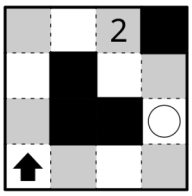
# Puzzle Glossary & Conventions

Here we define some basic terms and state some common conventions in puzzle rules of this WPC, so that the individual puzzle instructions can be more concise. (Conventions are marked with "*Unless otherwise specified*, …") This section is significantly longer than similar sections in previous WPC Instruction Booklets; while most of these terms/conventions will be familiar to most WPC veterans, we still recommend reading these first to avoid confusion or misunderstanding.

## Grid elements

- Puzzles usually take place on a grid comprised of **cells**, each of which is a polygon (usually square) with several **edges** (represented by dashed or solid **gridlines**) and **vertices** (where different edges meet, sometimes marked by small dots). The grid **boundary** refers to all edges that are adjacent to regions that are not part of the grid (usually marked by thick solid lines).
- *Unless otherwise specified*, **black cells** inside the grid (without any symbols inside) are not part of the grid (i.e. they are **holes**). An **empty cell** refers to any non-black cell inside the grid that does not have any symbols in them. (This is important for puzzles that starts with "shade some empty cells…", for example.)

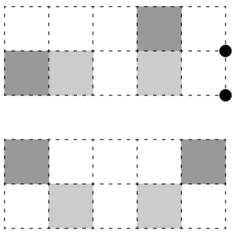



4 black cells

9 empty cells

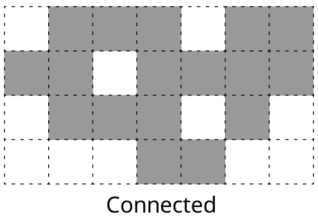
- Two cells are said to be **adjacent** if they share at an edge. Two vertices are said to be **adjacent** if they are connected by an edge. Two cells are said to be **touching** if they share at least a vertex; therefore, two adjacent cells are always touching.
- A group of (at least one) cells is said to be **connected** if for any two cells in the group there is a sequence of cells from one to the other where any two consecutive cells in the sequence are adjacent. Such a group is said to be **diagonally connected** if the previous condition holds with "adjacent" replaced by "touching". (Therefore, a group that is connected is also diagonally connected.)



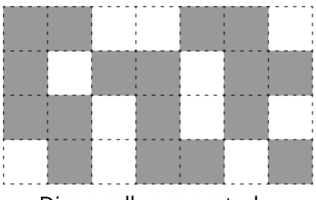
Adjacent

Touching

(But not adjacent)



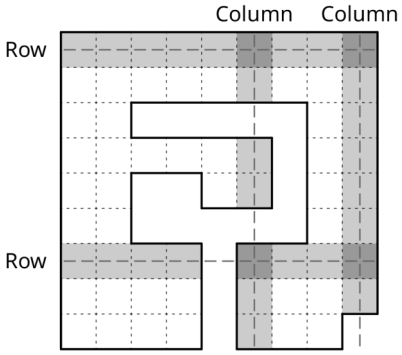
Connected

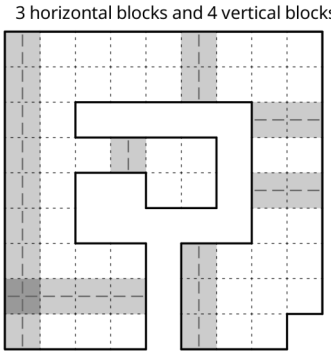


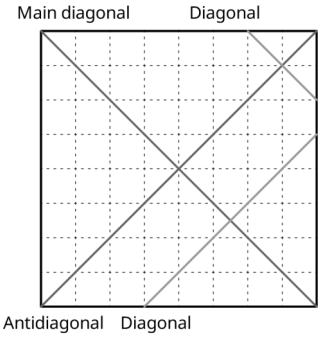
Diagonally connected

- *Unless otherwise specified*, a **"(diagonally) connected group"** of cells with a certain property (e.g. shaded, containing symbols, etc.) is assumed to be maximal, i.e. there are no other cells adjacent/touching the group that have the same property.
- *Unless otherwise specified*, if all cells of a grid have the same shape and size, the **area** of a group of cells is assumed to be the number of cells in the group. In other words, all cells are assumed to have area 1. This also means that for a standard square grid, the side length of each cell is assumed to be 1. (For grids with cells of varying shape or size, we will avoid using this term and use "number of cells" directly.)

- A grid of square cells has several **(horizontal) rows** and several **(vertical) columns**, consisting of all cells along a horizontal or vertical line. In particular, if the grid is not rectangular or has holes, the cells of a row or column may not be all connected.
- A horizontal or vertical **block** of cells (with a certain property) refers to a maximally continuous group of cells within a row or column, bounded by grid boundaries or cells that don't have this property.
- In a square grid (with unit square cells), the **main diagonal** refers to the cells that lie on the segment connecting the top-left corner of the grid and the bottom-right corner of the grid, and the **antidiagonal** refers to the cells on the segment connecting the other two corners of the grid. These two are both referred to as **long diagonals**. Other line segments parallel to one of the two long diagonals define other **diagonals**.

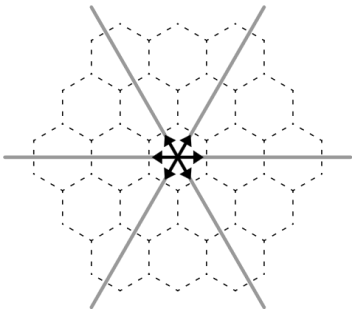


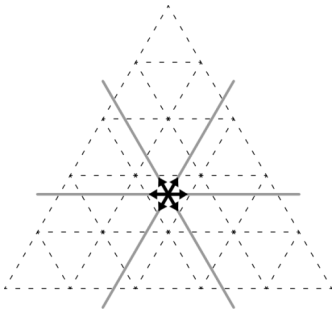



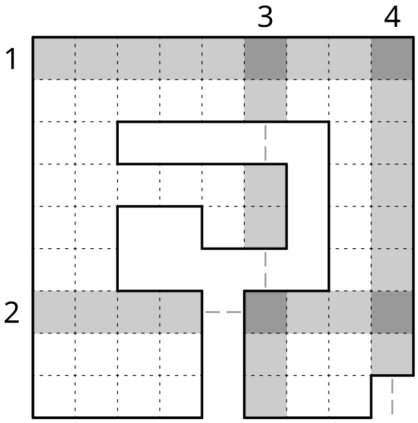

- In a standard grid with unit square cells, the four **orthogonal directions** refer to all horizontal and vertical directions: up/north, down/south, left/west, right/east. The eight **compass directions** refer to all orthogonal directions plus the four **diagonal directions** at 45 degrees from orthogonal: up-left/ northwest, up-right/northeast, down-left/southwest, down-right/southeast.


- In a grid with non-square cells, **standard directions** usually refer to one of two things: (a) Directions that travel straight through cells, entering and exiting through opposite edges; (b) Directions that travel straight along gridlines or between two adjacent parallel gridlines. All cells along such a standard direction will also be called a **row**, although in some cases the row might not be in a straight line. These definitions will generally be clarified whenever it is not obvious.
- *Unless otherwise specified*, any arrow in puzzles will point in one of the compass directions or standard directions.



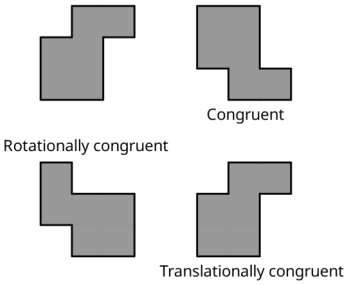


- Puzzles usually have **clues** in the form of numbers, letters, arrows, symbols, colors, or a combination thereof. A clue usually provides some information about “the cell”, “the region” or “the row or column” that it belongs to.
- When a clue is given to the left or right of the grid, “the row” refers to the row that (when extended) contains the clue, and similar for “the column” for a clue given above or below the grid. If the order of the cells in the row or column is important (e.g. “the first non-empty cell in the row or column from the respective direction”), the first cell will be the cell nearest to the clue, then proceeding away from the clue. For non-rectangular grids, parts of the row or column outside the grid will be marked with grey dashed lines starting from the clue for ease of visualization.

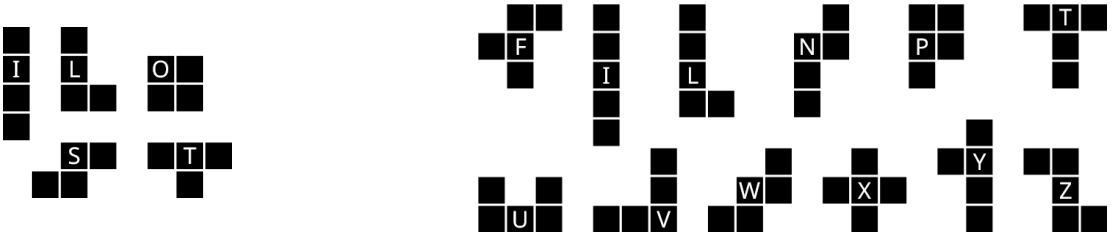



- *Unless otherwise specified*, it is not guaranteed that all possible clues will be given. The absence of clues for a row/column/region/cell means that no information is given for that row/column/region/cell, instead of it having none of the relevant objects (usually there will be a special notation for this case as specified by the individual puzzle rules).
- *Unless otherwise specified*, a cell marked with a **cross** (×) must be left empty (unshaded, or without any symbols or objects placed in it). Even though it technically contains a symbol (the cross), it is treated as an empty cell in the solution.

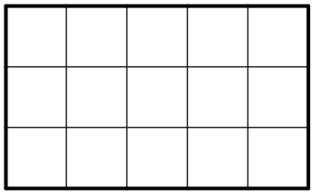
## Shapes

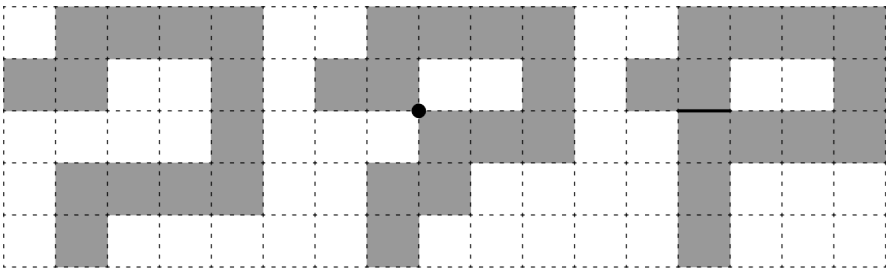



- Two shapes are **congruent** if one can obtain one shape from the other using translations, rotations and reflections. They are **rotationally congruent** if reflection is not needed. They are **translationally congruent** if only translation is needed. (Obviously, translationally congruent shapes are rotationally congruent and rotationally congruent shapes are congruent.)
- A **polyomino** is a connected shape comprised of several unit squares connected edge-to-edge. Polyominoes of size 1, 2, 3, 4, and 5 are called **monominoes**, **dominoes**, **trominoes**, **tetrominoes**, and **pentominoes**, respectively. Different tetrominoes and pentominoes are usually assigned letters; if this assignment is relevant for a puzzle, the correspondence will be supplied alongside the puzzle.



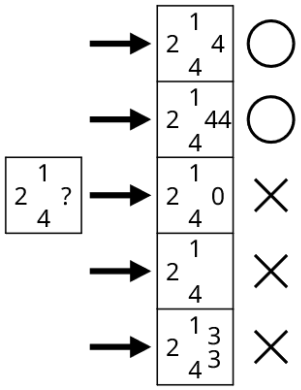

- A **polyhex** is similar to a polyomino, but comprised of several regular hexagons. A **polyiamond** is comprised of several equilateral triangles.
- A **rectangle** is a quadrilateral whose angles are all right angles. It is **orthogonal** if all of its sides are in orthogonal directions. The **width** of an orthogonal rectangle is the length of one of its horizontal sides, and the **height** is the length of one of its vertical sides. The dimensions of an orthogonal rectangle made of unit square cells can be described with "H×W", where H is the number of rows (i.e. height) and W is the number of columns (i.e. width).
- *Unless otherwise specified*, a **square** shape is also considered to be a rectangle.
- A **snake** is a sequence of at least two cells where any two consecutive cells are adjacent but no two non-consecutive cells are adjacent. It is said to also **not touch itself** if any two diagonally touching cells (that are not adjacent) are two cells apart along the sequence (i.e. exactly one cell between them). The same applies for multiple snakes not touching each other. A snake's two **ends** are the two cells that are each adjacent to exactly one other shaded cell; all other cells are adjacent to two shaded cells. A **snaky loop** is similarly defined, but with a cyclic sequence without any ends. The **length** of a snake (or snaky loop) is the number of cells it occupies.


Height = 3, Width = 5


Not touching itself  Touching itself  Not a snake

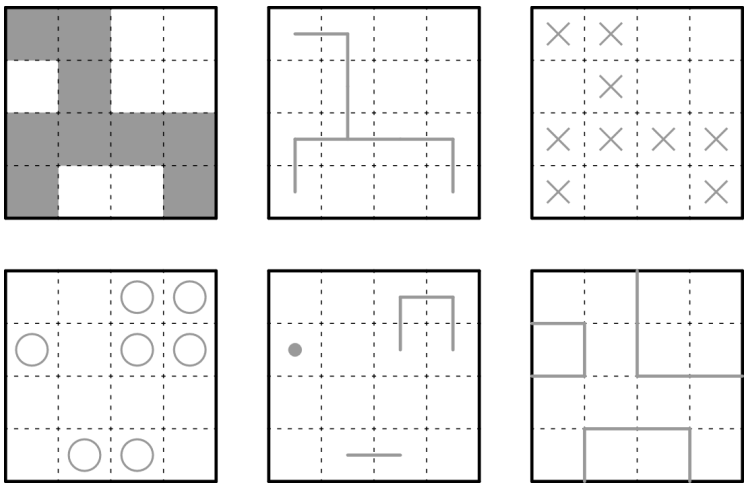
## Numbers and Letters

- *Unless otherwise specified*, all **numbers** are assumed to be integers, written in base-10. Non-integer numbers can only be given in the puzzles as clues, and are written in their exact values, either in terminating decimals (e.g. “1.25”) or fractions (e.g. “5/4” or “1 1/4”).
- A (positive) number consists of one or more **digits** (0, 1, 2, 3, 4, 5, 6, 7, 8, 9). The first (leftmost) digit of a nonzero number may not be 0.
- Some puzzles use the English alphabet, consisting of 26 **letters**. The letters in order are: A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z.
- A **character** can either be a digit or a letter. A **word** is a sequence of characters, which may or may not be meaningful. Whenever a word is given in a puzzle (such as in a word list), the characters are read from left to right.
- *Unless otherwise specified*, all letters will be in upper-case. Any diacritics on these letters as well as any non-English characters can be ignored.
- Some puzzle rules refer to a **list** of numbers or characters (or shapes) that will be given alongside a puzzle. This list will either be given as some comma-separated characters (e.g. “1, 2, 4, X, O”) or as a consecutive subset of the numbers or letters with a tilde (e.g. “1~5” or “A~E”, which are short for “1, 2, 3, 4, 5” or “A, B, C, D, E” respectively). The phrase “from X to Y” also refers to the range “X~Y” as well. While uncommon, lists are allowed to contain duplicates.
- *Unless otherwise specified*, if a list contain duplicates, the phrase “each number in the list appears exactly once” automatically means “each number appears exactly as many times as it appears in the list” (e.g. if the list is “0, 0, 1, 1, 1”, then 0 must appear twice and 1 must appear three times). In other words, each number in the list is treated as a different element even though some of them may be equal. The same applies with “number” replaced by “character” or “shape”, and “exactly” replaced by “at least” or “at most”.
- *Unless otherwise specified*, a **question mark** (?) in a puzzle represents exactly one unknown <u>positive</u> integer (which may have one or more digits). In particular, it cannot represent zero, or multiple numbers at once. This is important when the number of clues in a group is significant. A question mark should also be treated as a number for any other purposes (e.g. a cell with a question mark should also be treated as “a numbered cell”).
- It must be possible for each question mark to be replaced by some number while satisfying the puzzle condition, although the replacement might not be unique (e.g. when the order of clues doesn’t matter).



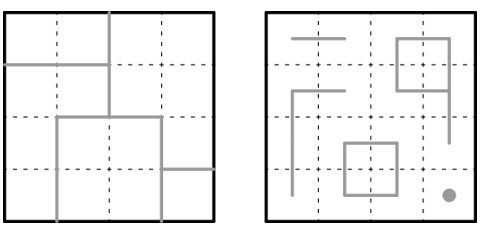
## Shading

- In most shading puzzles, the task is to shade some entire cells, so there are fully **shaded** cells and fully **unshaded** cells. While we will avoid using the words "black" or "white" (which are reserved to describe clues), we still use **color** to refer to the shading status of a cell for conciseness (e.g. "two cells of the opposite color" refer to a shaded cell and an unshaded cell).
- Remember that given fully black cells are (usually) not part of the grid, and hence should not be considered as shaded cells.
- Acceptable notations: You only need to either mark just the shaded cells or just the unshaded cells (either via shading or symbols). You may also draw lines to connect each connected group of shaded (or unshaded) cells instead of shading; make sure to also mark groups of single cells in this case. You may also draw just the borders between shaded cells and unshaded cells.
- Some puzzles use black circles to indicate cells that must be shaded; it is OK to not actually shade those cells as they are implied (although we generally recommend that you shade them anyways).



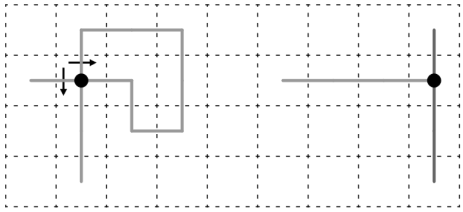
## Region Division

- Most division puzzles require region borders to be drawn along gridlines, resulting in regions consisting of a group of full cells. The grid boundaries are also region borders.
- *Unless otherwise specified*, each region must be orthogonally connected.
- *Unless otherwise specified*, the solution may not contain extraneous region borders. In other words, every region border (except for the grid boundary) must be between two different regions. This also means that there cannot be any "dead-ends". Note that this does not apply to non-division puzzles, where the given borders may be "extraneous".
- Acceptable notations: You may draw lines to connect the cells belonging to the same region instead of drawing the region borders; make sure to mark single-cell regions in this case. (If extraneous borders are allowed, then the connections must be drawn between all pairs of adjacent cells that are not separated by a border.)

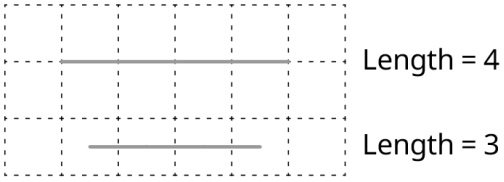


## Loops and Paths

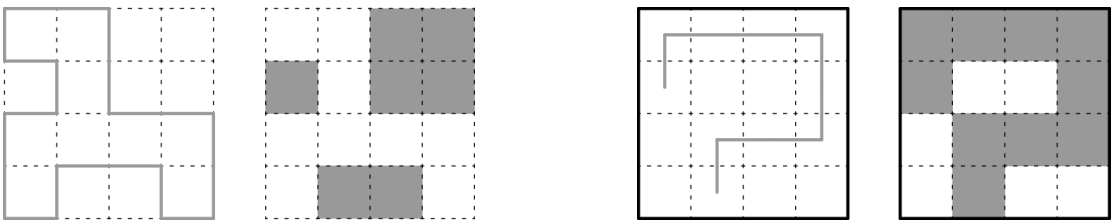
- A **loop** is a (cyclic) sequence of line **segments** that does not have any open ends (i.e. both endpoints of each segment must be an endpoint of another segment), where between any two consecutive segments there is a **turn** of an angle strictly between 0 and 180 degrees. A **path** is such a sequence with two open ends. Such a loop or path is **orthogonal** if all of its segments are in orthogonal directions.
- A path is **straight** if it does not make a turn (i.e. consists of only one segment).
- A loop or path may be **oriented**, meaning that it has a specified direction of travel. (For a path, this means it has a starting point and an ending point; this applies to all movement puzzles.) A straight oriented path is sometimes also referred to as an **arrow**.
- There are two common ways a loop/path is drawn: along cell edges or through cell centers. In the former case, the loop/path may only make a turn on vertices. In the latter case, the loop/path may only make a turn on cell centers.
- A segment contains both of its endpoints. We will use **interior** of a segment to exclude the endpoints.
- Two segments **intersect** if they share a common point or partially overlap, including the endpoints. A loop or path is **non-intersecting** if there are no two (non-consecutive) segments that intersect. (The same applies for multiple loops/paths not intersecting each other.)
- *Unless otherwise specified*, if a loop/path is allowed to intersect itself, the intersections may not be on endpoints of segments. That is, the segments must go straight through the intersection point without turning. (The same applies for two loops/paths intersecting each other.)
- In a standard grid with unit square cells, the **length** of an orthogonal segment drawn along gridlines is equal to the number of cell edges it covers; the **length** of an orthogonal segment drawn through cell centers is equal to the number of cell edges it crosses (or equivalently, the number of cells that the segment occupies minus one).



Intersecting path(s)

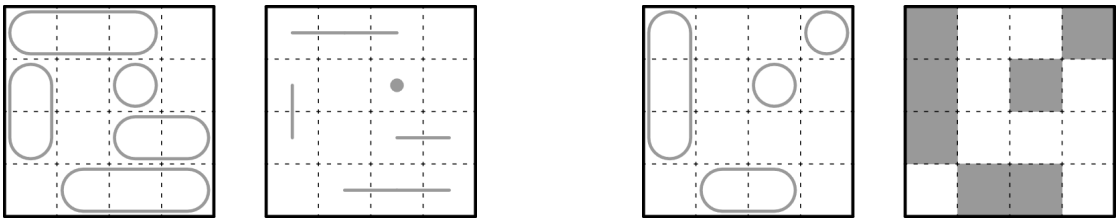



- Acceptable notations: If a loop is drawn orthogonally along cell edges and is non-intersecting, you may instead shade the cells inside or outside the loop (like in a shading puzzle). If a loop or path is drawn through centers of adjacent cells and is snake-shaped, you may instead shade the cells visited by the loop.



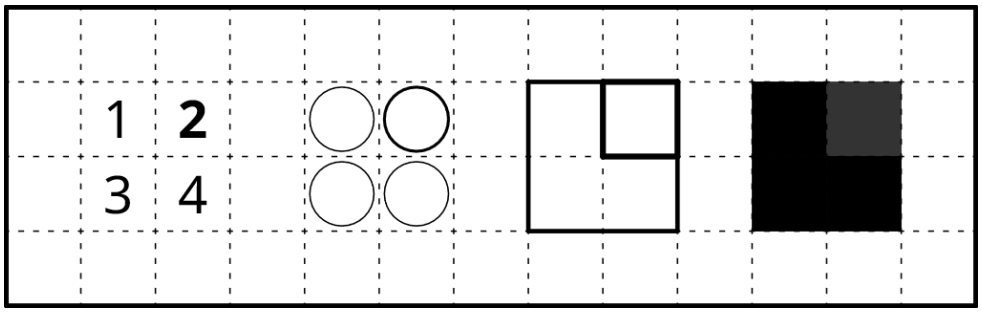
## Object Placement

- *Unless otherwise specified*, objects that are placed "in some cells" are assumed to occupy one cell each, and multi-cell objects that are placed "into the grid" are assumed to be placed in a grid-aligned fashion.
- *Unless otherwise specified*, two objects may not occupy the same cell.
- Two objects are **adjacent** or **touching** if the two groups of cells they occupy respectively are adjacent or touching. This applies even if the objects do not entirely occupy a cell.
- Acceptable notations: If only the location of each object is important, you may draw only the boundaries of the objects (near gridlines but slightly inside) or lines connecting all cells in each object (making sure that single-cell objects are marked separately). If in addition the objects are all single-cell or never adjacent (due to the rules), you may instead shade all the occupied cells (like in a shading puzzle).



## Miscellaneous

- The puzzle instructions may include a short italicized paragraph before the rules (known as **flavor text**) that explains some background, for thematic or informational purposes. These are not actually relevant to solving, and hence will not be reproduced in the competition booklets.
- The puzzle instructions may also include a short italicized paragraph after the rules (known as **notes**) that provides some possibly helpful information, including clarifications on acceptable notations, meanings of additional markings, etc. These will be reproduced in the competition booklets alongside the main rules.
- Sometimes, the theme of a puzzle will be emphasized via some subtle changes to the normal presentation, including bolded clues/text, slightly thicker region borders, or slightly offset colors. These changes are not meant to interfere with the puzzle rules (for example, a slightly off-black cell should still be treated as black cells), and can be safely ignored during solving.




- The example puzzles will usually be presented in the same format as the competition puzzles.
- In the example puzzle solutions, elements to be added by the solver will always be in (some shade of) grey, and clearly distinguishable from the given clues. Sometimes multiple ways of notating a solution will be shown together; this either is clarified previously in this section or will be clarified in the notes. Sometimes some additional elements will be included to illustrate some of the rules, they don't need to be included in your solution (this will also be clarified in individual notes).

Individual Round 01

# Welcome

欢迎

8 Puzzles

35 Minutes

**350** Points

| | | | | | |
|---|---|---|---|---|---|
| 01 | Midloop | **35** | 05 | Moon or Sun | **5** |
| 02 | Country Road | **15** | 06 | Star Battle | **45** |
| 03 | Balance Loop | **90** | 07 | Letter Weights | **25** |
| 04 | Canal View | **80** | 08 | Scrabble | **55** |

*Welcome, or welcome back!*

This round features several assorted puzzles.

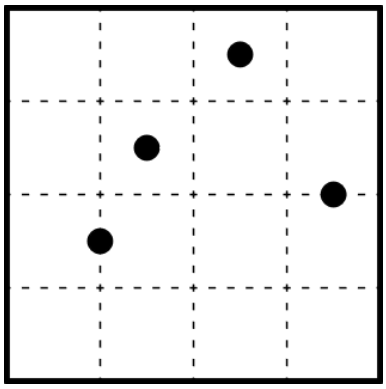
## 01.01 Midloop

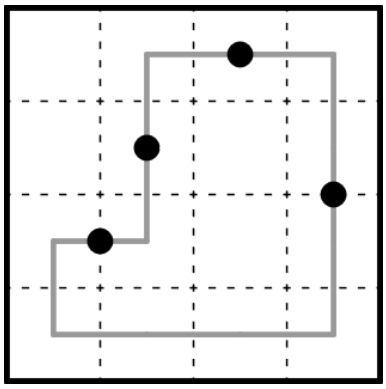
**35**pts

中点回路

Example from puzz.link

Draw a non-intersecting loop that passes orthogonally through centers of some cells. The loop must pass straight through all black dots, and each dot must be at the midpoint of the loop segment it is on.





## 01.02 Country Road

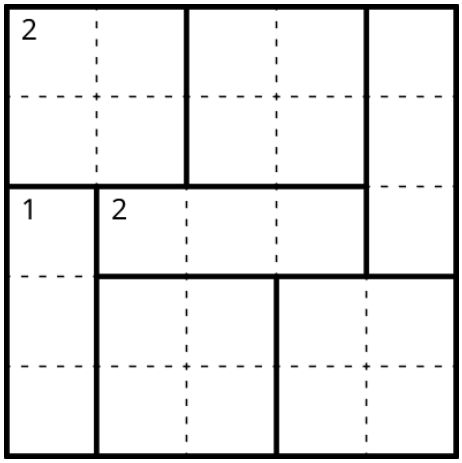
**15**pts

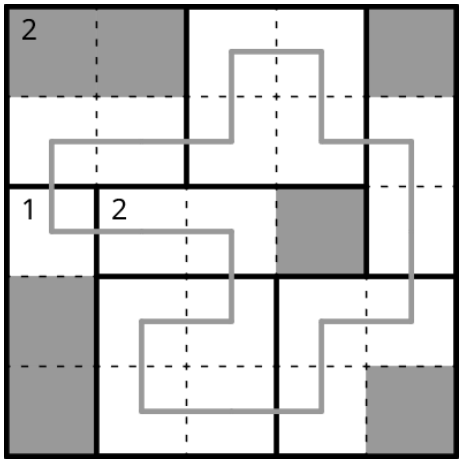
周游列国

Example from puzz.link

Draw a non-intersecting loop that passes orthogonally through centers of some cells. The loop must visit each region exactly once. No two cells that are adjacent across a region border can both be unvisited. Numbers indicate the number of cells visited by the loop in the region.

*It is not necessary to shade the unused cells.*



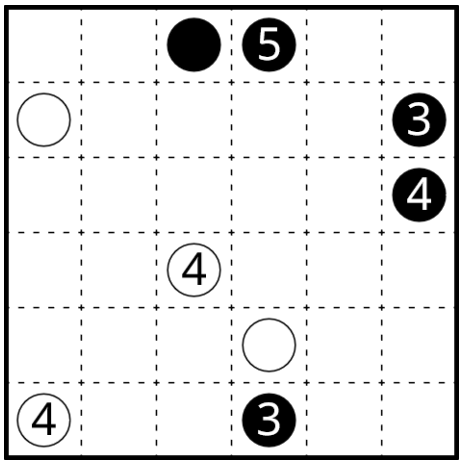
## 01.03 Balance Loop

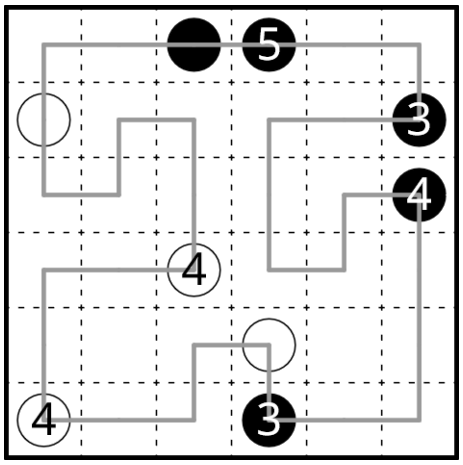
**90**pts

平衡回路

Example adapted from PGP 2023 R1

Draw a non-intersecting loop that passes orthogonally through centers of some cells, including all cells with circles. The color of circles indicate the lengths of the two segments extending out of the circle (treating the center of the circle as a breakpoint): white circles indicate that the two lengths are equal, and black circles indicate that the two lengths are not equal. Numbers in circles indicate the sum of the two segments' lengths.



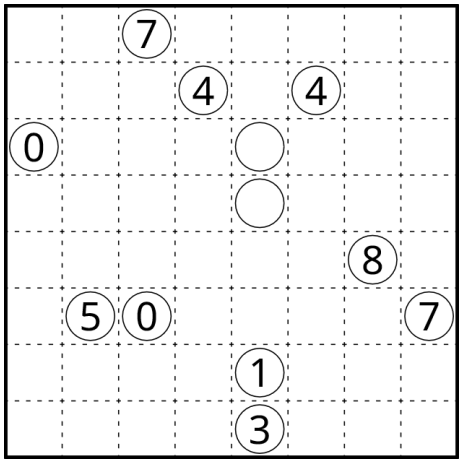

## 01.04 Canal View

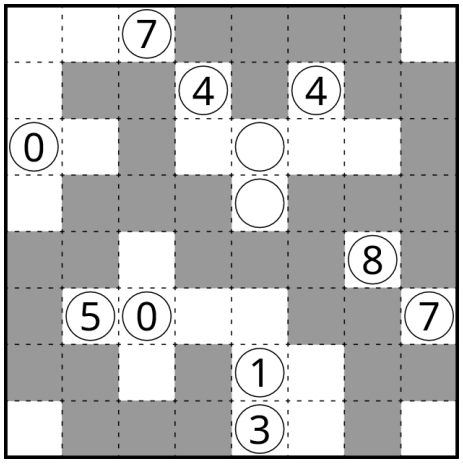
**80**pts

峡谷

Example adapted from PGP 2023 R7

Shade some empty cells so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded. Numbers in circles indicate the number of shaded cells connected in a straight orthogonal line to the cell (not including the cell itself).



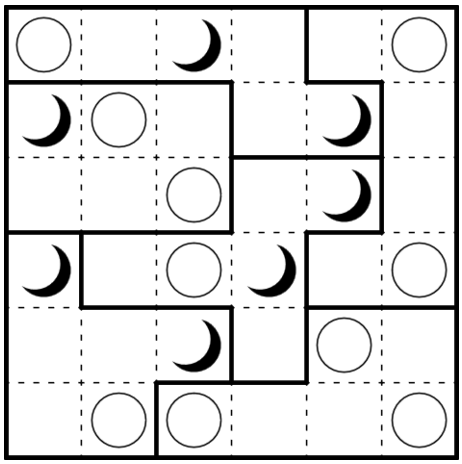
## 01.05 Moon or Sun

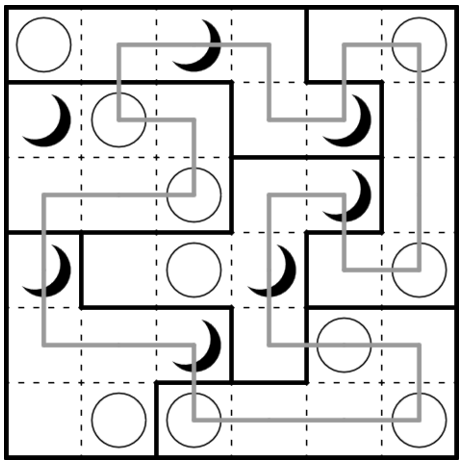
**5**pts

日月交替

Example adapted from PGP 2024 R3

Draw a non-intersecting loop that passes orthogonally through centers of some cells. The loop must visit each region exactly once, and must pass through at least one symbol within each region. For each region, the loop must pass through either all sun symbols and no moon symbols, or all moon symbols and no sun symbols, and must alternate between the two symbols between consecutive regions that the loop visits.





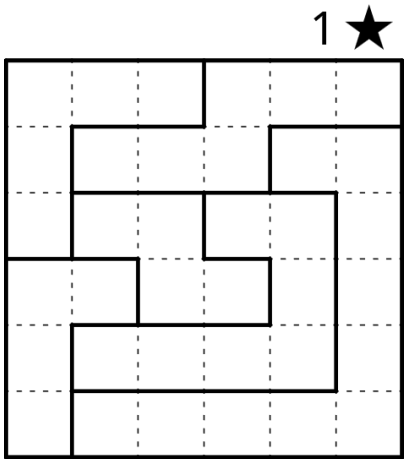
## 01.06 Star Battle

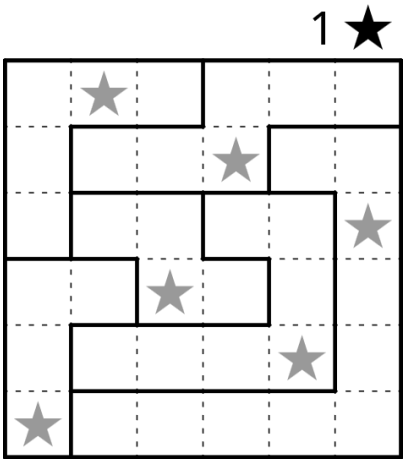
**45**pts

星战

Example from puzz.link

Place a star in some cells so that the number of stars within each row, each column, and each region is equal to the given number outside the grid. No two stars can be placed in touching cells.



# 01.07 Letter Weights

**25**pts

字母和

Example from PGP 2023 R2

Match the letters with the given list of numbers (in an outlined box), so that the sum of all letters in each given word is equal to the corresponding number.

CAB=11
BEE=7
ABE=8

| 1 | 2 | 3 |
|---|---|---|
| 4 | 5 | |

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

CAB=11
BEE=7
ABE=8

| 1 | 2 | 3 |
|---|---|---|
| 4 | 5 | |

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

# 01.08 Scrabble

**55**pts

拼词

Example adapted from PGP 2024 R1

Place a character into some empty cells of the grid so that all filled cells form one connected group. The content of every horizontal or vertical block of filled cells of length at least two (either from left to right or from top to bottom) is given in a word list outside the grid, where each given word must appear exactly once. Some characters may be already placed in the grid. Crosses will not be used in this puzzle (and not to be confused with the letter X); cells that must be left empty will be represented using holes.

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

AUSTRIA
CROATIA
GEORGIA
ICELAND
LUXEMBOURG
MOLDOVA
SPAIN

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | S | | L | | | | M |
| | P | | U | | | | O |
| | A | | X | | | | L |
| | I | C | E | L | A | N | D |
| | N | | M | | U | | O |
| | | | B | | S | | V |
| | C | R | O | A | T | I | A |
| | | | U | | R | | |
| G | E | O | R | G | I | A | |
| | | | G | | A | | |

Individual Round 02

# Classic Dozen

经典

12 Puzzles

40 Minutes

**400** Points

| | | | | | |
|---|---|---|---|---|---|
| 01 | Hashi | **35** | 07 | Kakuro | **60** |
| 02 | Hitori | **60** | 08 | Slitherlink | **45** |
| 03 | Tents | **25** | 09 | Nurikabe | **20** |
| 04 | Four Winds | **50** | 10 | Masyu | **15** |
| 05 | Tapa | **20** | 11 | Shikaku | **15** |
| 06 | Akari | **15** | 12 | Snake | **40** |

This round features the 12 classic puzzle genres that frequently appear in puzzle events hosted by Beijing Sudoku Association as a way to promote (non-Sudoku) puzzles in China.

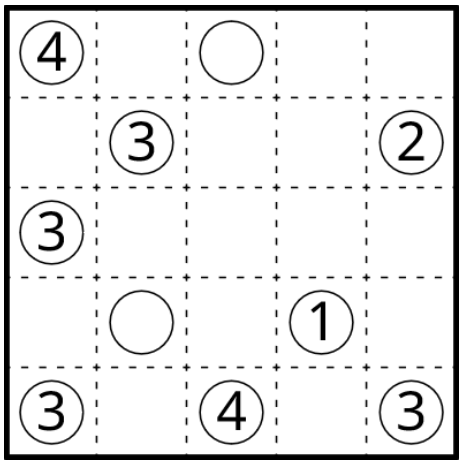
## 02.01 Hashi

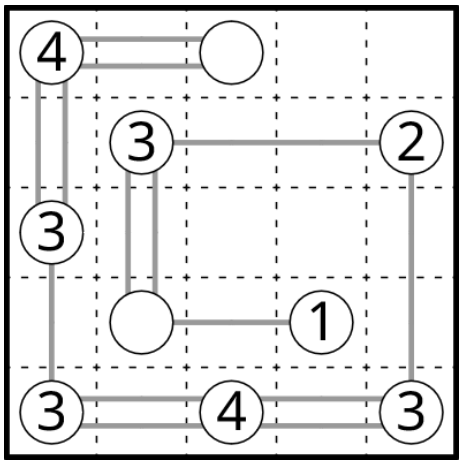
**35**pts

数桥

Example adapted from puzz.link

Connect all circles into one network by drawing one or two straight orthogonal segments (representing bridges) between some pairs of circles. Segments may not intersect each other or go over other circles. Numbers in circles indicate the number of segments that are connected to the circle.




## 02.02 Hitori

**60**pts

数壹

Example adapted from PGP 2023 R3

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. No two unshaded cells in the same row or column may contain the same number.

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

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

## 02.03 Tents

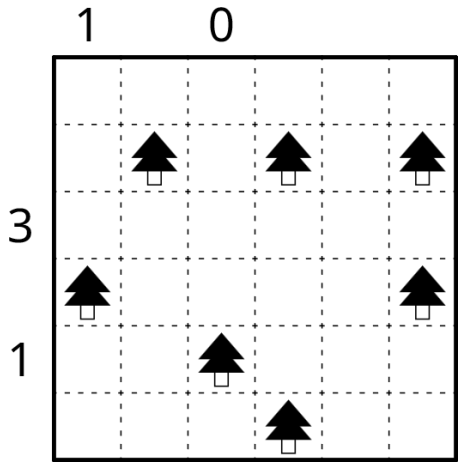
**25**pts

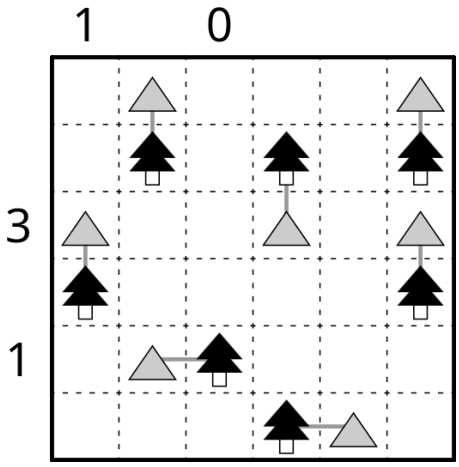
帐篷

Example from PGP 2024 R8

For each tree in the grid, place a tent in one of the empty cells adjacent to the tree. No two tents may be in the same cell or two touching cells. Numbers outside the grid indicate the number of tents in the row or column.

*The correspondence between tents and trees is part of the solution, and hence must be indicated for full credit.*



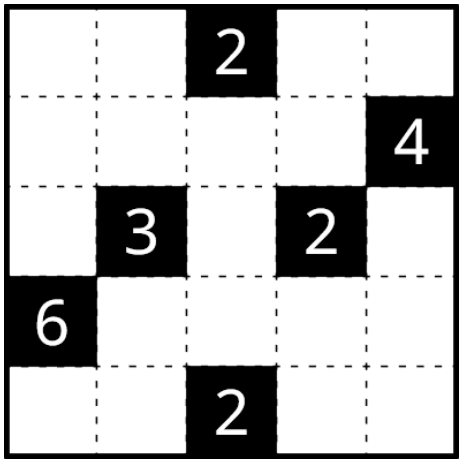

## 02.04 Four Winds

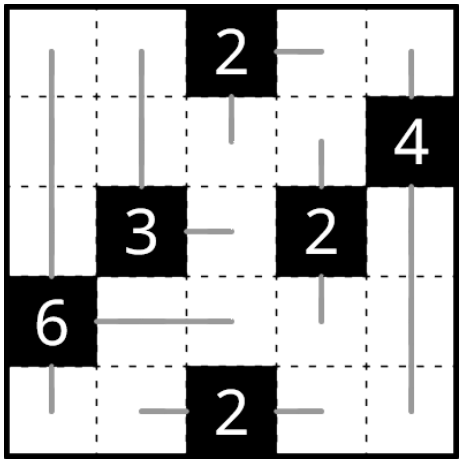
**50**pts

四风

Example from PGP 2024 R8

Draw some straight orthogonal lines starting at an edge of a black cell, extending away from the cell, and ending at the center of a cell. Each empty cell must be used by exactly one line, and lines may not enter black cells or leave the grid. Numbers in black cells indicate the total number of cells used by all the lines that begin at an edge of the cell (not including the cell itself).



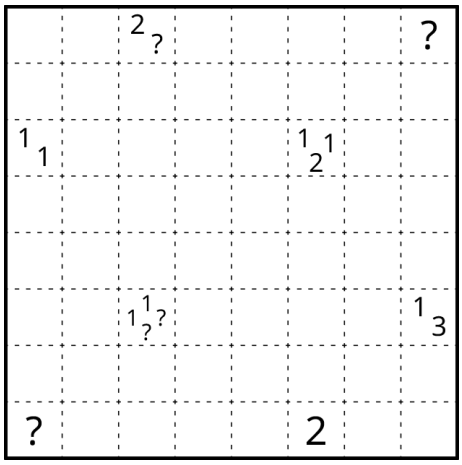
## 02.05 Tapa

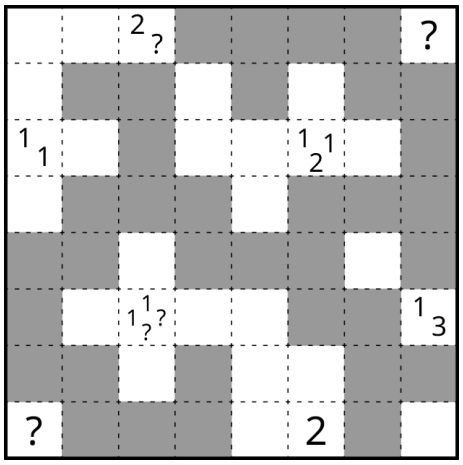
**20**pts

土派艺术

Example adapted from PGP 2023 R1

Shade some empty cells so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded. Numbers indicate the lengths of groups of consecutive shaded cells in the ring of (up to) eight touching cells around the cell, in no particular order. As a special case, a single “0” indicates that there are no shaded cells touching the cell. A single question mark in a cell without any other numbers or question marks may represent “0”.



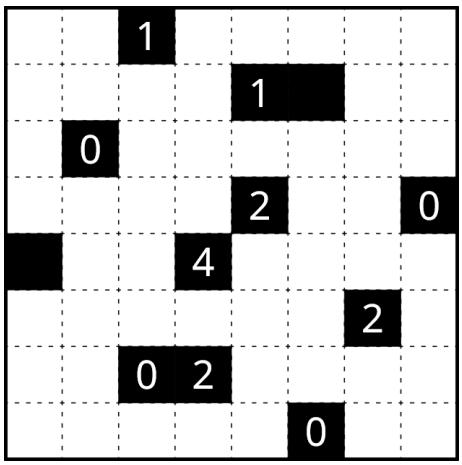

## 02.06 Akari

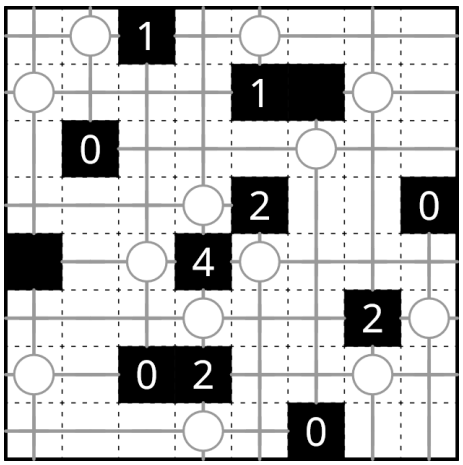
**15**pts

美术馆

Example from PGP 2023 R5

Place a light bulb in some empty cells so that all empty cells are illuminated. A light bulb in a cell illuminates all cells that are connected in a straight orthogonal line to the cell without any black cells in between, including the cell itself. No two light bulbs may illuminate each other. Numbers in black cells indicate the number of light bulbs in adjacent cells.



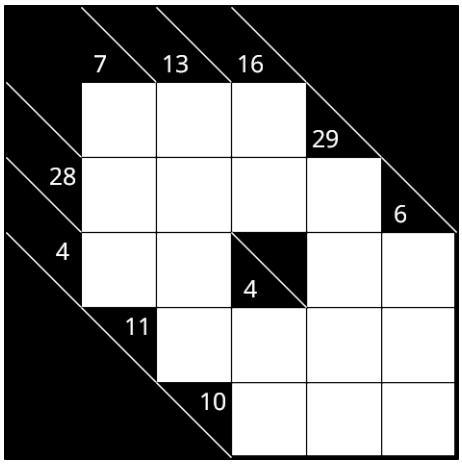
## 02.07 Kakuro

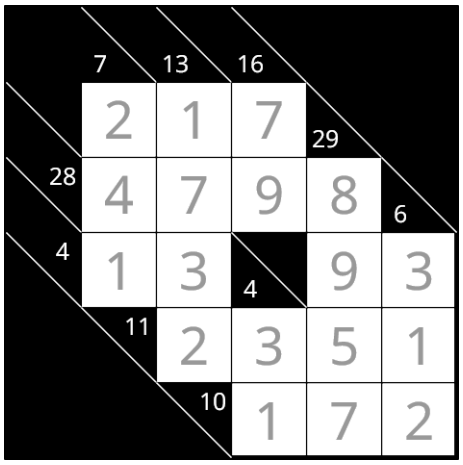
**60**pts

数和

Example adapted from PGP 2024 R8

Place a digit from 1 to 9 in each empty cell so that digits do not repeat within each horizontal or vertical block of empty cells. Numbers in black triangles indicate the sum of digits in the adjacent block to the right or below it (in the direction that the triangle is facing).



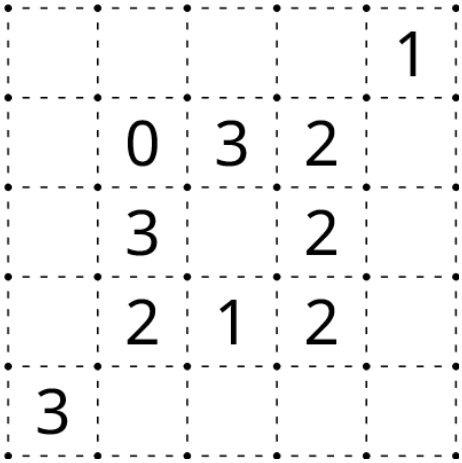

## 02.08 Slitherlink

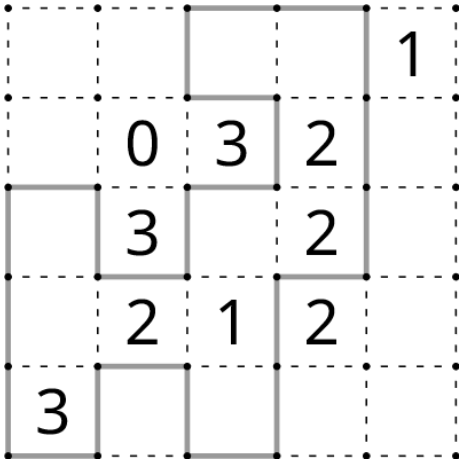
**45**pts

数回

Example from PGP 2023 R6

Draw a single non-intersecting loop along the dashed gridlines. Numbers indicate the number of edges adjacent to the cell that are used by the loop.



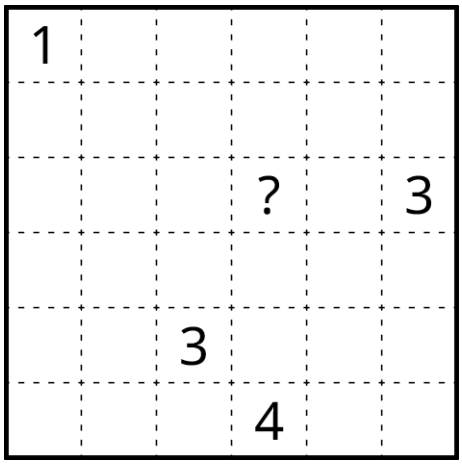
## 02.09 Nurikabe

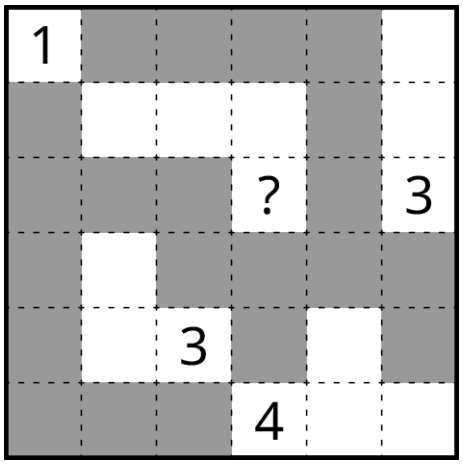
**20**pts

数墙

Example adapted from PGP 2021 R3

Shade some empty cells so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded. Each connected group of unshaded cells must contain exactly one numbered cell. Numbers indicate the number of cells in its connected group of unshaded cells.



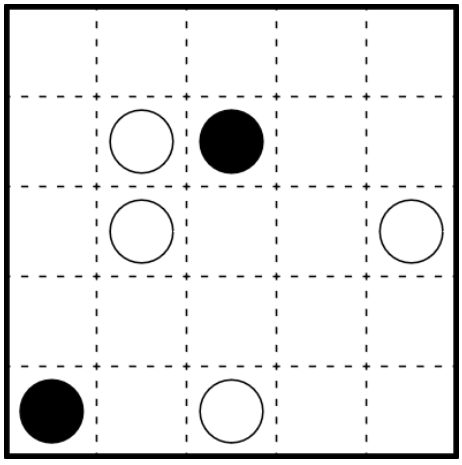

## 02.10 Masyu

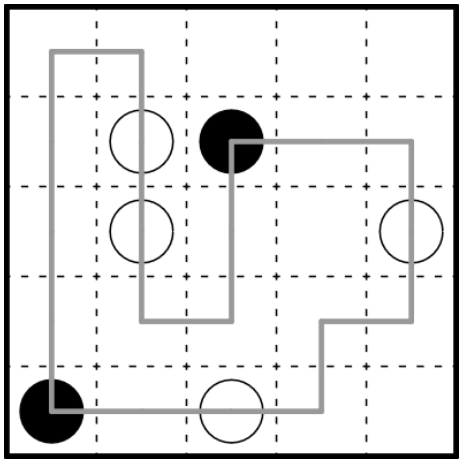
**15**pts

珍珠

Example from PGP 2024 R3

Draw a non-intersecting loop that passes orthogonally through centers of some cells, including all cells with circles. The loop must turn on cells with black circles, and travel straight through both adjacent cells along the loop. The loop must go straight through cells with white circles, and turn on at least one of the two adjacent cells along the loop.





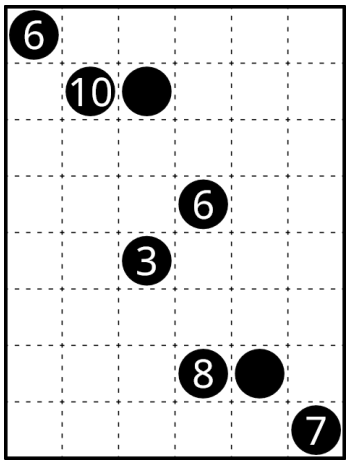
## 02.11 Shikaku

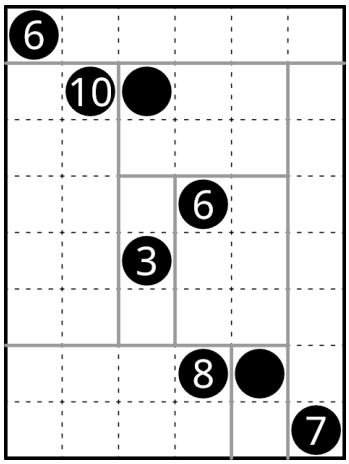
**15**pts

数方

Example adapted from PGP 2024 R1

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one clue. Numbers in black circles indicate the area of the rectangle that it belongs to.



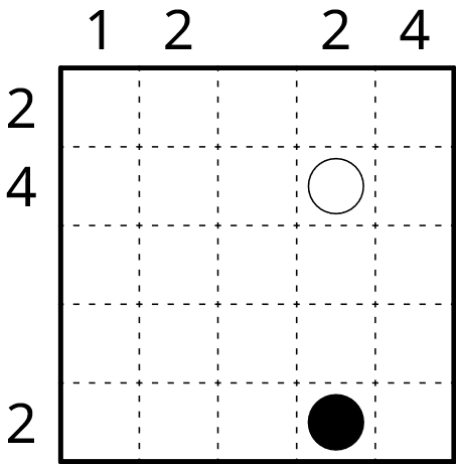

## 02.12 Snake

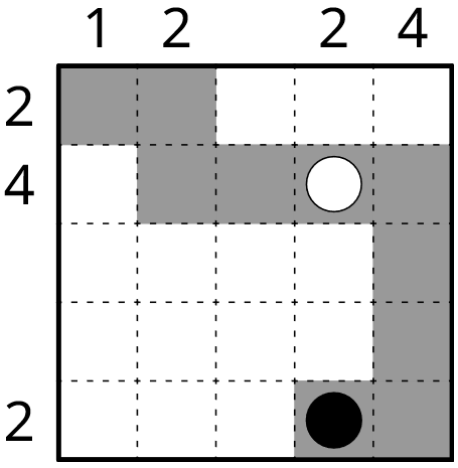
**40**pts

数蛇

Example adapted from PGP 2023 R7

Shade a one-cell-wide snake that does not touch itself. Black circles indicate that the cell is an end of the snake, and white circles indicate that the cell is part of the body (and not an end). Numbers outside the grid indicate the number of shaded cells in the row or column.



Individual Round 03

# Miscellaneous

杂题

10 Puzzles

45 Minutes

**450** Points

| | | | | | |
|---|---|---|---|---|---|
| 01 | Pyramid Climbers | **85** | 06 | Battleships | **30** |
| 02 | Heyawake | **55** | 07 | Aqre | **55** |
| 03 | Yajilin | **40** | 08 | Minesweeper | **25** |
| 04 | Magnets | **55** | 09 | Pentominous | **50** |
| 05 | Spiral Galaxies | **30** | 10 | Creek | **25** |

This round features several assorted puzzles, most of which are evergreens.

# 03.01 Pyramid Climbers

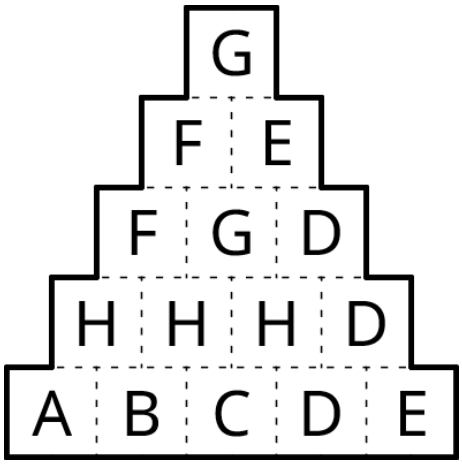
**85**pts

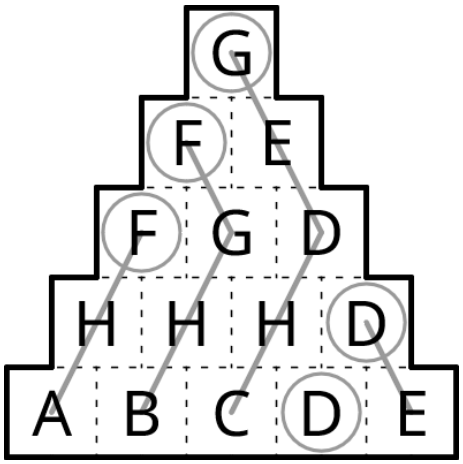
攀登金字塔

Example from PGP 2023 R3

Draw a path starting from each cell on the bottom row of the pyramid, travelling upwards through adjacent cells (one cell per row), so that each cell is used by exactly one path. (One of the paths will consist of only the bottom cell.) A path may not visit two cells with the same letter.

*For full credit, it is also sufficient to only mark the top endpoint of each path.*



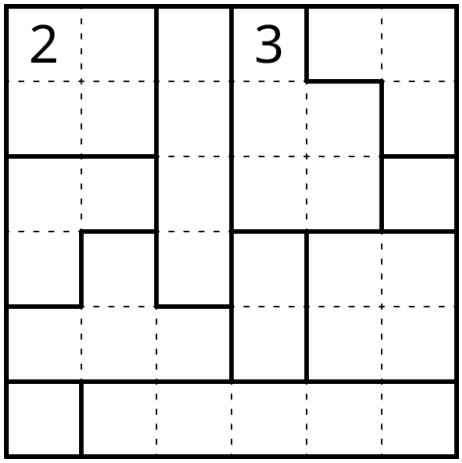

# 03.02 Heyawake

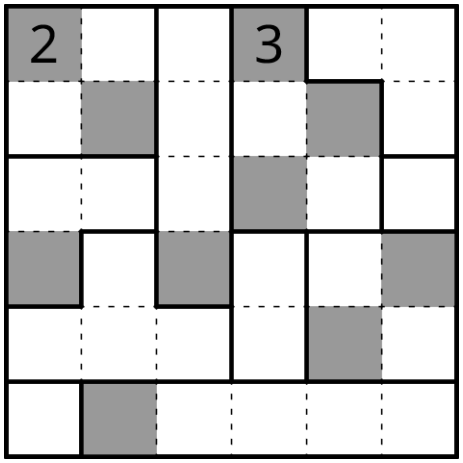
**55**pts

数间

Example adapted from PGP 2022 R4

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. No horizontal or vertical block of unshaded cells may cross two or more region borders. Numbers indicate the number of shaded cells in the region.



# 03.03 Yajilin

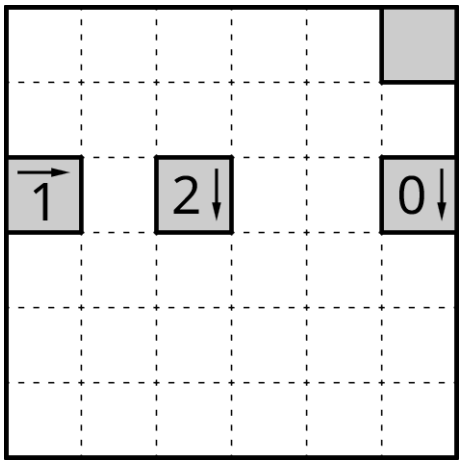
**40**pts

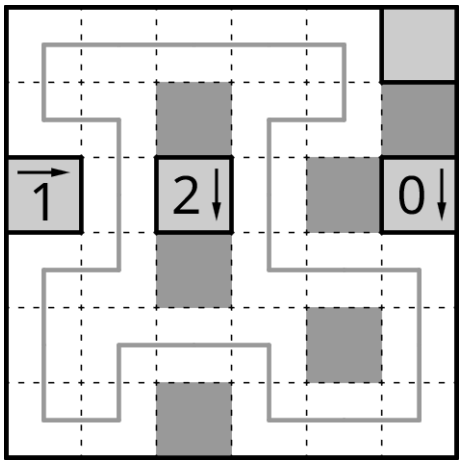
仙人指路

Example adapted from PGP 2024 R1

Draw a non-intersecting loop that passes orthogonally through centers of some empty cells. No two adjacent empty cells may be both unused by the loop. Numbers with arrows in grey cells indicate the number of unused empty cells in the indicated direction from the cell.

*It is not necessary to shade the unused empty cells.*




# 03.04 Magnets

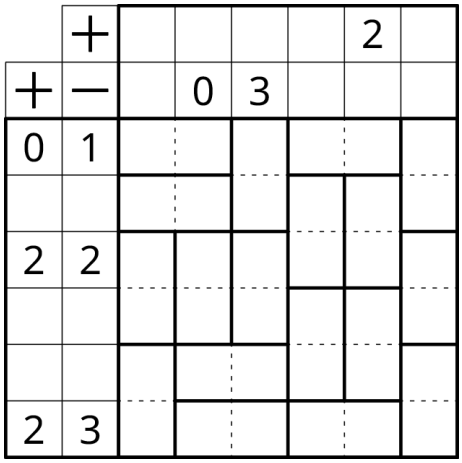
**55**pts

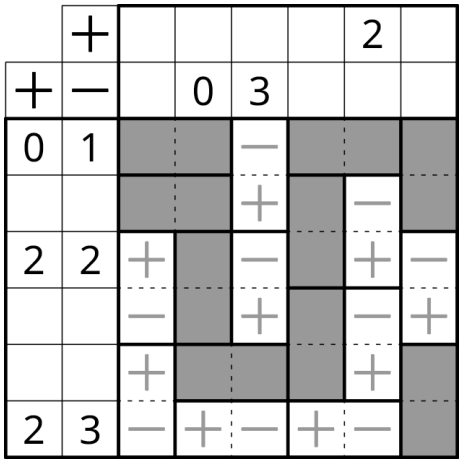
磁铁

Example from PGP 2022 R8

Place a plus sign and a minus sign in some two-cell regions (one sign per cell) of the main grid, so that no two adjacent cells contain the same sign. Numbers outside the grid indicate the number of plus signs or minus signs in the row or column.

*It is not necessary to shade the remaining empty cells.*



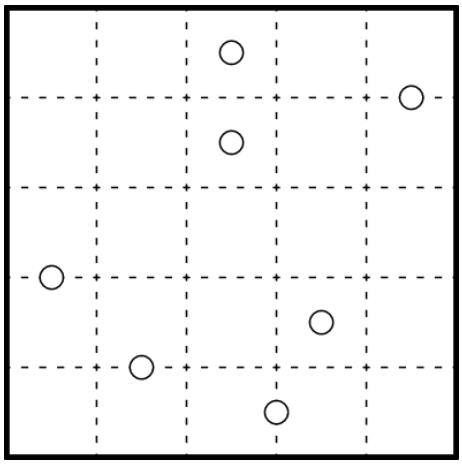
## 03.05 Spiral Galaxies

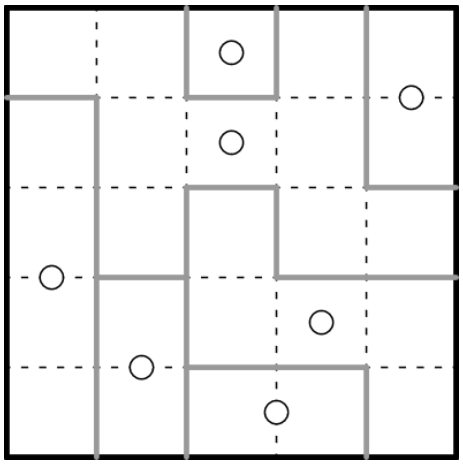
**30**pts

星系

Example from PGP 2023 R1

Divide the grid into regions along dashed gridlines so that each region contains exactly one dot. No dot may be on the boundary of a region. All regions must have 180° rotational symmetry, where a dot must be at the point of symmetry of its region.





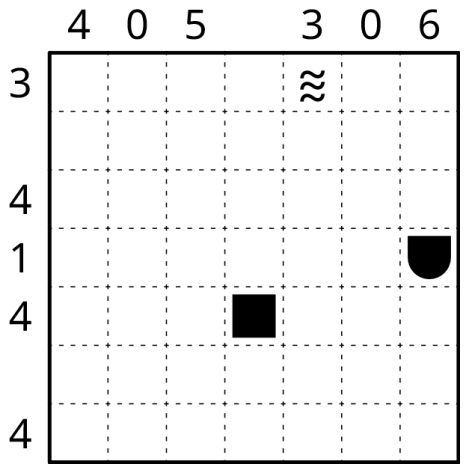
## 03.06 Battleships

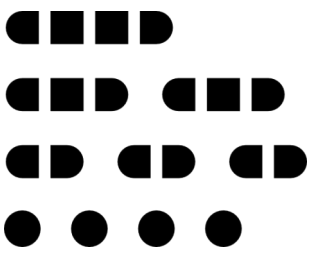
**30**pts

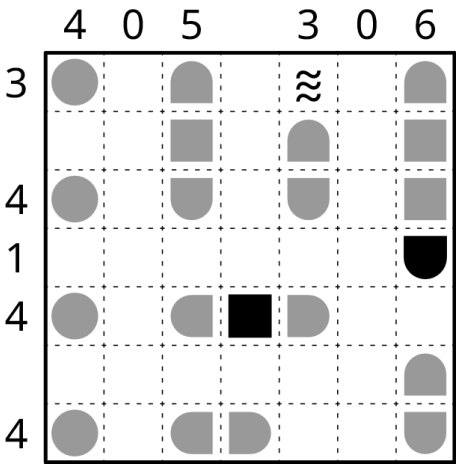
战舰

Example adapted from PGP 2024 R1

Place the given shapes (representing ships) into the grid so that no two shapes overlap or touch each other. Numbers outside the grid indicate the number of cells occupied by ships in the row or column. Some of the ship segments may be given in the grid; all corners of the ship pieces that are not adjacent to another ship piece are rounded. Water wave symbols indicate that the cell must not be occupied.





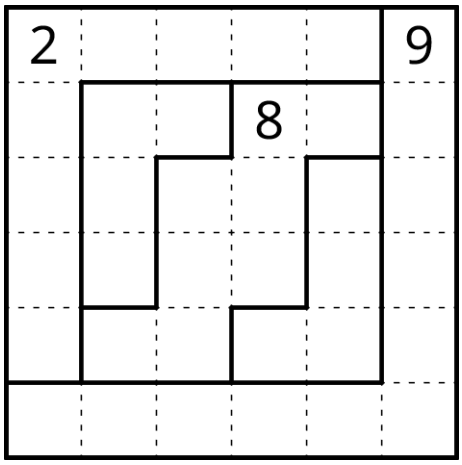
## 03.07 Aqre

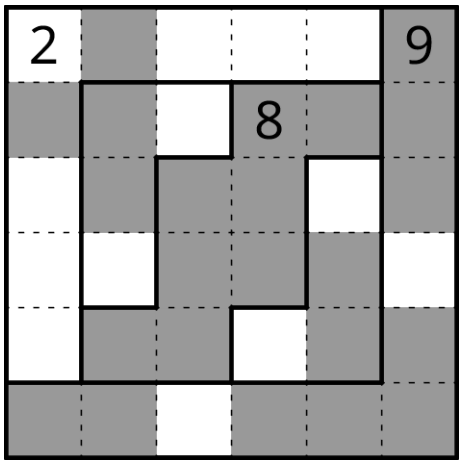
**55**pts

黑白无四

Example from PGP 2023 R6

Shade some cells so that all shaded cells form one connected group, and no 1×4 or 4×1 group of cells is entirely shaded or entirely unshaded. Numbers indicate the number of shaded cells in the region.



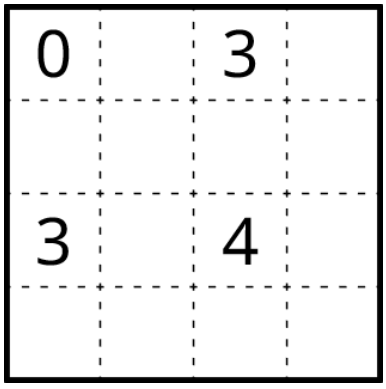

## 03.08 Minesweeper

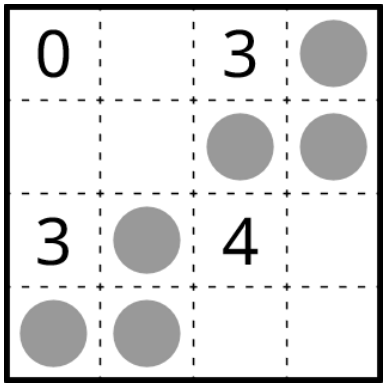
**25**pts

扫雷

Example from PGP 2020 R1

Place a mine in some empty cells. Numbers indicate the number of mines in all cells that are touching the cell.



# 03.09 Pentominous

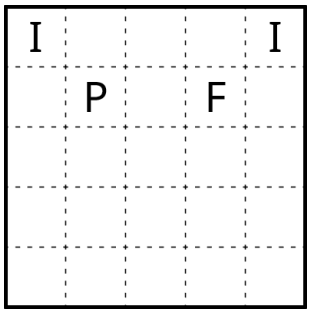
**50**pts

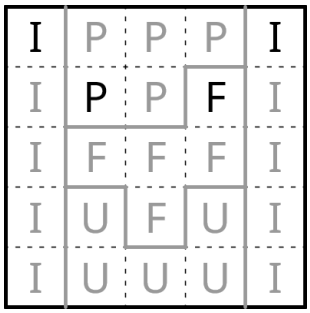
五格拼板

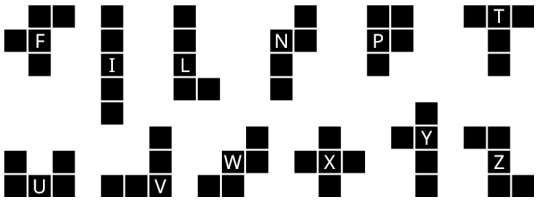
Example from PGP 2024 R1

Divide the grid into pentominoes along dashed gridlines so that no two adjacent pentominoes are congruent. Letters indicate the shape of the region that it belongs to.

*The correspondence between pentominoes and letters is provided. For full credit, it is sufficient to draw the dividing lines OR fill each cell with a letter indicating the shape of its region.*



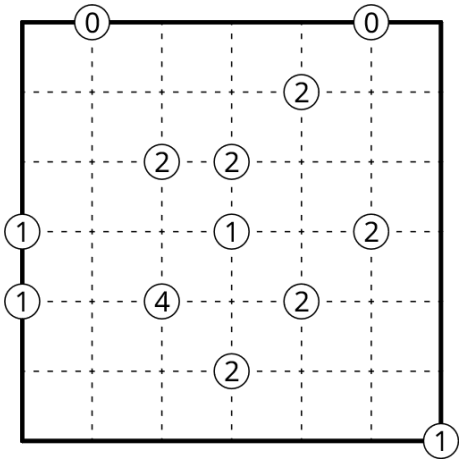

# 03.10 Creek

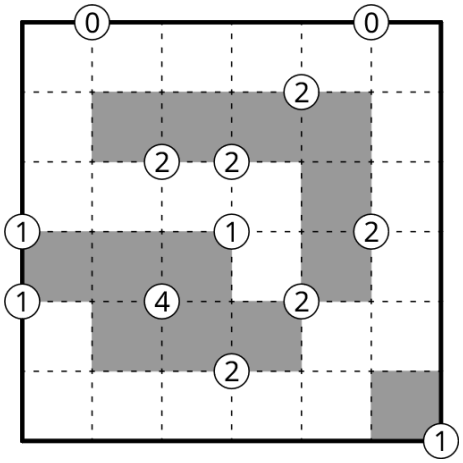
**25**pts

溪流

Example adapted from puzz.link

Shade some cells so that the unshaded cells form one connected group. Numbers in circles indicate the number of shaded cells that touch the vertex.



Individual Round 04

# Puzzle Chain

接龙

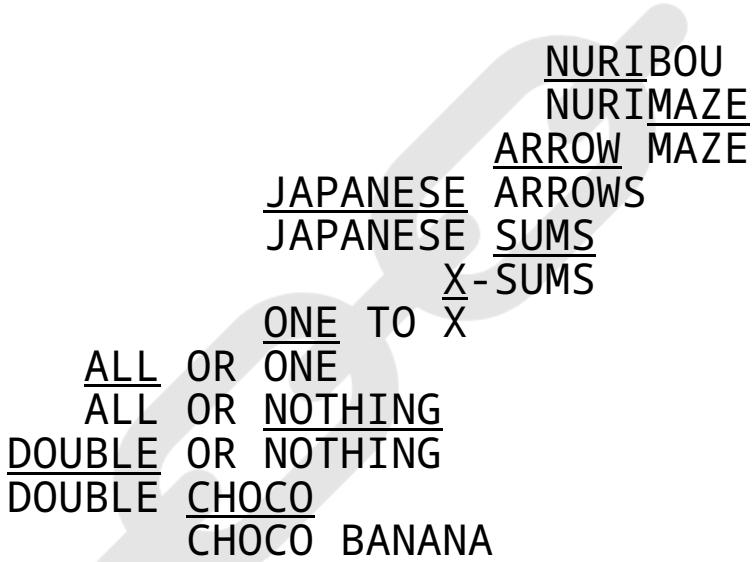
12 Puzzles

50 Minutes

**500** Points

| | | | | | |
|---|---|---|---|---|---|
| 01 | Nuribou | **25** | 07 | One to X | **75** |
| 02 | Nurimaze | **20** | 08 | All or One | **40** |
| 03 | Arrow Maze | **30** | 09 | All or Nothing | **30** |
| 04 | Japanese Arrows | **30** | 10 | Double or Nothing | **35** |
| 05 | Japanese Sums | **120** | 11 | Double Choco | **25** |
| 06 | X-Sums | **45** | 12 | Choco Banana | **25** |

*The round's theme is made possible by the vast number of puzzle genres with similar names.* This round features a sequence of puzzles where any two consecutive puzzles share approximately half of their name. (You may still solve the puzzles in any order.)



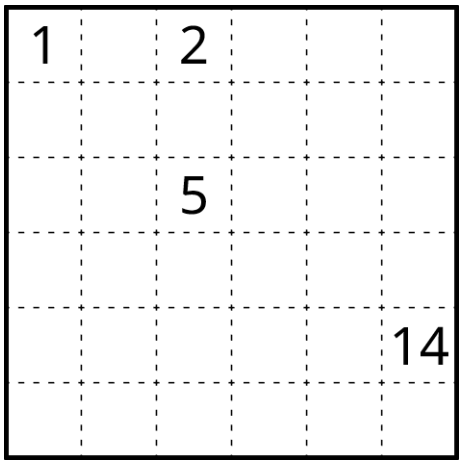
## 04.01 Nuribou

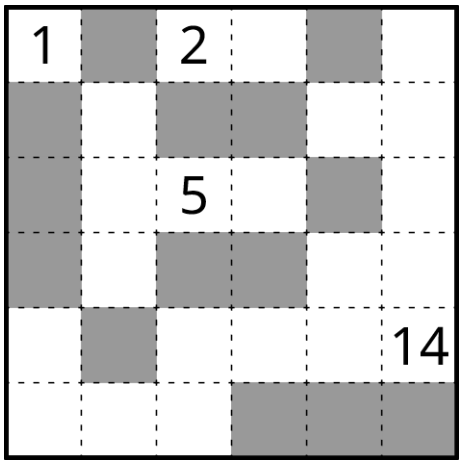
**25**pts

数壁

Example from PGP 2019 R8

Shade some empty cells so that each connected group of unshaded cells contain exactly one numbered cell. Each connected group of shaded cells is a rectangle of height one or width one, and no two groups of shaded cells with the same area may be touching. Numbers indicate the number of cells in its connected group of unshaded cells.



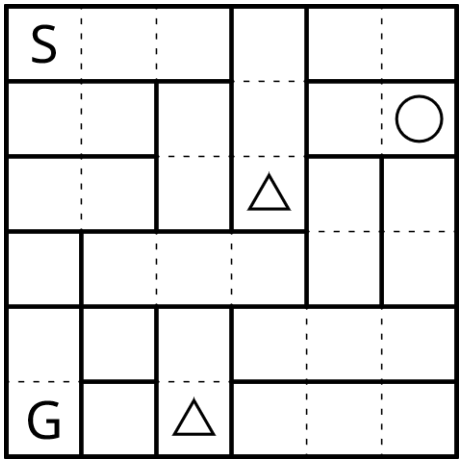

## 04.02 Nurimaze

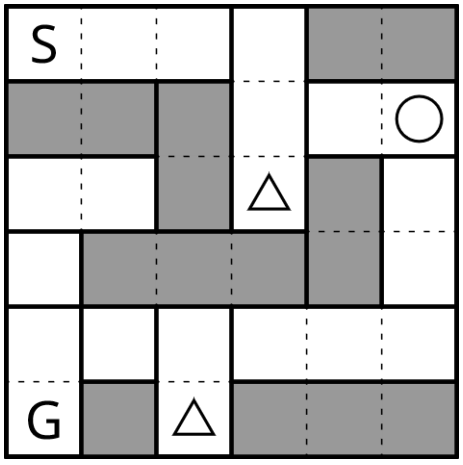
**20**pts

迷宫地图

Example from puzz.link

Shade some empty cells so that no 2×2 group of cells can be entirely shaded or entirely unshaded, and each region is either entirely shaded or entirely unshaded. The unshaded cells must form one connected group with no loops of unshaded cells. (In other words, between any two unshaded cells, there must be a unique path from one to the other that travels through adjacent unshaded cells without revisiting any cell.) Circles indicates that the cell is on the unique path from the cell with S to the cell with G, while triangles indicate that it is not on the path.



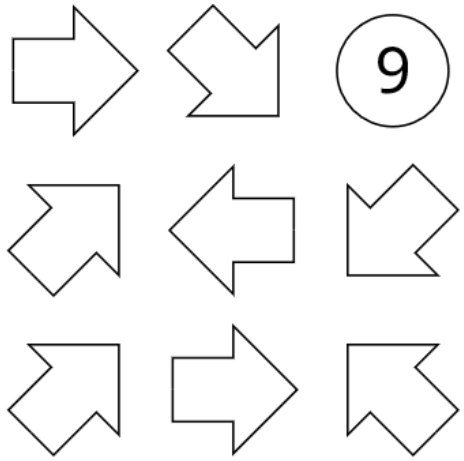
## 04.03 Arrow Maze

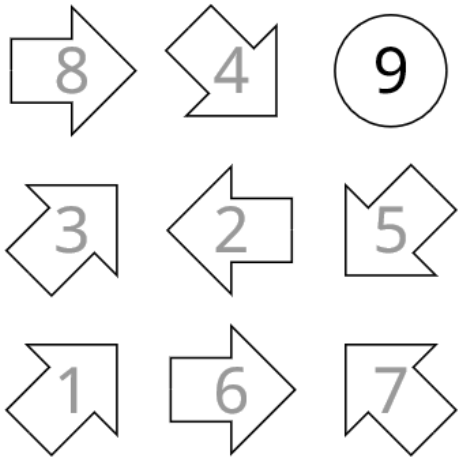
**30**pts

箭头迷宫

Example adapted from PGP 2024 R8

Place a number in each of the empty hollow arrows so that no number appears more than once. Each arrow must point at an arrow or circle with a number that is one greater than its own number.



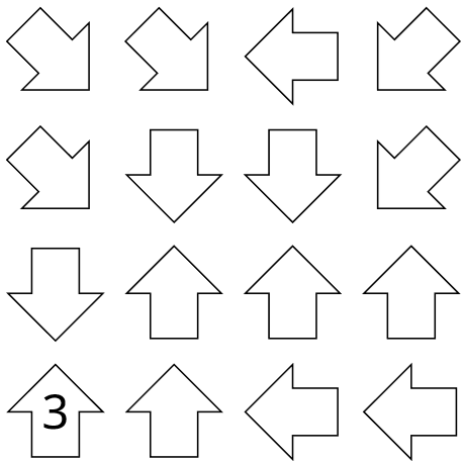

## 04.04 Japanese Arrows

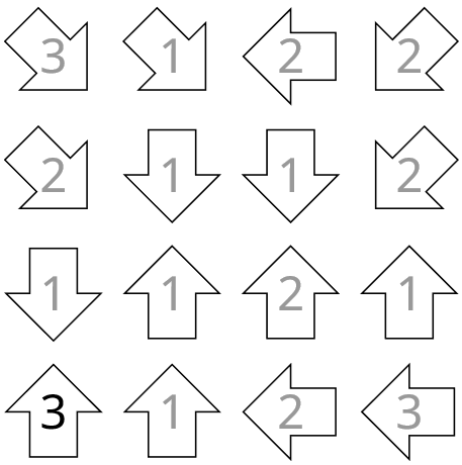
**30**pts

种类箭头

Example from PGP 2015 R8

Place a nonnegative integer in each of the empty hollow arrows so that numbers in arrows indicate the number of different types of numbers that appear in the direction that the arrow is pointing at.



# 04.05 Japanese Sums

**120**pts

日本和

Example adapted from PGP 2022 R8

Place a number in the indicated list into some empty cells so that each number appears at most once in each row and column. Numbers outside the grid indicate the sums of blocks of consecutive cells with numbers in the row or column, in order. Question marks represent any single such sum (which may be zero as long as it corresponds to a block of at least one number). As a special case, a single dash ('-') indicates that there are no numbers in the row or column. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

| 1~7 | 3<br>13 | 11<br>? | <br>19 | 6<br>? | <br>24 |
|---|---|---|---|---|---|
| 7 8 | | | | | |
| 18 | | | | | |
| 7 1 4 | | | | × | |
| 10 5 | | 2 | | | |
| 5 14 | | | | | |

| 1~7 | 3<br>13 | 11<br>? | <br>19 | 6<br>? | <br>24 |
|---|---|---|---|---|---|
| 7 8 | 3 | 4 | | 2 | 6 |
| 18 | | 7 | 5 | 4 | 2 |
| 7 1 4 | 7 | | 1 | × | 4 |
| 10 5 | 1 | 2 | 7 | | 5 |
| 5 14 | 5 | | 6 | 1 | 7 |

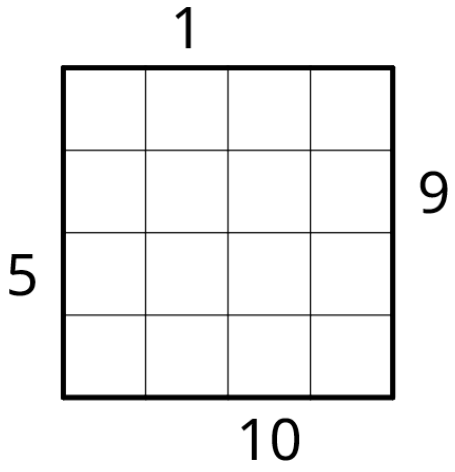
# 04.06 X-Sums

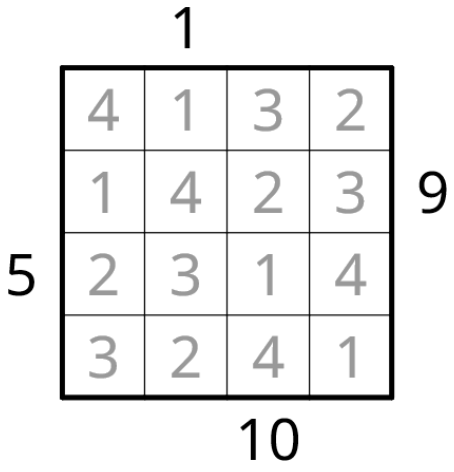
**45**pts

X和

Example by Yao Yuan

Fill each cell with a number from 1 to N, where N is the number of cells in each row or column, so that each number appears exactly once in each row and column. Numbers outside the grid indicate the sum of the first X numbers in the row or column from the respective direction, where X is the number in cell that is closest to the clue.



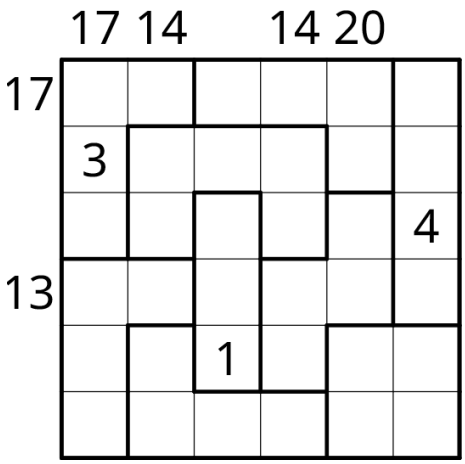
## 04.07 One to X

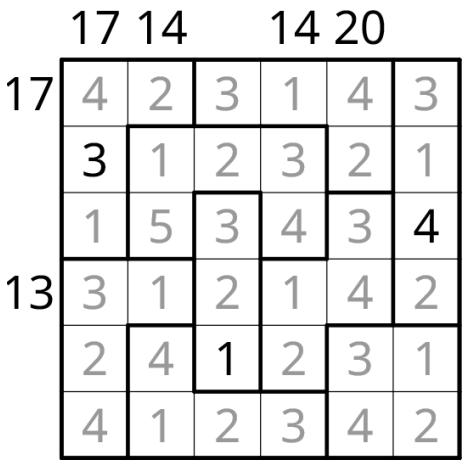
**75**pts

一到X

Example from PGP 2024 R4

Place a number into each empty cell so that each region contains the numbers from 1 to X, where X is the number of cells in the region. Identical numbers may not be placed in adjacent cells. Numbers outside the grid indicate the sum of all numbers in the row or column. Some numbers may be already placed in the grid.



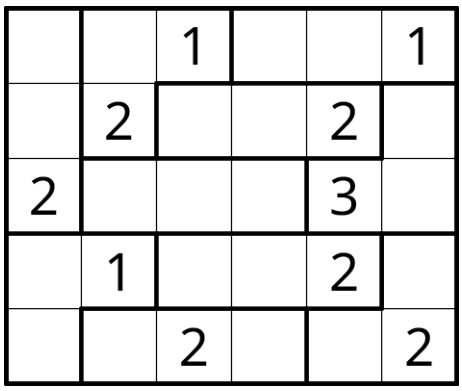

## 04.08 All or One

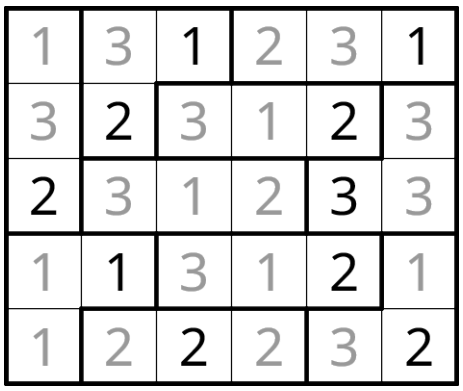
**40**pts

异或同

Example from PGP 2017 R1

Place a number from 1 to 3 into each empty cell so that each region either contains all three numbers or only one of the numbers three times. Identical numbers may not be placed in adjacent cells across a region border. Some numbers may be already placed in the grid.



## 04.09 All or Nothing

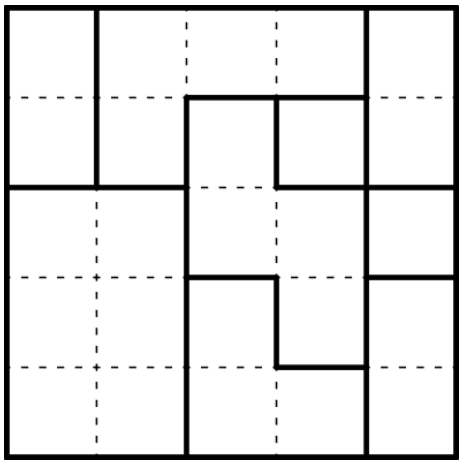
**30**pts

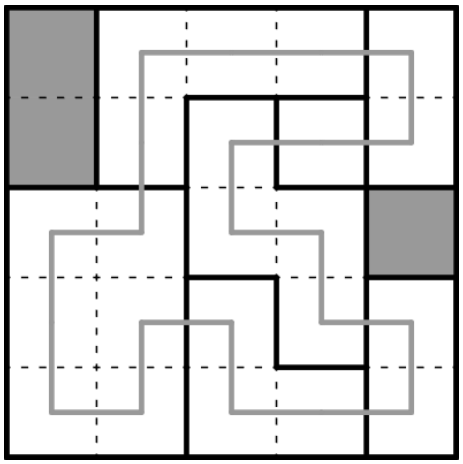
满或空

Example from puzz.link

Draw a non-intersecting loop that passes orthogonally through centers of some cells. The loop must visit each region at most once, and must visit every cell of each region that it visits. Unvisited regions cannot be adjacent.

*It is not necessary to shade the unvisited regions.*





## 04.10 Double or Nothing

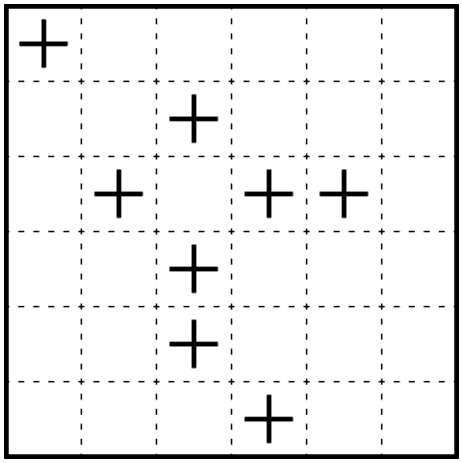
**35**pts

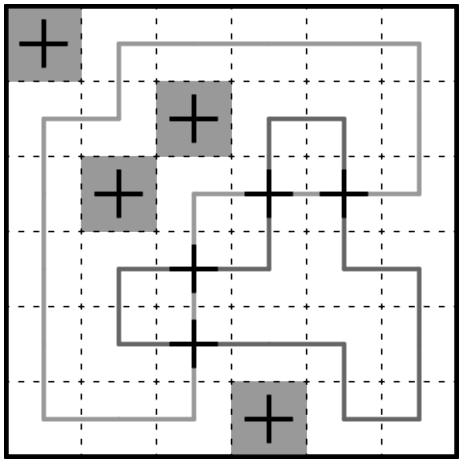
双或无

Example from PGP 2022 R5

Draw two loops that passes orthogonally through centers of some cells, so that each loop does not intersect itself. Each empty cell must be used by exactly one of the loops. Each cell containing a “+” symbol must either be used by both loops (which intersect each other orthogonally there) or neither loop.

*It is not necessary to differentiate the two loops in your solution.*





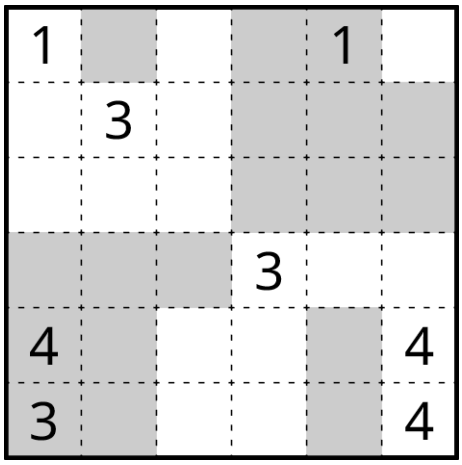
## 04.11 Double Choco

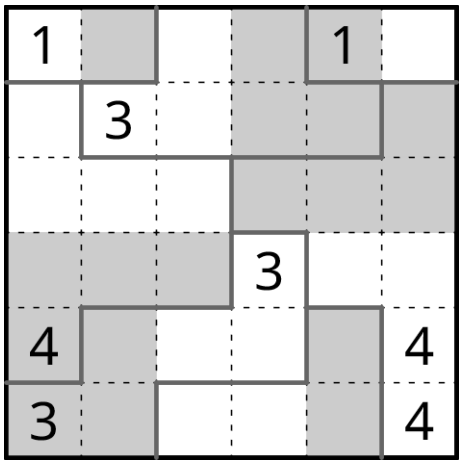
**25**pts

双巧克力

Example from PGP 2023 R5

Divide the grid into regions along dashed gridlines so that each region contains exactly one connected group of grey cells and one connected group of white cells, and the two groups are adjacent and congruent to each other. Numbers indicate the area of one such connected group in the region that it belongs to (that is, it is equal to half of the area of the entire region).



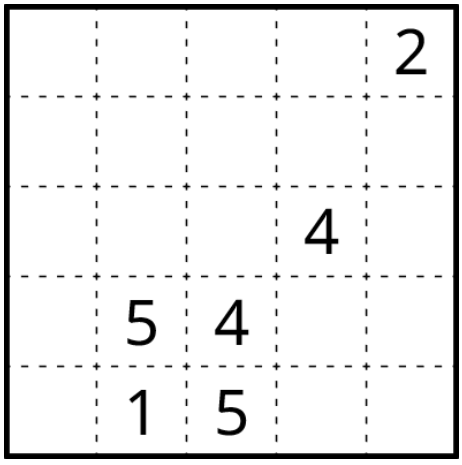

## 04.12 Choco Banana

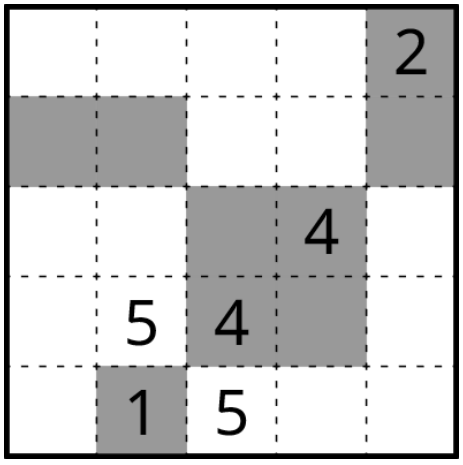
**25**pts

巧克力香蕉

Example from PGP 2023 R2

Shade some cells so that all connected groups of shaded cells are rectangular and all connected groups of unshaded cells are not rectangular. Numbers indicate the area of the connected group of shaded or unshaded cells it is in.



Individual Round 05

# Elemental Cycles

五行

10 Puzzles

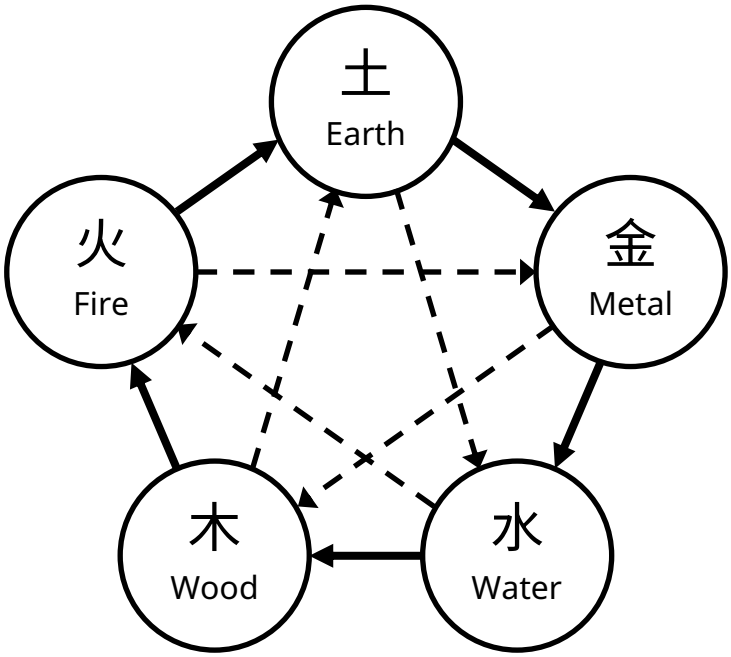
40 Minutes

**400** Points

| | | | | | |
|---|---|---|---|---|---|
| 01 | U-Bahn | **65** | 06 | Nurimisaki | **20** |
| 02 | Anglers | **20** | 07 | Yosenabe | **20** |
| 03 | Norinori | **15** | 08 | Laser | **85** |
| 04 | Tents | **50** | 09 | Herugolf | **20** |
| 05 | Araf | **30** | 10 | Statue Park | **75** |

*"Wuxing", or the "Five Agents/Elements" — Metal, Wood, Water, Fire, Earth — are in a sense the Chinese analogue of the four western classical elements (previously featured in Round 14 of the 2013 WPC), but with a much greater emphasis on their pairwise interactions, especially the cycles of generation and destruction.*

This round features 10 puzzles, one themed after each pair of agents/elements. The former 5 follow the cycle of generation and the latter 5 follow the cycle of destruction.



# 05.01 U-Bahn

**65**pts

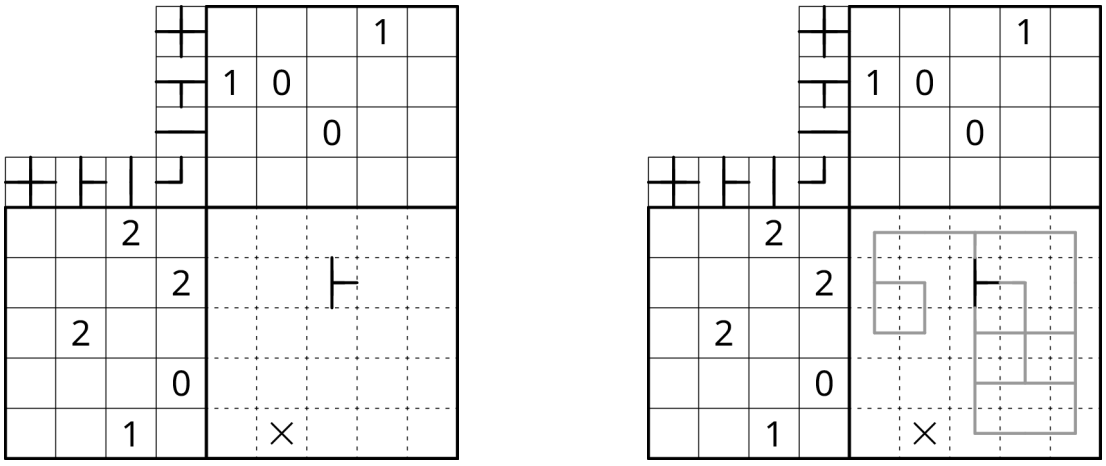
地铁

土+金 / Earth + Metal

Example adapted from PGP 2023 R8

*U-Bahn ("underground" in German) has metal trains running through earth.*

Draw orthogonal lines connecting some pairs of centers of adjacent cells in the main grid to form one connected network. No cell can be connected to exactly one adjacent cell (i.e. no dead ends), but some may have no connections. Numbers outside the grid indicate the number of cells in the row or column that have the corresponding type of connections (crossing, T-junction, straight, or turn), regardless of orientation. The contents of some cell may be given; cells marked with a cross must be left empty.



# 05.02 Anglers

**20**pts

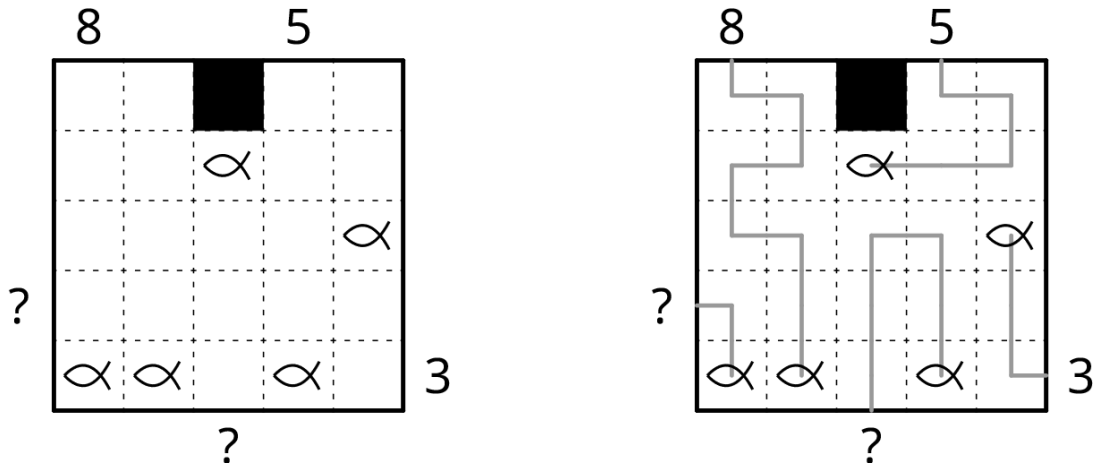
渔夫

金+水 / Metal + Water

Example adapted from puzz.link

*Anglers catch fish in water using metallic fishing hooks.*

Draw an orthogonal path from each number outside the grid to a fish, passing through centers of adjacent cells. Each fish must be connected to by exactly one number. The paths may not intersect themselves or each other, including at the endpoints. All cells must be used by exactly one path. Numbers indicate length of the path (which is equivalent to the number of cells its path uses, including the cell with the fish).



## 05.03 Norinori

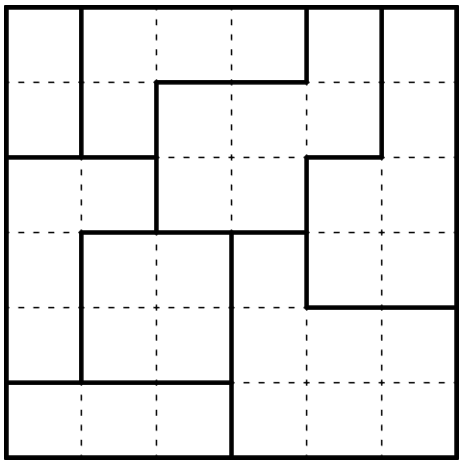
**15**pts

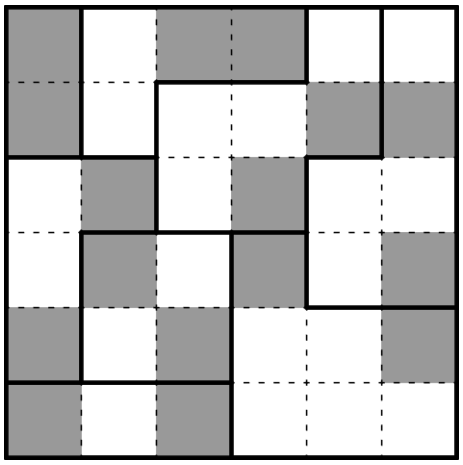
海苔

水+木 / Water + Wood
Example from PGP 2024 R4

*Nori ("seaweed" in Japanese) is a type of plant-like aquatic algae.*

Shade exactly two cells in each region, so that each connected group of shaded cells has exactly two cells.





## 05.04 Tents

**50**pts

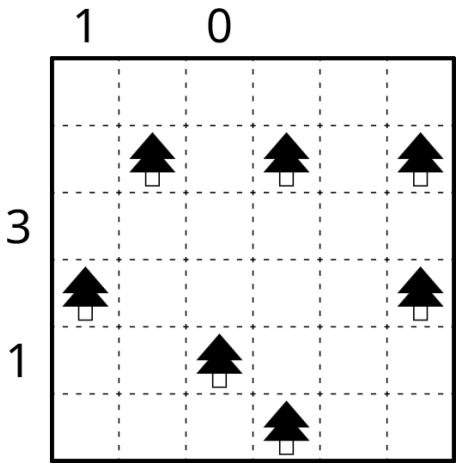
帐篷

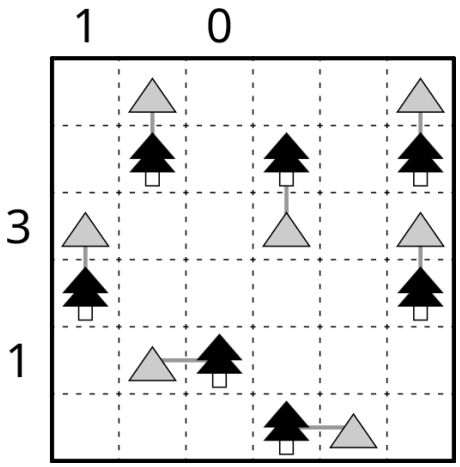
木+火 / Wood + Fire
Example from PGP 2024 R8

*Tents are found near trees, and often associated with campfires.*

For each tree in the grid, place a tent in one of the empty cells adjacent to the tree. No two tents may be in the same cell or two touching cells. Numbers outside the grid indicate the number of tents in the row or column.

*The correspondence between tents and trees is part of the solution, and hence must be indicated for full credit.*



## 05.05 Araf

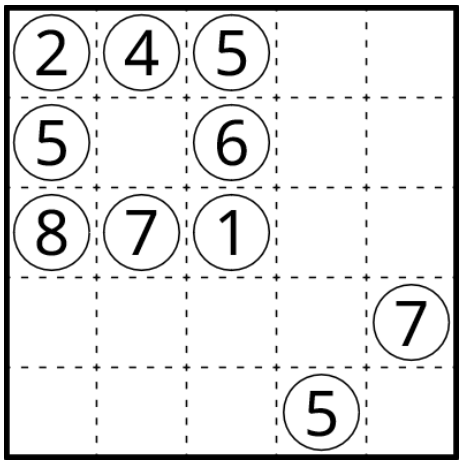
**30**pts

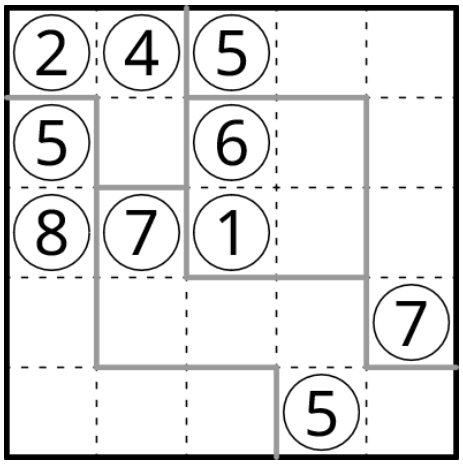
炼狱

火+土 / Fire + Earth
Example adapted from PGP 2022 R7

*Araf ("purgatory" in Turkish) is often depicted as a fiery land.*

Divide the grid into regions along dashed gridlines so that each region contains exactly two numbers in circles. The area of each region must be strictly between the two numbers in the region (in particular, neither number can be equal to the area).




## 05.06 Nurimisaki

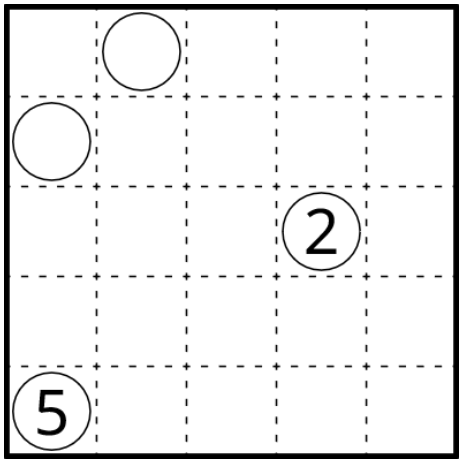
**20**pts

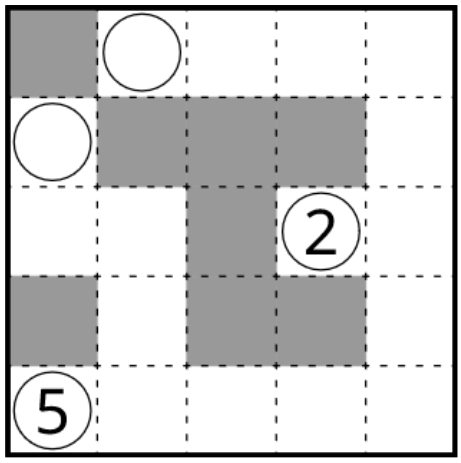
数岬

土+水 / Earth + Water
Example adapted from puzz.link

*Misaki ("promontory" in Japanese) is a landmass that is mostly surrounded by water.*

Shade some empty cells so that the unshaded cells form one connected group. No 2×2 group of cells can be entirely shaded or entirely unshaded. Circles indicate the positions of all unshaded cells that is adjacent to exactly one other unshaded cell. Numbers in circles indicate the number of unshaded cells connected in a straight orthogonal line to the circled cell without any shaded cells in between, including the cell itself.



## 05.07 Yosenabe

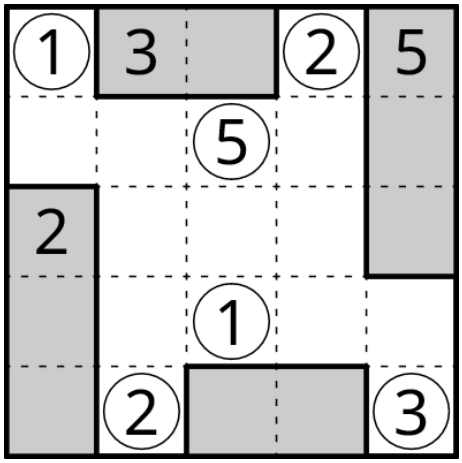
**20**pts

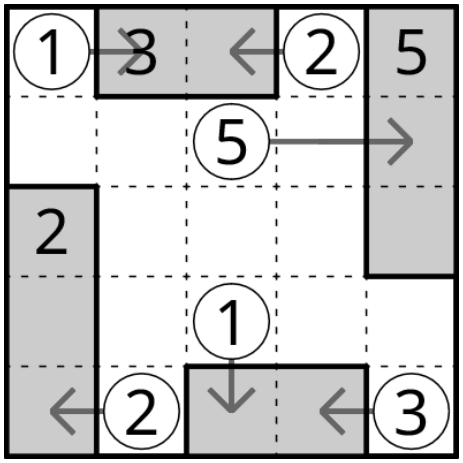
火锅

水+火 / Water + Fire
Example from puzz.link

*Yosenabe is a type of hot pot with boiling water.*

Move each circle orthogonally into a grey region so that every grey region contains at least one circle. The paths of the circles may not intersect each other, including at the endpoints. Circles may move past a grey region without stopping in it. The numbers in grey regions indicate the sum of numbers of all circles that are moved into the region.




## 05.08 Laser

**85**pts

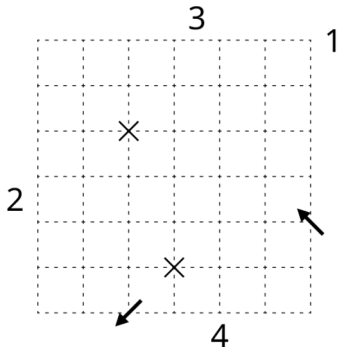
激光

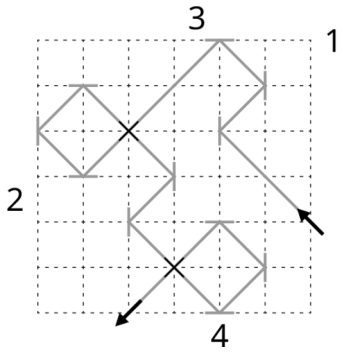
火+金 / Fire + Metal
Example from WPC 2013 IB

*A laser is a high-energy beam of light that can be reflected with metallic mirrors.*

Place a horizontal or vertical mirror on some vertices of the grid, and draw a path (representing a laser beam) entering and leaving the grid at the indicated locations (in the indicated directions). The path travels diagonally through centers of cells, and can only turn at vertices where a mirror is placed (via reflection). Every vertex where the path intersects itself is marked with a cross. Each mirror must be used exactly once, and cannot be placed on the arrows or crosses. Numbers to the left of or above the grid indicate the number of cells in the row or column that is used by the path; numbers to the right or below the grid indicate the number of mirrors placed on the horizontal or vertical line, regardless of orientation.

*For full credit, it is sufficient to only place the mirrors OR only draw the path.*



# 05.09 Herugolf

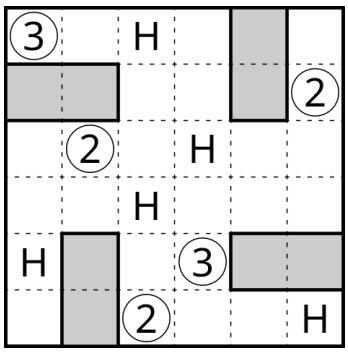
**20**pts

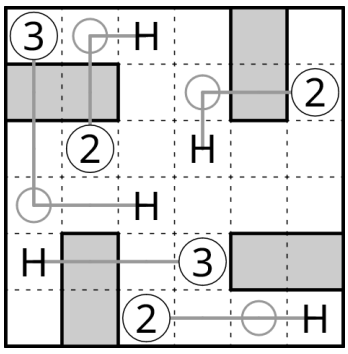
高尔夫

金+木 / Metal + Wood
Example adapted from puzz.link

*Golf involves striking balls with metal clubs on a grassy fairway.*

Move each circle to a cell marked “H” via a series of (at least one) orthogonal moves. Each cell marked “H” must be reached by exactly one circle. The length of the first move in each series must be equal to the number in the circle, and the length of each successive move must be exactly one less than the previous move (hence the total number of moves cannot exceed the number in the circle). The end of each move may not be in grey cells (representing water hazards), but circles may pass through them during a move. Directions of consecutive moves may be the same or different, but cannot be completely opposite of each other (i.e. no U-turns). The paths of circles may not intersect themselves or each other, including at the endpoints.




# 05.10 Statue Park

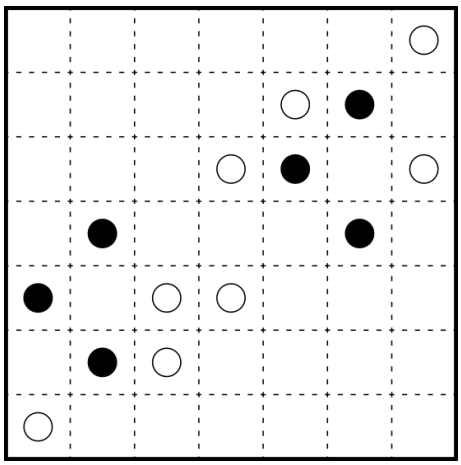
**75**pts

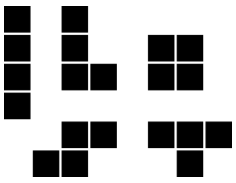
雕像公园

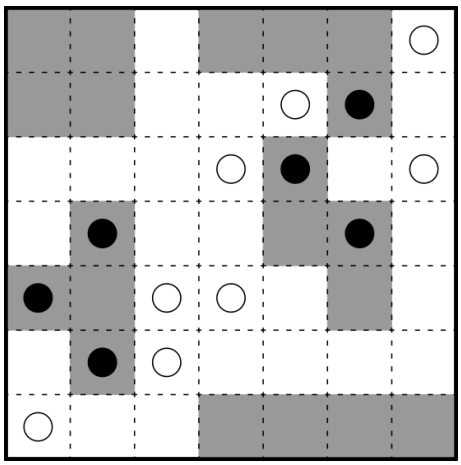
木+土 / Wood + Earth
Example from PGP 2022 R3

*A statue park is where statues made of concrete or marble are placed in a common green space.*

Place the given shapes into the grid so that no two shapes overlap or are adjacent to each other (but may touch each other at a point), and the remaining unoccupied cells form one connected group. The shapes may be rotated or reflected before being placed in the grid. Cells with black circles must be occupied by a shape, and cells with white circles cannot be occupied.







Individual Round 06

# Solar Terms

节气

24 Puzzles

105 Minutes

**1050** Points

| | | |
|---|---|---|
| 01 | LITS | **35** |
| 02 | Clouds | **35** |
| 03 | Worms | **10** |
| 04 | LITS (Splitter) | **75** |
| 05 | Akari | **25** |
| 06 | Aquapelago | **25** |
| 07 | Kakuro | **45** |
| 08 | Top Heavy Number Place | **55** |
| 09 | Skyscrapers | **45** |
| 10 | Kakuro (Hexagonal) | **120** |
| 11 | Magic Summer | **5** |
| 12 | Magic Summer | **30** |
| 13 | Fillomino | **20** |
| 14 | Dominoes | **100** |
| 15 | Sashigane | **45** |
| 16 | Fillomino (Matching Splitter) | **95** |
| 17 | Heavy Dots | **65** |
| 18 | FiveCells | **25** |
| 19 | Simple Loop | **5** |
| 20 | Slalom | **10** |
| 21 | Slalom | **10** |
| 22 | Simple Loop (All Crossings, Toroidal) | **35** |
| 23 | Icebarn | **30** |
| 24 | Icebarn | **105** |

*The traditional Chinese calendar divides the year into 24 "jieqi", or "solar terms", 6 for each season. The solar terms are generally named after natural or agricultural phenomena. Some of the dates that mark the beginning of solar terms are also observed as holidays in China.*

This round features 24 puzzles, one themed after each solar term. The 6 puzzles corresponding to each season belong to the same category: Shading/Objects for spring, Numbers for summer, Division for autumn, and Loops/Paths for winter.

*This round is eligible for the more lenient partial bonus for having at least 20 puzzles.*

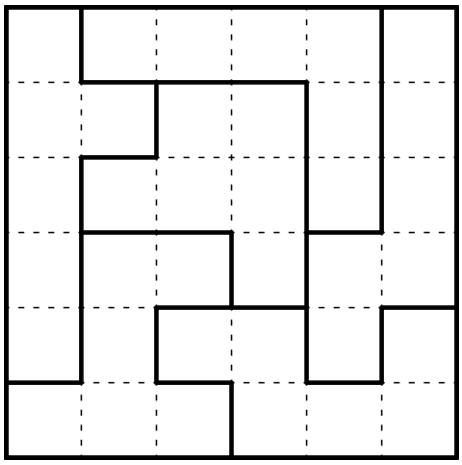
## 06.01 LITS

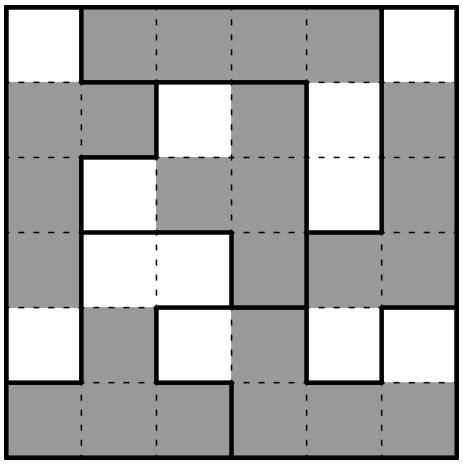
**35**pts

四格骨墙

立春 / Beginning of Spring
Example adapted from PGP 2023 R2

Shade a tetromino in each region so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded. No two congruent shaded tetrominoes in different regions may be adjacent.





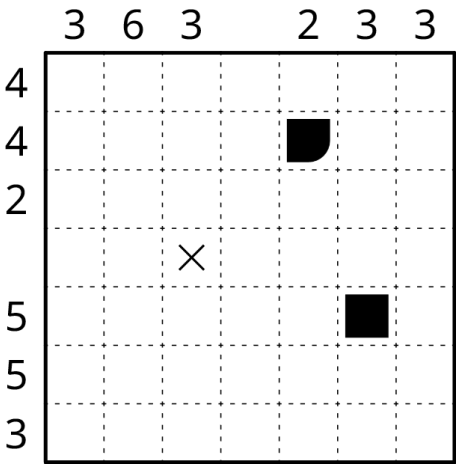
## 06.02 Clouds

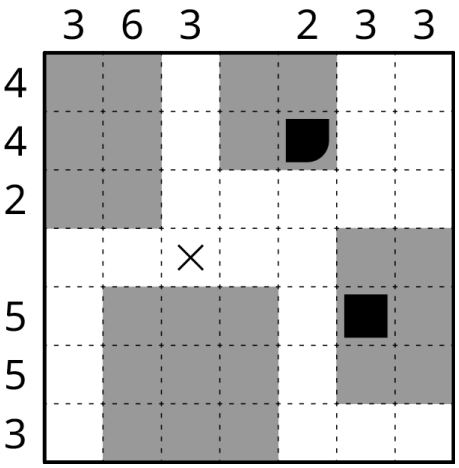
**35**pts

云团

雨水 / Rain Water
Example adapted from PGP 2019 R4

Shade some cells so that each connected group of shaded cells is a rectangle whose width and height are both at least 2 (representing a cloud). No two clouds may be touching. Numbers outside the grid indicate the number of shaded cells in the row or column. The contents of some cells may be provided: a black cell with a rounded corner indicates that it must be a corner of a cloud; a black square cell indicates that it is part of a cloud that is not a corner; a cross indicates that it must be left unshaded.



## 06.03 Worms

**10**pts

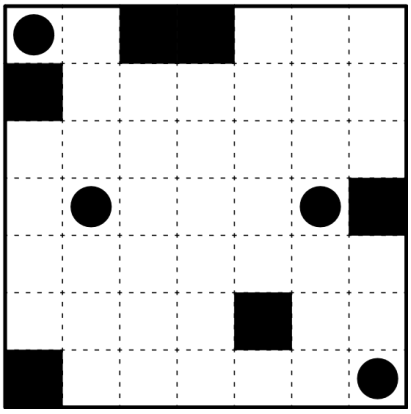
蠕虫

惊蛰 / Awakening of Insects
Example by Yao Yuan

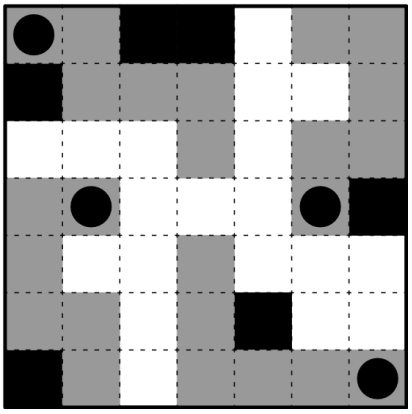
*This version of "Worms" previously appeared in WPC 2015, slightly generalized here.*

Shade some one-cell-wide snakes, whose lengths (in cells) are indicated by the boxed number outside the grid. Exactly one end of each snake must be at one of the cells with a black circle, and each black circle must be used by exactly one snake. Snakes cannot touch themselves or each other.

6



6



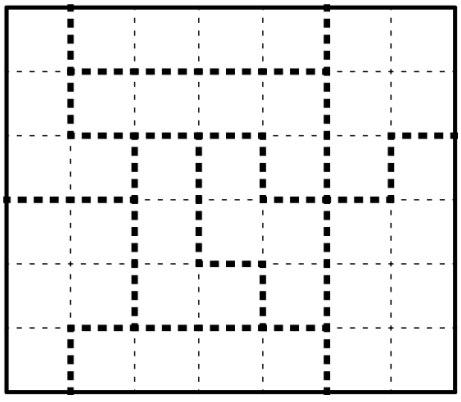
## 06.04 LITS (Splitter)

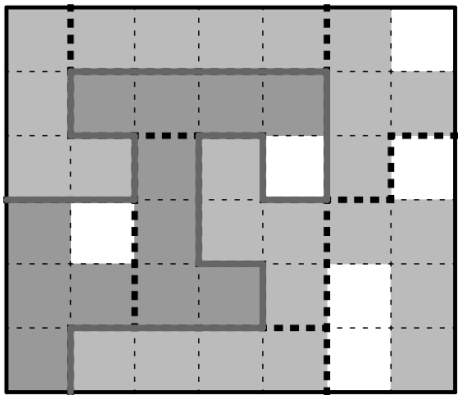
**75**pts

四格骨墙（分盘）

春分 / Spring Equinox
Example by Yao Yuan

Divide the grid into two connected sub-grids along heavy dotted region borders, then shade a tetromino in each region so that the shaded cells within each sub-grid form one connected group and no 2×2 group of cells within a sub-grid is entirely shaded. No two congruent shaded tetrominoes in different regions of the same sub-grid may be adjacent.





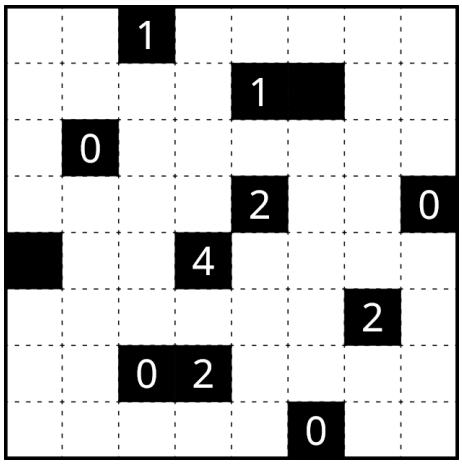
## 06.05 Akari

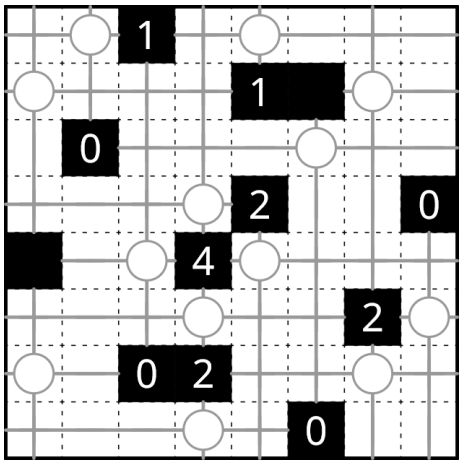
**25**pts

美术馆

清明 / Pure Brightness
Example from PGP 2023 R5

Place a light bulb in some empty cells so that all empty cells are illuminated. A light bulb in a cell illuminates all cells that are connected in a straight orthogonal line to the cell without any black cells in between, including the cell itself. No two light bulbs may illuminate each other. Numbers in black cells indicate the number of light bulbs in adjacent cells.



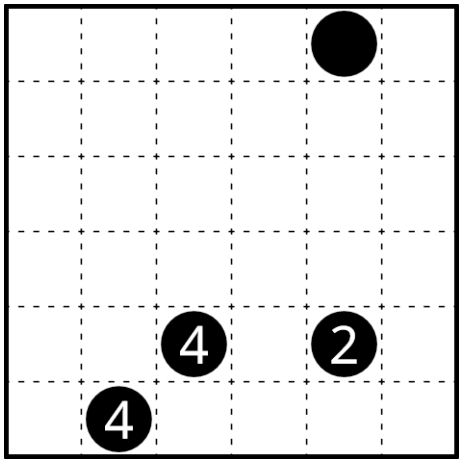

## 06.06 Aquapelago

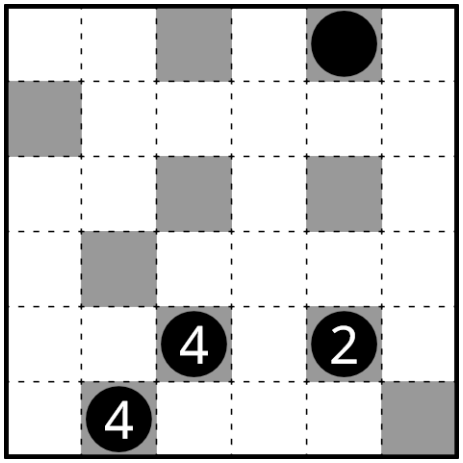
**25**pts

千岛湖

谷雨 / Grain Rain
Example from puzz.link

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. No 2×2 group of cells may be entirely unshaded. Black circles must be in shaded cells, and numbers in those circles indicate the number of shaded cells in the same diagonally connected group as the cell, including the cell itself.



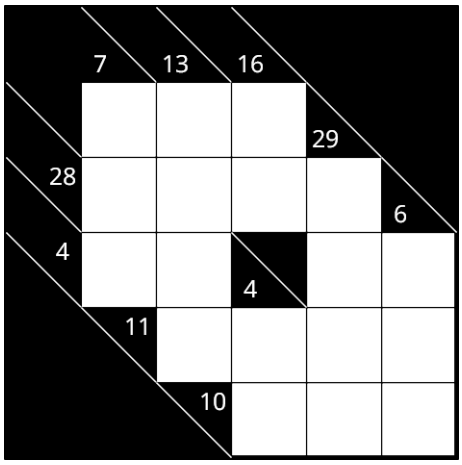
# 06.07 Kakuro

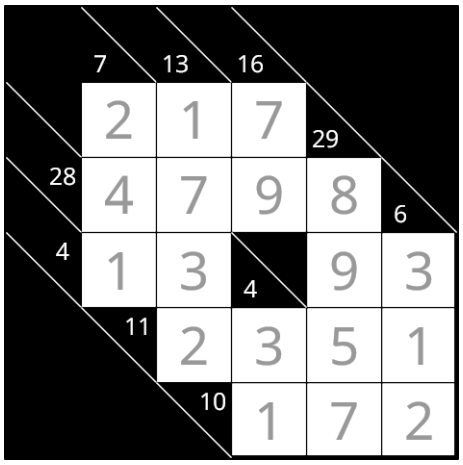
**45**pts

数和

立夏 / Beginning of Summer
Example from PGP 2024 R8

Place a digit from 1 to 9 in each empty cell so that digits do not repeat within each horizontal or vertical block of empty cells. Numbers in black triangles indicate the sum of digits in the adjacent block to the right or below it (in the direction that the triangle is facing).




# 06.08 Top Heavy Number Place

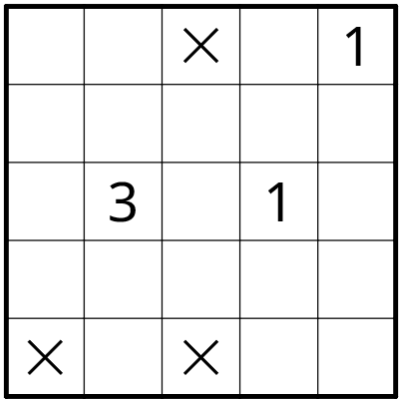
**55**pts

头重脚轻

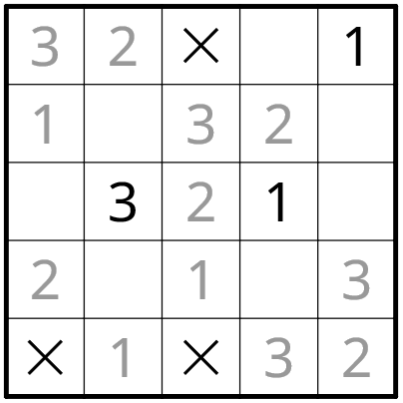
小满 / Grain Buds
Example from PGP 2019 R3

Place a number in the indicated list into some empty cells so that each number in the list appears exactly once in each row and column. Whenever two numbers are in vertically adjacent cells, the number on top must be larger than the number on the bottom. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

1~3




1~3



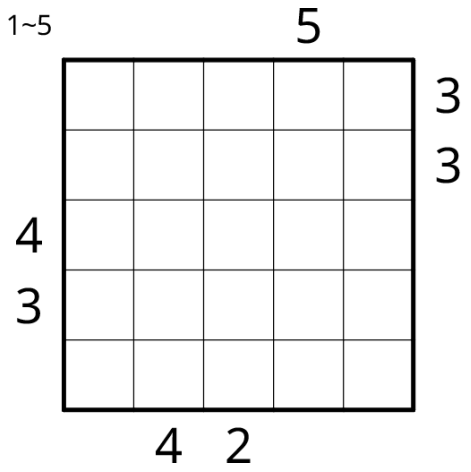
## 06.09 Skyscrapers

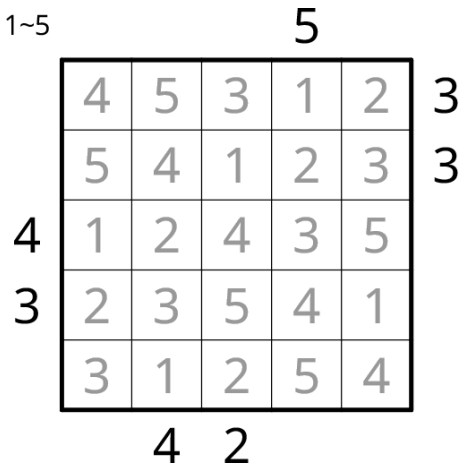
**45**pts

摩天楼

芒种 / Grain in Ear
Example from PGP 2024 R7

Place a number from the indicated list into some empty cells so that each number in the list appears exactly once in each row and column. Each number represents a skyscraper of its respective height. Numbers outside the grid indicate the number of skyscrapers that can be seen in the row or column from the respective direction, where shorter skyscrapers are hidden behind taller ones. (Empty cells do not block vision.) Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.



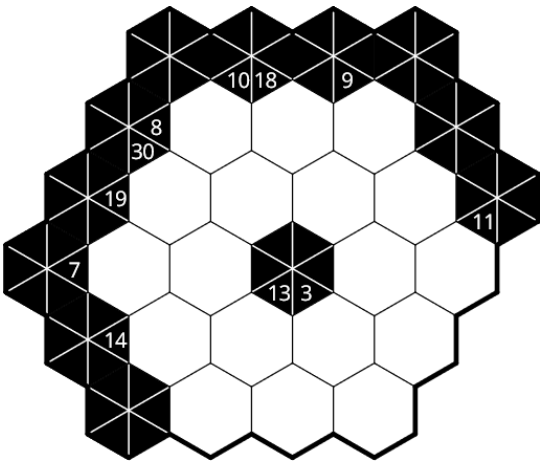

## 06.10 Kakuro (Hexagonal)

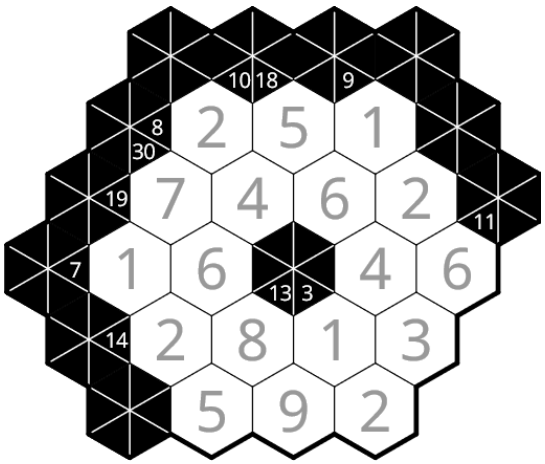
**120**pts

数和（六边形）

夏至 / Summer Solstice
Example by Yao Yuan

Place a digit from 1 to 9 in each empty cell so that digits do not repeat within each consecutive block of empty cells in any of the three standard directions. Numbers in black triangles indicate the sum of digits in the adjacent block (in the direction that the triangle is facing).



| 06.11 | 06.12 | Magic Summer |
|---|---|---|
| **5**pts | **30**pts | 魔夏 |

小暑+大暑 / Minor Heat + Major Heat
Example adapted from PGP 2015 R3

Place a digit in the indicated list into some empty cells so that each digit in the list appears exactly once in each row and column. Numbers outside the grid indicate the sum of all numbers formed by the digits in the row or column, where digits in consecutive cells form multi-digit numbers from left to right or from top to bottom. Some digits may be already placed in the grid. Cells marked with a cross cannot contain a digit.

1~4

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | 37 |
| | | | | | | 46 |
| | | | | | | 424 |
| | | | | | | 19 |
| | | | | | | |
| | | | | | | 3142 |
| 37 | 37 | 28 | 37 | 37 | 145 | |

1~4

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | | 4 | | 3 | 2 | 37 |
| 3 | 2 | | 1 | 4 | | 46 |
| | 4 | 2 | 3 | | 1 | 424 |
| 2 | | 3 | | 1 | 4 | 19 |
| 4 | 1 | | 2 | | 3 | |
| | 3 | 1 | 4 | 2 | | 3142 |
| 37 | 37 | 28 | 37 | 37 | 145 | |

# 06.13 Fillomino

**20**pts

码牌

立秋 / Beginning of Autumn
Example from PGP 2022 R4

Divide the grid into regions along dashed gridlines so that no two adjacent regions have the same area. Numbers indicate the area of the region that it belongs to.

*For full credit, it is sufficient to draw the dividing lines OR fill each cell with a number indicating the area of its region.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8 | | | | 1 | 4 | | |
| | | 2 | | 4 | | | |
| | 2 | | | | | | 4 |
| | | | 6 | | | 6 | 5 |
| 1 | 5 | | | 2 | | | |
| 4 | | | | | | 1 | |
| | | | 4 | | 3 | | |
| | | 4 | 5 | | | | 3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8 | 8 | 8 | 8 | 1 | 4 | 2 | 4 |
| 8 | 8 | 2 | 2 | 4 | 4 | 2 | 4 |
| 8 | 2 | 5 | 6 | 4 | 6 | 4 | 4 |
| 8 | 2 | 5 | 6 | 6 | 6 | 6 | 5 |
| 1 | 5 | 5 | 2 | 2 | 5 | 5 | 5 |
| 4 | 4 | 5 | 4 | 3 | 5 | 1 | 3 |
| 4 | 2 | 4 | 4 | 3 | 3 | 5 | 3 |
| 4 | 2 | 4 | 5 | 5 | 5 | 5 | 3 |

# 06.14 Dominoes

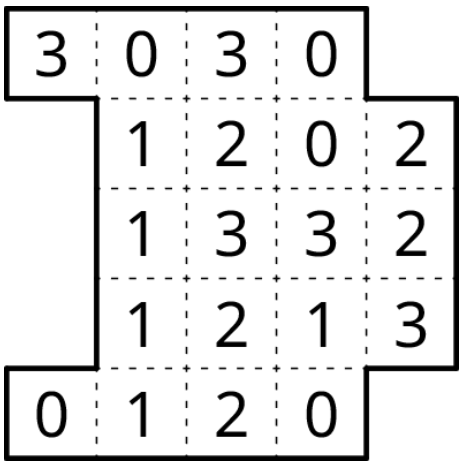
**100**pts

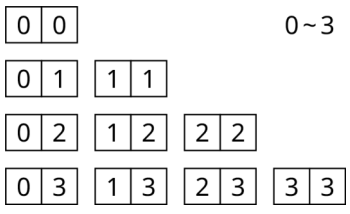
多米诺

处暑 / End of Heat
Example from PGP 2024 R8

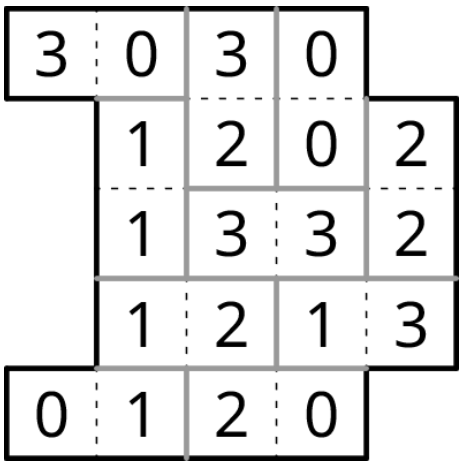
Divide the grid into dominoes along dashed gridlines so that every possible (unordered) pair of numbers in the indicated list appears in the same domino exactly once.

*A list of all possible pairs is provided for convenience.*




0~3



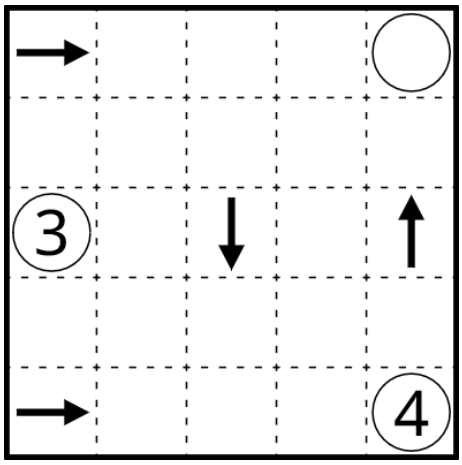
## 06.15 Sashigane

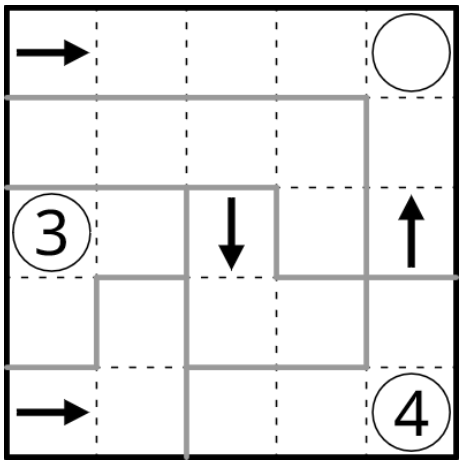
**45**pts

曲尺分割

白露 / White Dew
Example from puzz.link

Divide the grid into 1-cell-wide L-shaped regions along dashed gridlines. Circles must be at the turn of its region and arrows must be at an end of its region, pointing toward the turn. Numbers in circles indicate the area of the region that it belongs to.




## 06.16 Fillomino (Matching Splitter)

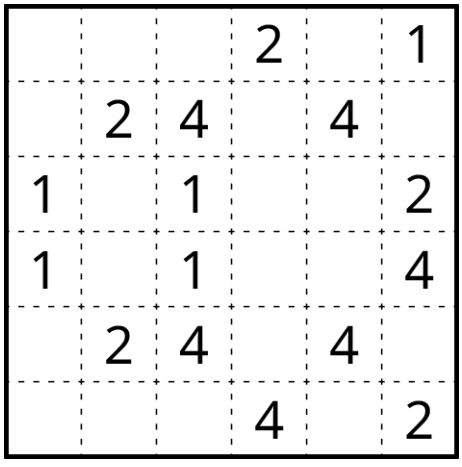
**95**pts

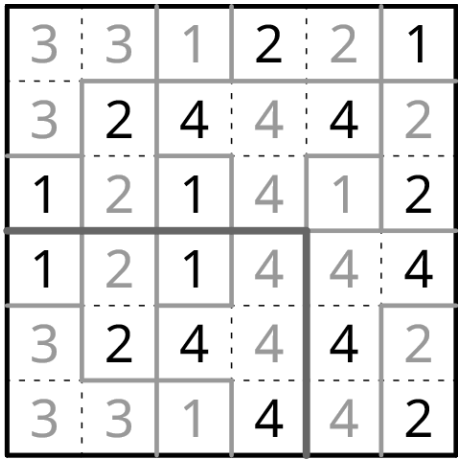
码牌（对等分盘）

秋分 / Autumn Equinox
Example by Qin Jiaqi

Divide the grid into two connected sub-grids along dashed gridlines, then divide each sub-grid into regions along dashed gridlines so that no two adjacent regions in the same sub-grid have the same area. Any two adjacent regions in different sub-grids must have the same area. Numbers in cells indicate the area of the region that it belongs to.

*For full credit, please clearly differentiate the notation used for dividing sub-grids and dividing regions.*



## 06.17 Heavy Dots

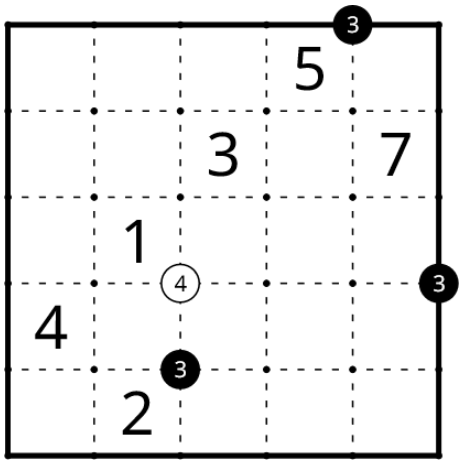
**65**pts

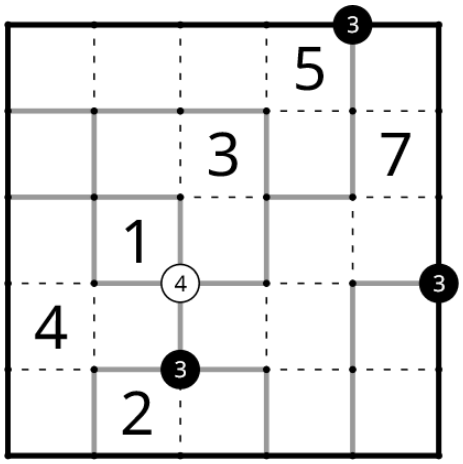
重点

寒露 / Cold Dew
Example by Yao Yuan

Divide the grid into regions along dashed gridlines so that no region contains a 2×2 group of cells. Each region may contain at most one number, indicating the area of the region. Black dots must have exactly three region borders extending out of it, while white dots must have exactly four region borders. Not all possible black and white dots are necessarily marked, but unmarked vertices adjacent to a black or white dot must not have three or four regions borders extending out of it.

*The black and white dots contain a small "3" and "4" respectively as a reminder.*



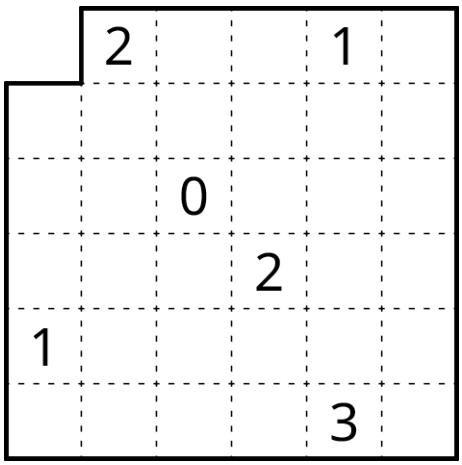

## 06.18 FiveCells

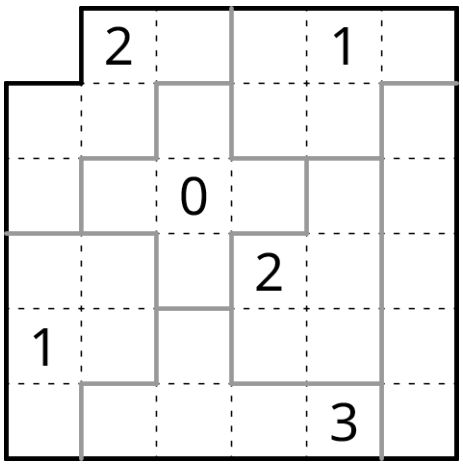
**25**pts

五格分区

霜降 / Frost's Descent
Example from puzz.link

Divide the grid into pentominoes along dashed gridlines. Numbers indicate the number of adjacent edges that are region borders.



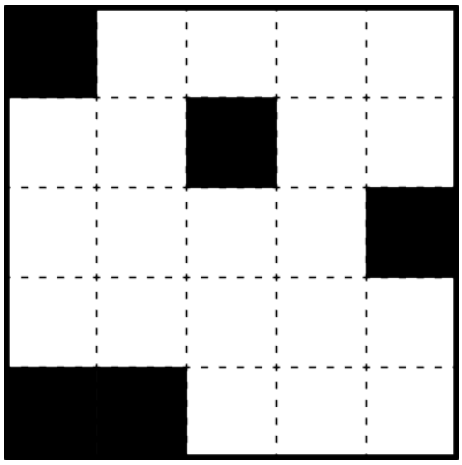
# 06.19 Simple Loop

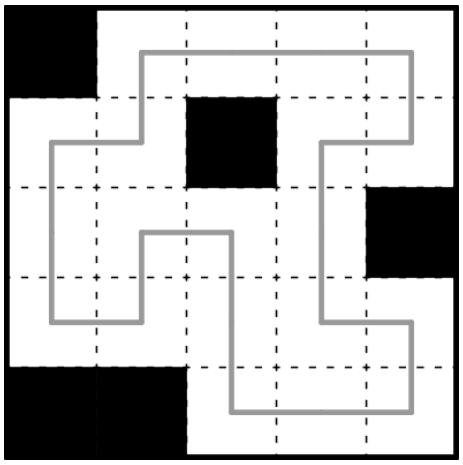
**5**pts

简单回路

立冬 / Beginning of Winter
Example from PGP 2023 R3

Draw a non-intersecting loop that passes orthogonally through the centers of all empty cells exactly once (and no other cells).





# 06.20 06.21 Slalom

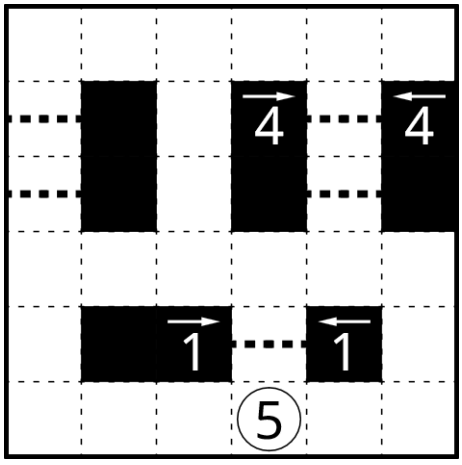
**10**pts | **10**pts

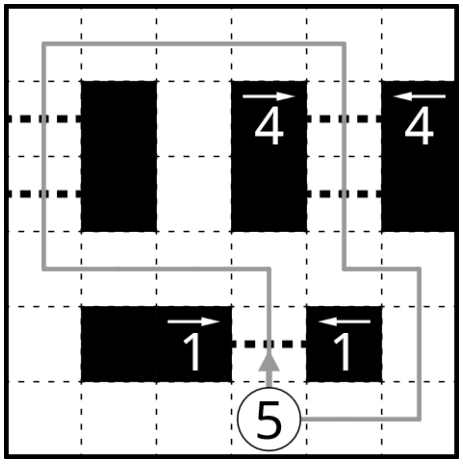
巡行通关

小雪+大雪 / Minor Snow + Major Snow
Example from puzz.link

Draw an oriented non-intersecting loop through the centers of some white cells, starting and ending at the cell containing a circle. The loop must pass straight through each “gate” (represented by heavy dashed lines) exactly once, without turning on the gates. Numbers with arrows in black cells indicate the order in which the indicated gate must be visited along the loop (starting at the circle).

*The number in the circle indicates the total number of gates for convenience. For full credit, the direction of the loop must be indicated.*



# 06.22 Simple Loop (All Crossings, Toroidal)

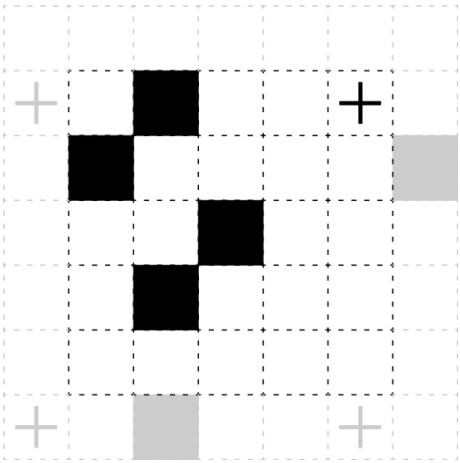
**35**pts

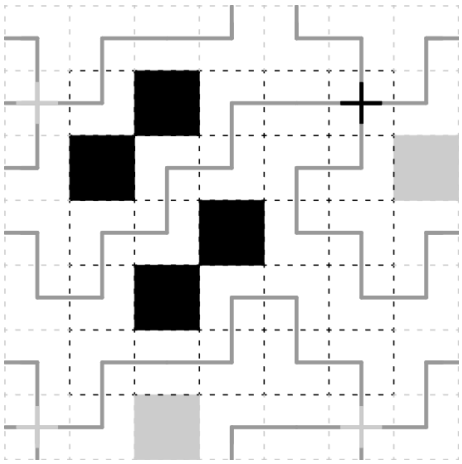
简单回路（全交叉、环面）

冬至 / Winter Solstice
Example by Yao Yuan

Draw a single loop that passes orthogonally through the centers of all empty cells. The loop must intersect itself orthogonally exactly at the cells containing a "+" symbol and nowhere else. The grid is toroidal, meaning that the first row is adjacent to the last row (in the same order), and similar for the first and last column.

*The first and last row and column are duplicated on the opposite sides of the grid in light grey for convenience. For full credit, it is sufficient to draw the loop within the main grid (in black).*





# 06.23 06.24 Icebarn

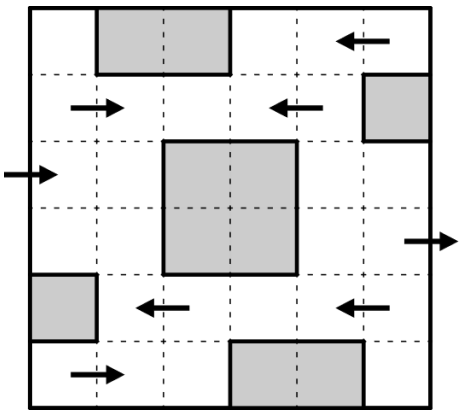
**30**pts

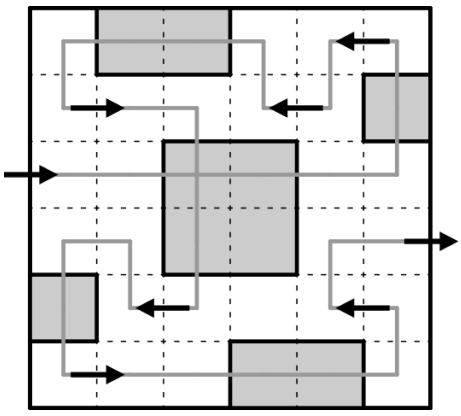
**105**pts

冰宫游弋

小寒+大寒 / Minor Cold + Major Cold
Example from PGP 2022 R4

Draw a path that passes orthogonally through the centers of some cells, starting at the inward arrow on the boundary of the grid and ending at the outward arrow on the boundary. The path must travel through all arrows in the indicated direction. The path may not intersect itself on white cells. The path may not turn on grey ("icy") cells, but may intersect itself orthogonally on such cells. Each (outlined) connected group of grey cells must be visited at least once.





Individual Round 07

# Duality

太极

18 Puzzles

60 Minutes

**600** Points

| | | |
|---|---|---|
| 01 | Yin-Yang | **5** |
| 02 | Domino Domino | **10** |
| 03 | Binairo | **30** |
| 04 | Not Alone | **30** |
| 05 | Light and Shadow | **30** |
| 06 | Go | **85** |
| 07 | Syuma | **25** |
| 08 | Pearl Loop | **20** |
| 09 | Alternate Loop | **50** |
| 10 | Kuroshiro Loop | **70** |
| 11 | KaitoRamma | **15** |
| 12 | Black and White | **15** |
| 13 | Shirokuro Link | **25** |
| 14 | Milk Tea | **35** |
| 15 | Voxas | **25** |
| 16 | Kropki Pairs | **75** |
| 17 | Clock Faces | **20** |
| 18 | Consecutive Quads | **35** |

*"Yin-Yang" refers to the two complementary forces believed to have originated from "Taiji", the undifferentiated state at the start of the universe. This concept has been used to describe many dualities in life and nature: hot and cold, growth and decay, high and low, bright and dark, etc.*

This round features puzzles that mainly use black and white circles as clues. They are grouped into pairs that have similar rules or clue presentation.

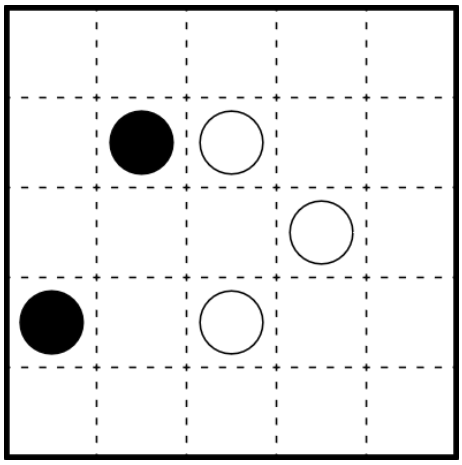
## 07.01 Yin-Yang

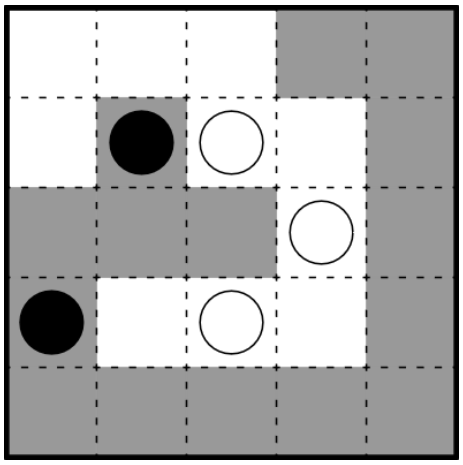
**5**pts

阴阳

Example from PGP 2023 R8

Shade some cells so that all shaded cells form one connected group and so do all unshaded cells. No 2×2 group of cells is entirely shaded or entirely unshaded. Cells with black circles must be shaded and cells with white circles must be unshaded.





## 07.02 Domino Domino

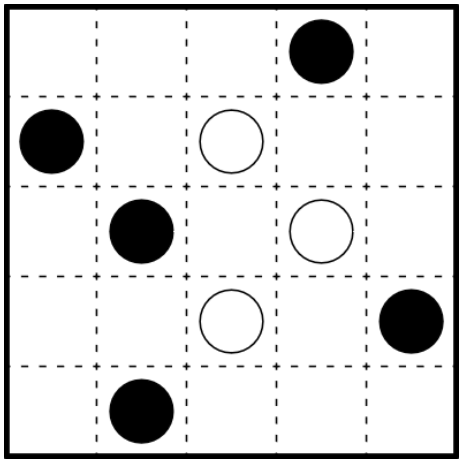
**10**pts

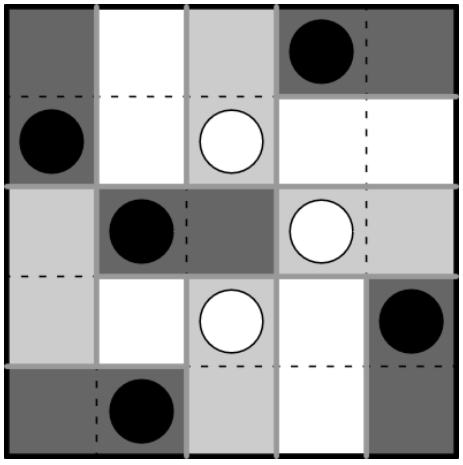
双色多米诺

Example by Yao Yuan

Place some dominoes that are entirely black or entirely white so that all cells occupied by dominoes form one connected group and no 2×2 group of cells is entirely occupied. No two dominoes of the same color may be adjacent. Cells with circles must be occupied by dominoes with the same color as the circle.

*For full credit, it is sufficient to mark the colors of all occupied cells OR outline the positions of all dominoes.*





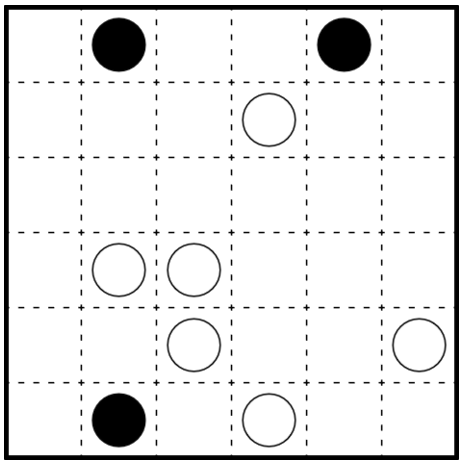
## 07.03 Binairo

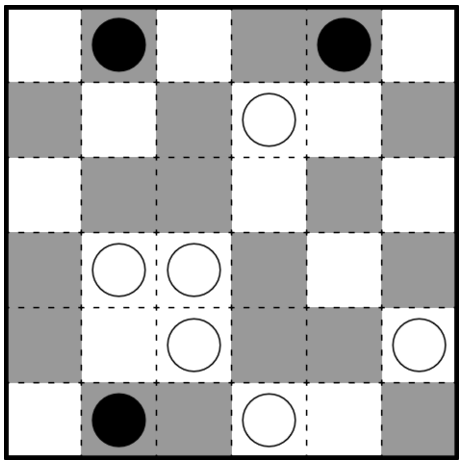
**30**pts

横竖无三

Example from PGP 2018 R2

Shade some cells so that no 1×3 or 3×1 group of cells is entirely shaded or entirely unshaded. Exactly half of the cells in each row and column must be shaded. The shading pattern (from left to right) of any two rows must be different, and same for any two columns (from top to bottom). Cells with black circles must be shaded and cells with white circles must be unshaded.





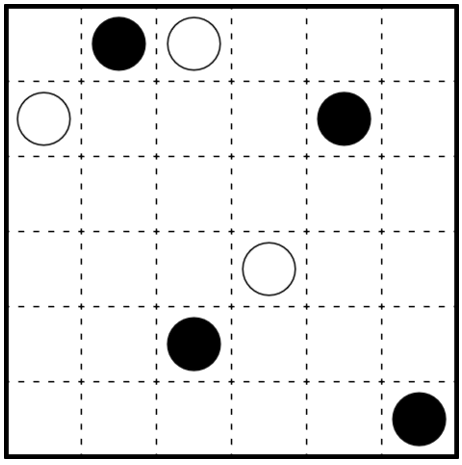
## 07.04 Not Alone

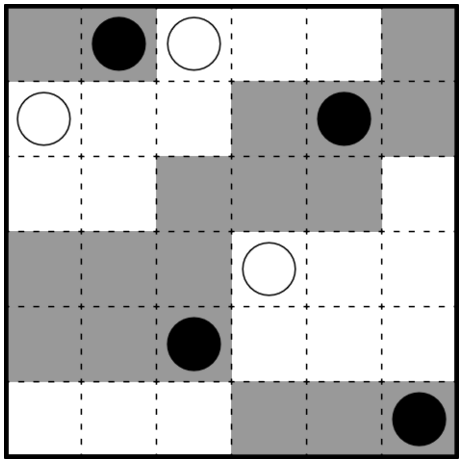
**30**pts

横竖无夹

Example by Yao Yuan

Shade some cells so that there are no 1×3 or 3×1 group of cells where the center cell has the opposite color as the other two cells. Exactly half of the cells in each row and column must be shaded. Cells with black circles must be shaded and cells with white circles must be unshaded.





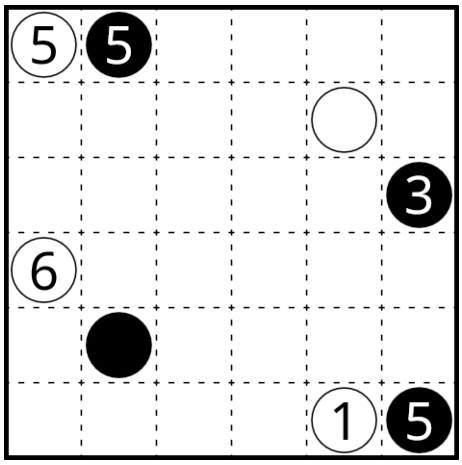
## 07.05 Light and Shadow

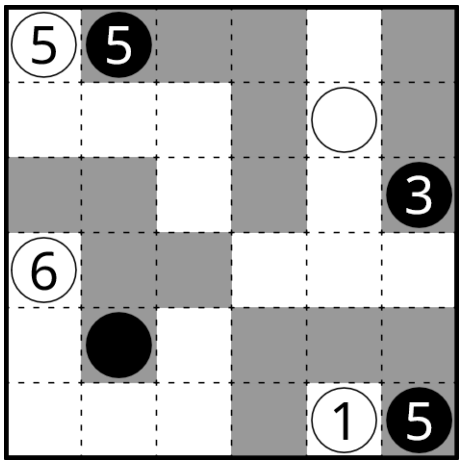
**30**pts

黑白分明

Example adapted from PGP 2024 R7

Shade some cells so that each connected group of shaded cells contain exactly one black circle (and no white circles) and each connected group of unshaded cells contain exactly one white circle (and no black circles). Numbers in circles indicate the area of the connected group of shaded or unshaded cells it is in.





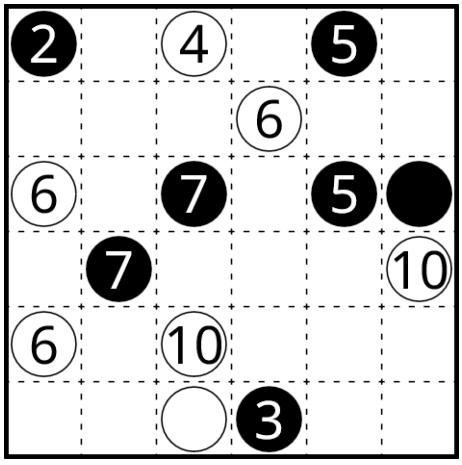
## 07.06 Go

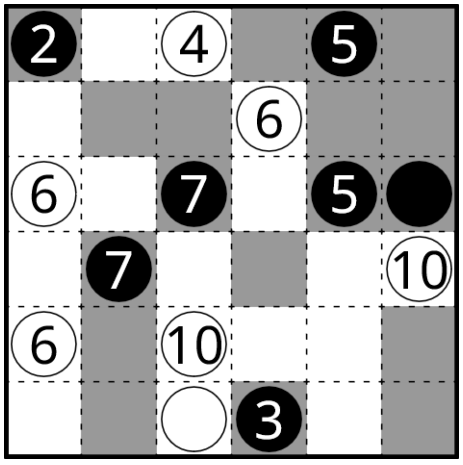
**85**pts

围棋

Example by Xu Chenhao

Shade some cells so that cells with black circles are shaded and cells with white circles are unshaded. Numbers in circles indicate the number of oppositely-colored cells that are adjacent to the connected group of shaded or unshaded cells it is in.





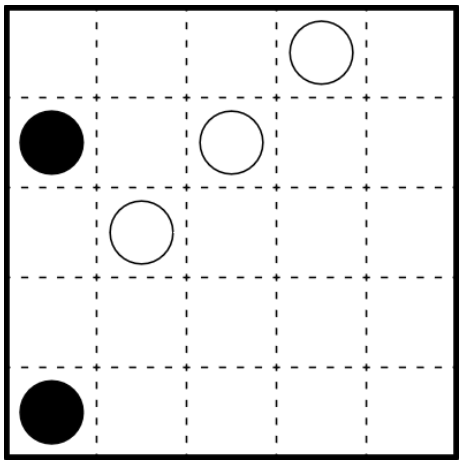
## 07.07 Syuma

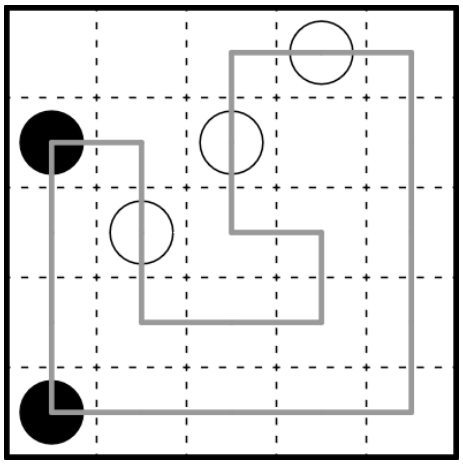
**25**pts

珠珍

Example by Yao Yuan

Draw a non-intersecting loop that passes orthogonally through centers of some cells, including all cells with circles. The loop must turn on cells with black circles, and travel straight through at least one of the two adjacent cells along the loop. The loop must go straight through cells with white circles, and turn on both of the adjacent cells along the loop.





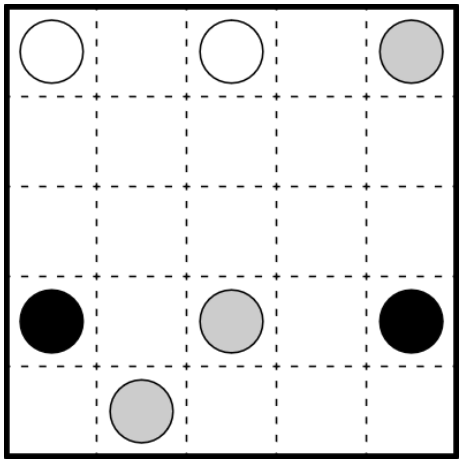
## 07.08 Pearl Loop

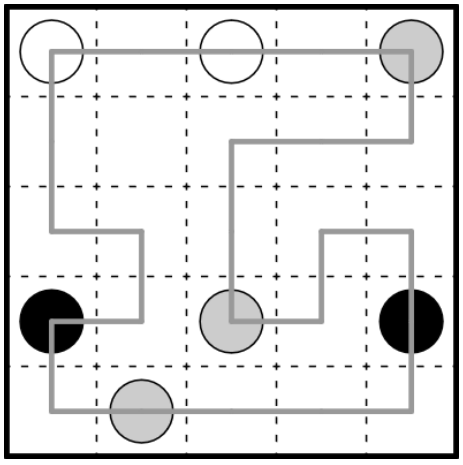
**20**pts

明珠回路

Example by Yao Yuan

Draw a non-intersecting loop that passes orthogonally through centers of some cells, including all cells with circles. The colors of circles indicate the number of turns that the loop make among the two adjacent cells (to the cell with the circle) along the loop: white circles represent no turns, grey circles represent one turn, and black circles represent two turns.





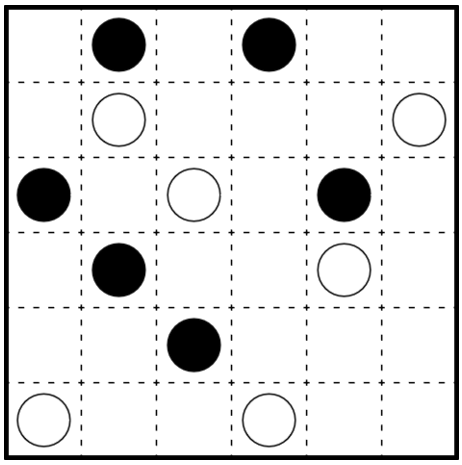
## 07.09 Alternate Loop

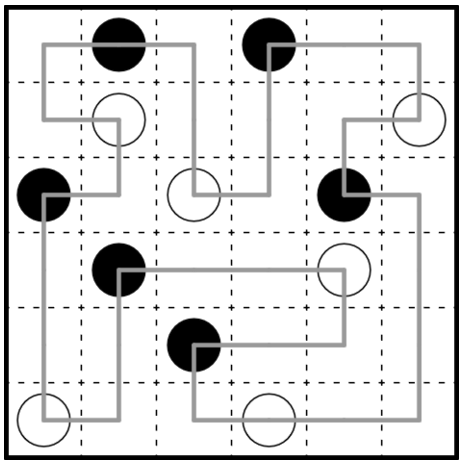
**50**pts

交替回路

Example by Yao Yuan

Draw a non-intersecting loop that passes orthogonally through the centers of all cells exactly once. Any two circles consecutively visited by the loop must not have the same color.





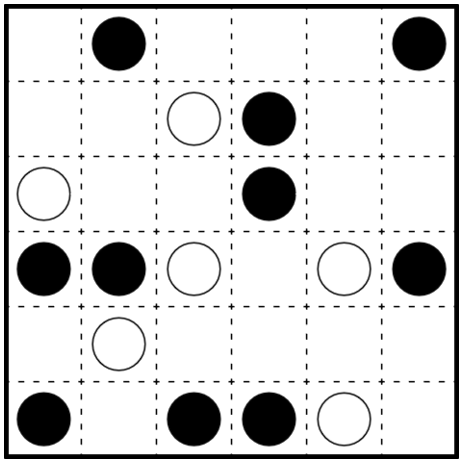
## 07.10 Kuroshiro Loop

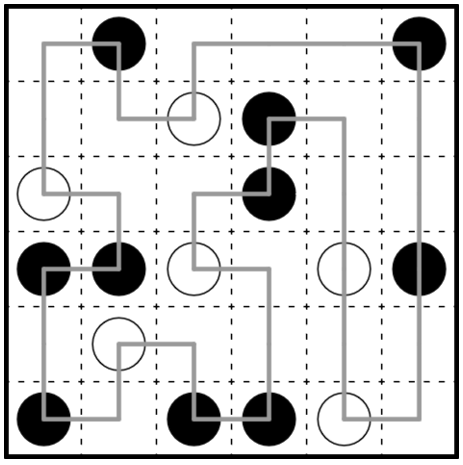
**70**pts

黑白回路

Example by Yao Yuan

Draw a non-intersecting loop that passes orthogonally through the centers of all cells exactly once. Between two consecutively visited circles of the same color, the loop must not turn. Between two consecutively visited circles of different colors, the loop must turn exactly once. (The turns on the cells with circles are not included for these purposes.)





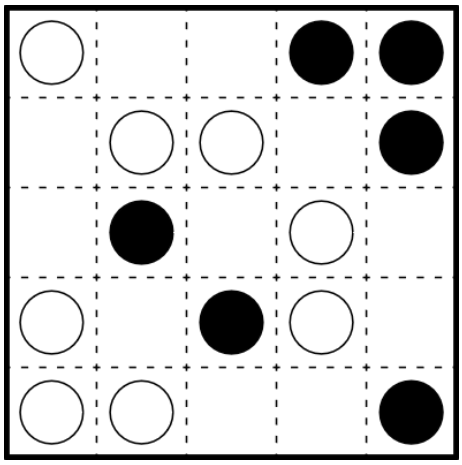
## 07.11 KaitoRamma

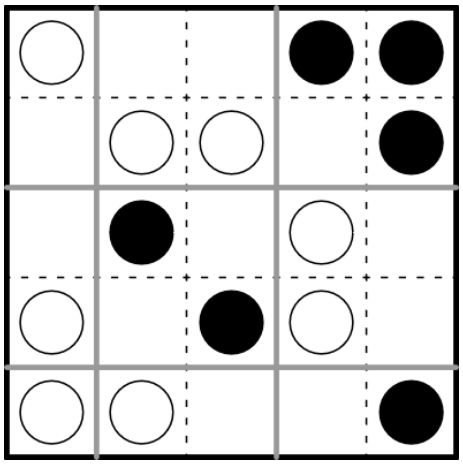
**15**pts

快刀乱麻

Example from puzz.link

Divide the grid into regions along dashed gridlines, where each dividing line must be orthogonal and starts and ends on the grid boundary. Each region must contain at least one circle, and all circles in a region must have the same color.





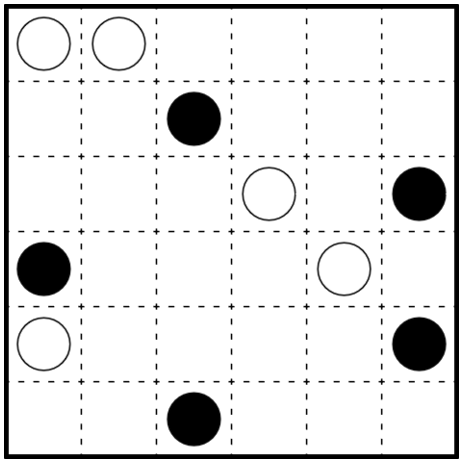
## 07.12 Black and White

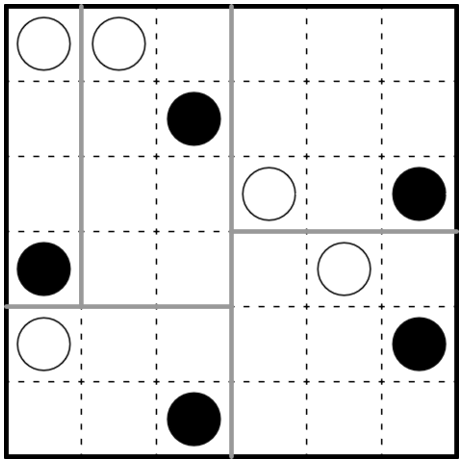
**15**pts

黑白分割

Example by Yao Yuan

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one black circle and one white circle.





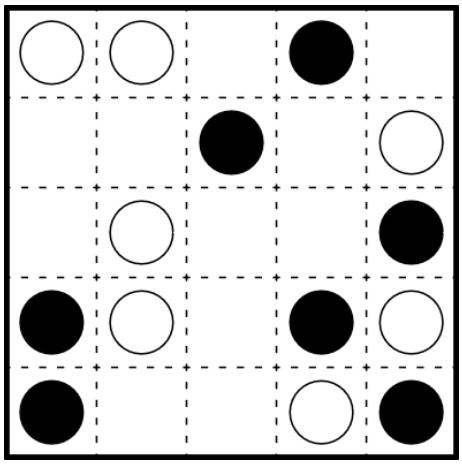
## 07.13 Shirokuro Link

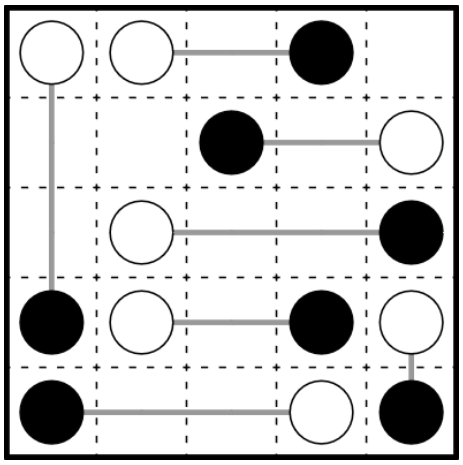
**25**pts

黑白配

Example from puzz.link

Connect pairs of one black circle and one white circle with orthogonal line segments so that every circle belongs to exactly one pair. The line segments may not intersect each other, including at endpoints.





## 07.14 Milk Tea

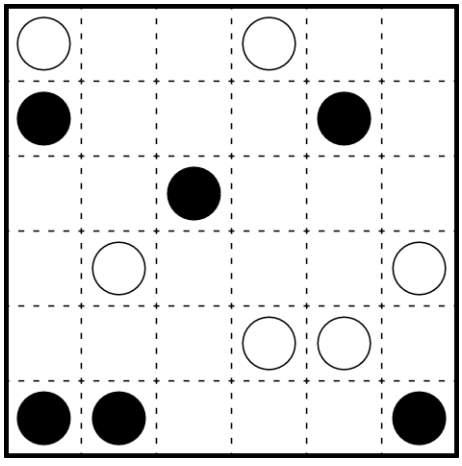
**35**pts

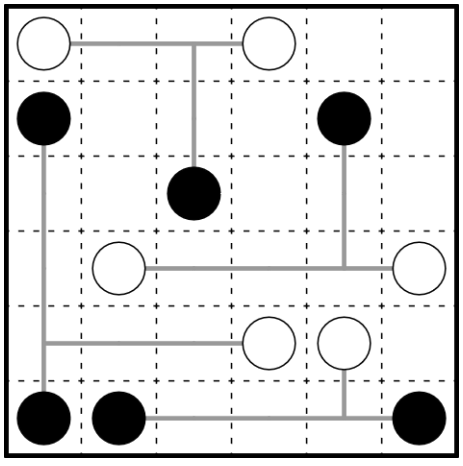
奶茶

Example by Yao Yuan

*A slightly generalized version from the original (which requires each group to have two white circles).*

Connect triples of black and white circles using “T”-shaped connections (formed by two perpendicular segments in orthogonal directions, where one endpoint of the second segment is on the interior of the first segment) so that each circle belongs to exactly one triple. Each triple must consists of two circles of one color and one circle of the other color, where the two circles of the same colors are directly connected by the first segment of the “T” and the third circle is connected to the first segment by the second segment. The “T” shapes may not intersect each other, including at endpoints.





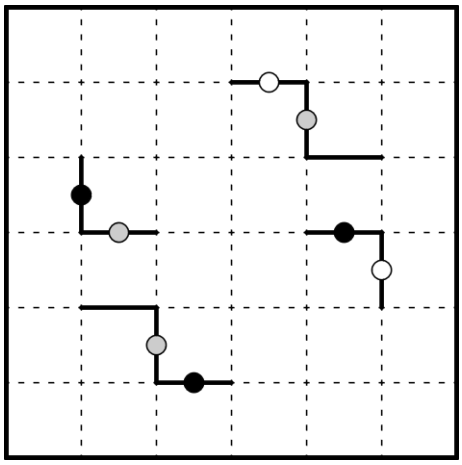
# 07.15 Voxas

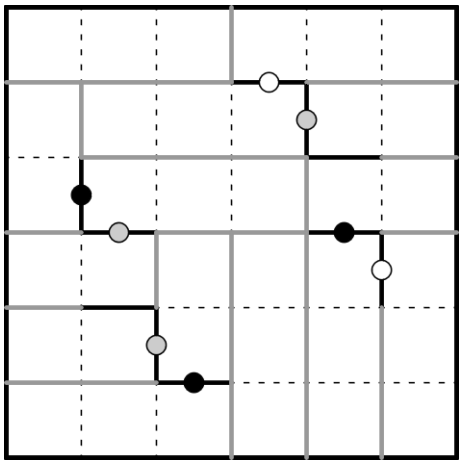
**25**pts

二三分割

Example from PGP 2024 R7

Divide the grid into rectangular regions along dashed gridlines so that each region has area 2 or 3. Such regions are horizontal if their height is 1 and vertical if their width is 1. Given borders must separate two different regions, and colors of dots on such borders indicate if the area and orientation of the two regions are equal or not: white dots mean that both the area and the orientation are equal, grey dots mean that exactly one of the two is equal, and black dots mean that neither is equal.





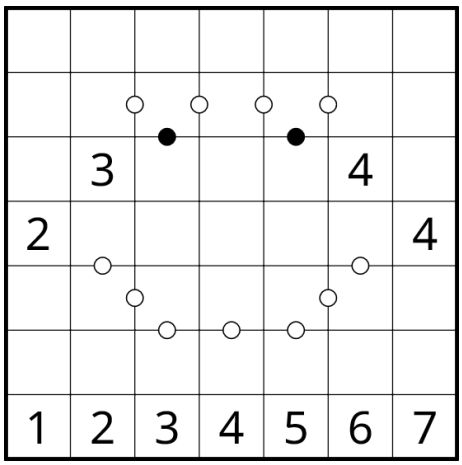
# 07.16 Kropki Pairs

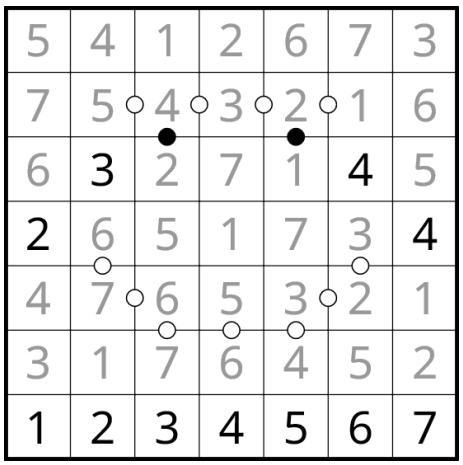
**75**pts

黑白点对

Example by Qin Jiaqi

Fill each cell with a number from 1 to N, where N is the number of cells in each row or column, so that each number appears exactly once in each row and column. White dots between two cells indicate that the two numbers in those two cells have an absolute difference of 1 and black dots indicate that the two numbers are in a 1:2 ratio (in some order). Not all possible dots are necessarily given. Some numbers may be already given in the grid.



# 07.17 Clock Faces

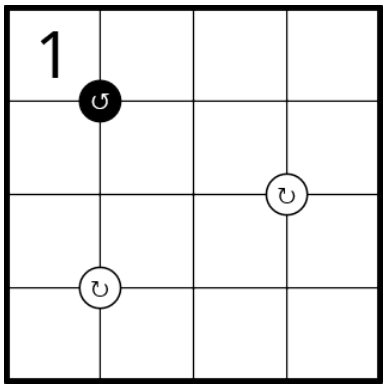
**20**pts

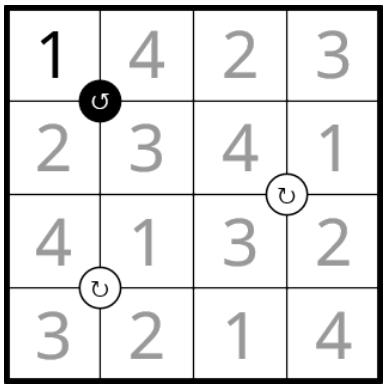
钟面

Example by Yao Yuan

Fill each cell with a number from 1 to N, where N is the number of cells in each row or column, so that each number appears exactly once in each row and column. White dots on vertices indicate that the four numbers around the dot are strictly increasing in clockwise direction (starting from one of the numbers), and black dots indicate that the four numbers are strictly increasing in anti-clockwise direction. All possible dots are given. Some numbers may be already given in the grid.

*The white and black dots contain a small clockwise and anti-clockwise arrow respectively as a reminder.*




# 07.18 Consecutive Quads

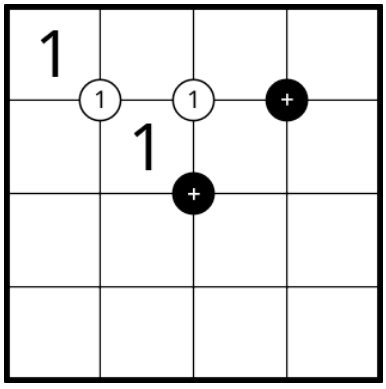
**35**pts

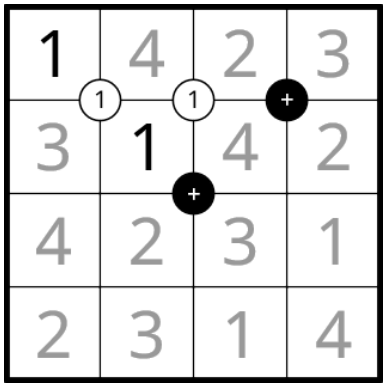
连续四数组

Example by Yao Yuan

Fill each cell with a number from 1 to N, where N is the number of cells in each row or column, so that each number appears exactly once in each row and column. Dots indicate that there are at least one pair of consecutive numbers among the four numbers around the dot: white dots indicate that there is exactly one such pair, and black dots indicate that there are at least two such pairs (where the pairs are allowed to overlap). Not all possible dots are necessarily given. Some numbers may be already given in the grid.

*The white and black dots contain a small "1" and "+" respectively as a reminder.*



Individual Round 08

# Eleven Years Later

回眸

15 Puzzles

60 Minutes

**600** Points

| | | |
|---|---|---|
| 01 | Corridors | **55** |
| 02 | Thermometers | **105** |
| 03 | Skyscrapers (Digital Sum) | **40** |
| 04 | Vista | **50** |
| 05 | Pipes | **20** |
| 06 | Spiral Galaxies (Double) | **20** |
| 07 | Spokes | **40** |
| 08 | Windows | **30** |
| 09 | Lighthouses | **55** |
| 10 | Diagonal Dissection | **20** |
| 11 | Hexagon Arrangement | **55** |
| 12 | Hamle | **20** |
| 13 | Tria 4 | **15** |
| 14 | Triangle Snake | **35** |
| 15 | The Wall | **40** |

*The landscape of logic puzzle competitions has shifted in various ways since the last WPC in China (almost exactly!) 11 years ago. We revisit some of the genres that were perhaps more popular back in those days.*

This round features 15 puzzle genres, one from each round of the 2013 World Puzzle Championship (including team rounds and playoffs). Some of the genres have been slightly modified in name or rule to better fit modern conventions.

# 08.01 Corridors

**55**pts

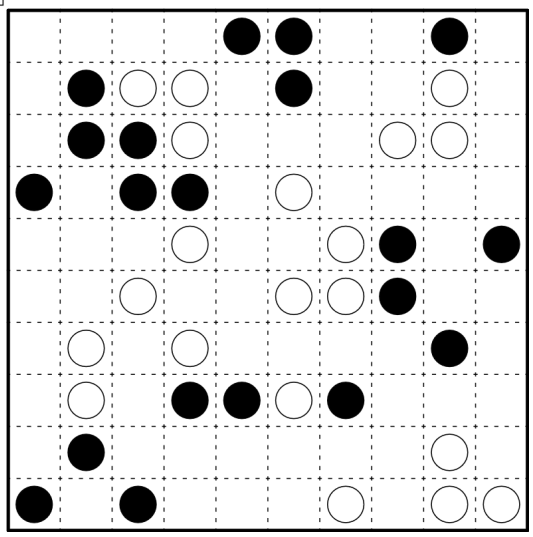
走廊

R01 - Welcome to China!
Example from WPC 2013 IB

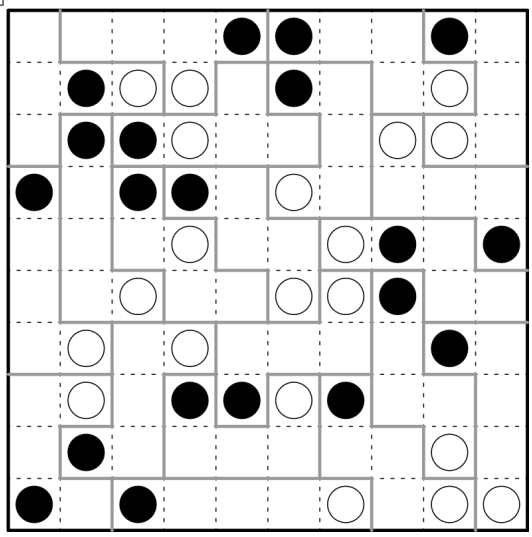
*This ruleset is generalized from the 2013 WPC version, and a special case of the 2019 WPC version.*

Divide the grid into regions along dashed gridlines so that each region contains exactly one black circle and one white circle. No region may contain a 2×2 group of cells. All regions have the same area, which is indicated by the boxed number outside the grid.

5



5



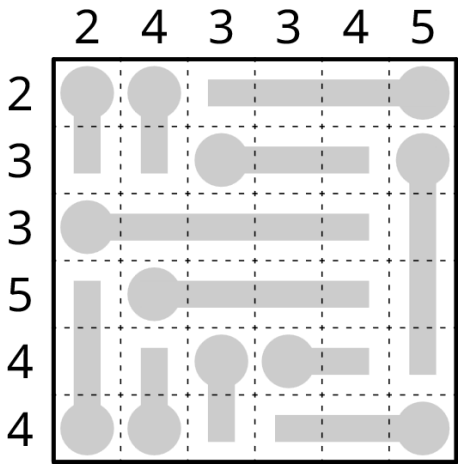
# 08.02 Thermometers

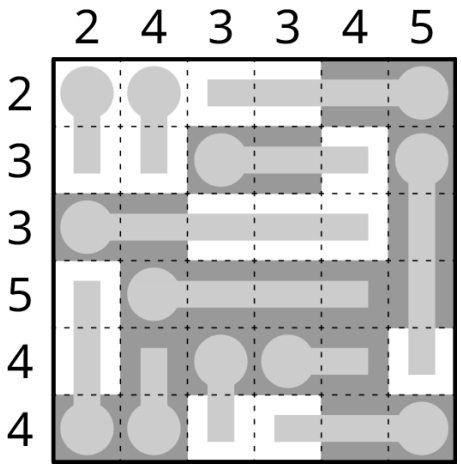
**105**pts

温度计

R02 - Classic Puzzles
Example from WPC 2013 IB

Shade some cells so that for each “thermometer” (represented by a grey path extending from a grey circle) in the grid, the shaded cells are filled in from the bulb (the end with the circle) to the other end. In other words, no shaded cells may be further along a thermometer than an unshaded cell on the same thermometer. Thermometers may be entirely shaded or entirely unshaded. The numbers outside the grid indicate the number of shaded cells in the row or column.



# 08.03 Skyscrapers (Digital Sum)

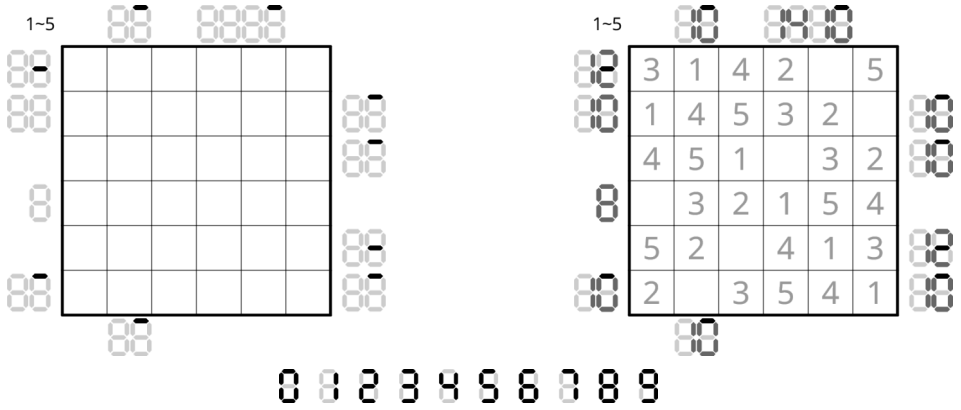
**40**pts

摩天楼（数码管和）

R03 - Digital Puzzles
Example from WPC 2013 IB

Place a number from the indicated list into some cells so that each number in the list appears exactly once in each row and column. Each number represents a skyscraper of its respective height. The numbers outside the grid indicate the sum of heights of all skyscrapers that can be seen in the row or column from the respective direction, where shorter skyscrapers are hidden behind taller ones. (Empty cells do not block vision.) The outside numbers are represented in seven-segment display; some segments are hidden but all placeholders are given (indicating the number of digits).

*A list of all digits in seven-segment display is provided for reference. It is not necessary to complete the outside numbers in your solution.*




# 08.04 Vista

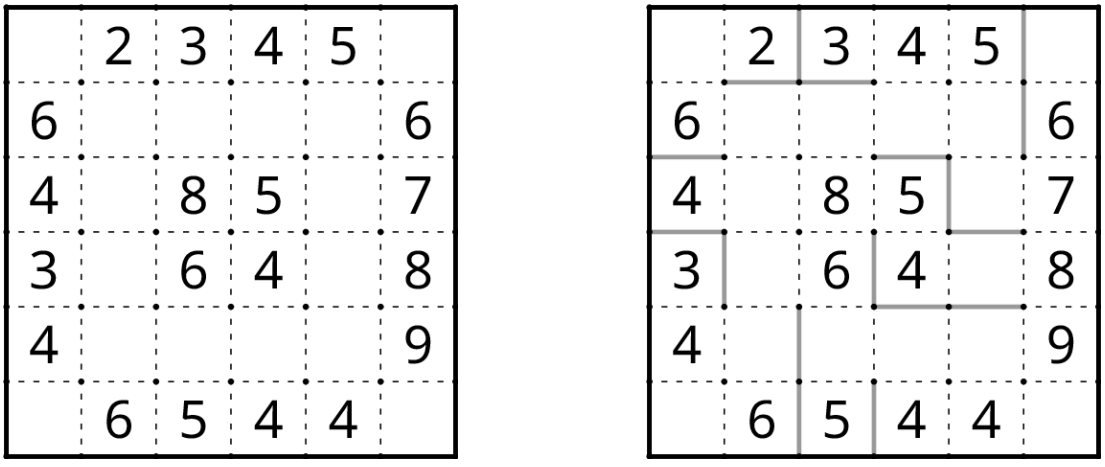
**50**pts

视野

R04 - Dutch Delight
Example adapted from WPC 2013 IB

*Also known as "Office" in 2013 WPC. Note that the clues are all incremented by 1 to better resemble similar genres, as with the version in 2017 WPC.*

Draw some dividing lines (representing walls) along dashed gridlines so that all cells of the grid remains connected. Numbers indicate the number of cells connected in a straight orthogonal line to the cell without any walls in between, <u>including the cell itself</u>.



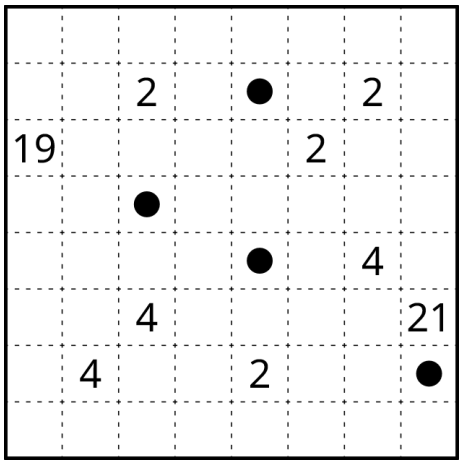
## 08.05 Pipes

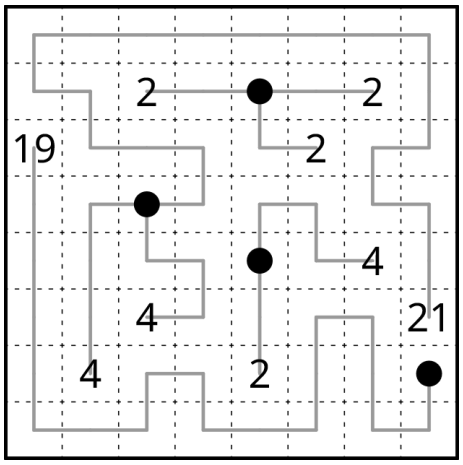
**20**pts

管道

R05 - Indian Intrigue
Example from WPC 2013 IB

Draw a path from each number to a dot that passes orthogonally through centers of some cells. Each dot must be connected to by at least one number. The paths may not intersect with themselves or each other (except at the dot that both paths end at), and all empty cells must be used by exactly one path. Numbers indicate the total length of its path (which is equivalent to the number of cells the path uses, including both endpoints, minus one).



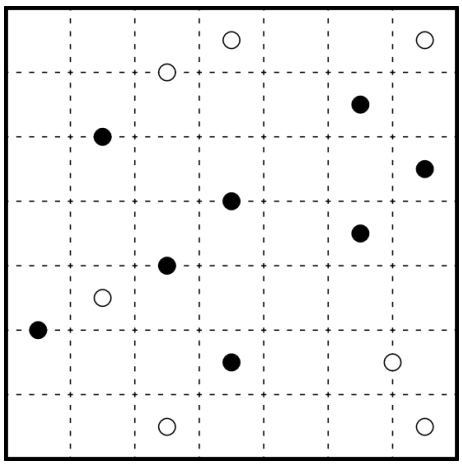

## 08.06 Spiral Galaxies (Double)

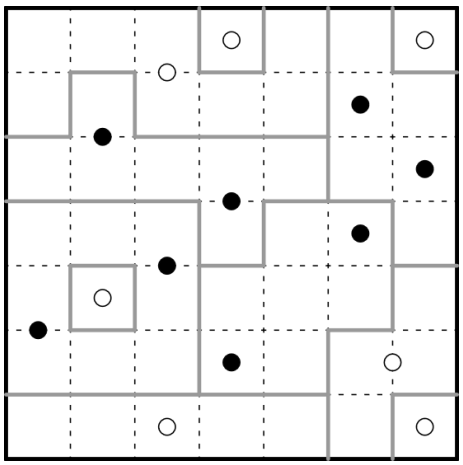
**20**pts

星系（双）

R06 - Doubled Decathlon
Example from WPC 2013 IB

Divide the grid into regions along dashed gridlines so that each region either contains one white dot and no black dots, or two black dots and no white dots. No dot may be on the boundary of a region. All regions must have 180° rotational symmetry. A white dot must be at the point of symmetry of its region; the two black dots in the same region must be rotationally symmetric around the point of symmetry of the region.





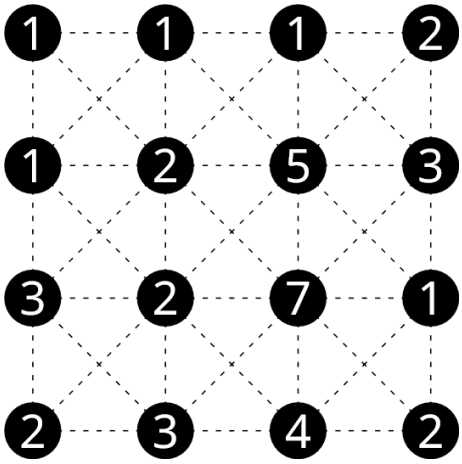
## 08.07 Spokes

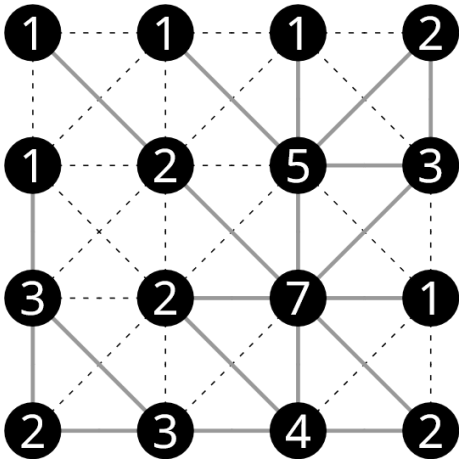
**40**pts

辐条

R07 - Serbian Snacks
Example from WPC 2013 IB

Connect all black circles into one network by drawing straight segments between circles along dashed lines (in the compass directions). Segments may not intersect each other. Numbers in circles indicate the number of segments that are connected to the circle.



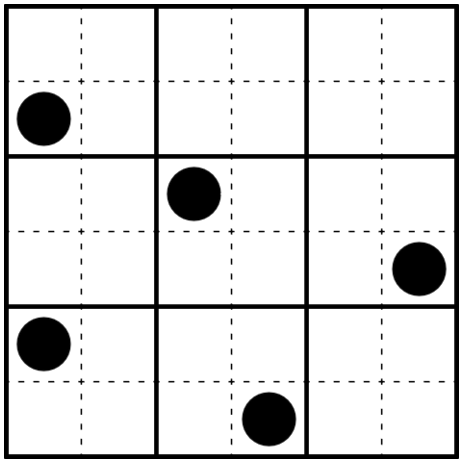

## 08.08 Windows

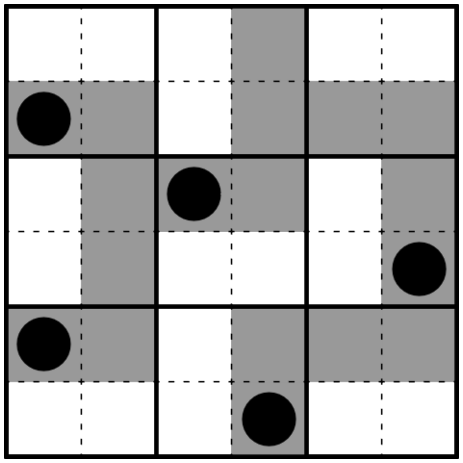
**30**pts

窗口

R08 - Black and White Matrix
Example from WPC 2013 IB

Shade two cells in each 2×2 region so that all shaded cells form one connected group and all unshaded cells are connected to the boundary of the grid. No 2×2 group of cells may be entirely shaded or entirely unshaded. Cells with black circles must be shaded.





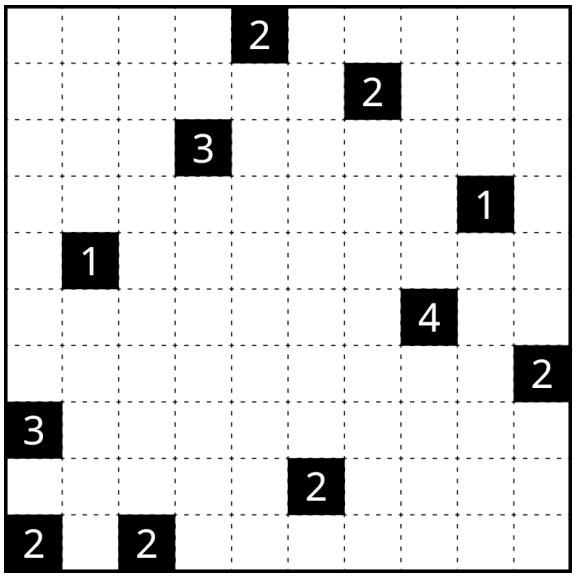
# 08.09 Lighthouses

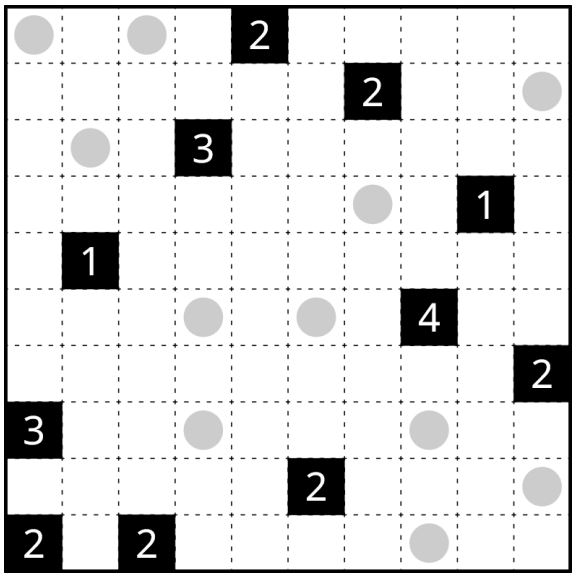
**55**pts

灯塔

R09 - Assorted Puzzles
Example adapted from WPC 2013 IB

Place a ship in some empty cells of the grid so that no ship is touching a black cell, and no two ships are in touching cells. Numbers in black cells indicate the total number of ships in the same row or column as the number, disregarding other black cells.





# 08.10 Diagonal Dissection

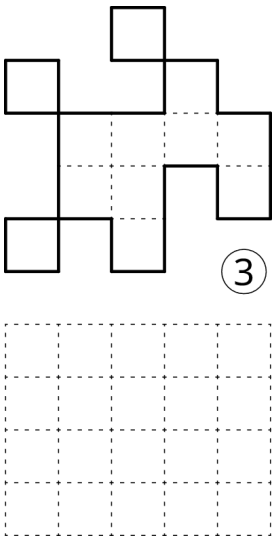
**20**pts

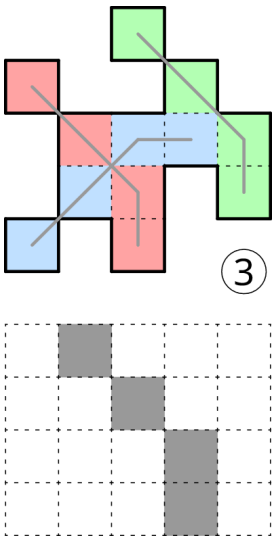
对角分割

R10 - Sprint
Example adapted from WPC 2013 IB

Divide the given shape into some rotationally congruent pieces. Each piece must be a diagonally connected group of cells (but might not be orthogonally connected). The number of pieces is given in a circle outside the grid.

*For full credit, it is sufficient to divide the shape (using lines to connect diagonally touching parts of each shape) OR draw one instance of the piece in the auxiliary grid below the shape.*





# 08.11 Hexagon Arrangement

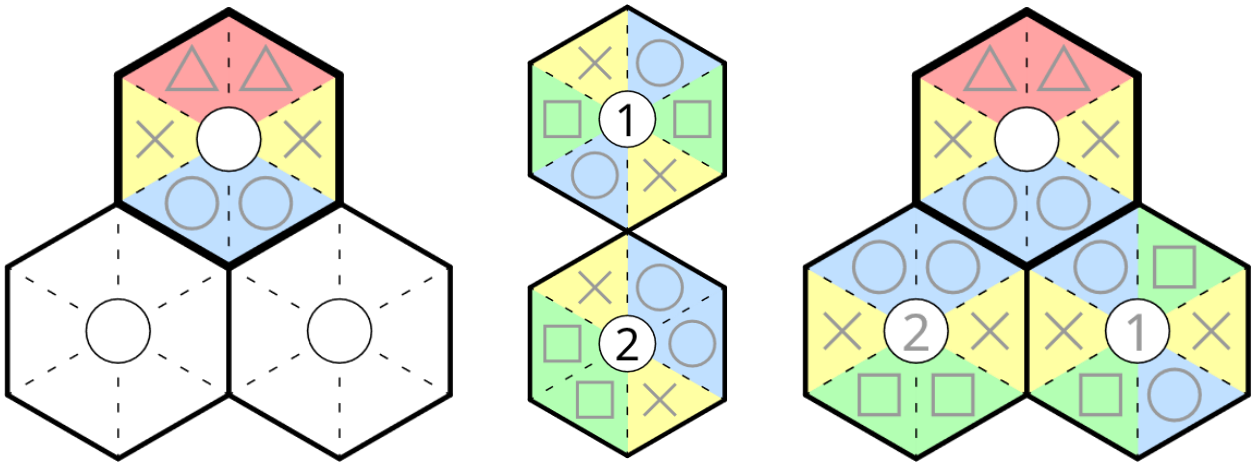
**55**pts

六边形拼图

R11 - Visual Puzzles
Example from WPC 2013 IB

Place the numbered hexagons into the placeholders of the diagram so that whenever two hexagons are adjacent by an edge, the triangles on the two sides of that edge have the same color. Each numbered hexagon may be rotated before being placed in the diagram, but cannot be reflected.

*For full credit, it is sufficient to write the numbers in the center of the placeholders OR indicate colors of all triangles. The symbols in each colored triangle are meant as a visual aid for solvers with difficulty identifying colors and a solving aid for ease of notating colors, and carry no additional information.*




# 08.12 Hamle

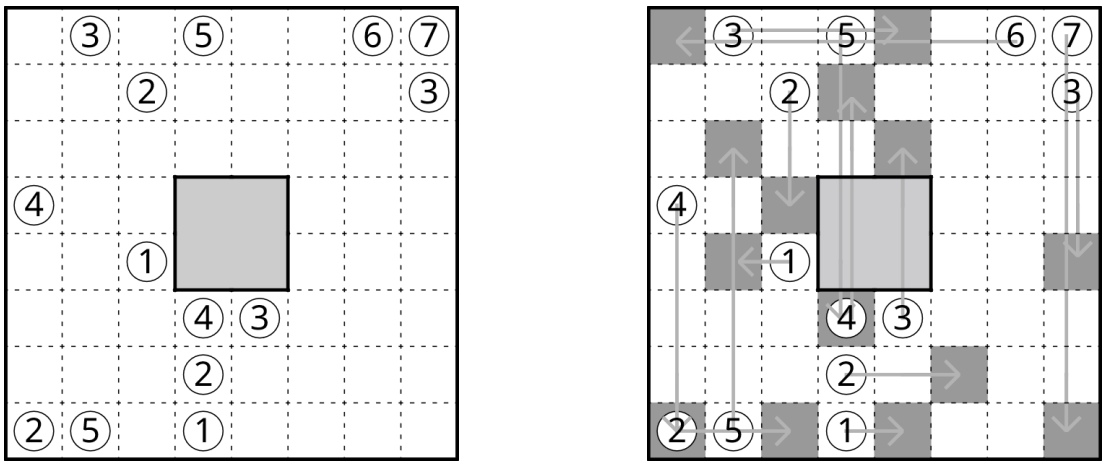
**20**pts

纵横移动

R12 - The Zodiac
Example from WPC 2013 IB

Draw an orthogonal arrow from each circle to a different cell so that no two arrow tips are in the same cell or adjacent cells, and all cells that are not occupied by arrow tips form one connected group. The arrows may intersect or overlap with each other, including at endpoints, and may be drawn over holes. Numbers in circles indicate length of the arrow.

*For this puzzle, the holes are in a much lighter shade of grey so that arrows can be drawn visibly over them.*



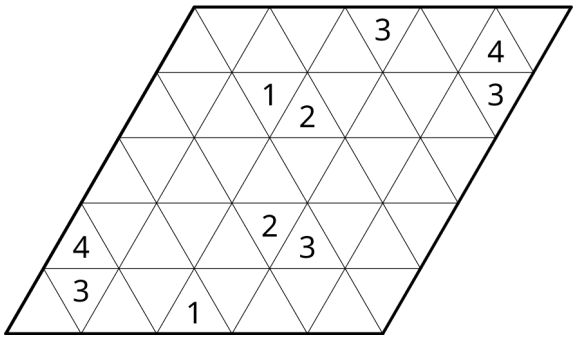
# 08.13 Tria 4

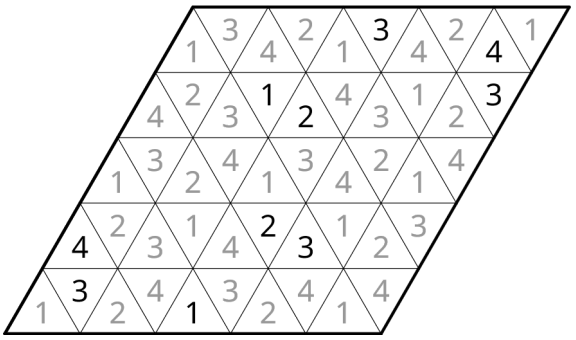
**15**pts

三角含四

R13 - Weakest Link - Samurai
Example from WPC 2013 IB

Place a number from 1 to 4 into each empty cell so that any four cells that form a large triangle (of side length two, in either orientation) contains each number exactly once. Some numbers are already given.





# 08.14 Triangle Snake

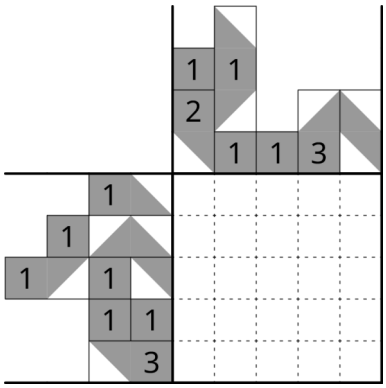
**35**pts

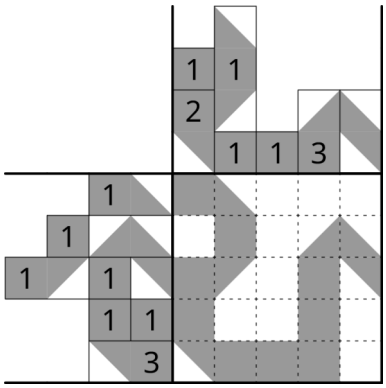
三角蛇

R14 - Year of Snake
Example by Yao Yuan

Shade some cells and halves of some cells (that are right isosceles triangles) of the grid to form a triangle snake. The cells and half-cells along the snake must be edge-connected (i.e. two consecutive (half-)cells must both fully use the common edge). The snake cannot touch itself, not even diagonally: more precisely, for any vertex of the grid there must be an unshaded (half-)cell with it as a vertex, and all unshaded (half-)cells must be connected to the boundary. The grey shapes outside the grid indicate the consecutive groups of shaded (half-)cells in the row or column, in the order of appearance (the groups are separated by lines). Consecutive fully shaded cells in each group are represented by a single grey cell with a number indicating the number of consecutive cells.

*There is a heavy line every five rows and columns for convenience. These lines are not relevant to the puzzle.*





# 08.15 The Wall

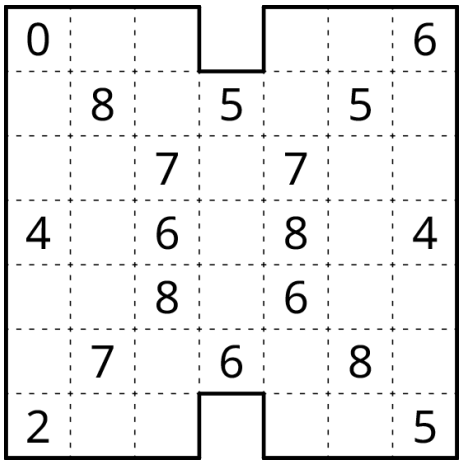
**40**pts

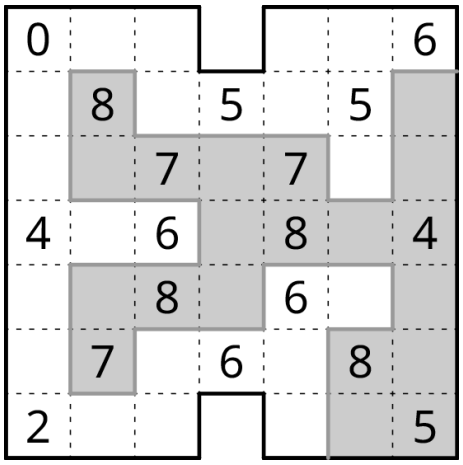
隔墙有耳

R15 - Playoffs
Example adapted from WPC 2013 IB

Divide the grid into two regions along dashed gridlines. Numbers indicate the total number of cells in the same row or column as the cell that are in the opposite region from the cell.

*For full credit, it is sufficient to draw the dividing lines OR shade one of the two regions.*



# Individual Round 09

# Variants

変型

12 Puzzles

60 Minutes

**600** Points

| | | | | | |
|---|---|---|---|---|---|
| 01 | Slitherlink (Touching) | **35** | 07 | Nurimisaki (Domino) | **25** |
| 02 | Akari (Regional) | **15** | 08 | Statue Park (Hitori) | **105** |
| 03 | Pentopia (Diagonal) | **55** | 09 | Star Battle (Generalized) | **35** |
| 04 | Doppelblock (Anti-Knight) | **135** | 10 | Skyscrapers (Deficit) | **45** |
| 05 | Nurikabe (Araf) | **20** | 11 | Shape Division (Splitter) | **55** |
| 06 | Maxi Loop (Mini) | **25** | 12 | Hashi (Projective Plane) | **50** |

This round features variants of many common puzzle genres, ranging from well-known to brand-new.

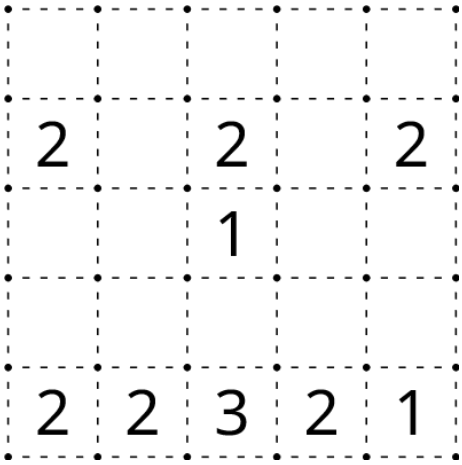
## 09.01 Slitherlink (Touching)

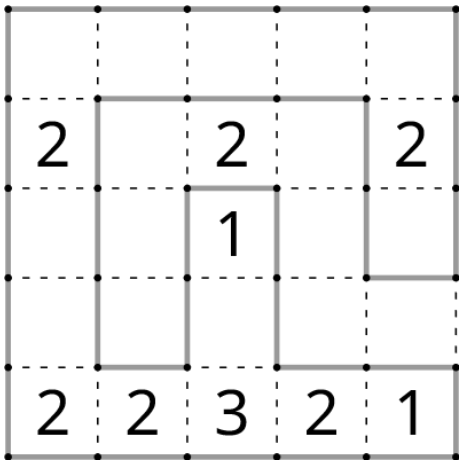
**35**pts

数回（接触）

Example from puzz.link

Draw a single non-intersecting loop along the dashed gridlines. Numbers indicate the number of times the loop visits (and leaves) the set of vertices and edges around the cell.




## 09.02 Akari (Regional)

**15**pts

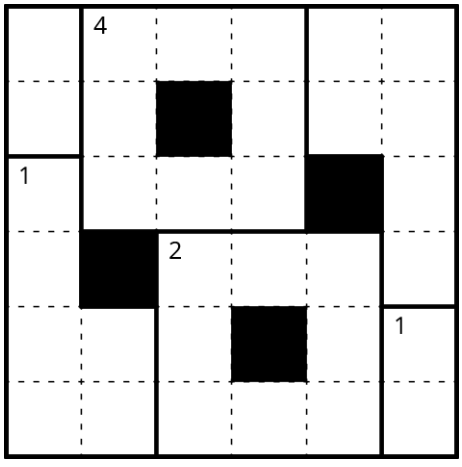
美术馆（区域）

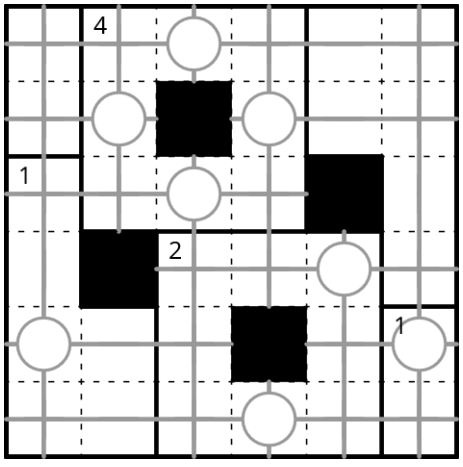
Example by Yao Yuan

*Generalized from "Regional Akari" in WPC 2017 and 2018.*

Place a light bulb in some empty cells so that all empty cells are illuminated. A light bulb in a cell illuminates all cells that are connected in a straight orthogonal line to the cell without any black cells in between, including the cell itself. No two light bulbs may illuminate each other.

Numbers indicate the number of light bulbs in the region.



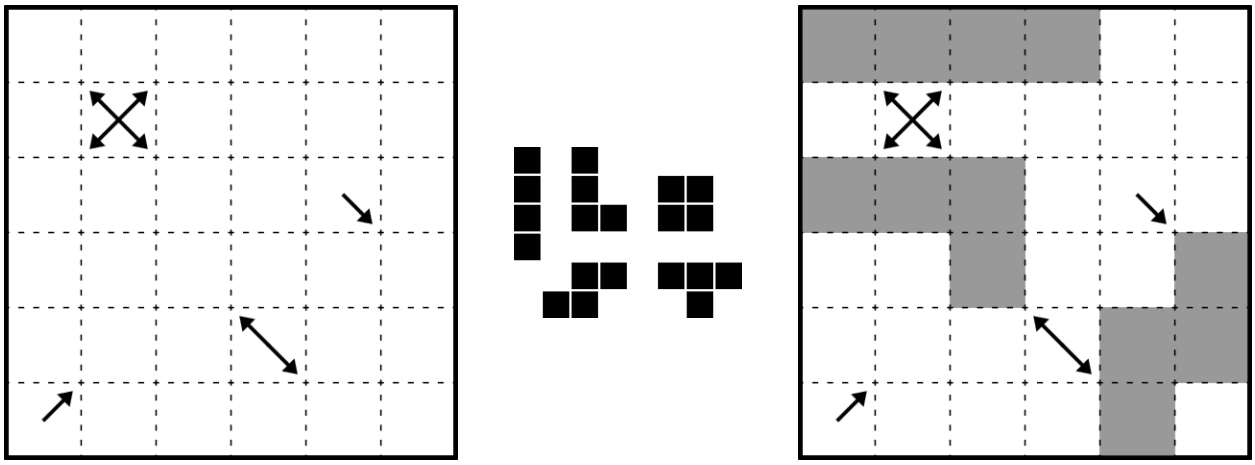
## 09.03 Pentopia (Diagonal)

**55**pts

近视骨牌（对角线）

Example by Yao Yuan

Place some (not necessarily all) of the given shapes into the grid so that no two shapes touch each other. Cells with arrows may not be occupied. Arrows in a cell indicate all diagonal directions where an occupied cell appears closest to the cell (ignoring any orthogonal directions).



## 09.04 Doppelblock (Anti-Knight)

**135**pts

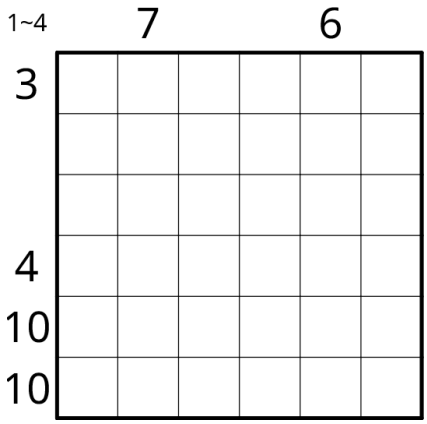
双黑格（无马）

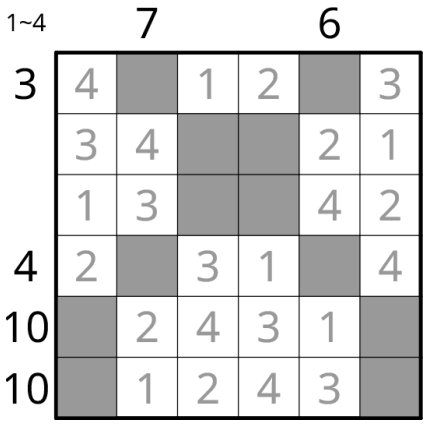
Example by Qin Jiaqi

Place a number from the indicated list into some empty cells so that each number in the list appears exactly once in each row and column. Numbers outside the grid indicate the sum of all numbers between the two empty cells in the row or column. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

Identical numbers may not be placed in cells that are a knight's move apart. (A knight moves two cells in an orthogonal direction and one cell in a perpendicular direction.)

*It is not necessary to shade the remaining empty cells.*



## 09.05 Nurikabe (Araf)

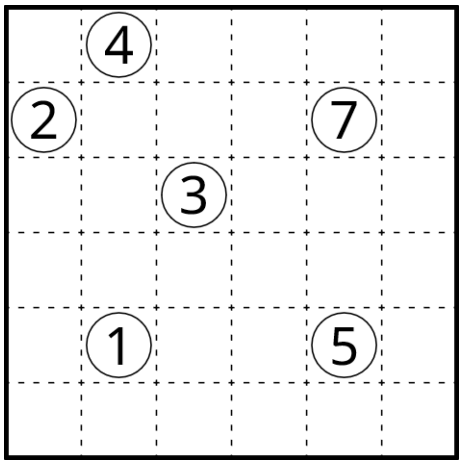
**20**pts

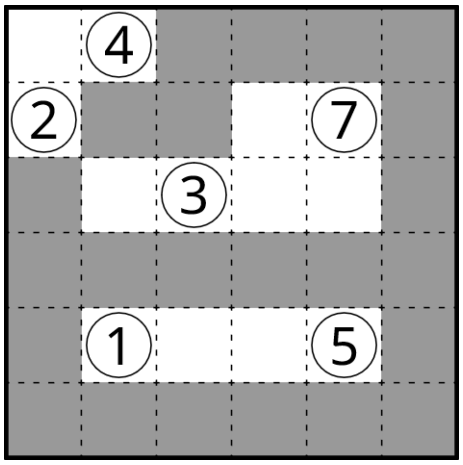
数墙（炼狱）

Example from PGP 2019 R2

*Also known as "Nuraf".*

Shade some empty cells so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded. Each connected group of unshaded cells must contain exactly <u>two</u> numbered cells, and its area must be strictly between the two numbers (in particular, neither number can be equal to the area).




## 09.06 Maxi Loop (Mini)

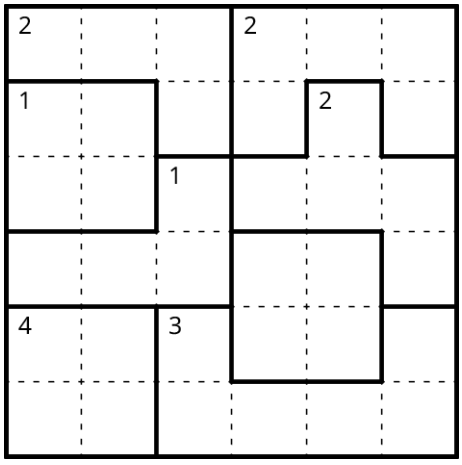
**25**pts

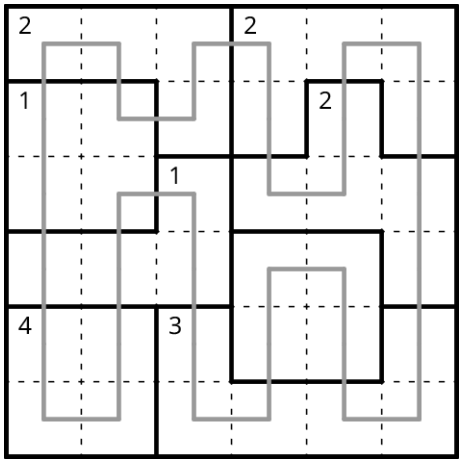
极大回路（极小）

Example by Yao Yuan

*Also known as "Mini Loop".*

Draw a single non-intersecting loop that passes orthogonally through the centers of all cells exactly once. Numbers indicate the <u>minimum</u> number of cells that the loop goes through within one visit of the region. This minimum must be attained in some visit.



## 09.07 Nurimisaki (Domino)

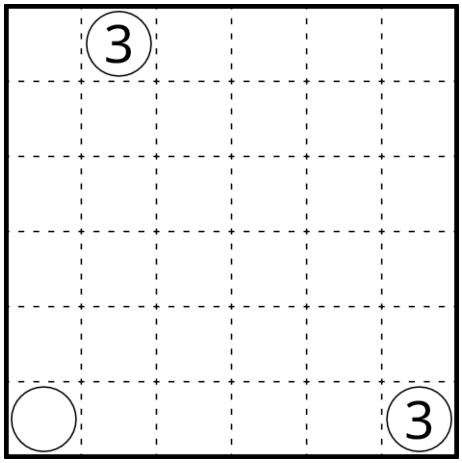
**25**pts

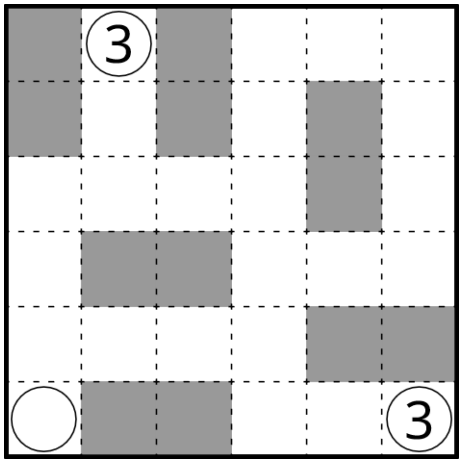
数岬（多米诺）

Example by Wang Mingyi

Shade some empty cells so that the unshaded cells form one connected group. No 2×2 group of cells can be entirely unshaded. Circles indicate the positions of all unshaded cells that is adjacent to exactly one other unshaded cell. Numbers in circles indicate the number of unshaded cells connected in a straight orthogonal line to the circled cell without any shaded cells in between, including the cell itself.

Each connected group of shaded cells must have exactly two cells.




## 09.08 Statue Park (Hitori)

**105**pts

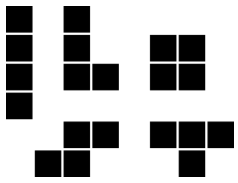
雕像公园（数壹）

Example by Qiu Yanzhe

Place the given shapes into the grid so that no two shapes are adjacent to each other (but may touch each other at a point), and the remaining unoccupied cells form one connected group. The shapes may be rotated or reflected before being placed in the grid.

No two unoccupied cells in the same row or column may contain the same number.

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



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

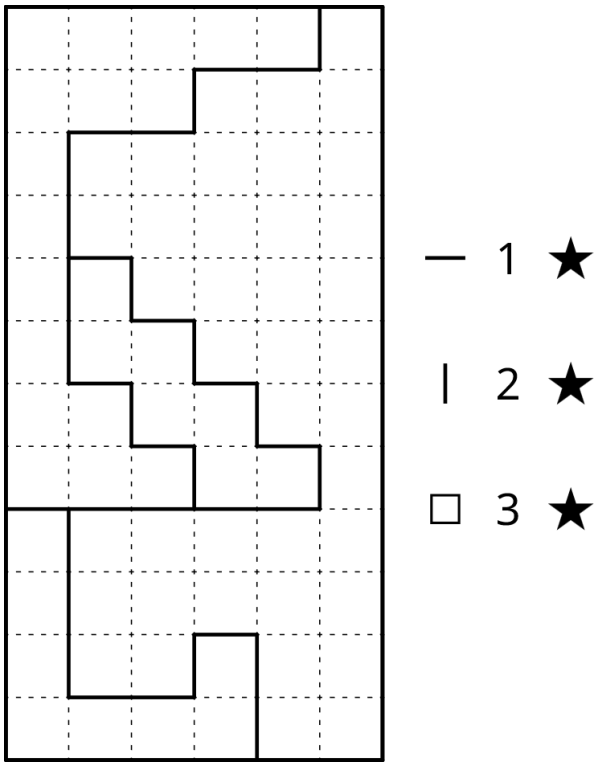
# 09.09 Star Battle (Generalized)

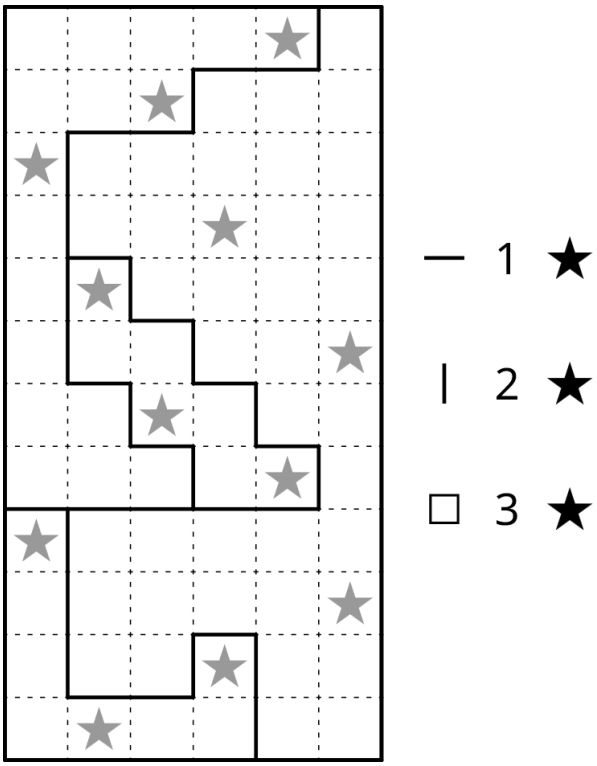
**35**pts

星战（广义）

Example by Yao Yuan

Place a star in some cells so that the number of stars within each row, each column, and each region is equal to the three given numbers outside the grid respectively (labeled by a horizontal line, a vertical line, and a box respectively). No two stars can be placed in touching cells.



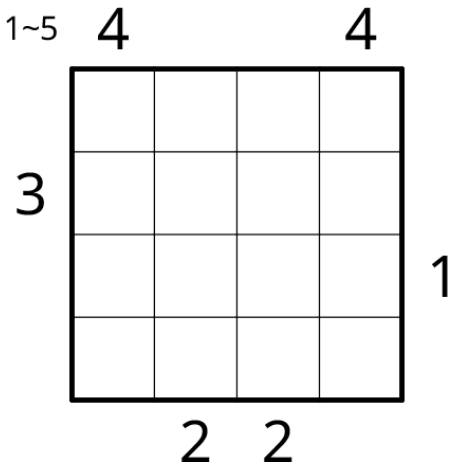
## 09.10 Skyscrapers (Deficit)

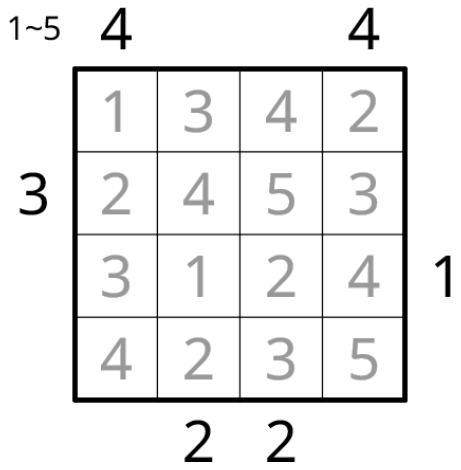
**45**pts

摩天楼（缺数）

Example by Wang Mingyi

Place a number from the indicated list into each empty cell so that each number in the list appears at most once in each row and column. Each number represents a skyscraper of its respective height. Numbers outside the grid indicate the number of skyscrapers that can be seen in the row or column from the respective direction, where shorter skyscrapers are hidden behind taller ones. Some numbers may be already placed in the grid.




## 09.11 Shape Division (Splitter)

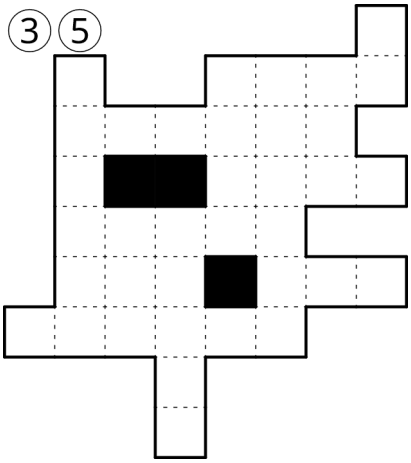
**55**pts

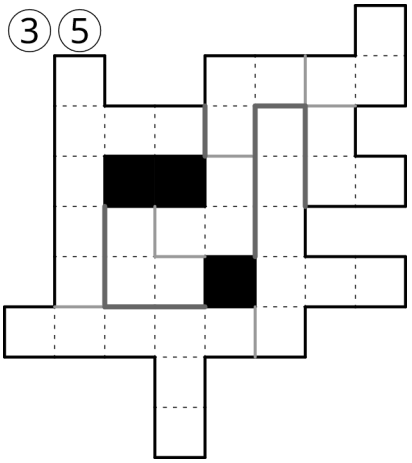
全等分割（分盘）

Example by Yao Yuan

Divide the grid into two connected sub-grids along dashed gridlines, then divide each sub-grid into some congruent regions along dashed gridlines. The numbers of regions within the two sub-grids are given in circles outside the grid.

*It is not necessary to differentiate the notation used for dividing sub-grids and dividing regions in your solution.*



# 09.12 Hashi (Projective Plane)

**50**pts

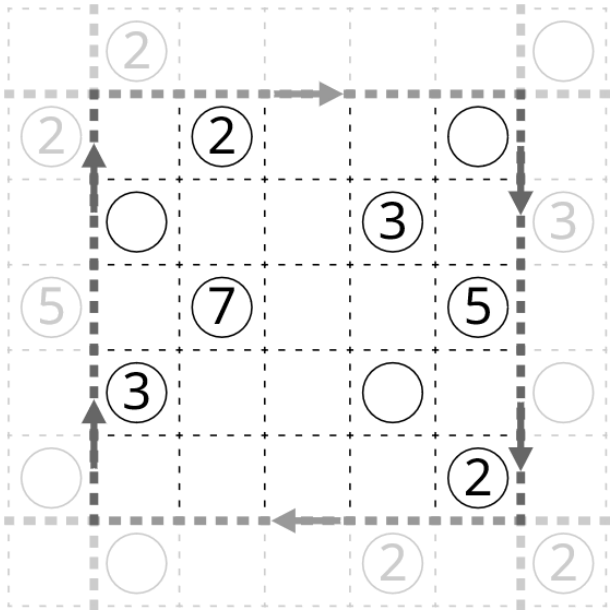
数桥（射影平面）

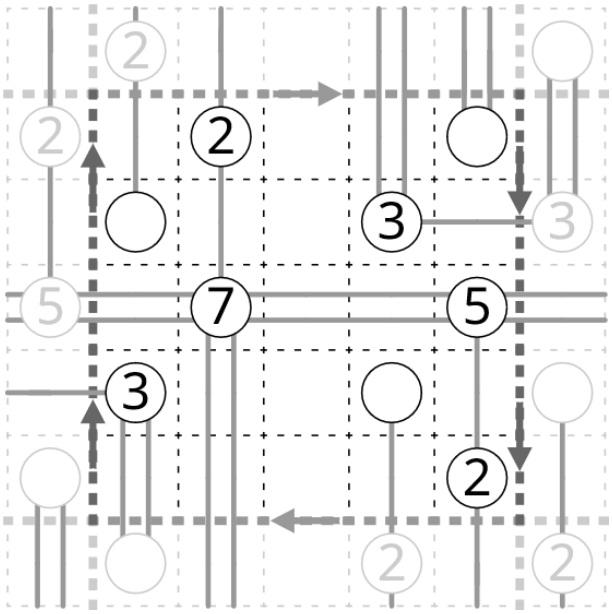
Example by Yao Yuan

Connect all circles into one network by drawing one or two straight orthogonal segments (representing bridges) between some pairs of circles. Segments may not intersect each other or go over other circles. Numbers in circles indicate the number of segments that are connected to the circle.

The grid is a projective plane, meaning that the first row is adjacent to the last row (in reversed order), and similar for the first and last column. (For example, the top-left corner of the grid is the same as the bottom-right corner, but not the other two corners.) If a circle connects to itself, both endpoints of the connections are included in the count (i.e. the segment will be counted twice).

*The first and last row and column are duplicated on the opposite sides of the grid (in reversed order) in light grey for convenience, and the edges of the grid are marked with arrows as a reminder of the reversal. For full credit, it is sufficient to draw parts of the connections within the main grid (in black).*





Individual Round 10

# Irregular

異形

10 Puzzles

60 Minutes

**600** Points

| | | |
|---|---|---|
| 01 | Yajisan-Kazusan (Triangular) | **75** |
| 02 | Straight Cross (Hexagonal) | **60** |
| 03 | Choco Banana (Tetrakis Square) | **60** |
| 04 | Cave (Truncated Square) | **70** |
| 05 | Koburin (Cairo Pentagonal) | **55** |
| 06 | Double Choco (Snub Square) | **50** |
| 07 | Slant (Deltoidal Trihexagonal) | **80** |
| 08 | Area Division (Rhombitrihexagonal) | **20** |
| 09 | Sudoku (Penrose) | **70** |
| 10 | Arithmetic Square (Cubic) | **60** |

This round features puzzles on various grids with non-square cells. The first 8 puzzles are grouped into pairs of geometrically dual grids, where one can obtain one grid from the other by replacing vertices with cells and vice versa.

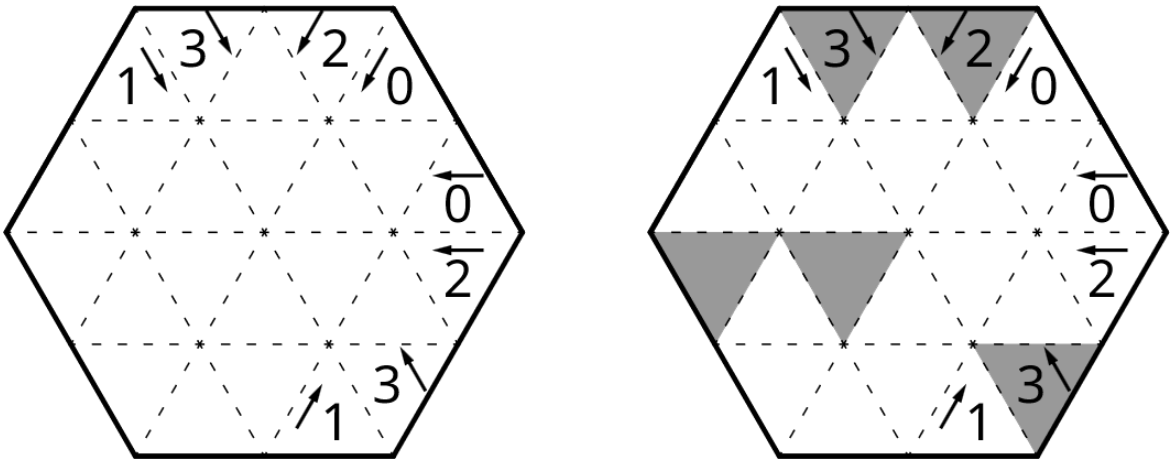
## 10.01 Yajisan-Kazusan (Triangular)

**75**pts

真假仙人（三角形）

Example by Wang Mingyi

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. Numbers with arrows in unshaded cells indicate the number of shaded cells in the indicated direction from the cell. Such clues in shaded cells give no information.



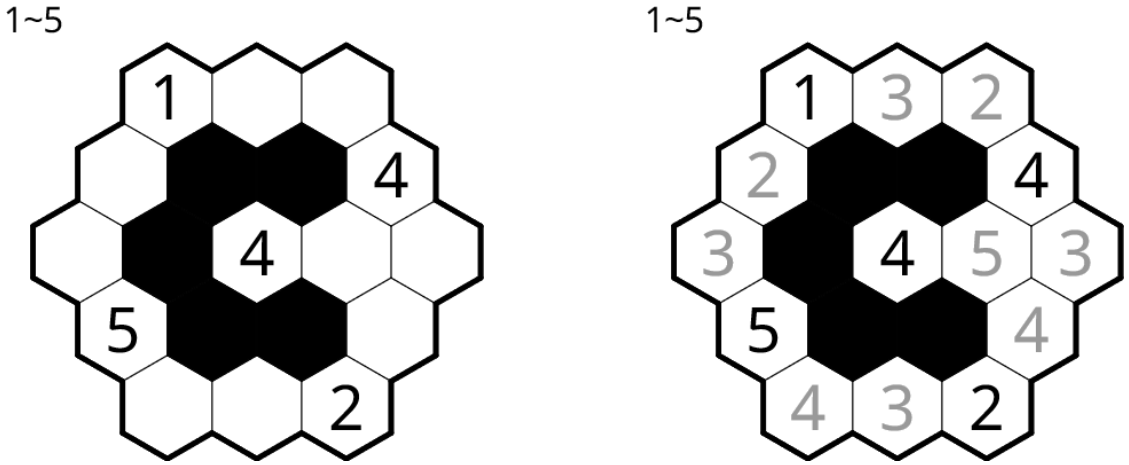

## 10.02 Straight Cross (Hexagonal)

**60**pts

连续数列（六边形）

Example by Yao Yuan

Place a number from the indicated list into some empty cells so that for each consecutive block of white cells in any of the three standard directions, the numbers do not repeat and form a consecutive sequence in some order. Some numbers may be already placed in the grid.



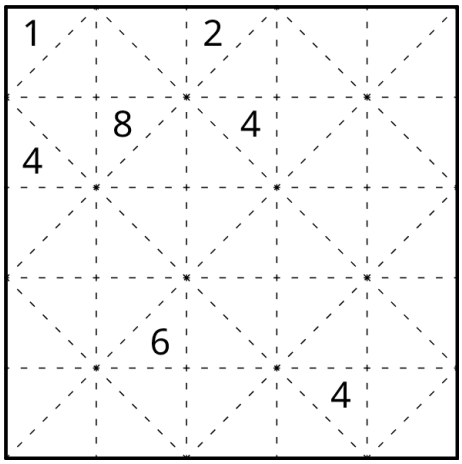
## 10.03 Choco Banana (Tetrakis Square)

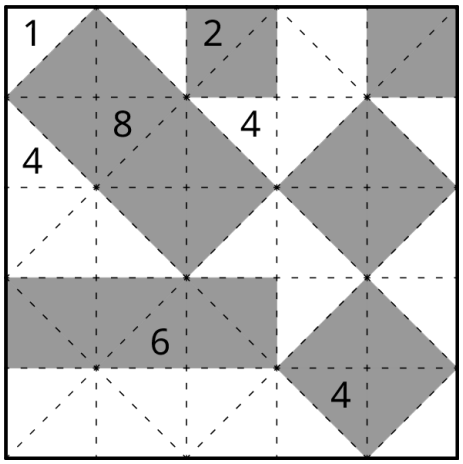
**60**pts

巧克力香蕉（四角化正方形）

Example by Yao Yuan

Shade some cells so that all connected groups of shaded cells are rectangular and all connected groups of unshaded cells are not rectangular. Numbers indicate the number of cells in the connected group of shaded or unshaded cells it is in.



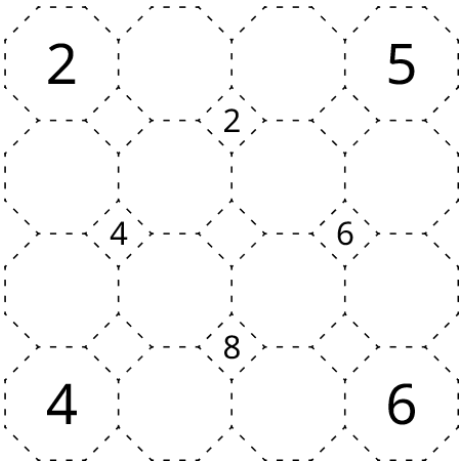

## 10.04 Cave (Truncated Square)

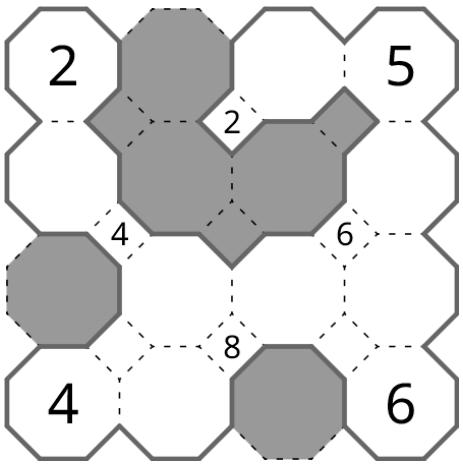
**70**pts

山洞（截角正方形）

Example by Xu Chenhao

Draw a single non-intersecting loop along the dashed gridlines. Numbers must be inside the loop, and indicate the number of cells inside the loop connected in a straight line (perpendicular to one of this cell's edges) to the cell without any loop segments in between, including the cell itself. In other words, a square cell sees all four diagonal directions and an octagonal cell sees all eight compass directions.



## 10.05 Koburin (Cairo Pentagonal)

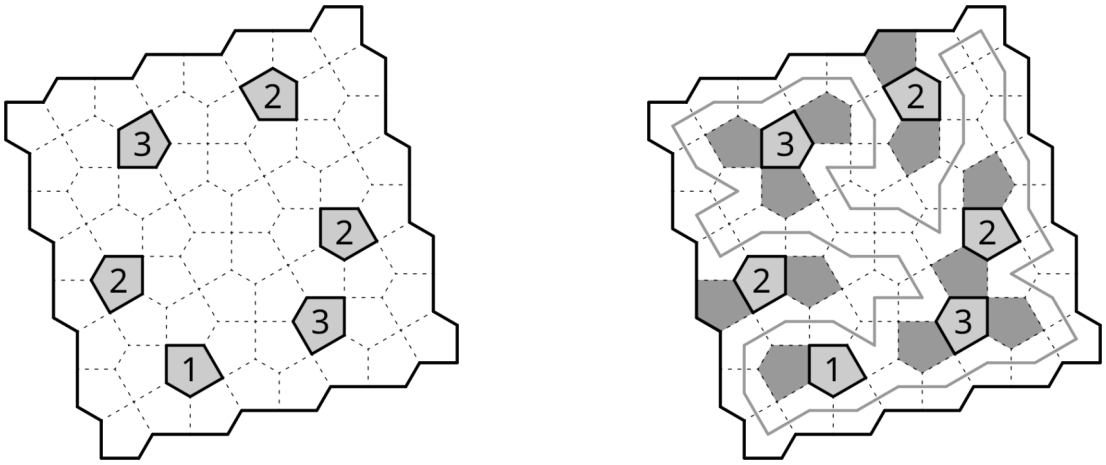
**55**pts

仙人指邻（开罗五边形）

Example by Wang Mingyi

Draw a non-intersecting loop that passes through centers of some empty cells, travelling between adjacent cells only. No two adjacent empty cells may be both unused by the loop. Numbers in grey cells indicate the number of unused empty cells adjacent to the cell.

*It is not necessary to shade the unused empty cells.*



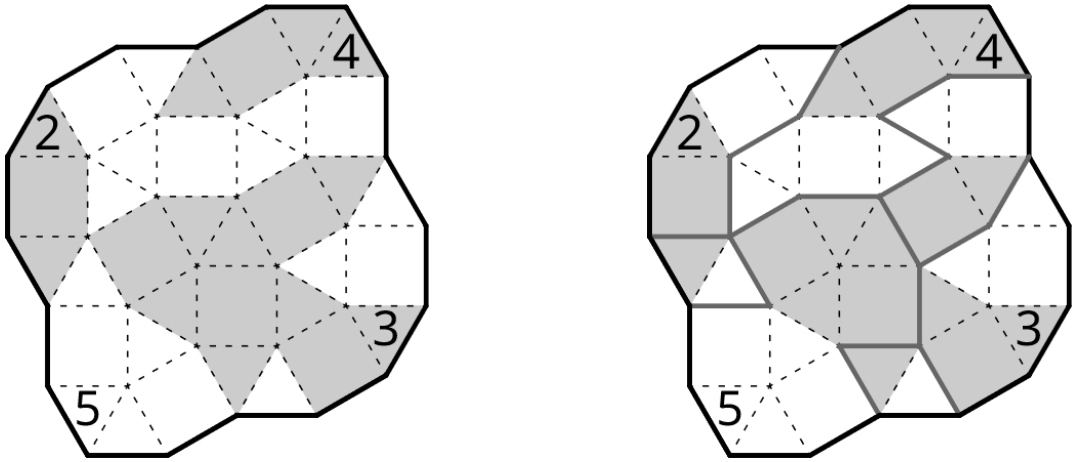

## 10.06 Double Choco (Snub Square)

**50**pts

双巧克力（扭棱正方形）

Example by Yao Yuan

Divide the grid into regions along dashed gridlines so that each region contains exactly one connected group of grey cells and one connected group of white cells, and the two groups are adjacent and congruent to each other. Numbers indicate the number of cells in one such connected group in the region that it belongs to (that is, it is equal to half of the number of cells in the entire region).



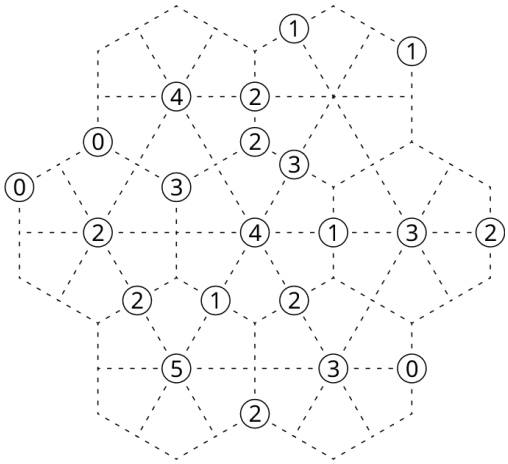
## 10.07 Slant (Deltoidal Trihexagonal)

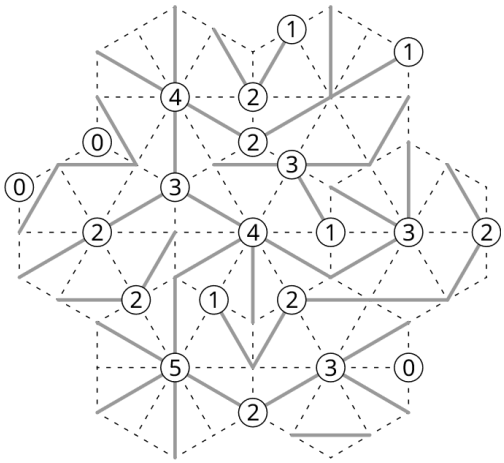
**80**pts

斜线迷宫（鸢形）

Example by Yao Yuan

Draw a diagonal line segment in each cell (connecting two opposite vertices) so that the line segments do not form any loops. Numbers in circles indicate the number of segments connected to the vertex it is on.





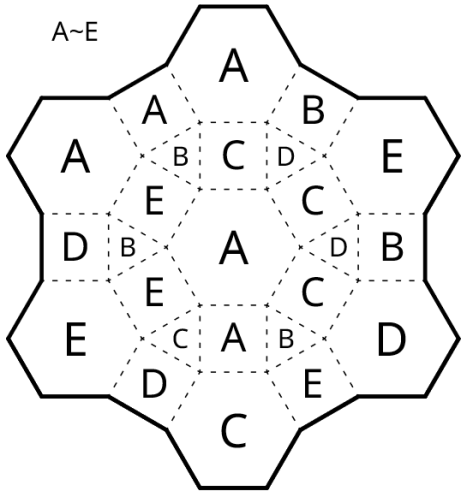
## 10.08 Area Division (Rhombitrihexagonal)

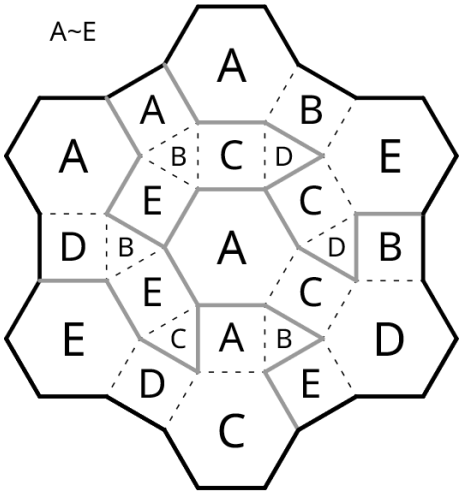
**20**pts

字母分区（小斜方截半六边形）

Example by Yao Yuan

Divide the grid into regions along dashed gridlines so that each region contains each character in the indicated list exactly once, in any order.



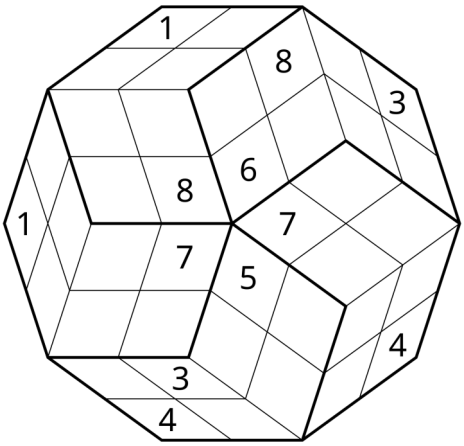
## 10.09 Sudoku (Penrose)

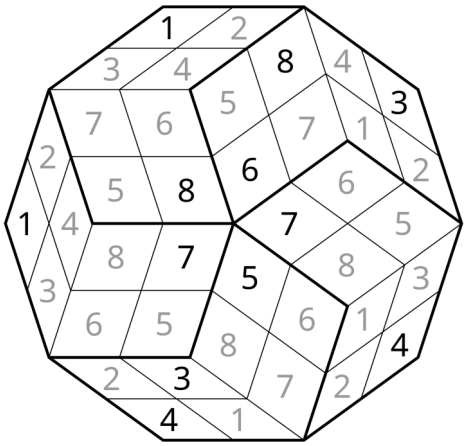
**70**pts

数独（彭罗斯菱形）

Example by Qin Jiaqi

Place a number from 1 to N into each empty cell so that each number appears exactly once in each “row” or region, where N is the number of cells in each “row”. Here, each “row” starts on an edge on the grid boundary and passes through opposite sides of each rhombus that are parallel to that edge.




## 10.10 Arithmetic Square (Cubic)

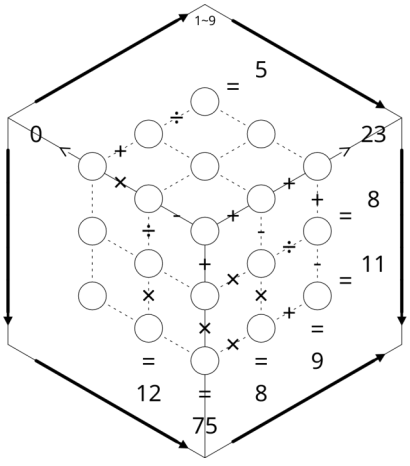
**60**pts

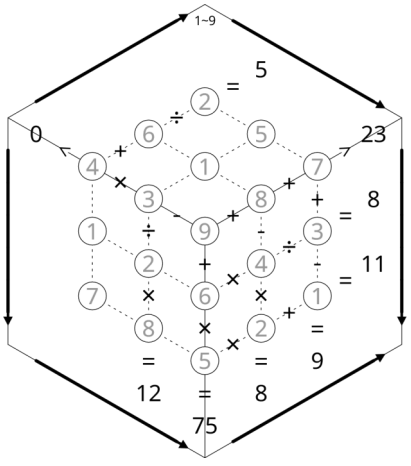
算术方阵（立方）

Example adapted from PGP 2023 R4

Place a number from the indicated list into each circle so that each number in the list appears exactly once on each face, and does not repeat along any “straight” dashed lines that span two faces. When the given expressions within a face or edge are evaluated from left to right (at an angle) or top to bottom (fully vertically), ignoring the usual precedence of operations, the results must satisfy the indicated equalities or inequalities.

*The directions of evaluation are shown with thick arrows on each face. Numbers, operators, and equality signs are not rotated, but inequality signs are rotated to point at the lesser side.*



Individual Round 11

# Little Happiness

小四喜

40 Puzzles

20 Minutes

**200** Points

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01 | Yajisan-Kazusan | **7** | 17 | Line of Sight | **14** | 33 | Easy as | **3** |
| 02 | Context | **7** | 18 | Myopia | **8** | 34 | Doppelblock | **2** |
| 03 | Kurodoko | **5** | 19 | Slitherlink | **5** | 35 | Skyscrapers | **3** |
| 04 | Aquapelago | **3** | 20 | Cave | **10** | 36 | Fuzuli | **4** |
| 05 | Cross the Streams | **7** | 21 | Yajilin | **5** | 37 | Suguru | **2** |
| 06 | Canal View | **9** | 22 | Koburin | **2** | 38 | Ripple Effect | **3** |
| 07 | Tapa | **2** | 23 | Castle Wall | **4** | 39 | Cojun | **3** |
| 08 | Nurikabe | **2** | 24 | Tapa-like Loop | **2** | 40 | Makaro | **2** |
| 09 | Cocktail Lamp | **3** | 25 | Sashikaku | **4** | | | |
| 10 | Martini | **6** | 26 | Shikaku (Ratio) | **3** | | | |
| 11 | Shimaguni | **7** | 27 | Recto | **3** | | | |
| 12 | Stostone | **11** | 28 | Shikaku | **2** | | | |
| 13 | Rail Pool | **7** | 29 | Symmetry Area | **4** | | | |
| 14 | Double Back | **10** | 30 | Snake Pit | **4** | | | |
| 15 | Detour | **5** | 31 | Wafusuma | **3** | | | |
| 16 | Maxi Loop | **7** | 32 | Subomino | **7** | | | |

*The "Four Happiness" in Chinese culture generally refers to Fortune, Wealth, Longevity, and Joy. The Chinese title of this round also refers to the Mahjong hand "Little Four Winds".*

This round features many small puzzles (ranging from 4×4 to 6×6), grouped into sets of 4 similar genres (on the same page). For reasons that will be clear in the next round, some clues are presented differently from usual; check the examples for the exact changes.
*The time bonus of this round is **5** points per full half-minute remaining. This round is eligible for the more lenient partial bonus for having at least 20 puzzles.*

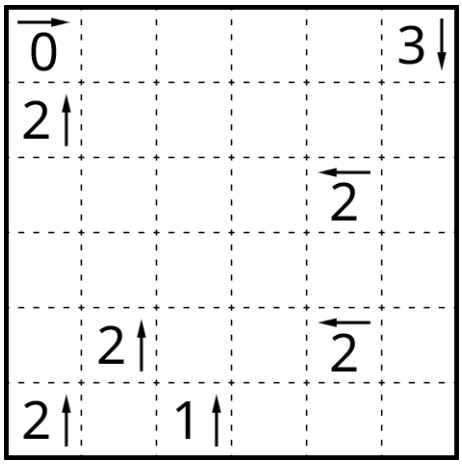
## 11.01 Yajisan-Kazusan

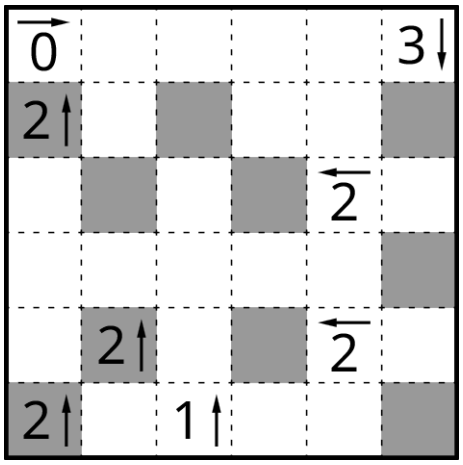
**7**pts

真假仙人

Example adapted from puzz.link

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. Numbers with arrows in unshaded cells indicate the number of shaded cells in the indicated direction from the cell. Such clues in shaded cells give no information.





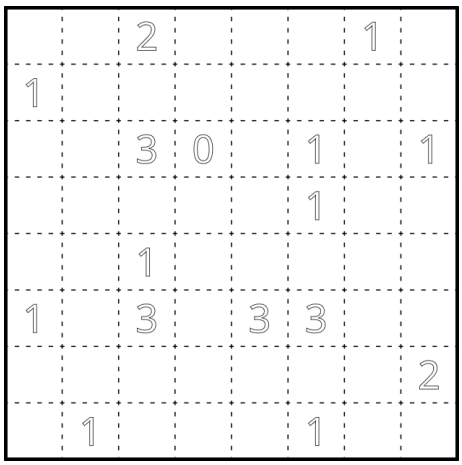
## 11.02 Context

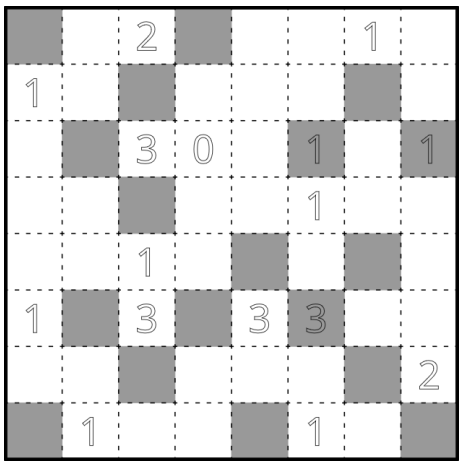
**7**pts

黑斜白邻

Example from puzz.link

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. Hollow numbers in unshaded cells indicate the number of shaded cells adjacent to the cell. Such clues in shaded cells indicate the number of shaded cells touching (but not adjacent to) the cell.





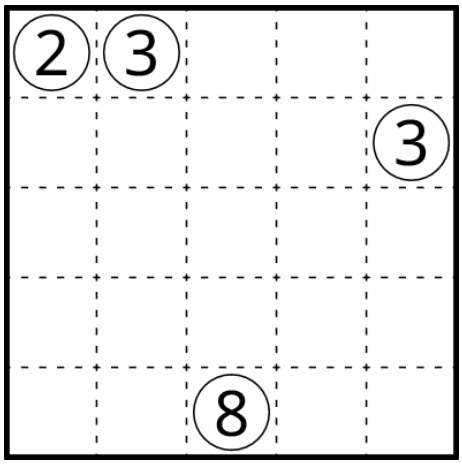
## 11.03 Kurodoko

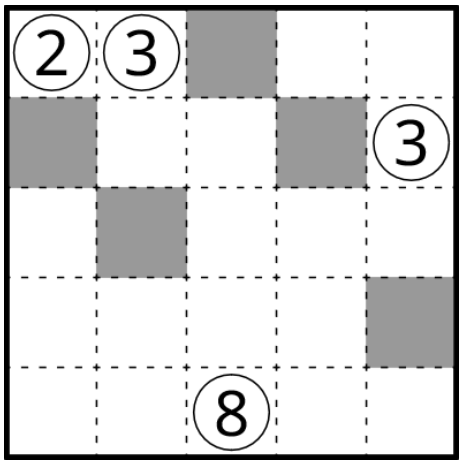
**5**pts

田鼠挖洞

Example from PGP 2023 R2

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. Numbers in white circles must be in unshaded cells, and indicate the number of unshaded cells connected in a straight orthogonal line to the cell without any shaded cells in between, including the cell itself.



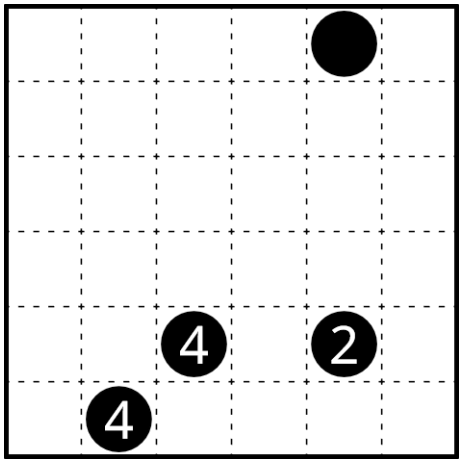

## 11.04 Aquapelago

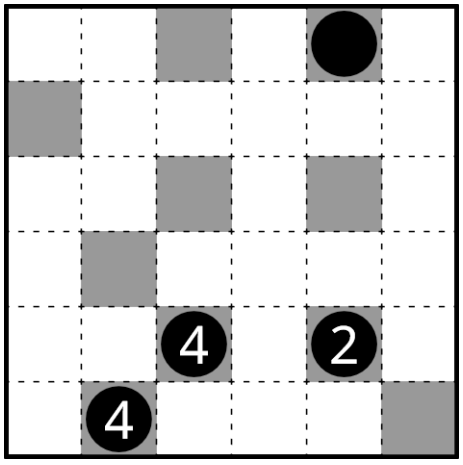
**3**pts

千岛湖

Example from puzz.link

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. No 2×2 group of cells may be entirely unshaded. Numbers in black circles must be in shaded cells, and indicate the number of shaded cells in the same diagonally connected group as the cell, including the cell itself.



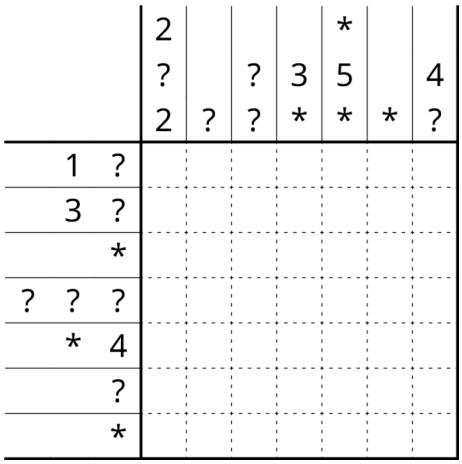
# 11.05 Cross the Streams

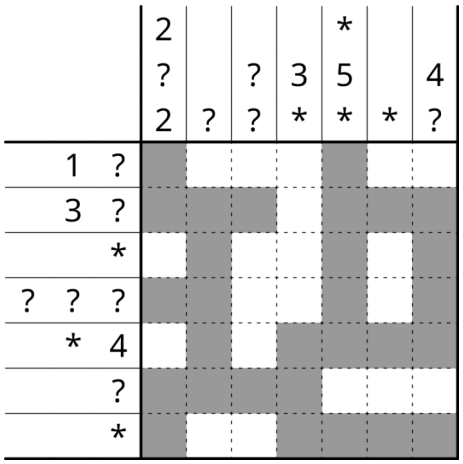
**7**pts

过河

Example from PGP 2022 R3

Shade some empty cells so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded. Numbers outside the grid indicate the lengths of blocks of consecutive shaded cells in the row or column, in order. Question marks represent any single such number clue. Asterisks represent any number of consecutive such number clues, including none at all. As a special case, a single "0" indicates that there are no shaded cells in the row or column.



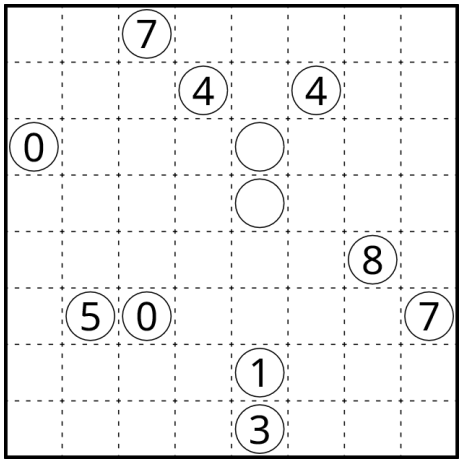

# 11.06 Canal View

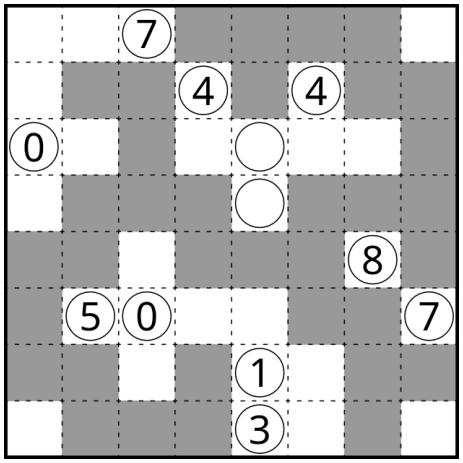
**9**pts

峡谷

Example from PGP 2023 R7

Shade some empty cells so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded. Numbers in circles indicate the number of shaded cells connected in a straight orthogonal line to the cell (not including the cell itself).



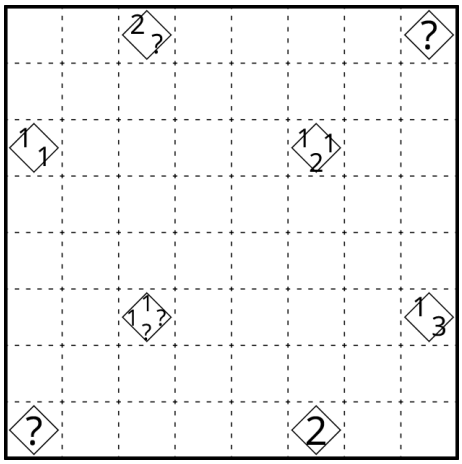
## 11.07 Tapa

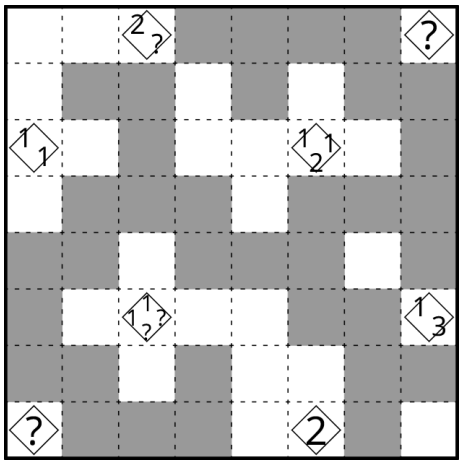
**2**pts

土派艺术

Example adapted from PGP 2023 R1

Shade some empty cells so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded. Numbers in diamonds indicate the lengths of groups of consecutive shaded cells in the ring of (up to) eight touching cells around the cell, in no particular order. As a special case, a single "0" indicates that there are no shaded cells touching the cell. A single question mark in a cell without any other numbers or question marks may represent "0".





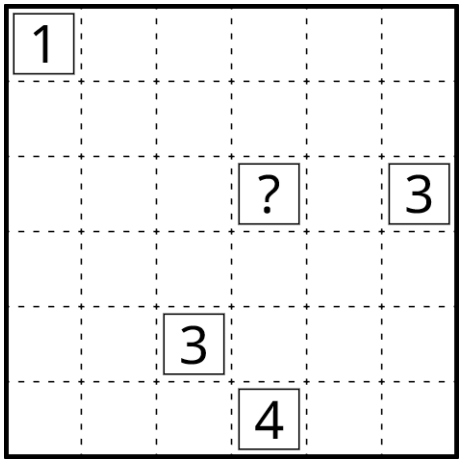
## 11.08 Nurikabe

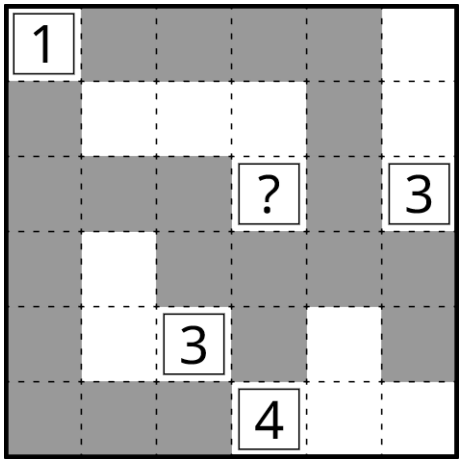
**2**pts

数墙

Example adapted from PGP 2021 R3

Shade some empty cells so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded. Each connected group of unshaded cells must contain exactly one numbered cell. Numbers in boxes indicate the number of cells in its connected group of unshaded cells.





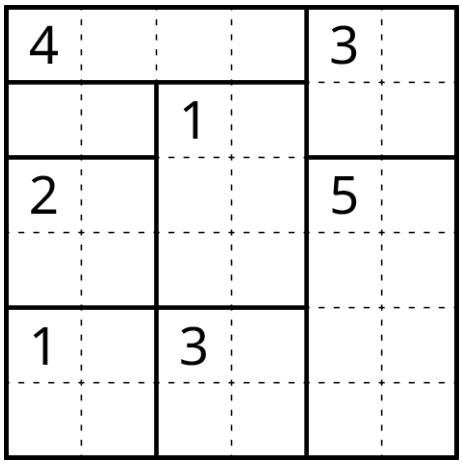
## 11.09 Cocktail Lamp

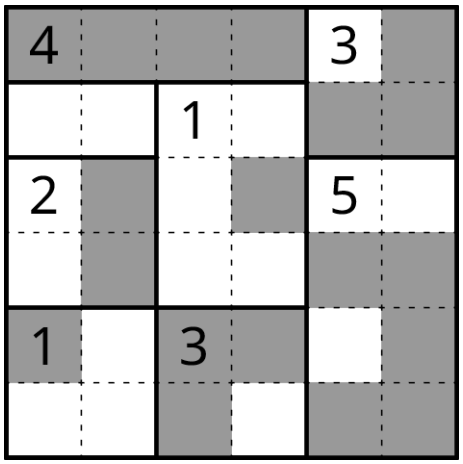
**3**pts

鸡尾酒灯

Example by from puzz.link

Shade up to one connected group of cells in each region so that no two groups in different regions are adjacent. Numbers without additional markings indicate the number of shaded cells in the region. All shaded cells must form a diagonally connected group. No 2×2 group of cells may be entirely shaded.



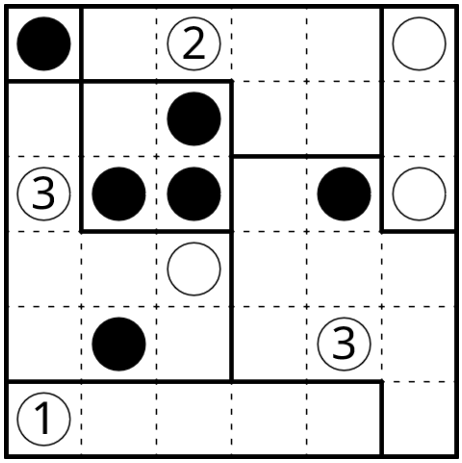

## 11.10 Martini

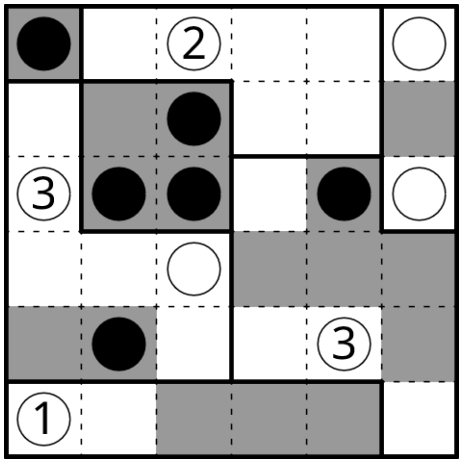
**6**pts

马提尼

Example from puzz.link

Shade up to one connected group of cells in each region so that no two groups in different regions are adjacent. All shaded cells must form a diagonally connected group. Black circles must be in shaded cells and white circles must be in unshaded cells. Numbers in white circles indicate the number of white circles in each connected group of unshaded cells (possibly spanning multiple regions), including the circle itself.



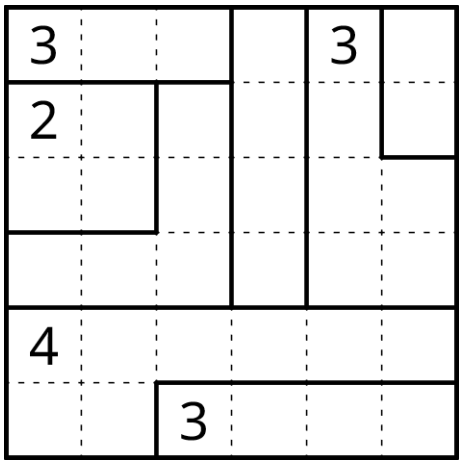
## 11.11 Shimaguni

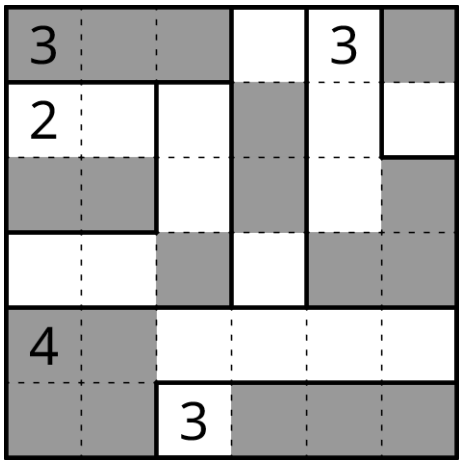
**7**pts

岛国

Example by from puzz.link

Shade exactly one connected group of cells in each region so that no two groups in different regions are adjacent. Numbers without additional markings indicate the number of shaded cells in the region. No two adjacent regions can have the same number of shaded cells.



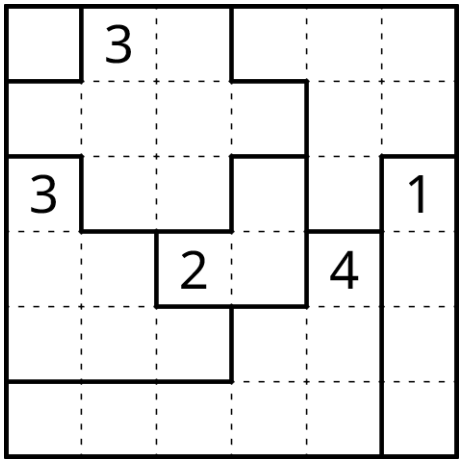

## 11.12 Stostone

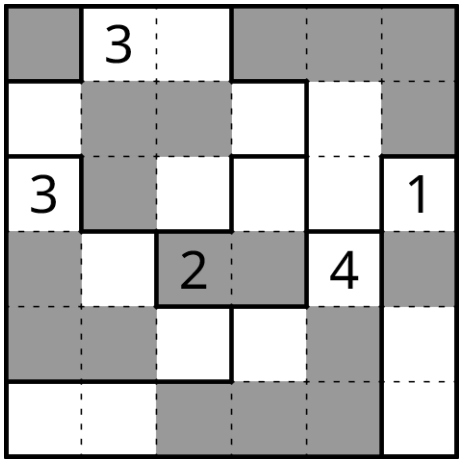
**11**pts

垒石

Example from PGP 2022 R3

Shade exactly one connected group of cells in each region so that no two groups in different regions are adjacent. Numbers without additional markings indicate the number of shaded cells in the region. If the connected groups of shaded cells fall straight down without changing shape, they must exactly occupy the bottom half of the grid.



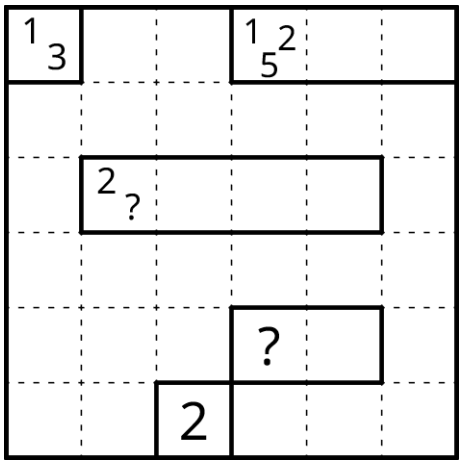
## 11.13 Rail Pool

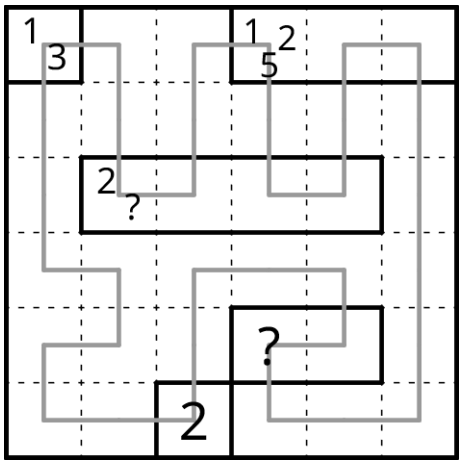
**7**pts

轨道库

Example adapted from PGP 2024 R7

Draw a single non-intersecting loop that passes orthogonally through the centers of all cells exactly once. Numbers without additional markings indicate the set of all lengths of straight segments that are at least partially contained in the region. Numbers (including unknowns) do not repeat in a region.



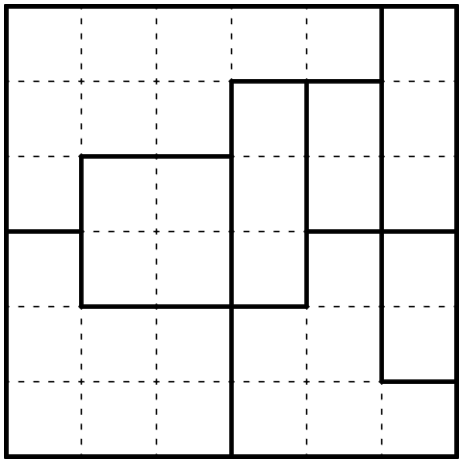

## 11.14 Double Back

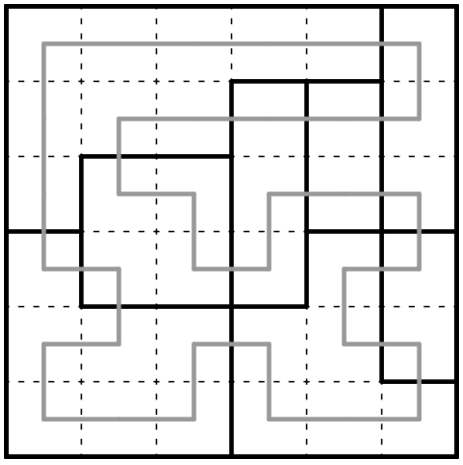
**10**pts

二次返回

Example from PGP 2024 R4

Draw a single non-intersecting loop that passes orthogonally through the centers of all cells exactly once. The loop must visit each region exactly twice.





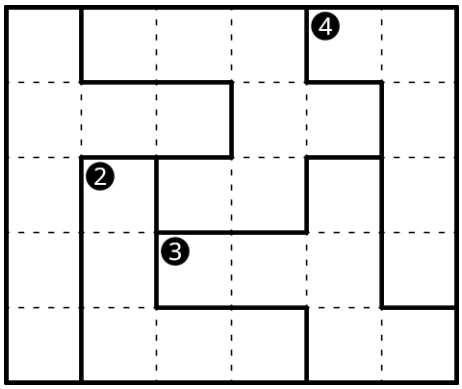
## 11.15 Detour

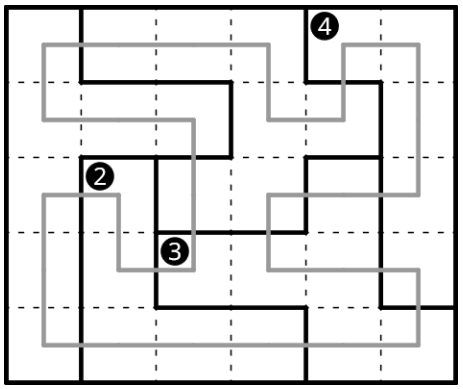
**5**pts

绕道

Example from puzz.link

Draw a single non-intersecting loop that passes orthogonally through the centers of all cells exactly once. Numbers in black circles indicate the total number of times that the loop turns in the region.



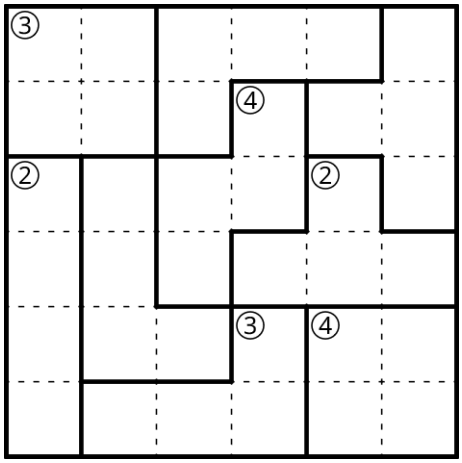

## 11.16 Maxi Loop

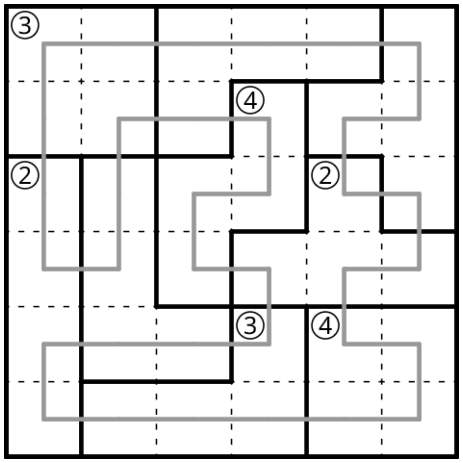
**7**pts

极大回路

Example from PGP 2023 R2

Draw a single non-intersecting loop that passes orthogonally through the centers of all cells exactly once. Numbers in white circles indicate the maximum number of cells that the loop goes through within one visit of the region. This maximum must be attained in some visit.



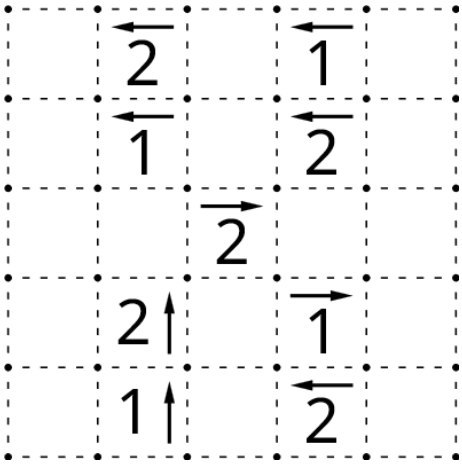
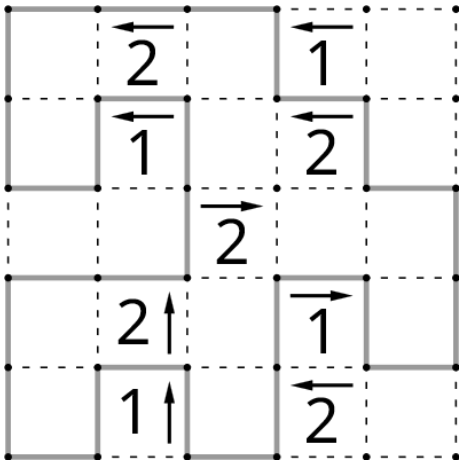
## 11.17 Line of Sight

**14**pts

视线

Example from puzz.link

Draw a single non-intersecting loop along the dashed gridlines. Numbers with arrows indicate the length of the first straight segment of the loop seen in the indicated direction from the cell. As a special case, a “0” indicates that there are no loop segments in the indicated direction.

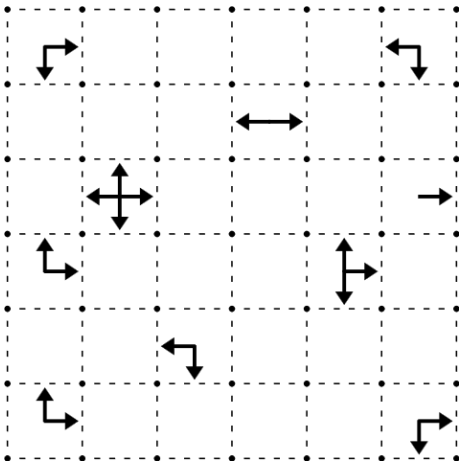
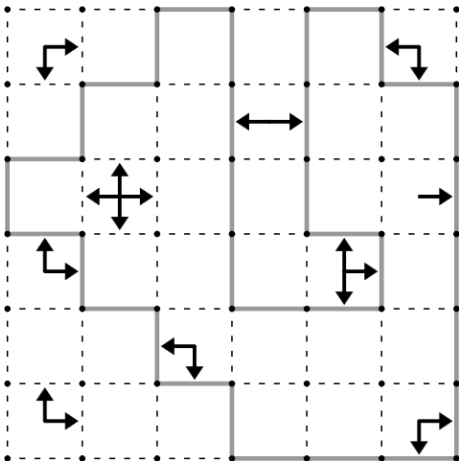
## 11.18 Myopia

**8**pts

近视回路

Example from PGP 2023 R7

Draw a single non-intersecting loop along the dashed gridlines. Arrows indicate all orthogonal directions where a loop segment appears closest to the cell.

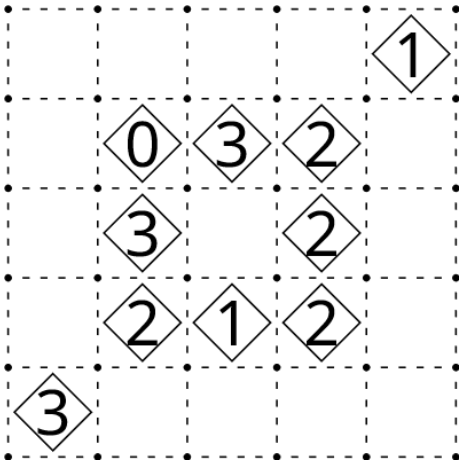
## 11.19 Slitherlink

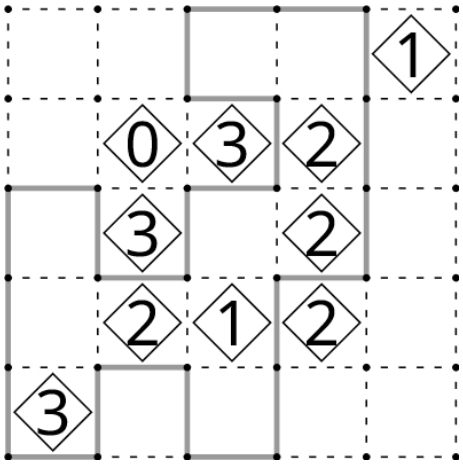
**5**pts

数回

Example from PGP 2023 R6

Draw a single non-intersecting loop along the dashed gridlines. Numbers with diamonds indicate the number of edges adjacent to the cell that are used by the loop.



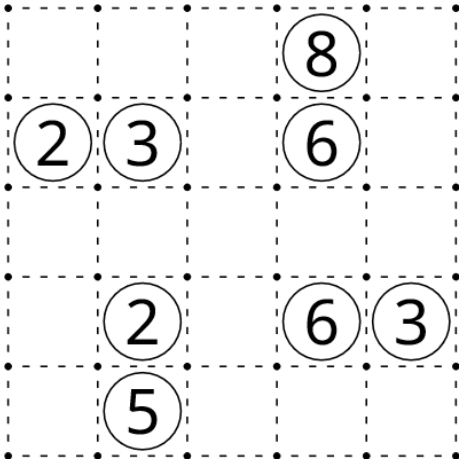

## 11.20 Cave

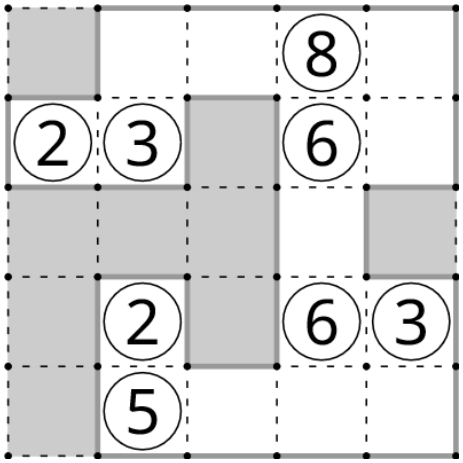
**10**pts

山洞

Example from PGP 2023 R8

Draw a single non-intersecting loop along the dashed gridlines. Numbers with circles must be inside the loop, and indicate the number of cells inside the loop connected in a straight orthogonal line to the cell without any loop segments in between, including the cell itself.



## 11.21 Yajilin

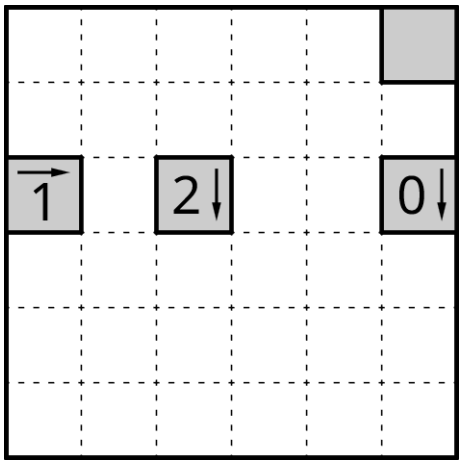
**5**pts

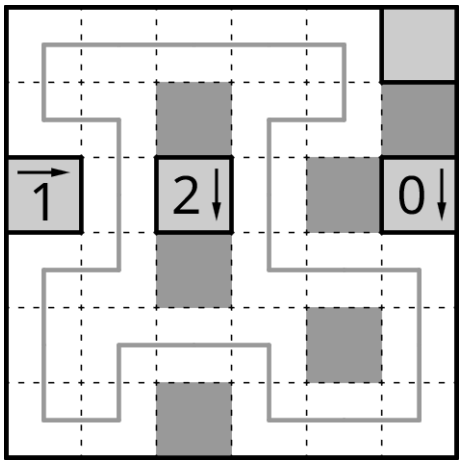
仙人指路

Example adapted from PGP 2024 R1

Draw a non-intersecting loop that passes orthogonally through centers of some empty cells. No two adjacent empty cells may be both unused by the loop. Numbers with arrows in grey cells indicate the number of unused empty cells in the indicated direction from the cell.

*It is not necessary to shade the unused empty cells.*




## 11.22 Koburin

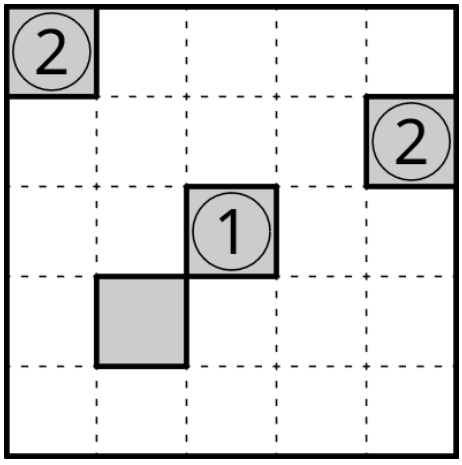
**2**pts

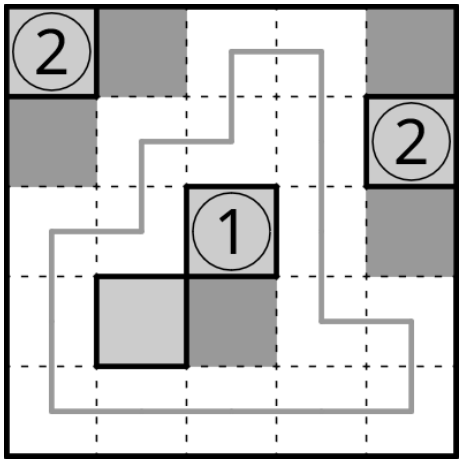
仙人指邻

Example from puzz.link

Draw a non-intersecting loop that passes orthogonally through centers of some empty cells. No two adjacent empty cells may be both unused by the loop. Numbers with circles in grey cells indicate the number of unused empty cells adjacent to the cell.

*It is not necessary to shade the unused empty cells.*



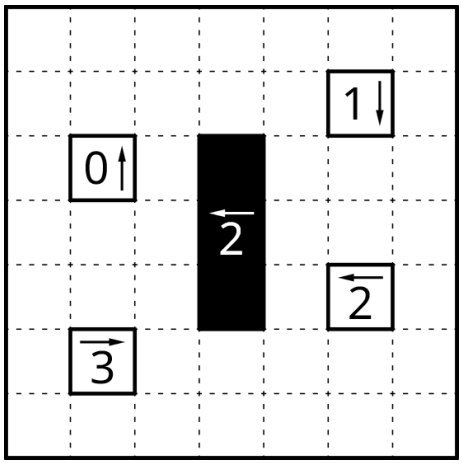
## 11.23 Castle Wall

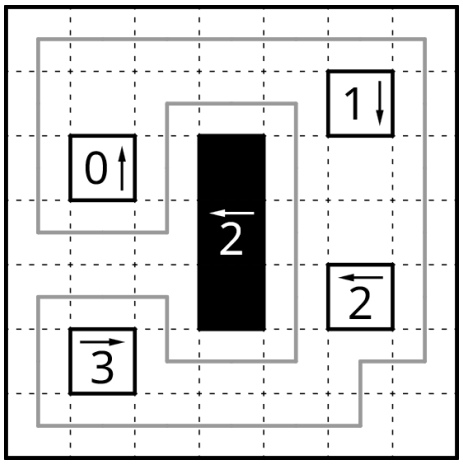
**4**pts

城堡墙

Example from PGP 2021 R6

Draw a non-intersecting loop that passes orthogonally through centers of some empty cells. Numbers with arrows in black or white outlined cells indicate the total lengths of straight segments in the indicated direction from the cell. Black cells with such clues must be outside the loop and white cells with such clues must be inside the loop.



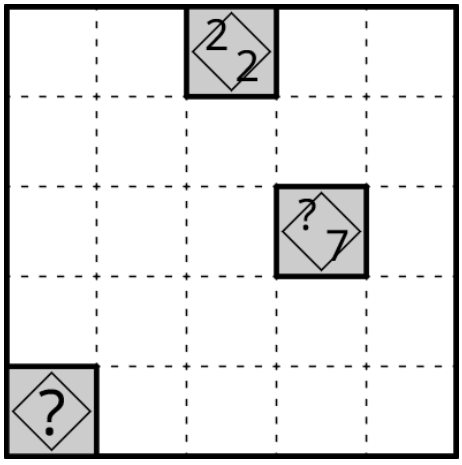

## 11.24 Tapa-like Loop

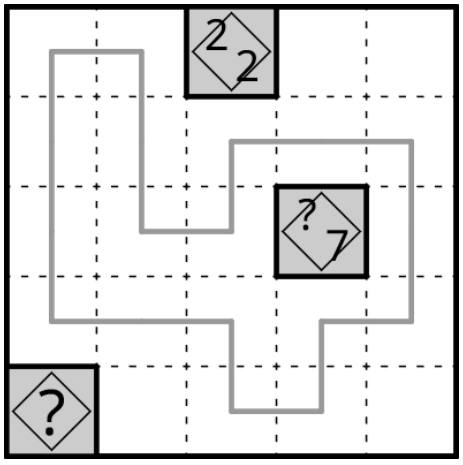
**2**pts

土派回路

Example adapted from PGP 2024 R7

Draw a non-intersecting loop that passes orthogonally through centers of some empty cells. Numbers with diamonds in grey cells indicate the lengths of each visit to the ring of (up to) eight touching cells around the cell, in no particular order. As a special case, a single “0” indicates that the loop does not visit any of the touching cells around the cell. A single question mark in a cell without any other numbers or question marks may represent “0”.



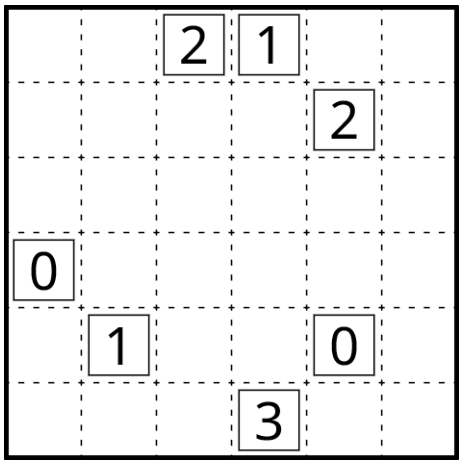
## 11.25 Sashikaku

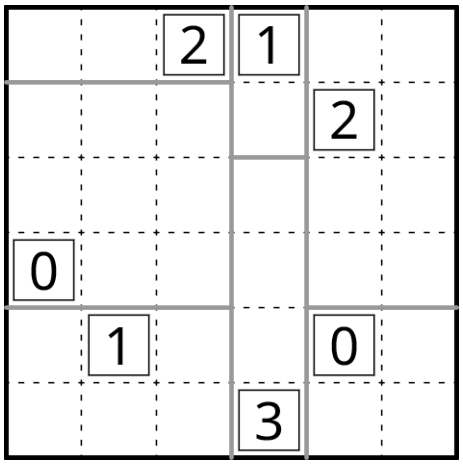
**4**pts

差方

Example by Yao Yuan

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one clue. Numbers in white boxes indicate the (nonnegative) difference between the height and width of the rectangle that it belongs to.



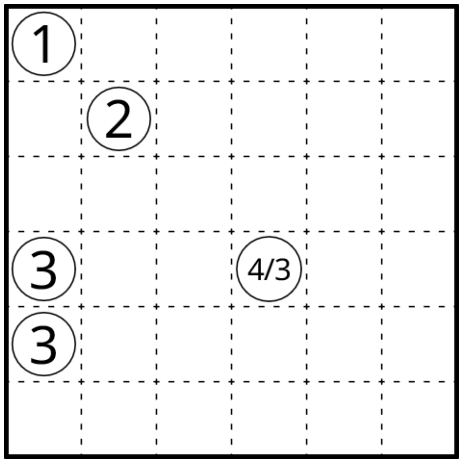

## 11.26 Shikaku (Ratio)

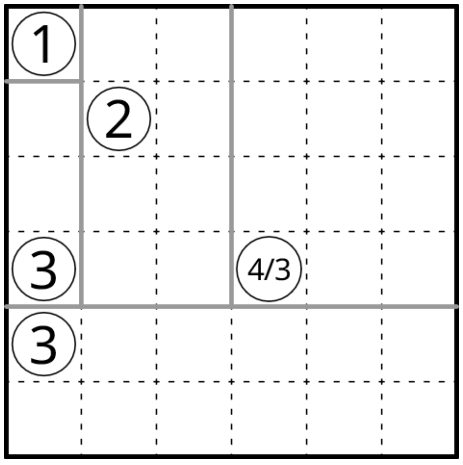
**3**pts

商方

Example by Yao Yuan

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one clue. Numbers in white circles indicate the ratio between the height and width of the rectangle that it belongs to (in some order).



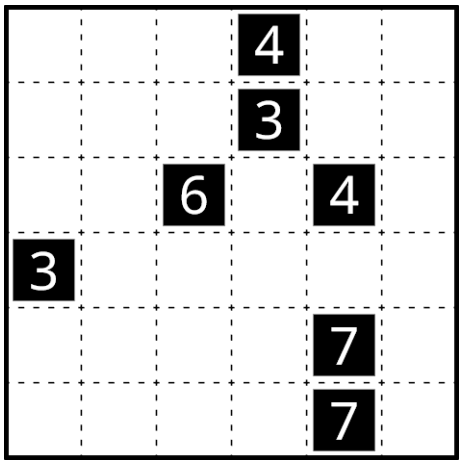
## 11.27 Recto

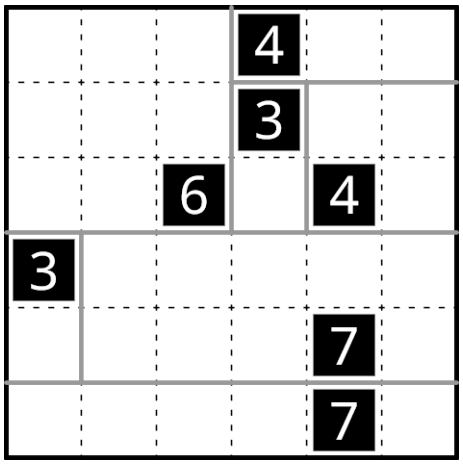
**3**pts

和方

Example from PGP 2019 R2

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one clue. Numbers in black boxes indicate the sum of the height and width of the rectangle that it belongs to.



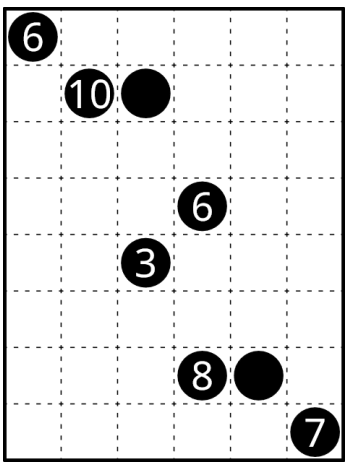

## 11.28 Shikaku

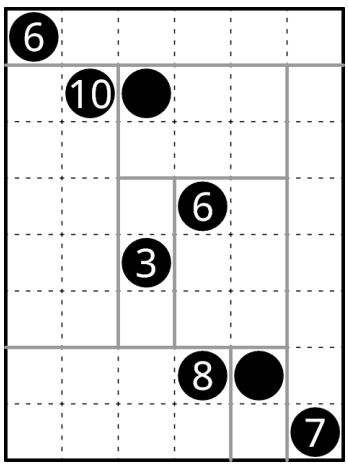
**2**pts

数方

Example adapted from PGP 2024 R1

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one clue. Numbers in black circles indicate the area of the rectangle that it belongs to.



## 11.29 Symmetry Area

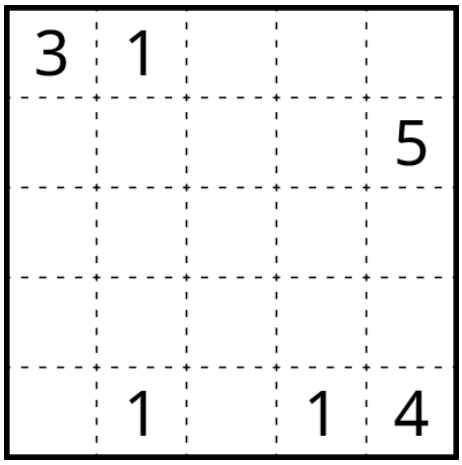
**4**pts

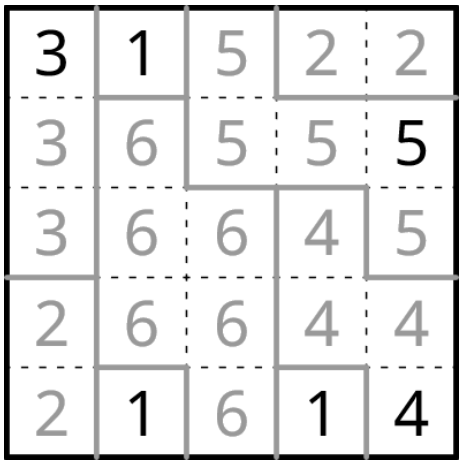
对称码牌

Example from PGP 2024 R1

Divide the grid into regions along dashed gridlines so that no two adjacent regions have the same area. Numbers in cells indicate the area of the region that it belongs to. All regions must have 180° rotational symmetry.

*For full credit, it is sufficient to draw the dividing lines OR fill each cell with a number indicating the area of its region.*




## 11.30 Snake Pit

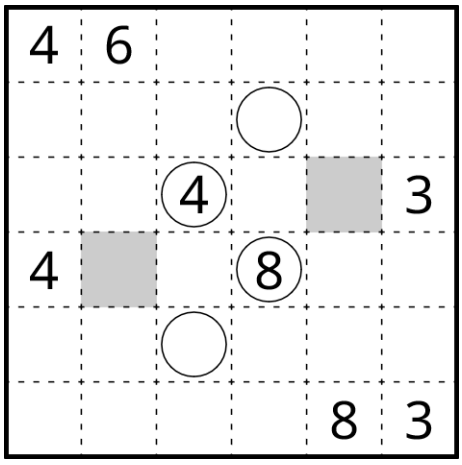
**4**pts

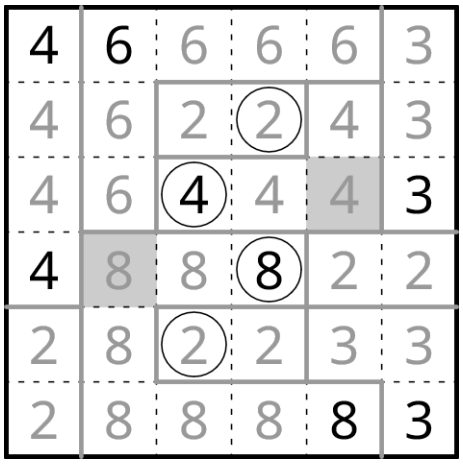
蛇窝

Example from PGP 2023 R6

Divide the grid into regions along dashed gridlines so that no two adjacent regions have the same area. Numbers in cells indicate the area of the region that it belongs to. All regions must be in the shape of a snake with width one and length least two cells that does not touch itself. Circles indicate the end of a snake and grey cells indicate a cell that is not the end of a snake.

*For full credit, it is sufficient to draw the dividing lines OR fill each cell with a number indicating the area of its region.*



## 11.31 Wafusuma

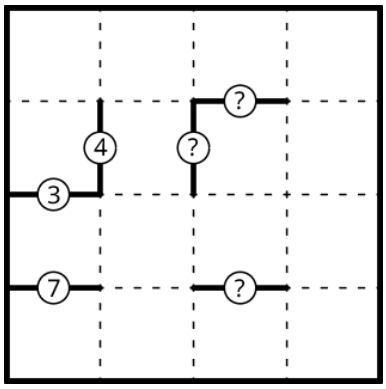
**3**pts

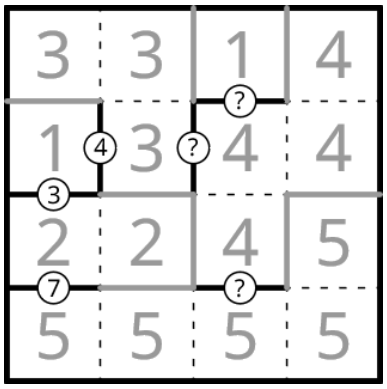
和障

Example from puzz.link

Divide the grid into regions along dashed gridlines so that no two adjacent regions have the same area. Numbers in circles on gridlines must be between two different regions, and indicate the sum of areas of these two regions.

*For full credit, it is sufficient to draw the dividing lines OR fill each cell with a number indicating the area of its region.*




## 11.32 Subomino

**7**pts

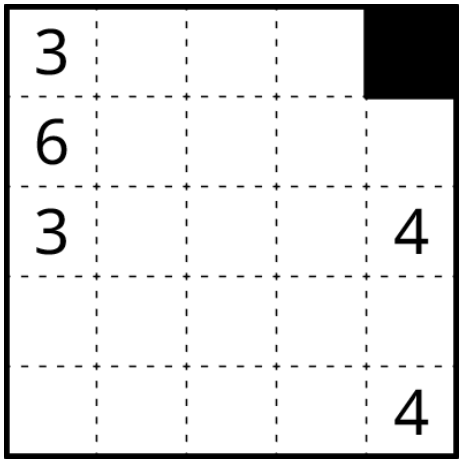
无包含码牌

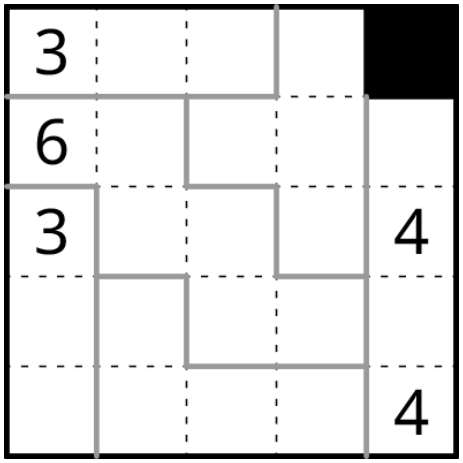
Example from puzz.link

*Unlike the previous three puzzles, this one is arguably not a Fillomino variant.*

Divide the grid into regions along dashed gridlines so that for any two adjacent regions, one cannot put one inside the other through translation only. Numbers in cells indicate the area of the region that it belongs to.

*Since adjacent regions may have the same area, writing area values is not sufficient in substituting division.*



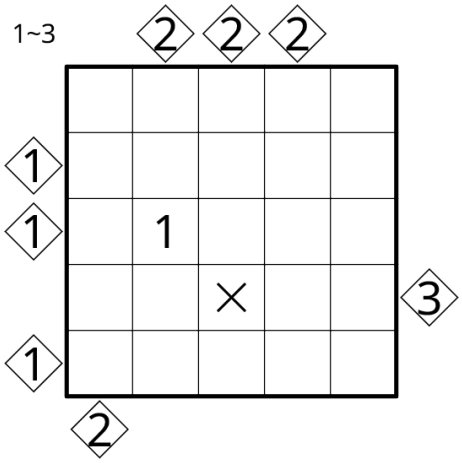
## 11.33 Easy as

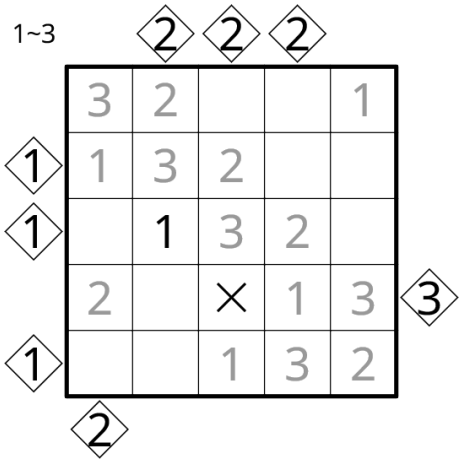
**3**pts

简单字符

Example adapted from PGP 2024 R8

Place a number from the indicated list into some empty cells so that each number in the list appears exactly once in each row and column. Numbers in diamonds outside the grid indicate the first number in the row or column from the respective direction. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.




## 11.34 Doppelblock

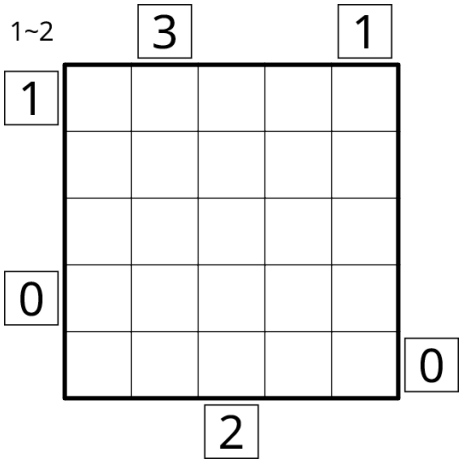
**2**pts

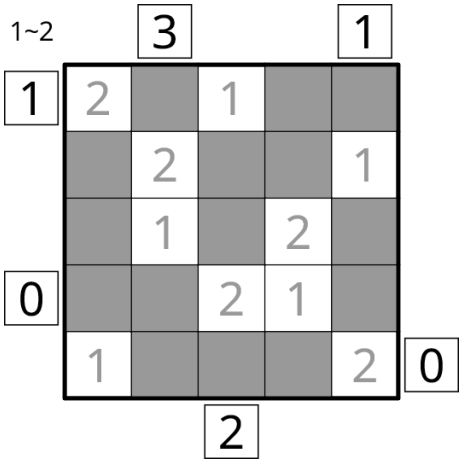
双黑格

Example by Yao Yuan

Place a number from the indicated list into some empty cells so that each number in the list appears exactly once in each row and column. Numbers in boxes outside the grid indicate the sum of all numbers between the first two empty cells in the row or column from the respective direction. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

*It is not necessary to shade the remaining empty cells.*



## 11.35 Skyscrapers

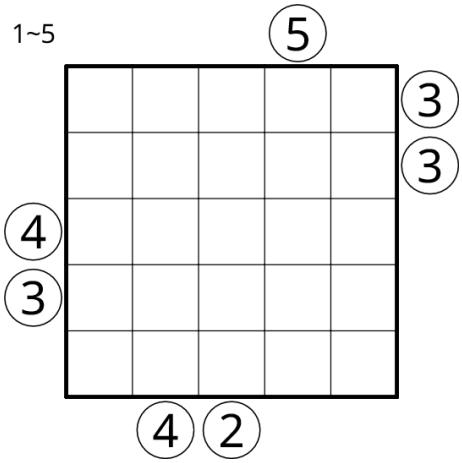
**3**pts

摩天楼

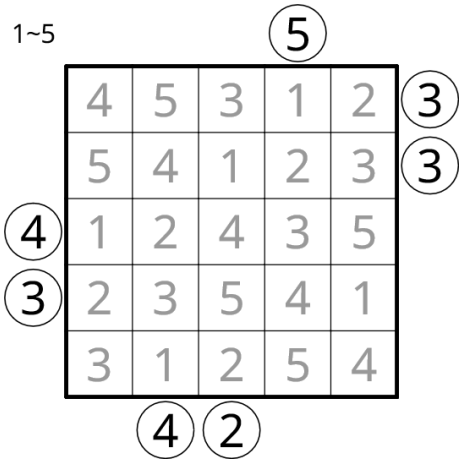
Example from PGP 2024 R7

Place a number from the indicated list into some empty cells so that each number in the list appears exactly once in each row and column. Each number represents a skyscraper of its respective height. Numbers in circles outside the grid indicate the number of skyscrapers that can be seen in the row or column from the respective direction, where shorter skyscrapers are hidden behind taller ones. (Empty cells do not block vision.) Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

1~5




1~5




## 11.36 Fuzuli

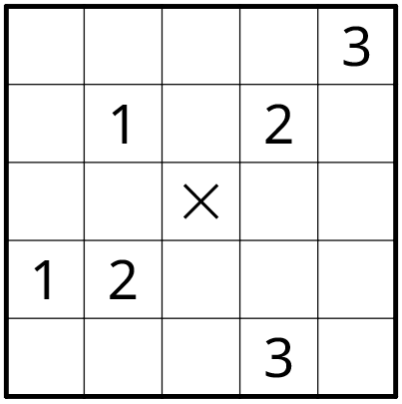
**4**pts

冗余

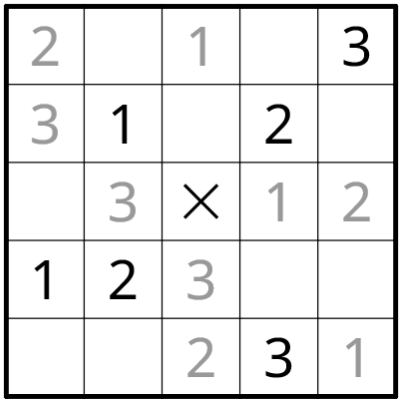
Example from PGP 2021 R5

Place a number from the indicated list into some empty cells so that each number in the list appears exactly once in each row and column. No 2×2 group of cells may be entirely filled with numbers. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

1~3




1~3



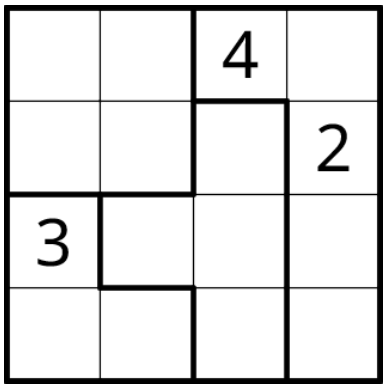
## 11.37 Suguru

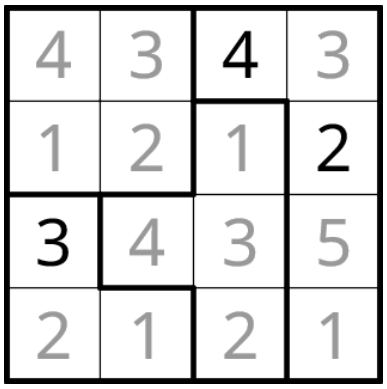
**2**pts

数组

Example from PGP 2022 R3

Place a number into each empty cell so that each region contains the numbers from 1 to N, where N is the number of cells in the region. Identical numbers may not be placed in touching cells. Some numbers may be already placed in the grid.



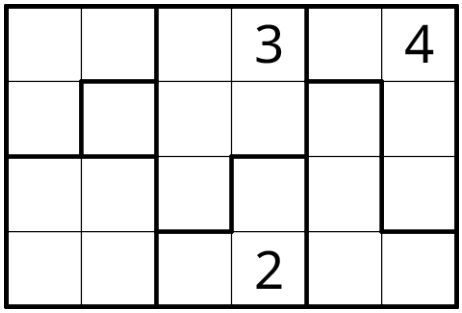

## 11.38 Ripple Effect

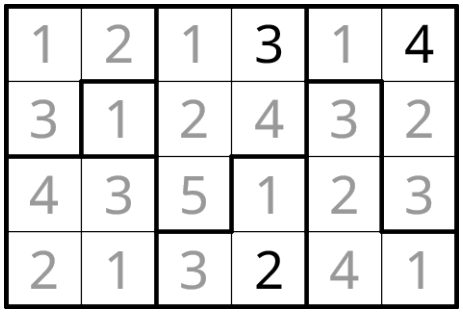
**3**pts

涟漪

Example from PGP 2024 R1

Place a number into each empty cell so that each region contains the numbers from 1 to N, where N is the number of cells in the region. Identical numbers in the same row or column must be separated by at least as many cells (including holes) as the value of the number. Some numbers may be already placed in the grid.



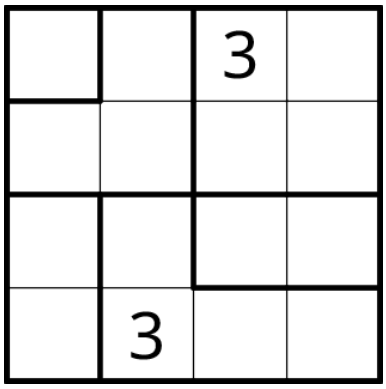
## 11.39 Cojun

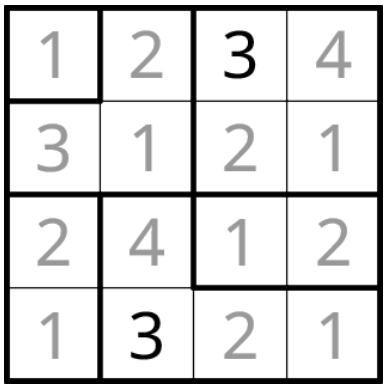
**3**pts

疊疊高

Example from puzz.link

Place a number into each empty cell so that each region contains the numbers from 1 to N, where N is the number of cells in the region. Identical numbers may not be placed in adjacent cells. Whenever two numbers are in vertically adjacent cells in the same region, the number on top must be larger than the number on the bottom. Some numbers may be already placed in the grid.



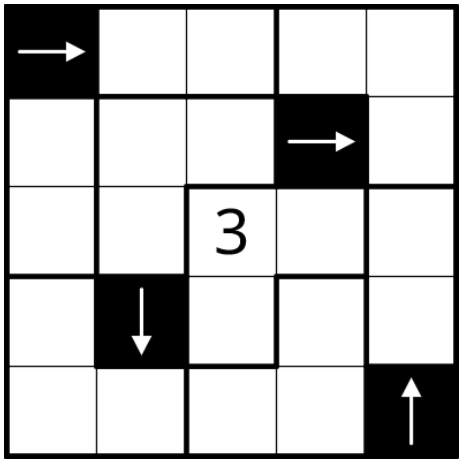

## 11.40 Makaro

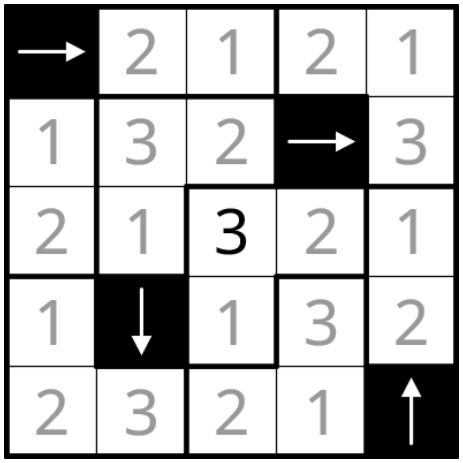
**2**pts

极大箭头

Example from puzz.link

Place a number into each empty cell so that each region contains the numbers from 1 to N, where N is the number of cells in the region. Identical numbers may not be placed in adjacent cells. Arrows in black cells must point to the unique largest number among all numbers adjacent to the black cell. Some numbers may be already placed in the grid.



Individual Round 12

# Quadruple Happiness

大四喜

10 Puzzles

65 Minutes

**650** Points

| | | |
|---|---|---|
| 01 | Yajisan-Kazusan + Context + Kurodoko + Aquapelago | **55** |
| 02 | Cross the Streams + Canal View + Tapa + Nurikabe | **60** |
| 03 | Cocktail Lamp + Martini + Shimaguni + Stostone | **125** |
| 04 | Rail Pool + Double Back + Detour + Maxi Loop | **85** |
| 05 | Line of Sight + Myopia + Slitherlink + Cave | **50** |
| 06 | Yajilin + Koburin + Castle Wall + Tapa-Like Loop | **40** |
| 07 | Sashikaku + Shikaku (Ratio) + Recto + Shikaku | **20** |
| 08 | Symmetry Area + Snake Pit + Wafusuma + Subomino | **45** |
| 09 | Easy as + Doppelblock + Skyscrapers + Fuzuli | **125** |
| 10 | Suguru + Ripple Effect + Cojun + Makaro | **45** |

*The Chinese title of this round also refers to the Mahjong hand "Big Four Winds".*

This round features puzzles that are each hybrids of a set of 4 similar genres from the previous round, combining all the rules and clue types in those genres (sometimes with minor modifications or generalizations).
In the instructions, rules that are shared by two or more genres will be introduced first, then the unique additions from each genre. Different types of clues will be underlined.

# 12.01 Yajisan-Kazusan + Context + Kurodoko + Aquapelago

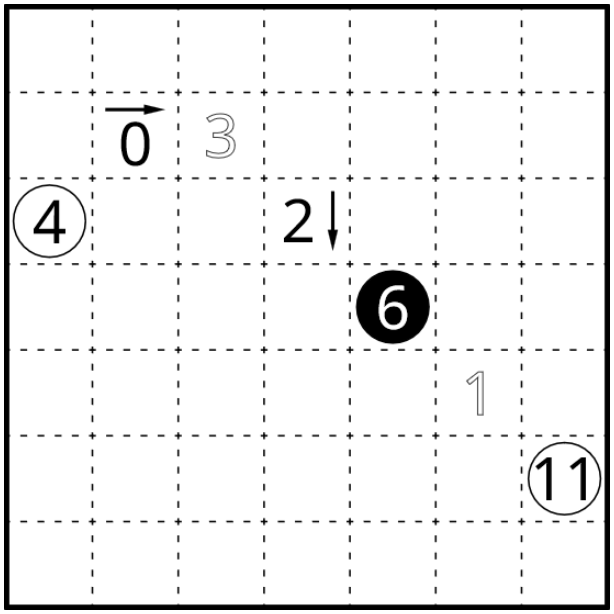
**55**pts

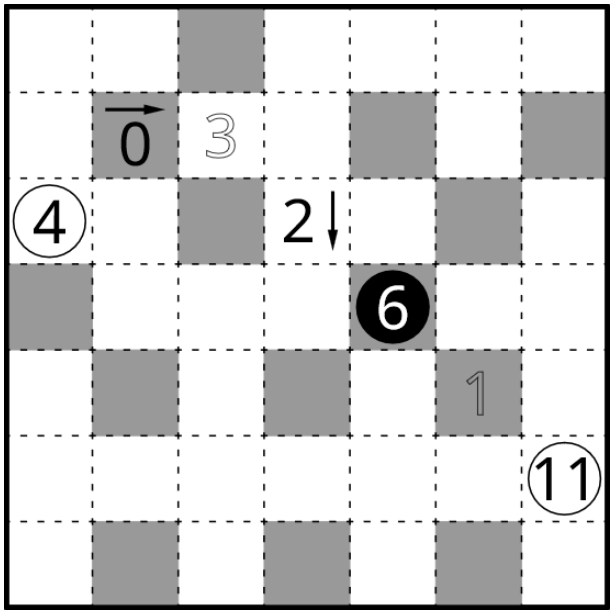
真假仙人 + 黑斜白邻 + 田鼠挖洞 + 千岛湖

Example by Yao Yuan

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group.

1. Yajisan-Kazusan: Numbers with arrows in unshaded cells indicate the number of shaded cells in the indicated direction from the cell. Such clues in shaded cells give no information.
2. Context: Hollow numbers in unshaded cells indicate the number of shaded cells adjacent to the cell. Such clues in shaded cells indicate the number of shaded cells touching (but not adjacent to) the cell.
3. Kurodoko: Numbers in white circles must be in unshaded cells, and indicate the number of unshaded cells connected in a straight orthogonal line to the cell without any shaded cells in between, including the cell itself.
4. Aquapelago: No 2×2 group of cells may be entirely unshaded. Numbers in black circles must be in shaded cells, and indicate the number of shaded cells in the same diagonally connected group as the cell, including the cell itself.



# 12.02 Cross the Streams + Canal View + Tapa + Nurikabe

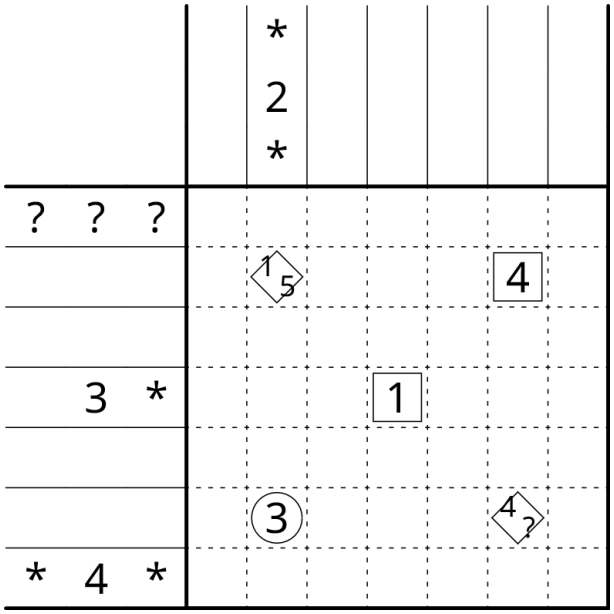
**60**pts

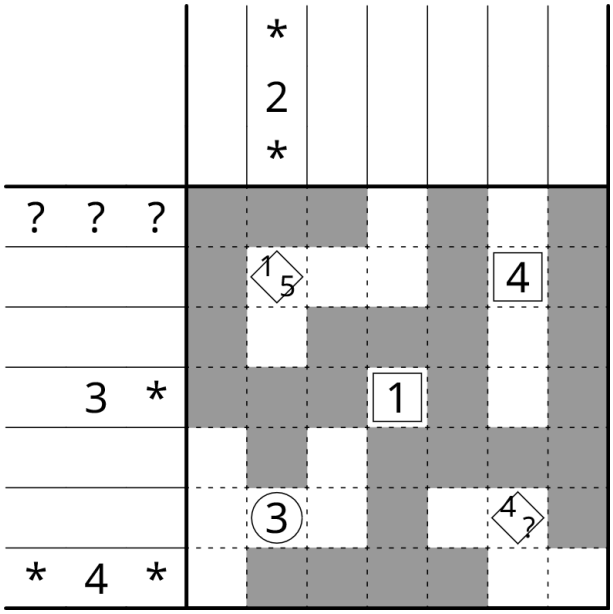
过河 + 峡谷 + 土派艺术 + 数墙

Example by Yao Yuan

Shade some empty cells so that the shaded cells form one connected group and no 2×2 group of cells is entirely shaded.

1. Cross the Streams: Numbers outside the grid indicate the lengths of blocks of consecutive shaded cells in the row or column, in order. Question marks represent any single such number clue. Asterisks represent any number of consecutive such number clues, including none at all. As a special case, a single "0" indicates that there are no shaded cells in the row or column.
2. Canal View: Numbers in circles indicate the number of shaded cells connected in a straight orthogonal line to the cell (not including the cell itself).
3. Tapa: Numbers in diamonds indicate the lengths of groups of consecutive shaded cells in the ring of (up to) eight touching cells around the cell, in no particular order. As a special case, a single "0" indicates that there are no shaded cells touching the cell. A single question mark in a cell without any other numbers or question marks may represent "0".
4. Nurikabe: Each connected group of unshaded cells must contain exactly one numbered cell (which is not necessarily a Nurikabe clue). Numbers in boxes indicate the number of cells in its connected group of unshaded cells.



# 12.03 Cocktail Lamp + Martini + Shimaguni + Stostone

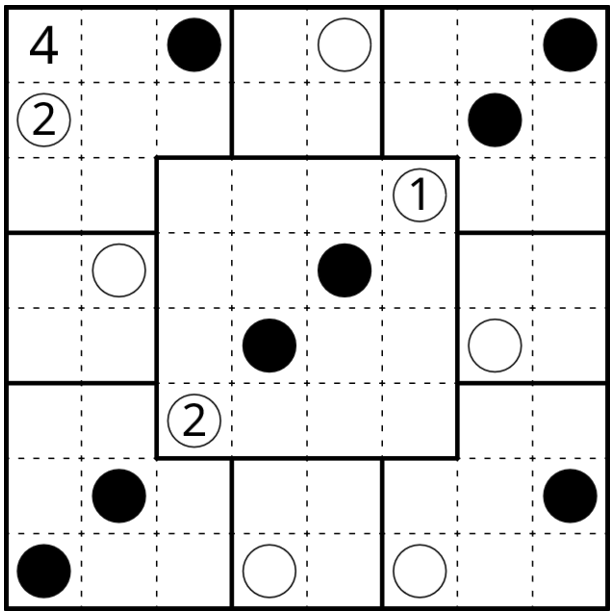
**125**pts

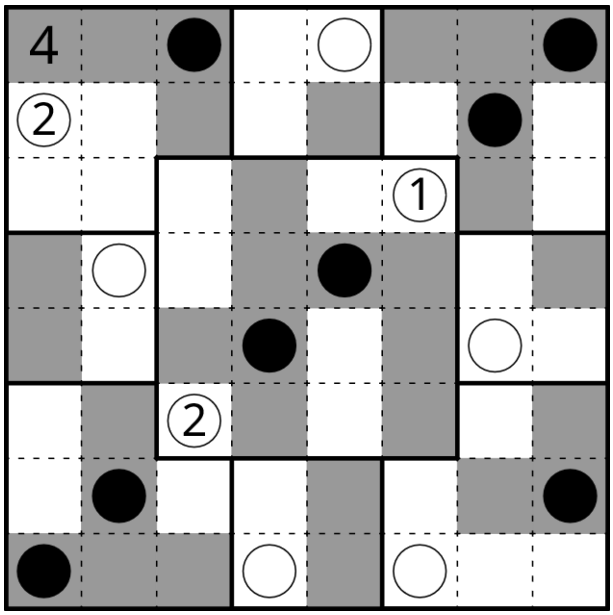
鸡尾酒灯 + 马提尼 + 岛国 + 垒石

Example by Yao Yuan

Shade exactly one connected group of cells in each region so that no two groups in different regions are adjacent. Numbers without additional markings indicate the number of shaded cells in the region. All shaded cells must form a diagonally connected group.

1. Cocktail Lamp: No 2×2 group of cells may be entirely shaded.
2. Martini: Black circles must be in shaded cells and white circles must be in unshaded cells. Numbers in white circles indicate the number of white circles in each connected group of unshaded cells (possibly spanning multiple regions), including the circle itself.
3. Shimaguni: No two adjacent regions can have the same number of shaded cells.
4. Stostone: If the connected groups of shaded cells fall straight down without changing shape, they must exactly occupy the bottom half of the grid.



# 12.04 Rail Pool + Double Back + Detour + Maxi Loop

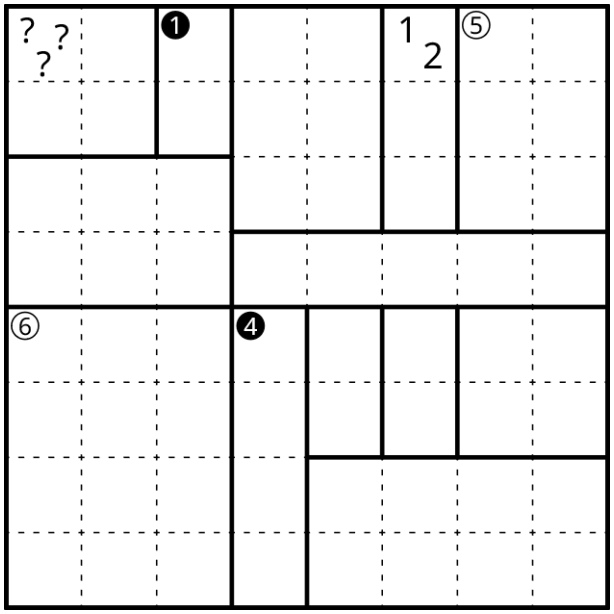
**85**pts

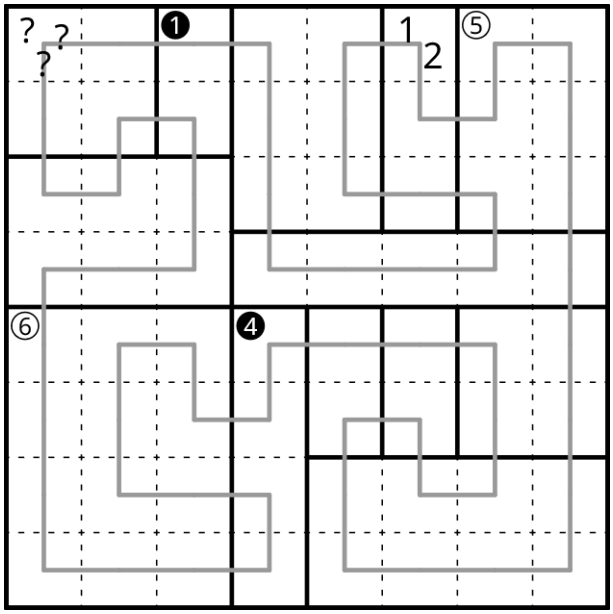
轨道库 + 二次返回 + 绕道 + 极大回路

Example by Yao Yuan

Draw a single non-intersecting loop that passes orthogonally through the centers of all cells exactly once.

1. Rail Pool: Numbers without additional markings indicate the set of all lengths of straight segments that are at least partially contained in the region. Numbers (including unknowns) do not repeat in a region.
2. Double Back: The loop must visit each region exactly twice.
3. Detour: Numbers in black circles indicate the total number of times that the loop turns in the region.
4. Maxi Loop: Numbers in white circles indicate the maximum number of cells that the loop goes through within one visit of the region. This maximum must be attained in some visit.



# 12.05 Line of Sight + Myopia + Slitherlink + Cave

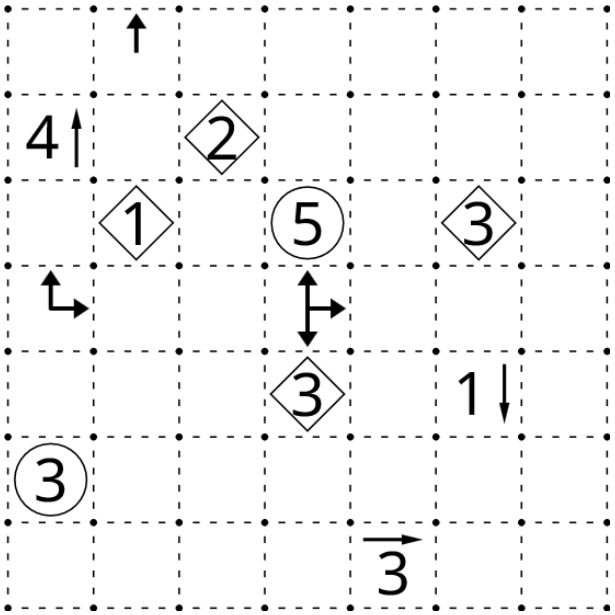
**50**pts

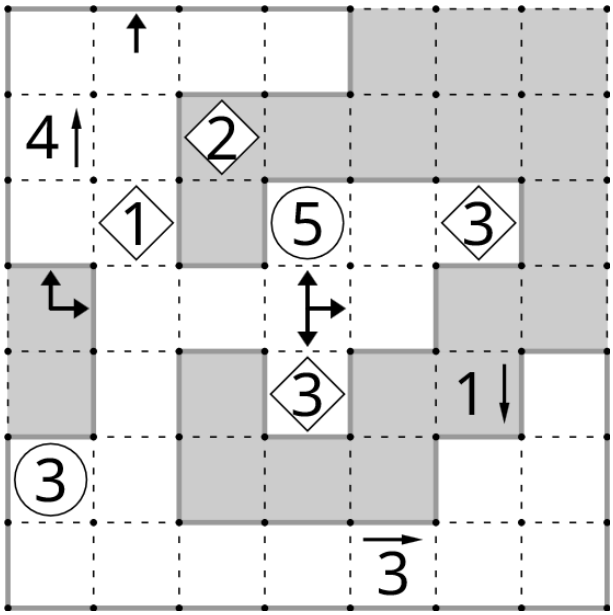
视线 + 近视回路 + 数回 + 山洞

Example by Yao Yuan

Draw a single non-intersecting loop along the dashed gridlines.

1. Line of Sight: Numbers with arrows indicate the length of the first straight segment of the loop seen in the indicated direction from the cell. As a special case, a “0” indicates that there are no loop segments in the indicated direction.
2. Myopia: Arrows (without numbers) indicate all orthogonal directions where a loop segment appears closest to the cell.
3. Slitherlink: Numbers in diamonds indicate the number of edges adjacent to the cell that are used by the loop.
4. Cave: Numbers in circles must be inside the loop, and indicate the number of cells inside the loop connected in a straight orthogonal line to the cell without any loop segments in between, including the cell itself.





# 12.06 Yajilin + Koburin + Castle Wall + Tapa-Like Loop

**40**pts

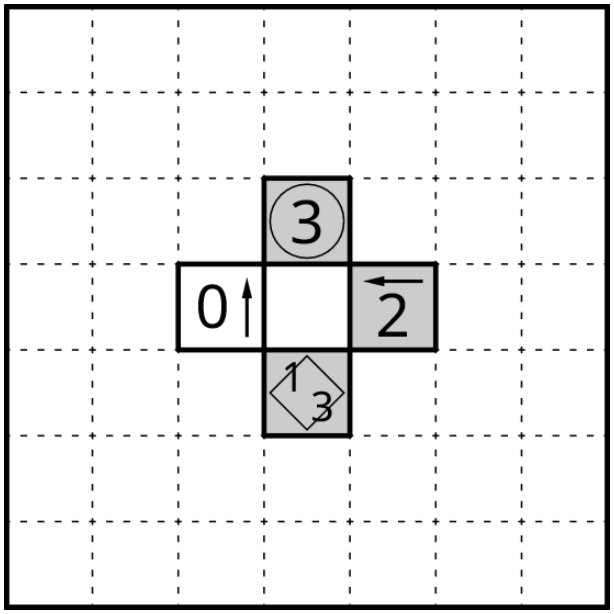
仙人指路 + 仙人指邻 + 城堡墙 + 土派回路

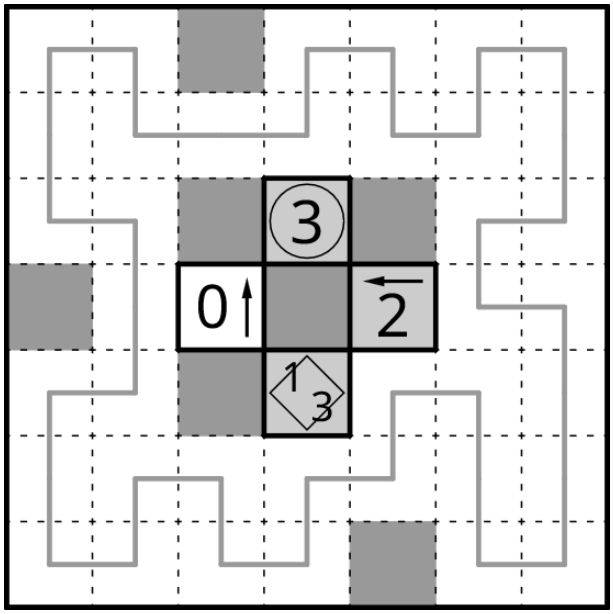
Example by Yao Yuan

Draw a non-intersecting loop that passes orthogonally through centers of some empty cells. No two adjacent empty cells may be both unused by the loop.

1. Yajilin: Numbers with arrows in grey cells indicate the number of unused empty cells in the indicated direction from the cell.
2. Koburin: Numbers with circles in grey cells indicate the number of unused empty cells adjacent to the cell.
3. Castle Wall: Numbers with arrows in black or white outlined cells indicate the total lengths of straight segments in the indicated direction from the cell. Black cells with such clues must be outside the loop and white cells with such clues must be inside the loop.
4. Tapa-like Loop: Numbers with diamonds in grey cells indicate the lengths of each visit to the ring of (up to) eight touching cells around the cell, in no particular order. As a special case, a single "0" indicates that the loop does not visit any of the touching cells around the cell. A single question mark in a cell without any other numbers or question marks may represent "0".

*All boundaries between clue cells and empty cells are marked with thick borders. It is not necessary to shade the unused empty cells.*



# 12.07 Sashikaku + Shikaku (Ratio) + Recto + Shikaku

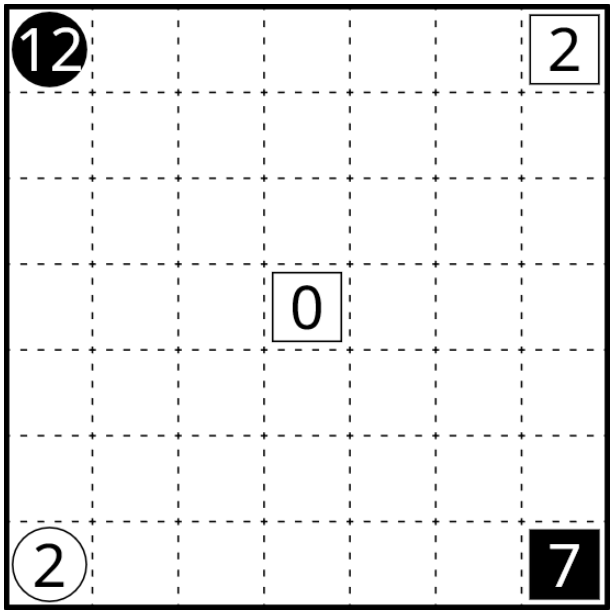
**20**pts

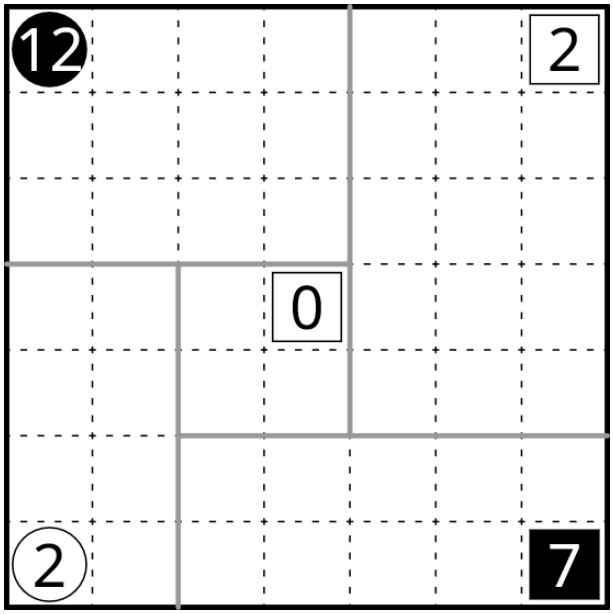
差方 + 商方 + 和方 + 数方

Example by Yao Yuan

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one clue.

1. Sashikaku: Numbers in white boxes indicate the (nonnegative) difference between the height and width of the rectangle that it belongs to.
2. Shikaku (Ratio): Numbers in white circles indicate the ratio between the height and width of the rectangle that it belongs to (in some order).
3. Recto: Numbers in black boxes indicate the sum of the height and width of the rectangle that it belongs to.
4. Shikaku: Numbers in black circles indicate the area of the rectangle that it belongs to.



# 12.08 Symmetry Area + Snake Pit + Wafusuma + Subomino

**45**pts

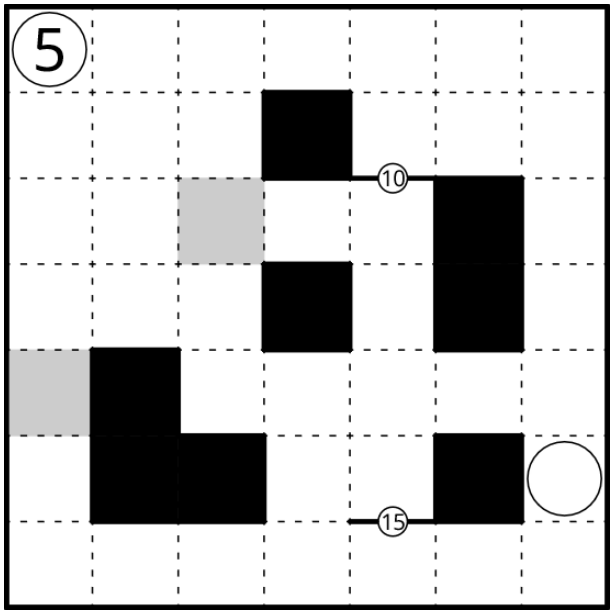
对称码牌 + 蛇窝 + 和障 + 无包含码牌

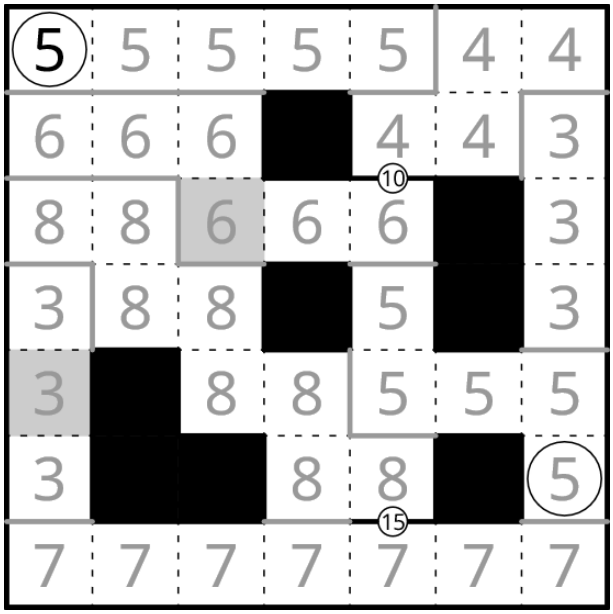
Example by Yao Yuan

Divide the grid into regions along dashed gridlines so that no two adjacent regions have the same area. Numbers in cells indicate the area of the region that it belongs to.

1. Symmetry Area: All regions must have 180° rotational symmetry.
2. Snake Pit: All regions must be in the shape of a snake with width one and length least two cells that does not touch itself. Circles indicate the end of a snake and grey cells indicate a cell that is not the end of a snake.
3. Wafusuma: Numbers in circles on gridlines must be between two different regions, and indicate the sum of areas of these two regions.
4. Subomino: For any two adjacent regions, one cannot put one inside the other through translation only.

*For full credit, it is sufficient to draw the dividing lines OR fill each cell with a number indicating the area of its region.*



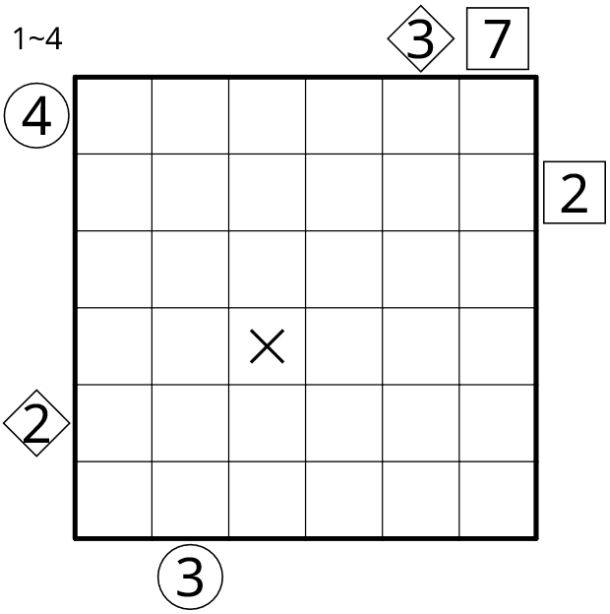
# 12.09 Easy as + Doppelblock + Skyscrapers + Fuzuli

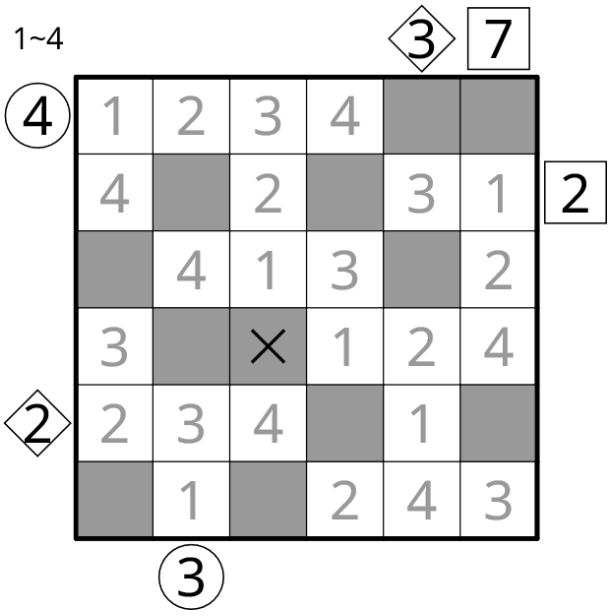
**125**pts 简单字符 + 双黑格 + 摩天楼 + 冗余 Example by Yao Yuan

Place a number from the indicated list into some empty cells so that each number in the list appears exactly once in each row and column. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

1. Easy as: Numbers in diamonds outside the grid indicate the first number in the row or column from the respective direction.
2. Doppelblock: Numbers in boxes outside the grid indicate the sum of all numbers between the first two empty cells in the row or column from the respective direction.
3. Skyscrapers: Each number represents a skyscraper of its respective height. Numbers in circles outside the grid indicate the number of skyscrapers that can be seen in the row or column from the respective direction, where shorter skyscrapers are hidden behind taller ones. (Empty cells do not block vision.)
4. Fuzuli: No 2×2 group of cells may be entirely filled with numbers.

*It is not necessary to shade the remaining empty cells.*



## 12.10 Suguru + Ripple Effect + Cojun + Makaro

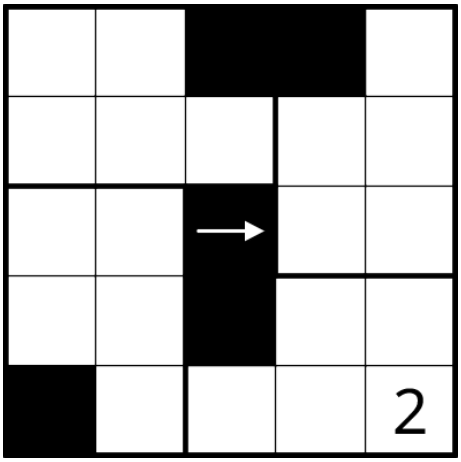
**45**pts

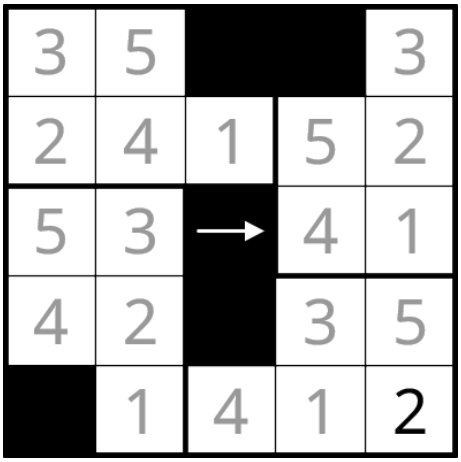
数组 + 涟漪 + 叠叠高 + 极大箭头

Example by Yao Yuan

Place a number into each empty cell so that each region contains the numbers from 1 to N, where N is the number of cells in the region. Some numbers may be already placed in the grid.

1. Suguru: Identical numbers may not be placed in touching cells.
2. Ripple Effect: Identical numbers in the same row or column must be separated by at least as many cells (including holes) as the value of the number.
3. Cojun: Whenever two numbers are in vertically adjacent cells in the same region, the number on top must be larger than the number on the bottom.
4. Makaro: Arrows in black cells must point to the unique largest number among all numbers adjacent to the black cell.



Individual Round 13

# Secret Symmetry

对称

9 Puzzles

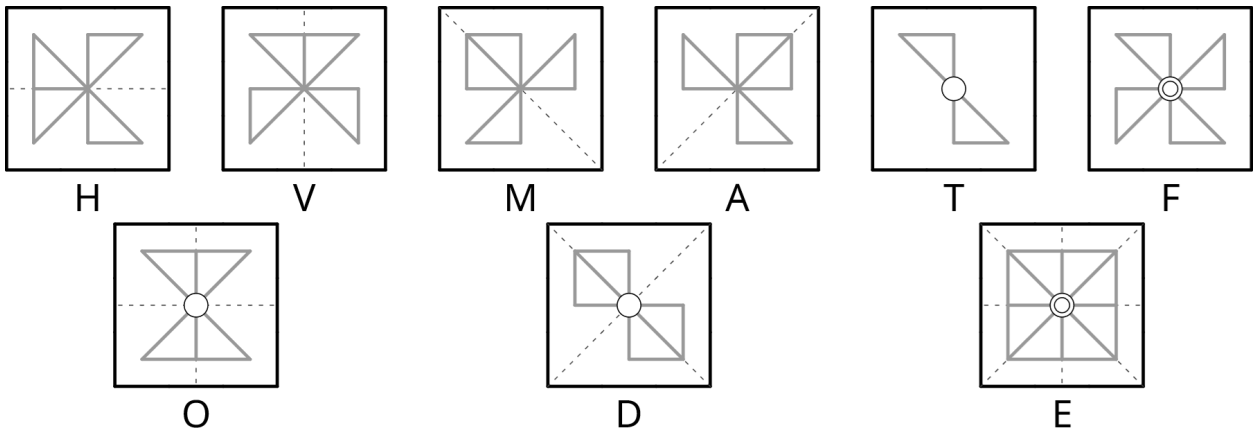
60 Minutes

**600** Points

| | | | | | |
|---|---|---|---|---|---|
| 01 | Shakashaka | **70** | 06 | Tatamibari | **65** |
| 02 | Stostone | **70** | 07 | Slash Pack | **55** |
| 03 | Aquarium | **80** | 08 | Four Winds | **75** |
| 04 | Regional Yajilin | **45** | 09 | Scrabble | **65** |
| 05 | Angle Loop | **75** | | | |

In each of the 9 puzzles of this round, there is a square area in the center of the grid, marked by a cage with grey dashed lines. In the interior of these 9 cages (i.e. not including the boundary), the solution elements added by the solver must each satisfy one of the 9 possible symmetry types in a square:

- Horizontal / Vertical / Main Diagonal / Antidiagonal line of symmetry
- Two-fold / Four-fold rotational symmetry
- Both Orthogonal / Diagonal lines of symmetry (includes Two-fold rotational symmetry)
- Every line of symmetry (includes Four-fold rotational symmetry)




No two cages can have the same symmetry type, and a cage assigned to one symmetry type cannot have extraneous symmetries. Even though some puzzles may have multiple solutions using different symmetry types, points are only awarded if the solution matches the one in the global solution where all 9 symmetry types appear. An auxiliary table will be given to help you find the correspondence between puzzles and symmetry types.

# 13.00 Symmetry Matchmaker

**0*** pts

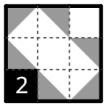
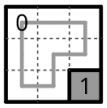
对称配对

Example by Yao Yuan

*This table will be provided on a separate sheet of paper. Make sure to put it in the booklet at the end of the round.*

Match the other nine puzzles of this round with the nine symmetry types by placing exactly one symbol in each row and column in the table below. Each puzzle should correspond to a different symmetry type. In this round, the part inside the grey dashed cage of the solution to each of the other puzzles should satisfy the symmetry type that this puzzle corresponds to.

**This "puzzle" is only to reiterate the global rules of this round and provide a table for your convenience, so it will not be marked at all, and is hence worth nothing and not needed for time bonus.*

| Puzzle ID / Genre | Symmetry / Example | H | V | M | A | T | F | O | D | E |
|---|---|---|---|---|---|---|---|---|---|---|
| 13.01 Shakashaka |  | | | | | | | | ○ | |
| 13.02 Stostone |  | | | | | | ○ | | | |
| 13.03 Aquarium |  | | | ○ | | | | | | |
| 13.04 Regional Yajilin |  | | | | | ○ | | | | |
| 13.05 Angle Loop |  | ○ | | | | | | | | |
| 13.06 Tatamibari |  | | | | | | | ○ | | |
| 13.07 Slash Pack |  | | | | | | | | | ○ |
| 13.08 Four Winds |  | | | | ○ | | | | | |
| 13.09 Scrabble |  | | ○ | | | | | | | |

(The example puzzle above already has the solution marked. This correspondence needs to be deduced from the 9 example puzzles on the following pages.)

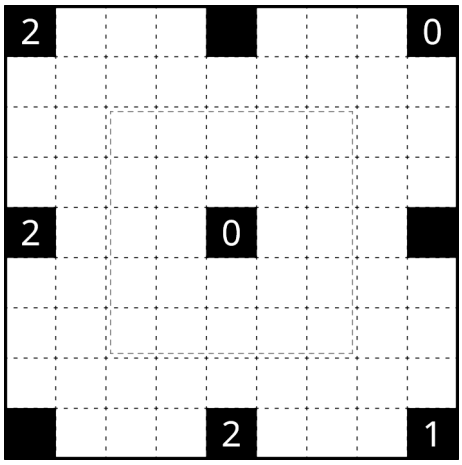
## 13.01 Shakashaka

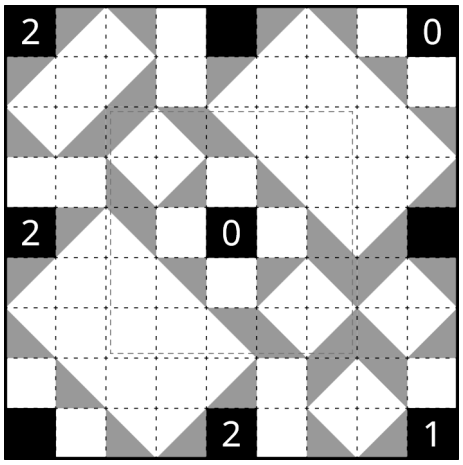
**70**pts

摇啊摇

Example by Yao Yuan

Shade some halves of some empty cells (that are right isosceles triangles), so that all remaining unshaded areas are all rectangles, either orthogonal or diagonal. Numbers in black cells indicate the number of empty cells adjacent to the cell that are half-shaded.



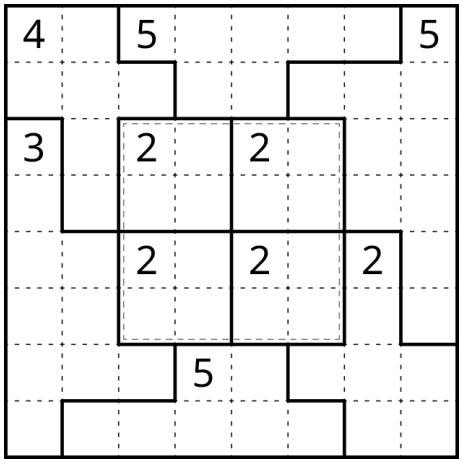

## 13.02 Stostone

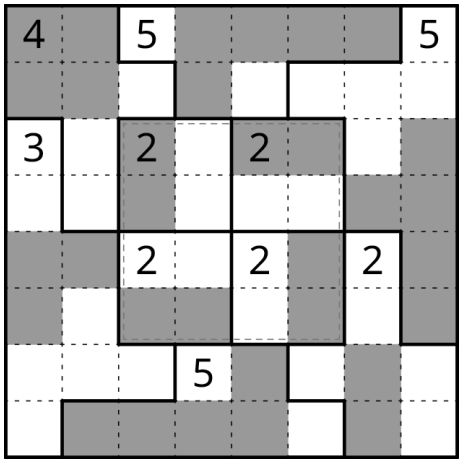
**70**pts

垒石

Example by Yao Yuan

Shade exactly one connected group of cells in each region so that no two groups in different regions are adjacent. Numbers indicate the number of shaded cells in the region. If the connected groups of shaded cells fall straight down without changing shape, they must exactly occupy the bottom half of the grid.



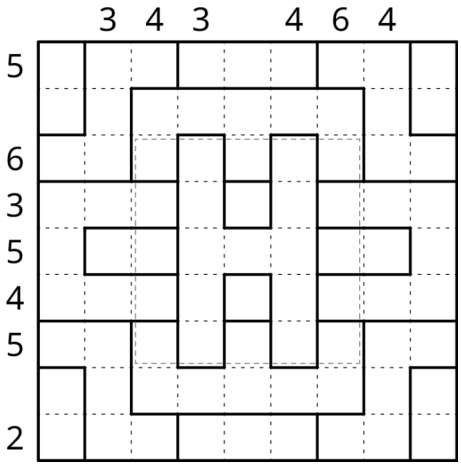
## 13.03 Aquarium

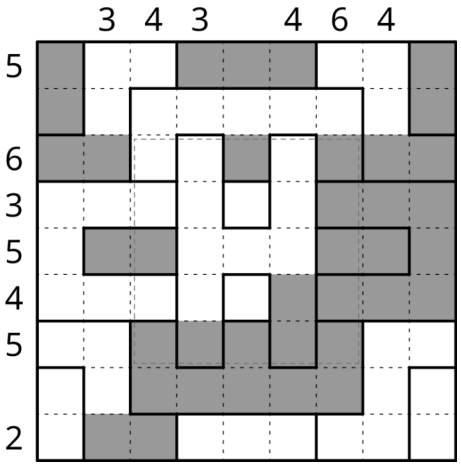
**80**pts

水族馆

Example by Yao Yuan

Shade some cells (representing water) so that the body (or bodies) of water in each region is at a resting state. More precisely, no unshaded cell may be adjacent to a shaded cell without a region border in between unless the unshaded cell is above the shaded cell (the horizontal edge between the two cells is a water surface), and all water surfaces adjacent to a connected group of shaded cells must be on the same horizontal line. Numbers outside the grid indicate the number of shaded cells in the row or column.




## 13.04 Regional Yajilin

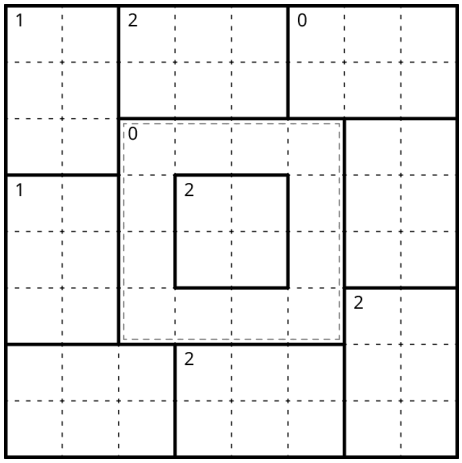
**45**pts

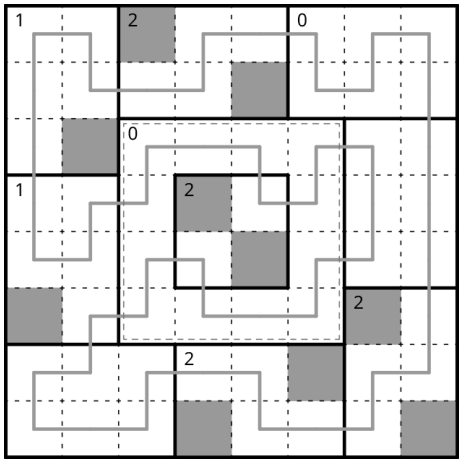
仙人指区

Example by Yao Yuan

Draw a non-intersecting loop that passes orthogonally through centers of some empty cells. No two adjacent empty cells may be both unused by the loop. Numbers indicate the number of unused empty cells in the region.

*It is not necessary to shade the unused empty cells.*



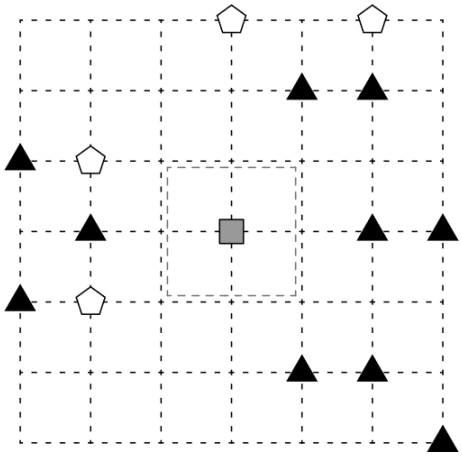
## 13.05 Angle Loop

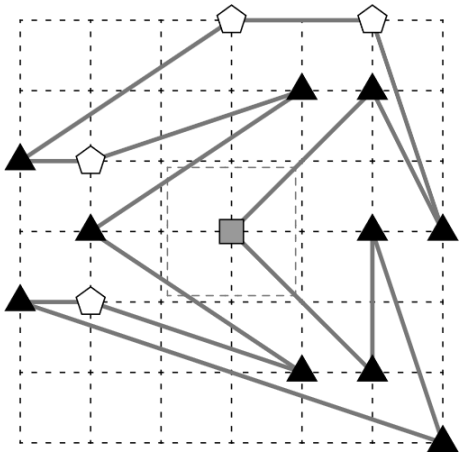
**75**pts

角度回路

Example by Yao Yuan

Draw a non-intersecting loop through all the symbols on vertices. The loop may contain non-orthogonal segments, but must make a turn exactly at the vertices with symbols (and nowhere else). Shapes of symbols indicate the angle formed by the two segments adjacent to the vertex: black triangles represent acute angles (less than 90°), grey squares represent right angles (exactly 90°), and white pentagons represent obtuse angles (greater than 90°).





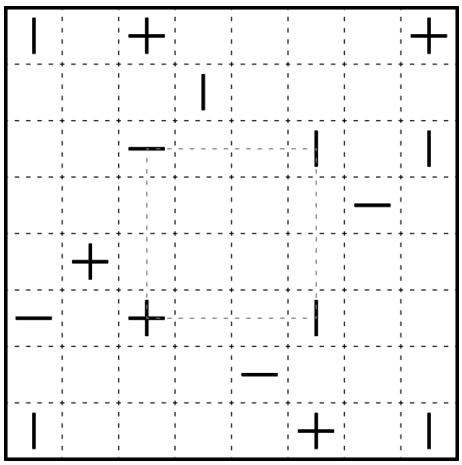
## 13.06 Tatamibari

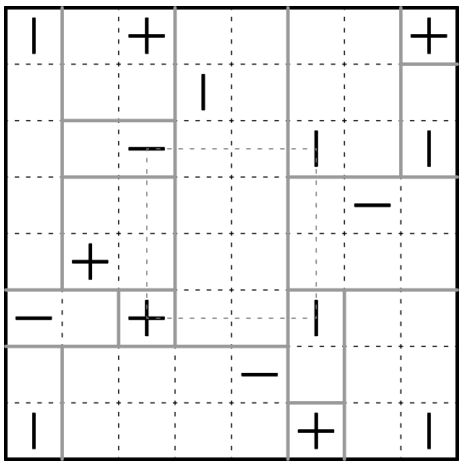
**65**pts

榻榻米

Example by Yao Yuan

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one symbol. No vertex may be shared by four different rectangles. Symbols indicate the relative lengths of the width and height of the rectangle: Horizontal bars mean that the width is longer, vertical bars mean that the height is longer, and plus signs mean that the two are equal.





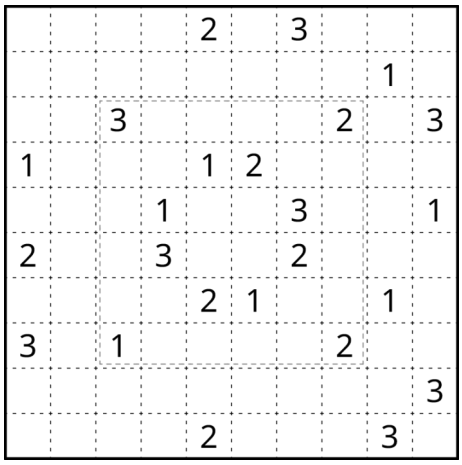
## 13.07 Slash Pack

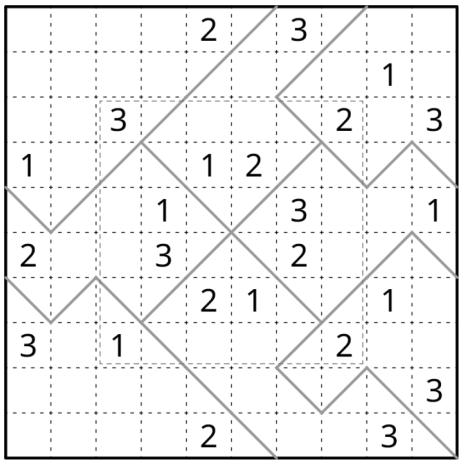
**55**pts

斜线分区

Example by Yao Yuan

Divide the grid into regions by drawing diagonals in some empty cells. Each region must contain each number that is present in the grid exactly once.



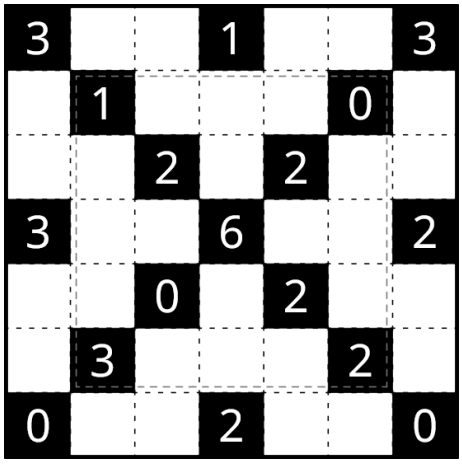

## 13.08 Four Winds

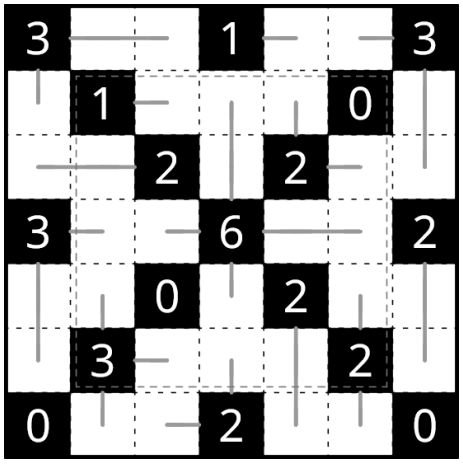
**75**pts

四风

Example by Yao Yuan

Draw some straight orthogonal lines starting at an edge of a black cell, extending away from the cell, and ending at the center of a cell. Each empty cell must be used by exactly one line, and lines may not enter black cells or leave the grid. Numbers in black cells indicate the total number of cells used by all the lines that begin at an edge of the cell (not including the cell itself).



# 13.09 Scrabble

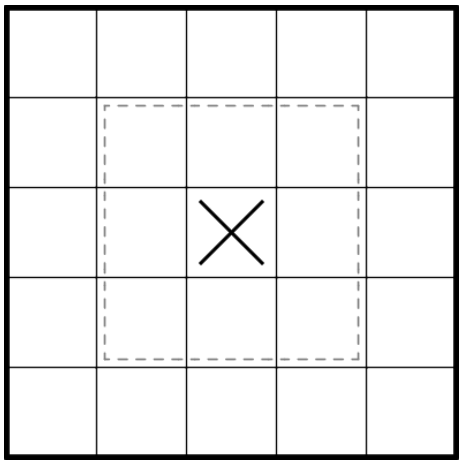
**65**pts

拼词

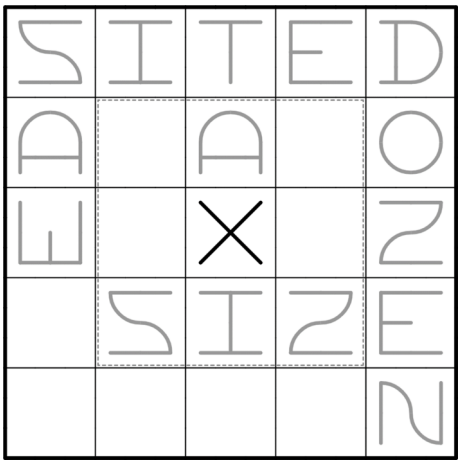
Example by Yao Yuan

Place a letter into some empty cells of the grid so that all cells with letters form one connected group. The content of every block of cells with letters of length at least two (either from left to right or from top to bottom) is given in a word list outside the grid, where each given word must appear exactly once. Some letters may be already placed in the grid. Crosses will not be used in this puzzle (and not to be confused with the letter X); cells that must be left empty will be represented using holes.

*Beware that the shapes of the letters themselves are also part of the symmetry, although it is not necessary to reproduce the exact shapes in your solution. A complete alphabet is given above the puzzle for reference.*



SAW
SIZE
TAXI
DOZEN
SITED



Individual Round 14

# Brain Power

脳力

21 Puzzles

50 Minutes

**1000** Points

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 01 | Elastic Bands | **25** | 08 | Elastic Words | **45** | 15 | Elastic Sums | **75** |
| 02 | Jigsaw Puzzle | **105** | 09 | Letter Pairs | **30** | 16 | Letter Weights | **85** |
| 03 | Picture Slice | **15** | 10 | Crisscross | **55** | 17 | Darts | **30** |
| 04 | Find the Pairs | **50** | 11 | Alphabet Blocks | **30** | 18 | Arithmetic Square | **30** |
| 05 | Old Maid | **30** | 12 | Mastermind | **30** | 19 | Operation Square | **30** |
| 06 | Password Path | **55** | 13 | Wordle Bank | **55** | 20 | Abacus Beads | **60** |
| 07 | Maze Collector | **80** | 14 | Word Search | **35** | 21 | Balance | **50** |

This round features puzzles that mostly test mental abilities other than grid-based logic (sometimes referred to as “casual” puzzles). The puzzles are grouped into three categories: Observational, Word, and Numerical, with 7 puzzles in each category. For Observational puzzles, ignore subtle differences due to graphic anomalies or overall distortion.

Beware that even though some puzzles have independent sub-parts, there is no partial credit for solving only some of the parts.

*The point values of this round are not inflated; the shorter time limit vs. point total is due to a combination of scheduling constraints, higher variance in solve times, and allowing for players to focus on stronger categories/puzzle genres. The time bonus for this round is doubled (**20** points per full minute). This round is also eligible for the more lenient partial bonus for having at least 20 puzzles.*

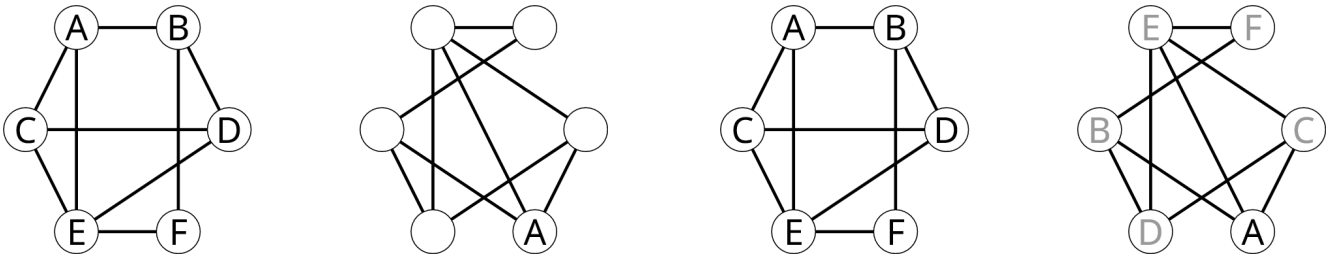
# 14.01 Elastic Bands

**25**pts

弹力绳

Example from PGP 2024 R8

Place a character in each empty circle so that no character repeats within a network and the two networks are identical. In other words, if two characters in one network are connected by a line segment, then they are also connected in the other network, and vice versa.




# 14.02 Jigsaw Puzzle

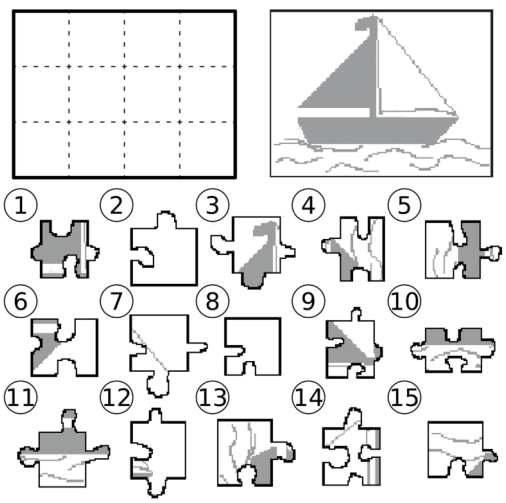
**105**pts

拼图

Example adapted from PGP 2016 R3

Assemble some of the given jigsaw pieces into the complete picture shown. Pieces may be rotated but not reflected. Not all pieces are necessarily used.

*For full credit, it is sufficient to write the label for the pieces in the provided placeholder grid, without indicating pieces' orientations or how adjacent pieces fit together.*




| | | | |
|---|---|---|---|
| 2 | 3 | 7 | 8 |
| 6 | 1 | 14 | 12 |
| 13 | 11 | 5 | 15 |

# 14.03 Picture Slice

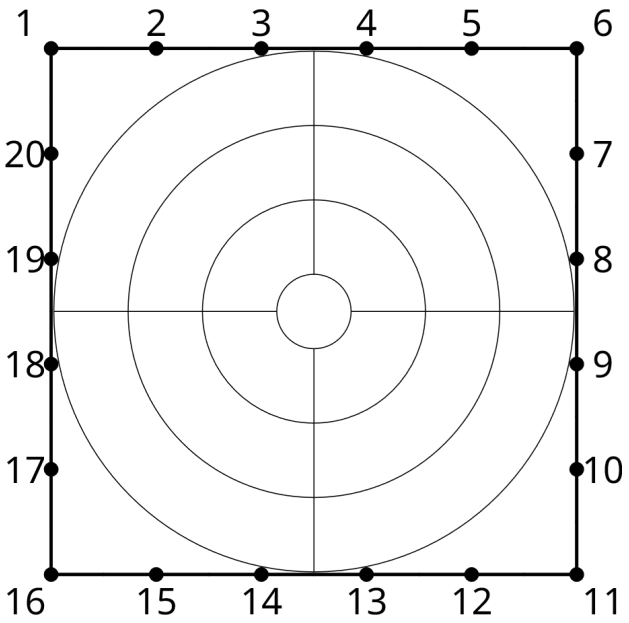
**15**pts

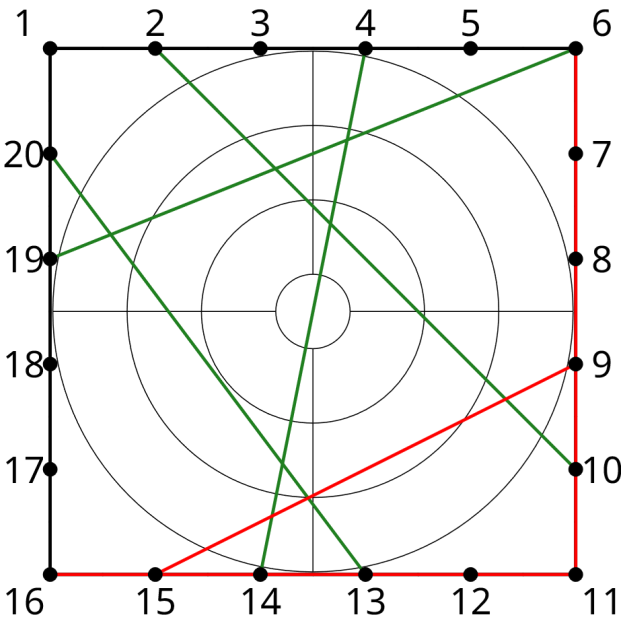
切片

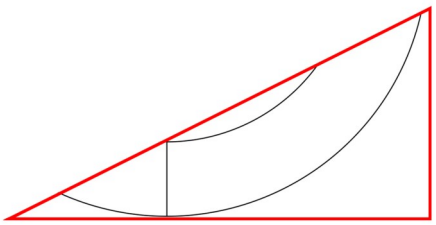
Example by Yao Yuan

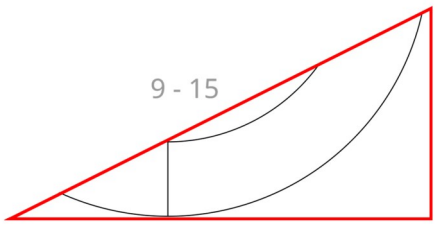
For each of the partial pictures (surrounded by colored edges), determine the pairs of endpoints so that cutting the original picture (surrounded by black edges) along straight lines connecting those pairs of endpoints would result in the partial pictures. The partial pictures are not rotated or reflected.

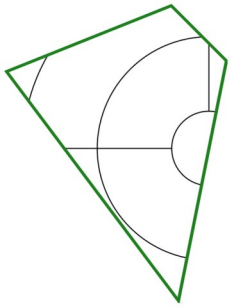
*The cuts do not need to be drawn on the original picture. There should be one pair of endpoints per edge of the partial picture (to be written on the corresponding edge), unless the edge coincides with an edge of the original picture, in which case the pair can be omitted. Each pair of endpoints can be written in either order. Each partial picture can be solved independently, but credits are only given for identifying all cuts of all partial pictures.*

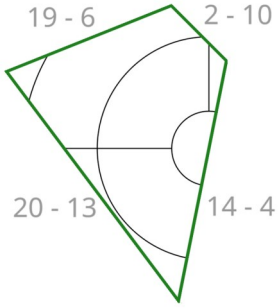






## 14.04 Find the Pairs

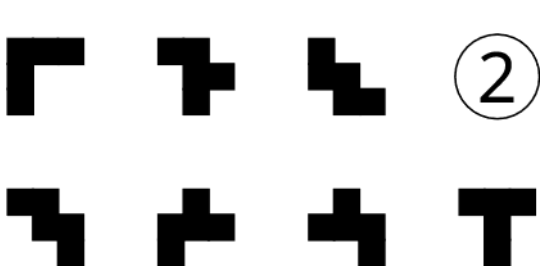
**50**pts

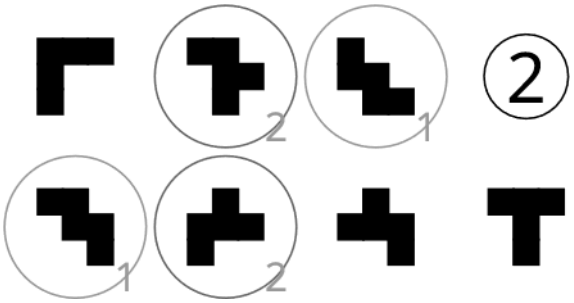
找对子

Example by Yao Yuan

Among the shapes shown, find the indicated number of pairs of rotationally congruent shapes.

*For full credit, make sure to distinctly label each pair (e.g. with a different number or shape).*



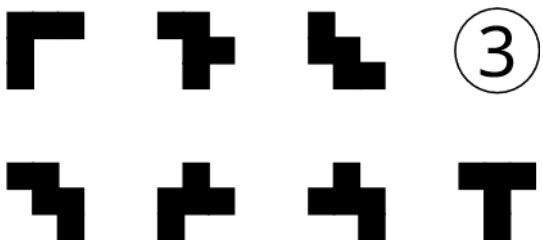

## 14.05 Old Maid

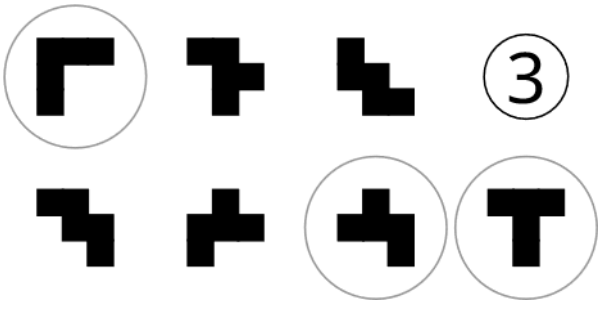
**30**pts

抽鬼牌

Example by Yao Yuan

Among the shapes shown, find the indicated number of shapes that do not have another shape that is rotationally congruent to it. (All other shapes come in rotationally congruent pairs.)



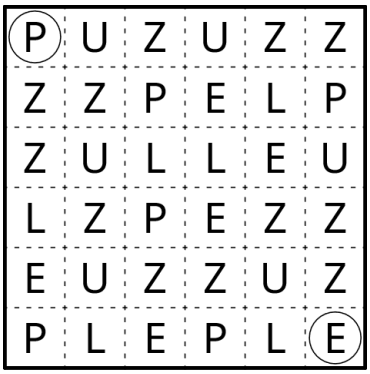
# 14.06 Password Path

**55**pts

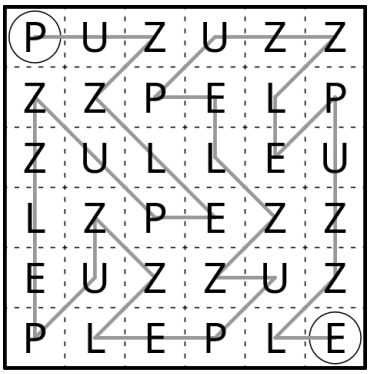
密码路径

Example from PGP 2024 R8

Draw a non-intersecting path that passes orthogonally or diagonally through centers of all cells exactly once, starting from the circled top-leftmost cell and ending at the circled bottom-rightmost cell. When the characters encountered along the path are read in order, they must only repeat the given password.




PUZZLE




PUZZLE

# 14.07 Maze Collector

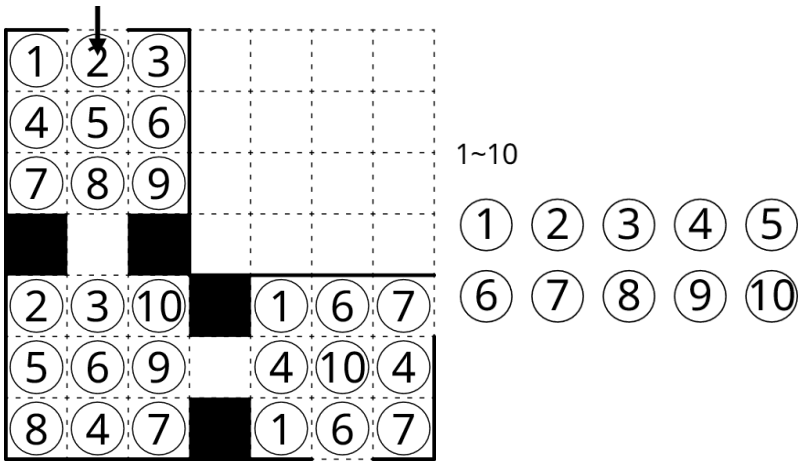
**80**pts

迷宫收集

Example by Qin Jiaqi

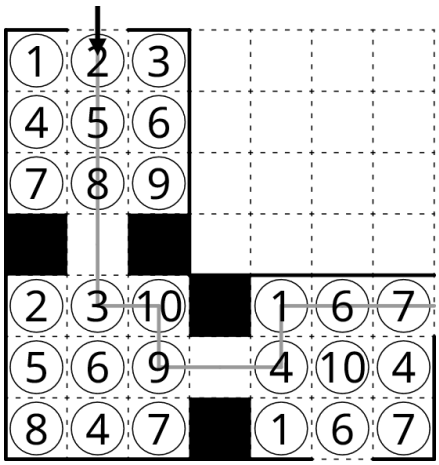
Find a path that enters the grid at the indicated arrow, passes orthogonally through centers of some white cells, and exits the grid at a different location. Each number in the indicated range must appear on the path exactly once. The path may not cross outlined borders, enter black cells, or visit a cell more than once.

*A checklist of all numbers in the range is provided for convenience.*




1~10

1 2 3 4 5
6 7 8 9 10



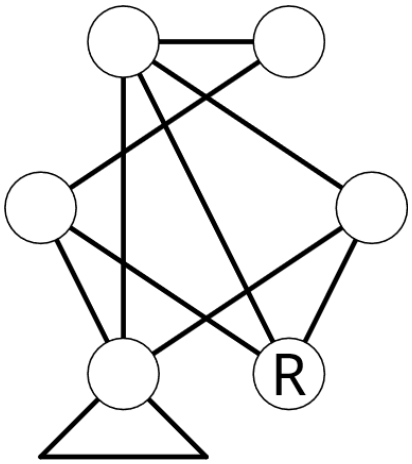
## 14.08 Elastic Words

**45**pts

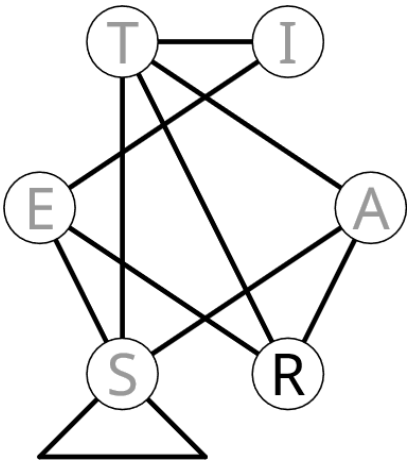
弹力词

Example from PGP 2021 R4

Place a character in each empty circle so that no character repeats within the network, and each word in the given list can be read by starting at a circle and traversing lines in the network. In other words, if two characters are adjacent within a word, there must be a line connecting the circles with those two characters. Not all connections need to be used by a word. Some characters may be given in some circles.




STRASSE
TASTIER




## 14.09 Letter Pairs

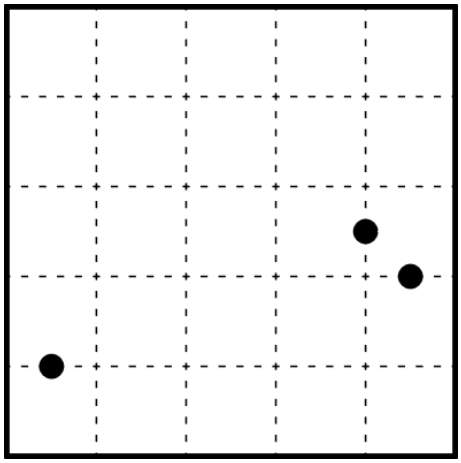
**30**pts

字母对

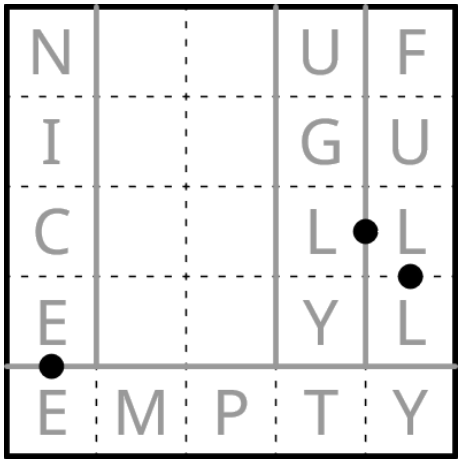
Example from PGP 2017 R4

Place each of the given words in the list either from left to right or from top to bottom into the grid, one character per cell, so that no two words overlap. All pairs of adjacent cells that contain the same character are marked with a black dot on the edge between them.

*For full credit, it is sufficient to place all the characters, without drawing the boundary for each word.*



NICE
UGLY
FULL
EMPTY



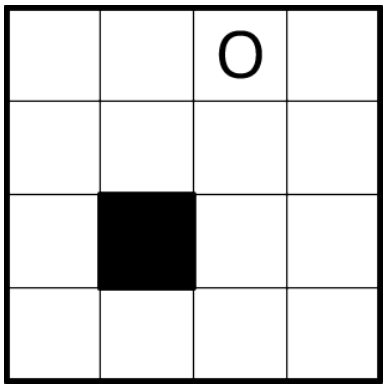
## 14.10 Crisscross

**55**pts

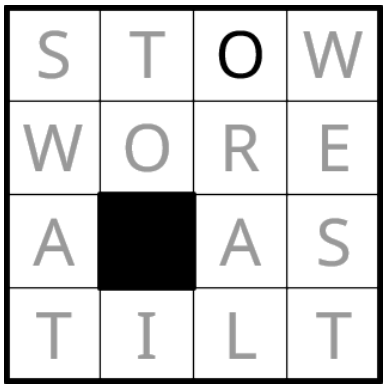
填词

Example adapted from PGP 2023 R1

Place a character into each empty cell of the grid. The content of every horizontal or vertical block of cells of length at least two (either from left to right or from top to bottom) is given in a word list outside the grid, where each given word must appear exactly once. Some characters may be already placed in the grid.




AS
TO
ORAL
STOW
SWAT
TILT
WEST
WORE




## 14.11 Alphabet Blocks

**30**pts

字母积木

Example from PGP 2017 R2

Partition all characters that appear at least once among the given words into groups of six (one group per column), so that each word can be spelled by taking exactly one character from each group, in some order.

*You may put the groups in any order in the columns of the grid, and enter the characters of each group in any order within each column.*

| | | | | | |
|---|---|---|---|---|---|
| A | C | E | F | U | N |
| A | R | T | H | U | M |
| C | A | P | M | E | W |
| C | O | G | O | U | T |
| D | I | M | S | I | T |
| F | I | X | T | E | N |

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| | | | | | |
|---|---|---|---|---|---|
| A | C | E | F | U | N |
| A | R | T | H | U | M |
| C | A | P | M | E | W |
| C | O | G | O | U | T |
| D | I | M | S | I | T |
| F | I | X | T | E | N |

| | | |
|---|---|---|
| A | C | E |
| M | D | G |
| N | F | I |
| O | H | P |
| S | T | R |
| X | W | U |

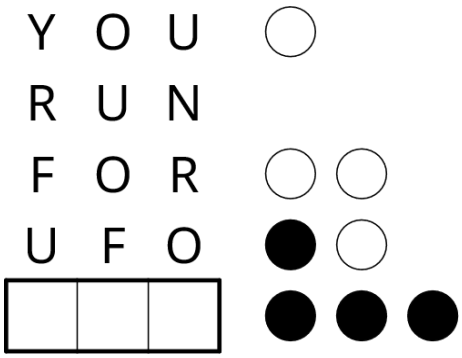
# 14.12 Mastermind

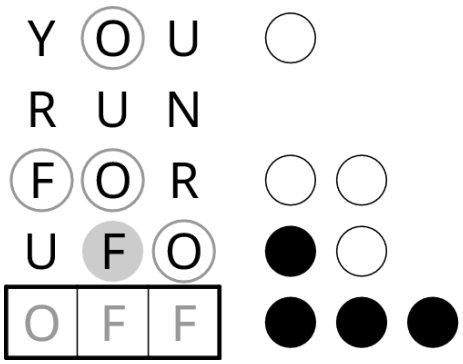
**30**pts

猜词

Example from PGP 2024 R7

Identify the secret code consisting of characters from the provided rows of guesses. (In other words, each character in the code must appear in at least one of the guesses.) For each guess, a black circle indicates a character in the same position as a character in the code, and a white circle indicates a character in the code but not in the same position. Each character in a guess or the code contributes at most one circle (i.e. if a match between the guess and the code is found, both characters will be ignored for further matches), and any possible black circles are given before white circles.



# 14.13 Wordle Bank

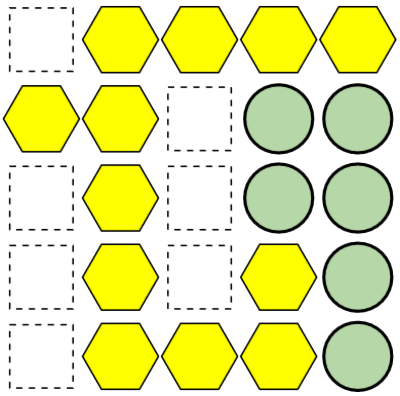
**55**pts

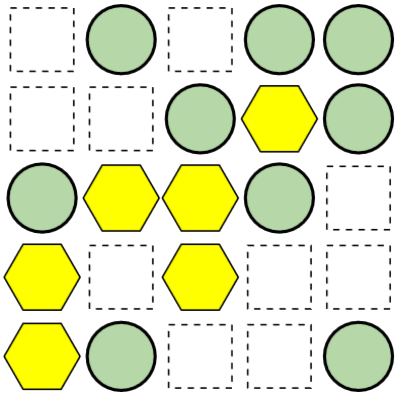
词兜

Example from PGP 2024 R7

Place each of the given words in the list into the rows of the grid(s), one character per cell from left to right, so that each word is used exactly once. Each grid has a secret code consisting of some characters (whose length is equal to the number of columns of the grid), not necessarily all of which appear in the grid. A green circle with heavy solid border indicates that the character is the same as the character of the code in the same position. A yellow hexagon with thin solid border indicates that the character appears in a different position in the code, and the code's character has not been matched with a previous character in the row. (In other words, each character in the row or the code contributes at most one circle or hexagon; for each distinct character, green circles are marked first, then yellow hexagons from left to right.) A white square with dashed border indicates that it cannot be a green circle or yellow hexagon.

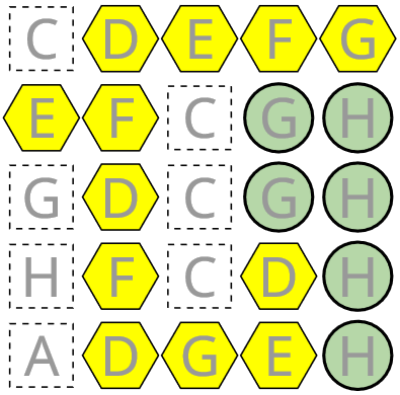
*It is not necessary to determine the secret code for each grid, and the secret code might not be uniquely determined by the grid.*

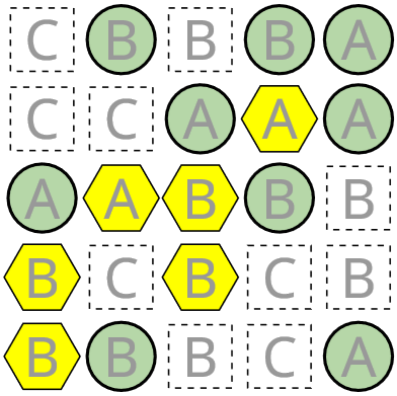




AABBB
ADGEH
BBBCA
BCBCB
CBBBA

CCAAA
CDEFG
EFCGH
GDCGH
HFCDH



## 14.14 Word Search

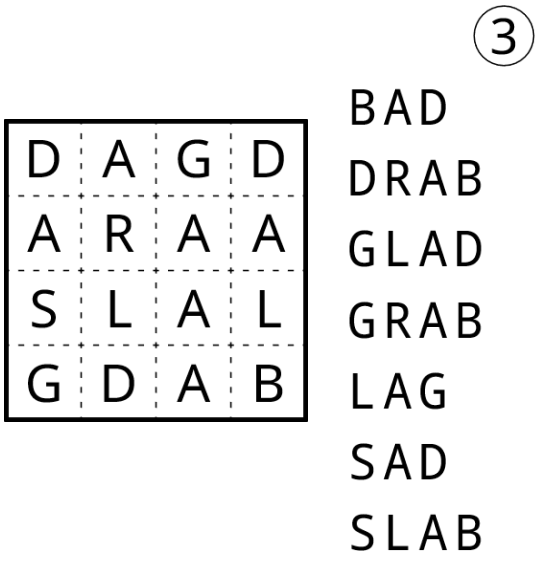
**35**pts

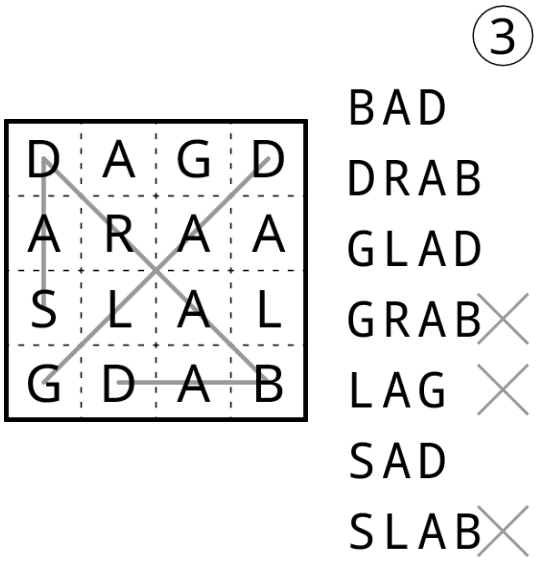
搜词

Example from PGP 2023 R7

Find all but N of the words from the given list in the grid, where N is the circled number. Each word can be found along a straight path in one of the eight compass directions.

*It is not necessary to indicate the direction of each path; in the case of a palindromic word, the direction might not be unique. It is not necessary to mark the unfound words.*



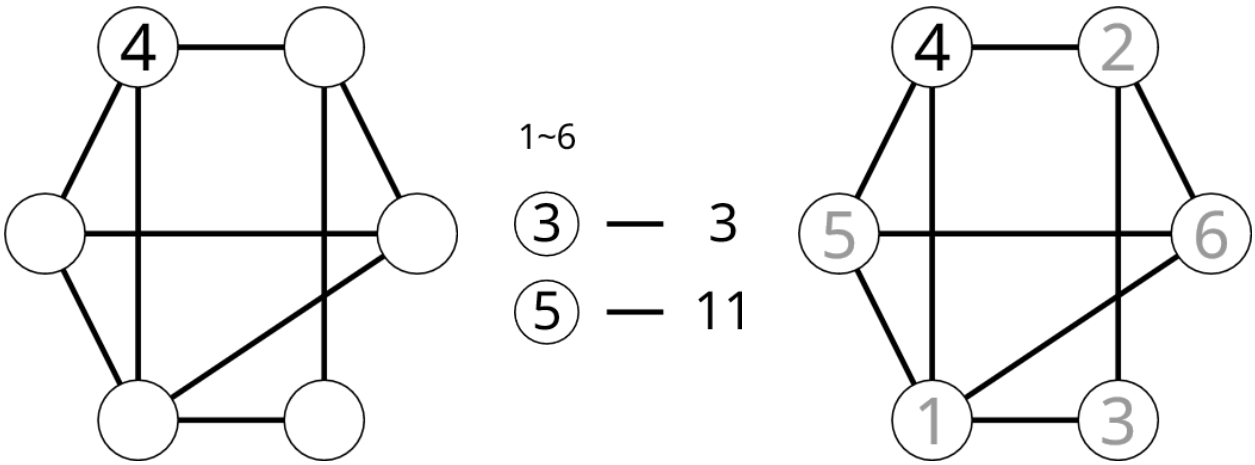

## 14.15 Elastic Sums

**75**pts

弹力和

Example by Yao Yuan

Place a number from the indicated list into each empty circle so that each number appears exactly once in the network. Each uncircled number S next to a circled number X (in the form of "X — S" next to the network) indicates that the sum of all numbers directly connected to X in the network is exactly S. Some numbers may be given in some circles.



## 14.16 Letter Weights

**85**pts

字母和

Example from PGP 2023 R2

Match the letters with the given list of numbers (in an outlined box), so that the sum of all letters in each given word is equal to the corresponding number.

CAB=11
BEE=7
ABE=8

| 1 | 2 | 3 |
|---|---|---|
| | 4 | 5 |

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

CAB=11
BEE=7
ABE=8

| 1 | 2 | 3 |
|---|---|---|
| | 4 | 5 |

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

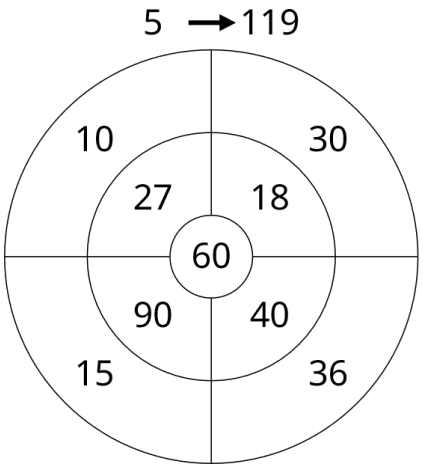
## 14.17 Darts

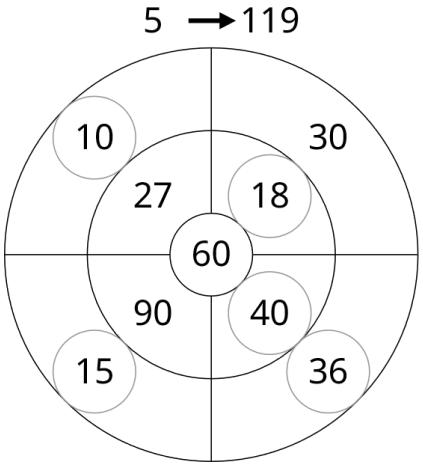
**30**pts

飞镖

Example from PGP 2021 R1

Select exactly X of the numbers on the dartboard so that their sum is exactly S, where X and S are given above the dartboard in the form of "X → S". No number may be selected more than once.



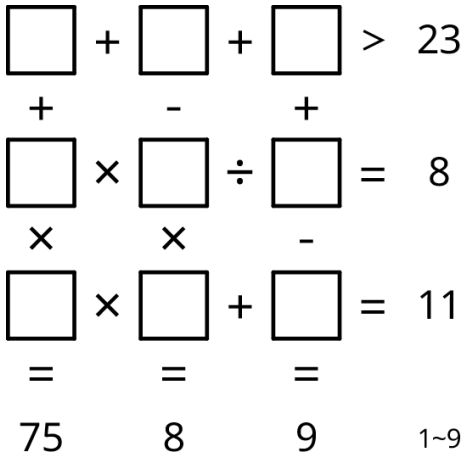
## 14.18 Arithmetic Square

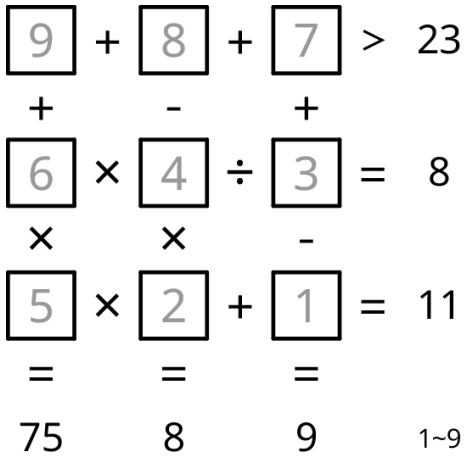
**30**pts

算术方阵

Example from PGP 2023 R4

Place a number from the indicated list into each empty cell so that each number appears exactly once. When the given expressions are evaluated from left to right or top to bottom, ignoring the usual precedence of operations, the results must satisfy the indicated equalities or inequalities. It is possible for expressions and partial expressions to be negative or non-integral.



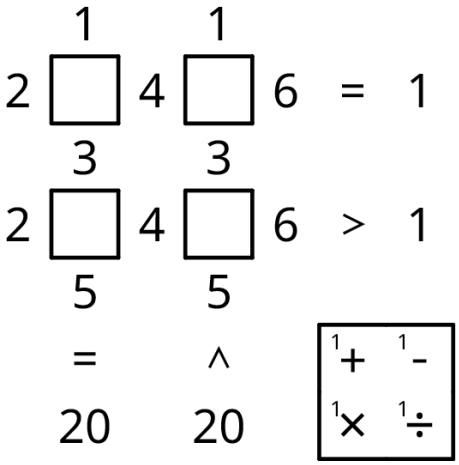

## 14.19 Operation Square

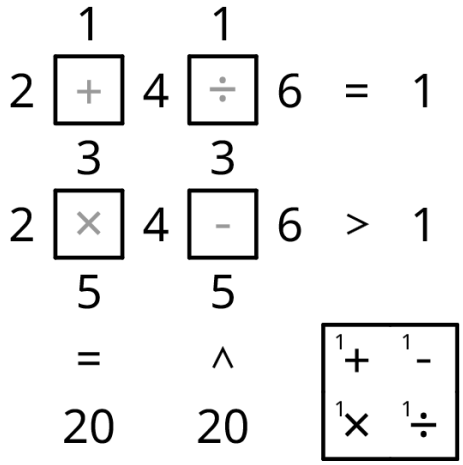
**30**pts

算符方阵

Example by Yao Yuan

Place an operator (+, -, ×, ÷) into each empty cell so that each operator appears exactly the indicated number of times. When the given expressions are evaluated from left to right or top to bottom, ignoring the usual precedence of operations, the results must satisfy the indicated equalities or inequalities. It is possible for expressions and partial expressions to be negative or non-integral.



# 14.20 Abacus Beads

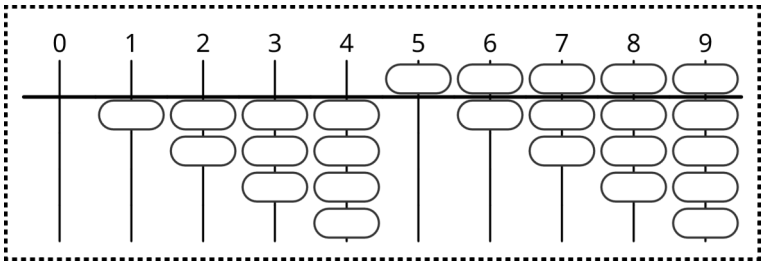
**60**pts

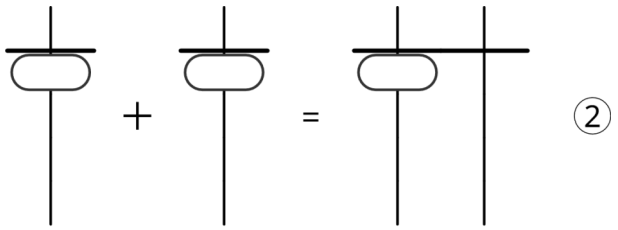
算珠

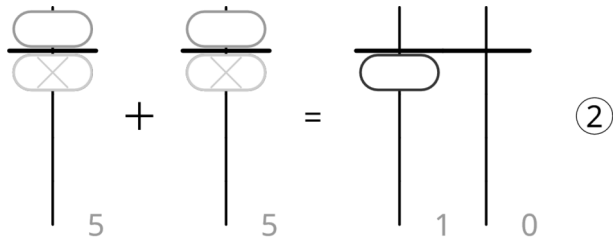
Example by Qin Jiaqi

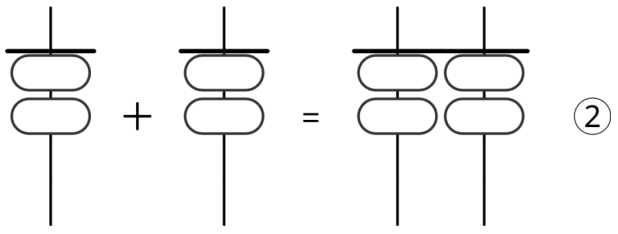
For each of the given equations, move the indicated number of abacus beads so that the result is a correct arithmetic equation. Each column of the abacus represents a digit, where a bead above the horizontal bar represents 5 and a bead below the bar represents 1. There can be at most one bead above the bar and four beads below the bar for each column. Numbers are allowed to start with a digit 0 if there is an empty column. For the part below the bar, the bottommost beads are added or removed first. Beads may move between different numbers in the equation.

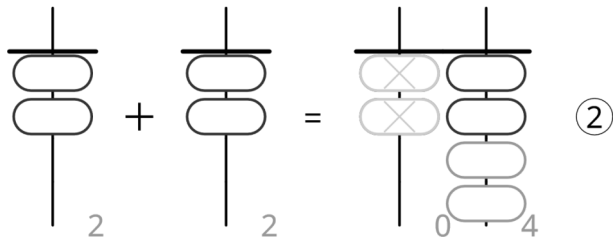
*The correspondence between digits and bead configurations is provided for convenience. It is also acceptable to write the correct digits below each column instead of indicating the moved beads. Each equation can be solved independently, but credits are only given for solving all equations correctly.*



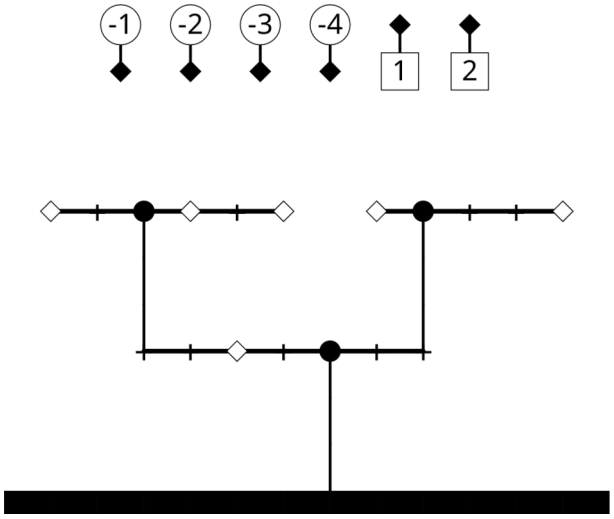
# 14.21 Balance

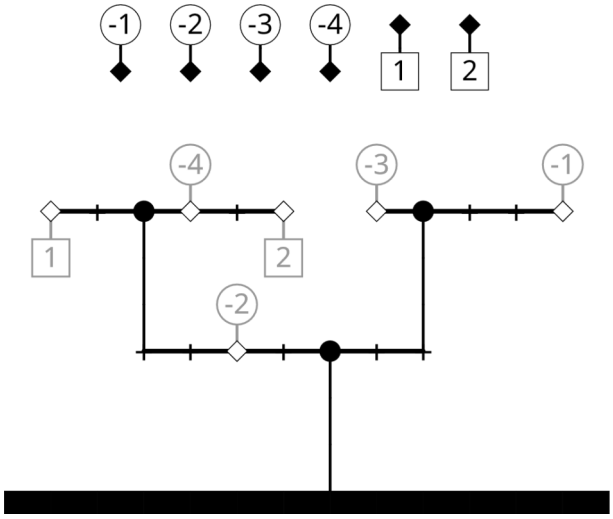
**50**pts

杠秤

Example adapted from PGP 2023 R6

Attach the given weights and/or balloons (with negative weight) to the mobile at the diamond-shaped attachment points, one per point, so that the entire system is balanced. Precisely, at each fulcrum indicated by a round black dot, the total torque (weight multiplied by distance to the fulcrum) on both sides of the balance must be the same. Ignore the weight of the horizontal rods and the vertical strings. A rod above its attachment point indicates that the total of the weights attached to it plus the weights attached to all subsequent rods is negative. (Otherwise the total weight is zero or positive.) Some weights or balloons may be already attached.



Team Round A

# Chinese Knot

中国结

8 Puzzles

50 Minutes

**4000** Points

| | | | | | |
|---|---|---|---|---|---|
| 01 | Barns | 4 × **125** | 05 | Masyu | 4 × **125** |
| 02 | Country Road | 4 × **125** | 06 | Maxi Loop | 4 × **125** |
| 03 | Detour | 4 × **125** | 07 | Tapa-like Loop | 4 × **125** |
| 04 | Dotchi Loop | 4 × **125** | 08 | Yajilin | 4 × **125** |

*Chinese knots are a type of traditional woven crafts that are commonly used as household decorations or ornaments, especially during festivals.*

This round features 8 connected puzzles, and the goal is to draw a single loop that passes orthogonally through cell centers, visiting all 8 grids. There are grey dashed lines ("threads") connecting some pairs of cells in different grids or the same grid, and the loop can only travel between the grids along these threads. The loop is allowed to intersect itself on threads, as well as any of the grids that allow for intersections. Rules for a grid might influence some cells immediately before or after visiting the grid, these will be clarified with individual rules.

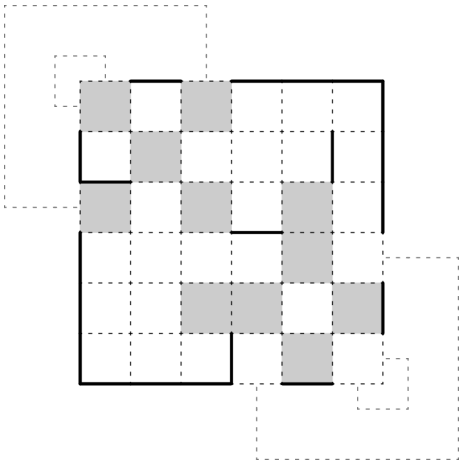
*For genres without regions, grid boundaries connected to threads will be replaced by dashed gridlines as a reminder that they can be crossed. For genres with regions, such boundaries will be replaced by thin solid gridlines; they can also be crossed, but still function as region borders for the puzzle itself.*

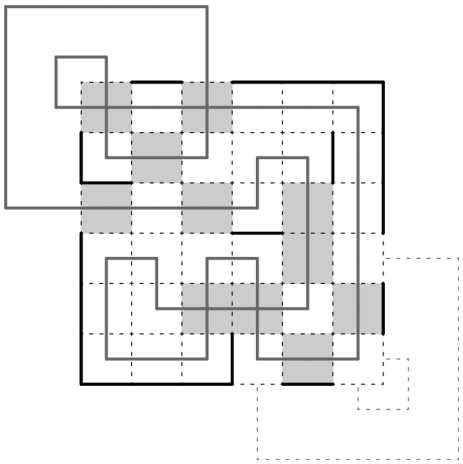
Each grid is square-shaped and has even dimensions; during marking the grids will each be divided into four equal quadrants and marked separately. Credits are given for a quadrant if the parts of the loop within that quadrant are drawn correctly, including the entries and exits to the quadrant.

# A.01 Barns

**500**pts 冰宫巡行 Example by Yao Yuan

The loop must visit all cells in the grid, and may not cross any thick borders. The loop may not intersect itself on white cells. The loop may not turn on grey (“icy”) cells, but may intersect itself orthogonally on such cells.



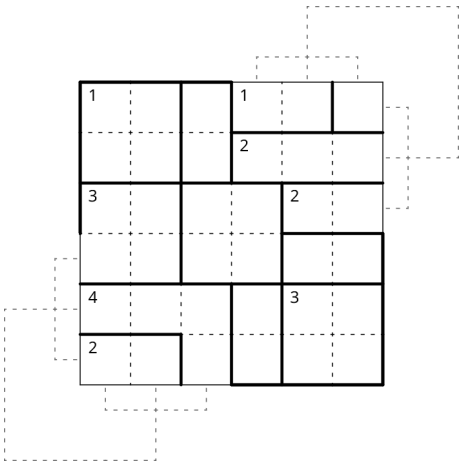


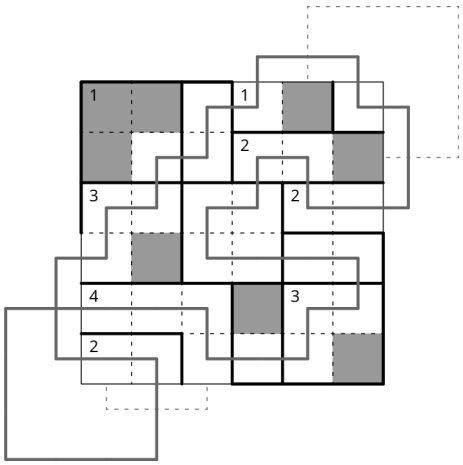
# A.02 Country Road

**500**pts 周游列国 Example by Yao Yuan

The loop may not intersect itself in the grid, and must visit each region exactly once. No two cells (in this grid) that are adjacent across a region border can both be unvisited. Numbers indicate the number of cells visited by the loop in the region.

*Cells connected by threads are not considered adjacent. It is not necessary to shade the unused cells.*



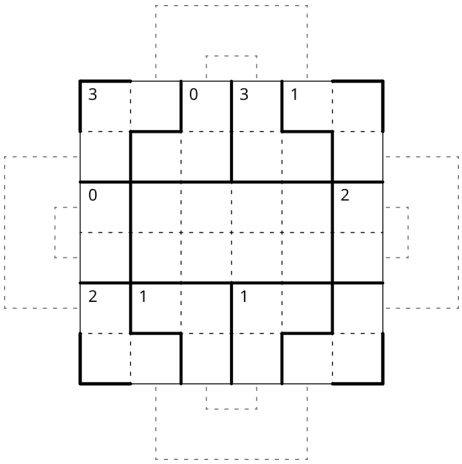
## A.03 Detour

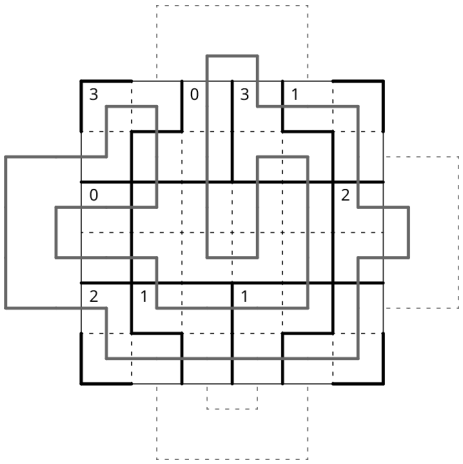
**500**pts

绕道

Example by Yao Yuan

The loop may not intersect itself in the grid, and must visit all cells in the grid exactly once. Numbers indicate the total number of times that the loop turns in the region.



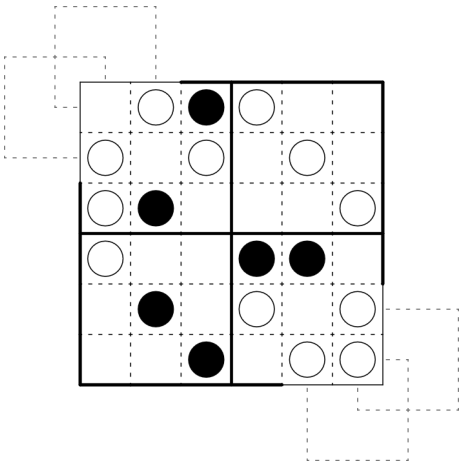

## A.04 Dotchi Loop

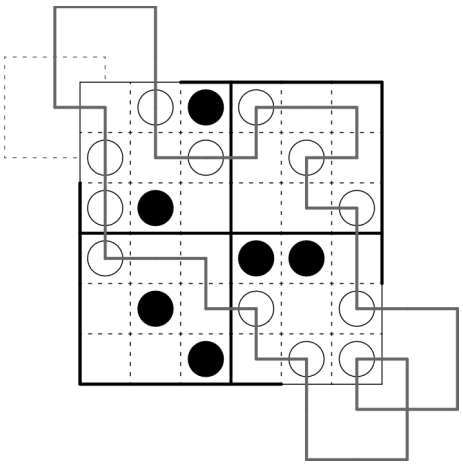
**500**pts

二择回路

Example by Yao Yuan

The loop may not intersect itself in the grid, and must visit all cells with white circles and no cells with black circles. Within each region, the loop must either go straight through all white circles or turn on all white circles.





# A.05 Masyu

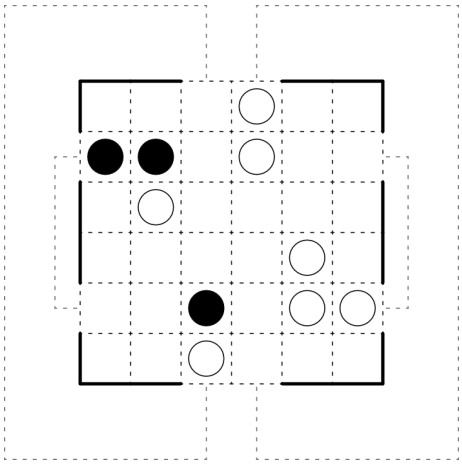
**500**pts

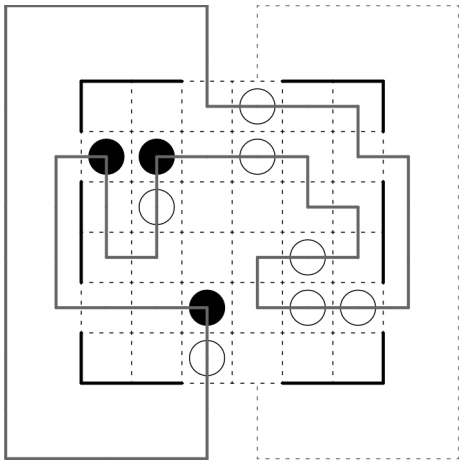
珍珠

Example by Yao Yuan

The loop may not intersect itself in the grid, and must visit all cells with circles. The loop must turn on cells with black circles, and travel straight through both adjacent cells along the loop. The loop must go straight through cells with white circles, and turn on at least one of the two adjacent cells along the loop.

*Traversing threads does not count as going through a cell, so one or both of the "adjacent cells along the loop" may be cells separated by a thread, even if the cells are in a different grid.*





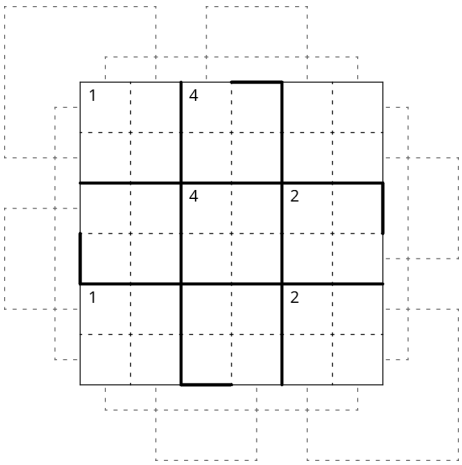
# A.06 Maxi Loop

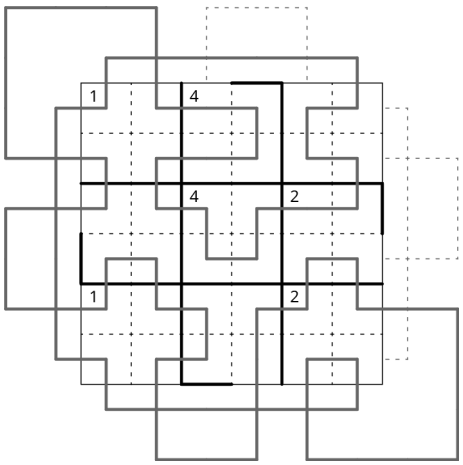
**500**pts

极大回路

Example by Yao Yuan

The loop may not intersect itself in the grid, and must visit all cells in the grid exactly once. Numbers indicate the maximum number of cells that the loop goes through within one visit of the region. This maximum must be attained in some visit.



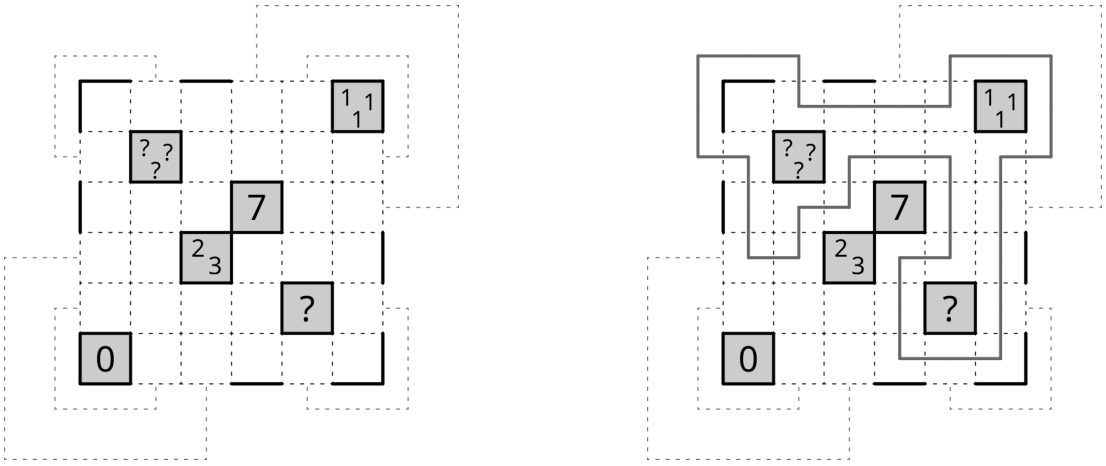



# A.07 Tapa-like Loop

**500**pts 土派回路 Example by Yao Yuan

The loop may not intersect itself or enter grey cells in the grid. Numbers in grey cells indicate the lengths of each visit to the ring of (up to) eight touching cells around the cell, in no particular order. As a special case, a single “0” indicates that the loop does not visit any of the touching cells around the cell. A single question mark in a cell without any other numbers or question marks may represent “0”.

*Cells do not touch over threads and threads do not count as cells, so set of cells in each ring is the same as if there are no threads.*

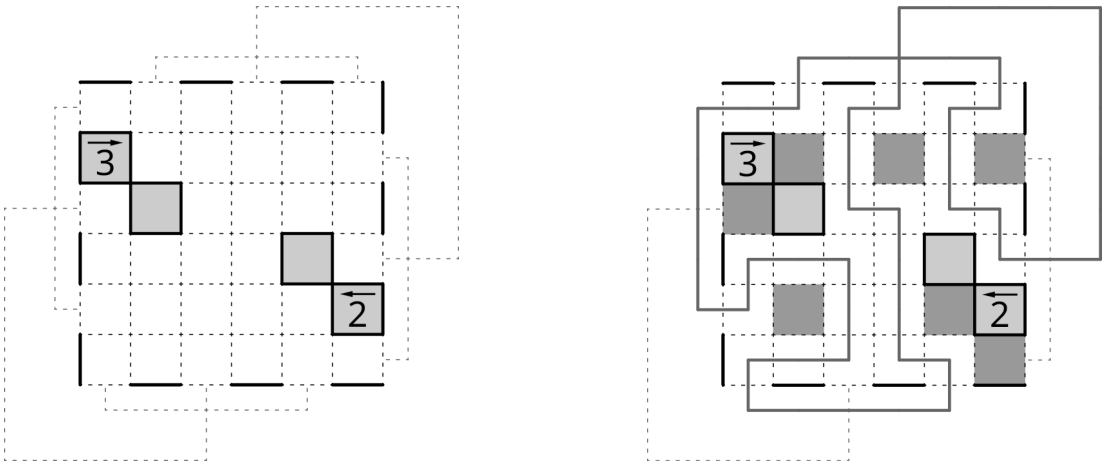



# A.08 Yajilin

**500**pts 仙人指路 Example by Yao Yuan

The loop may not intersect itself or enter grey cells in the grid. No two adjacent empty cells may be both unused by the loop. Numbers with arrows in grey cells indicate the number of unused empty cells in the indicated direction from the cell.

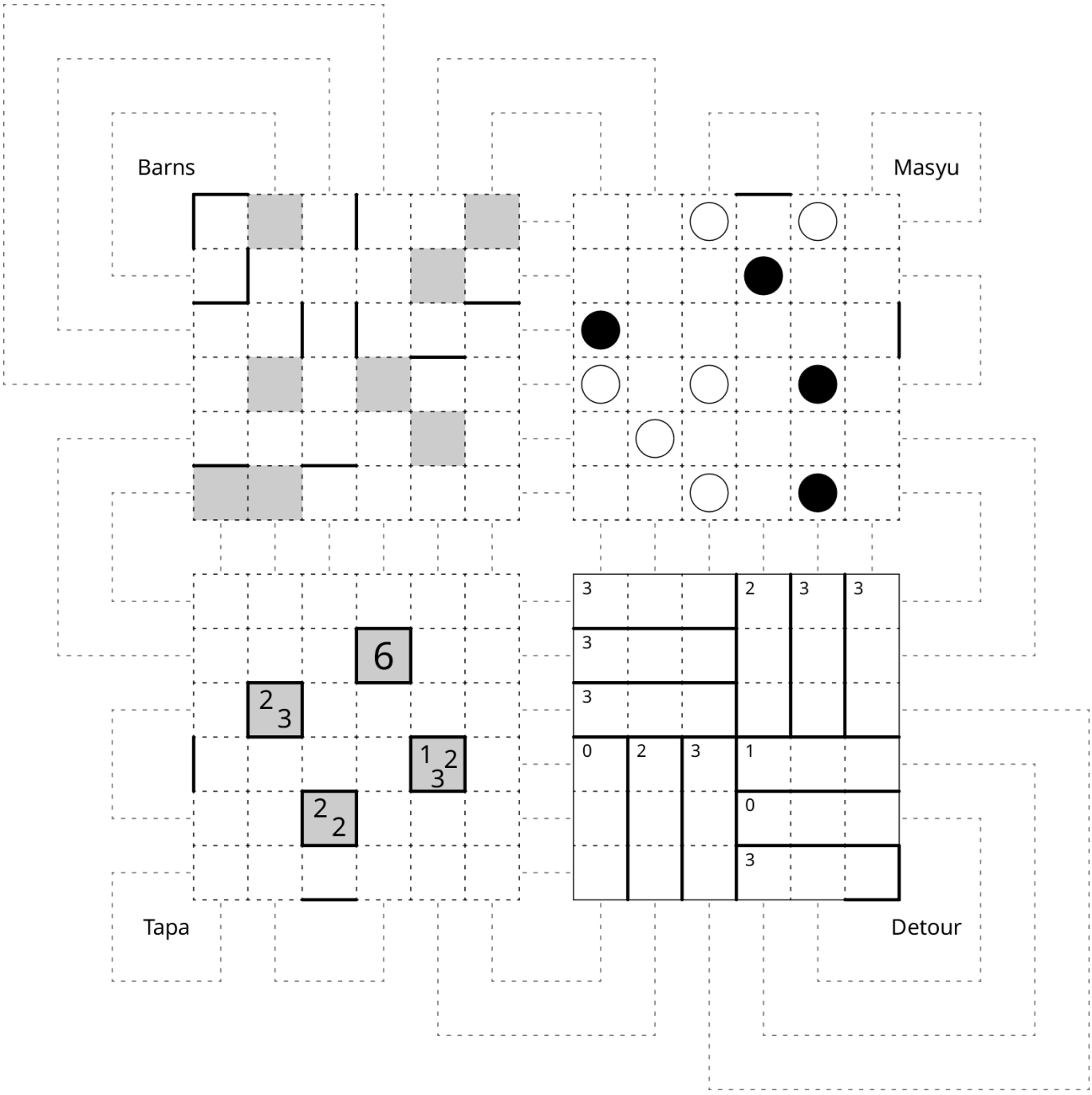
*Cells connected by threads are not considered adjacent. Clues do not see through threads. It is not necessary to shade the unused empty cells.*



# Round Example

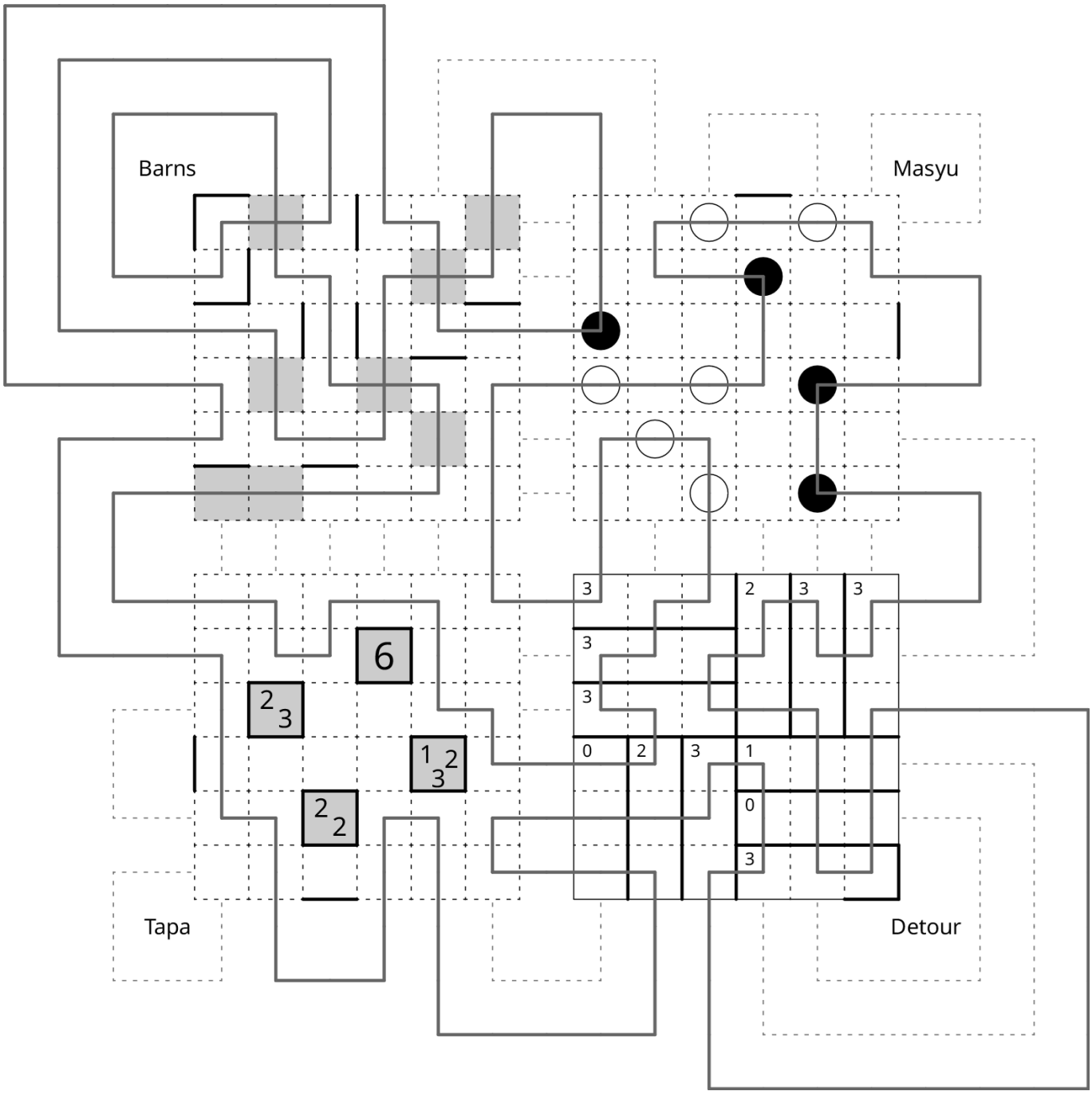
Example by Xu Chenhao

This example uses four grids: Barns, Masyu, Tapa-like Loop, Detour. The grids are labeled with the first few letters of the genre name.

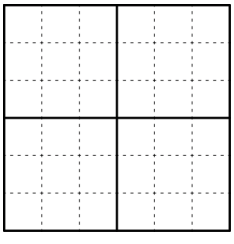


# Round Example Solution

Example by Xu Chenhao




Quadrants will look like this:



Team Round B

# Octahedron

八面玲珑

8 Puzzles

70 Minutes

**5600** Points

| | | | | | |
|---|---|---|---|---|---|
| 01 | Canal View | 4 × **175** | 05 | Nurikabe | 4 × **175** |
| 02 | Cave | 4 × **175** | 06 | Pentopia | 4 × **175** |
| 03 | Kurotto | 4 × **175** | 07 | SLICY | 4 × **175** |
| 04 | Minesweeper | 4 × **175** | 08 | Tapa | 4 × **175** |

*To say that someone is "refined on (all) eight faces" in Chinese is an idiomatic way to describe their ability to adapt to different people and situations.*

This round features 8 puzzles that all involve shading some empty cells. Each of the puzzles is on a triangular grid with hexagonal cells, printed on a triangular piece of paper. The 8 grids must be placed on the faces of a regular octahedron (see round icon) so that whenever two grids are adjacent across an edge of the octahedron, the shading patterns of the two rows of hexes closest to that edge must be either completely identical or completely inverted. Each grid may be rotated but not reflected during assembly (i.e. the grids must be facing outwards). While the rules for each grid are independent, the puzzles might not be uniquely solvable in isolation without using this edge rule.

Each grid has an even number of hexes on each side; during marking the grids will each be divided into four smaller triangular sub-grids and marked separately (the center sub-grid does not touch the edge of the big grid and is slightly smaller than the other three sub-grids). Credits are given for a sub-grid if the shading pattern within that sub-grid is drawn correctly. While assembling the octahedron is an important part of solving this round, the assembly itself will not be marked, nor is it needed for time bonus. In fact, between the end of round and start of marking, the grids will be disassembled for ease of transport. (Feel free to re-assemble the octahedron when the grids are returned after marking.)

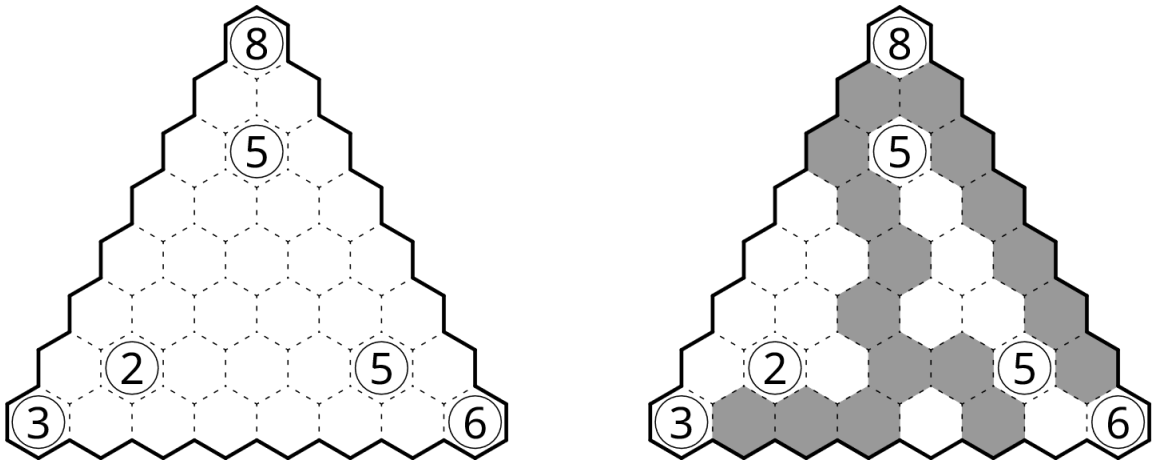
## B.01 Canal View

**700**pts

峡谷

Example by Yuan Yao

The shaded cells in the grid form one connected group, and no vertex is entirely surrounded by three shaded cells. Numbers in circles indicate the number of shaded cells connected in a straight line to the cell in one of the six standard directions without any unshaded cells in between (not including the cell itself).



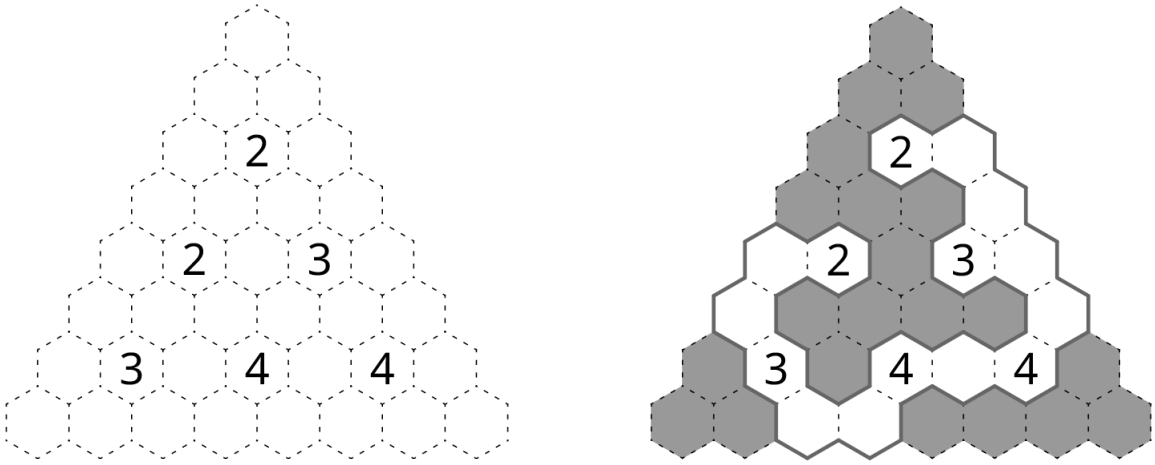

## B.02 Cave

**700**pts

山洞

Example by Yuan Yao

The unshaded cells in the grid form one connected group, and the shaded cells are connected to the grid boundary. Numbers indicate the number of unshaded cells connected in a straight line to the cell in one of the six standard directions without any shaded cells in between, including the cell itself.



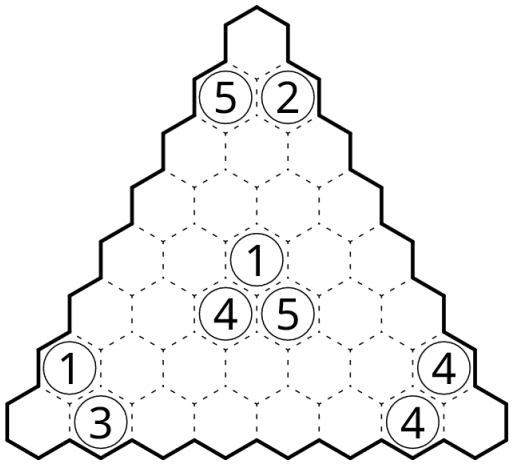
## B.03 Kurotto

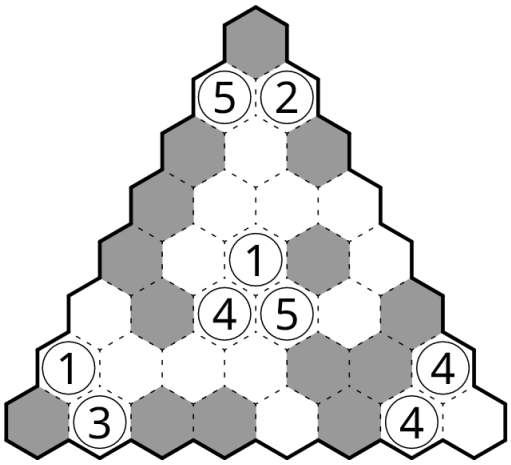
**700**pts

凝块

Example by Yuan Yao

Numbers indicate the total number of cells in all connected groups of shaded cells adjacent to the cell.



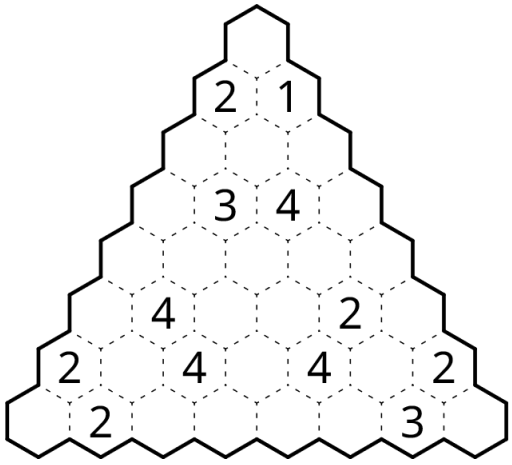

## B.04 Minesweeper

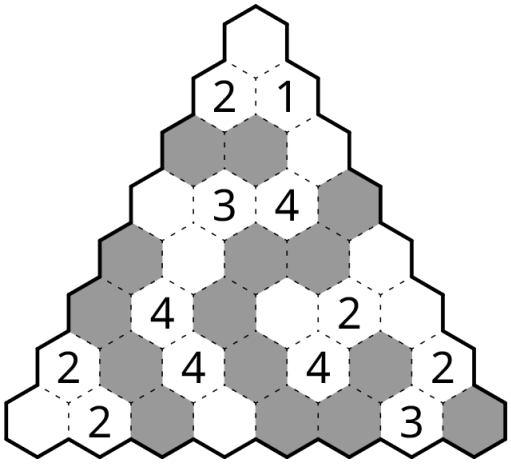
**700**pts

扫雷

Example by Yuan Yao

Numbers indicate the number of shaded cells that are adjacent to the cell.



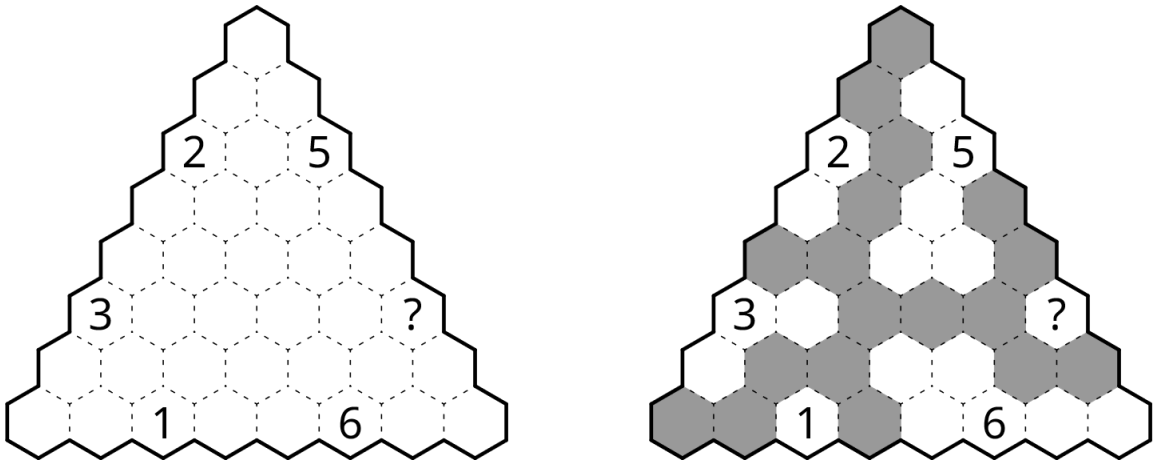
## B.05 Nurikabe

**700**pts

数墙

Example by Yuan Yao

The shaded cells in the grid form one connected group, and no vertex is entirely surrounded by three shaded cells. Each connected group of unshaded cells must contain exactly one numbered cell. Numbers indicate the number of cells in its connected group of unshaded cells.




## B.06 Pentopia

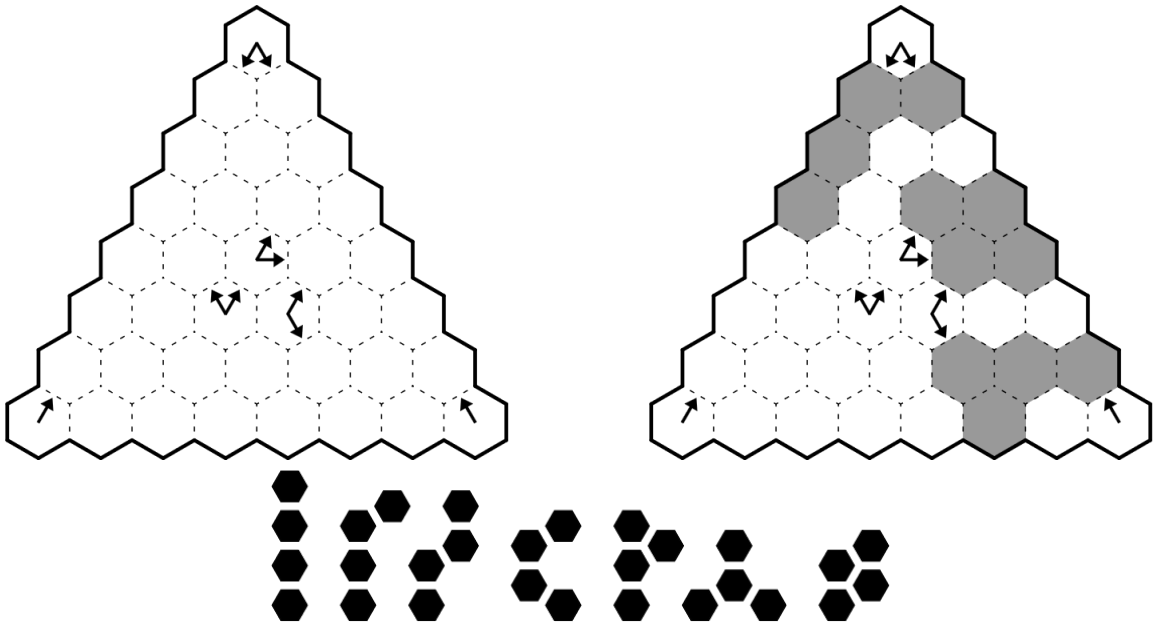
**700**pts

近视五格

Example by Yuan Yao

Each connected group of shaded cells must be congruent to one of the given shapes, and each shape must be used at most once. Arrows in a cell indicate all standard directions where a shaded cell appears closest to the cell.

*In the competition puzzle, the list of shapes will be given on a separate sheet of paper.*



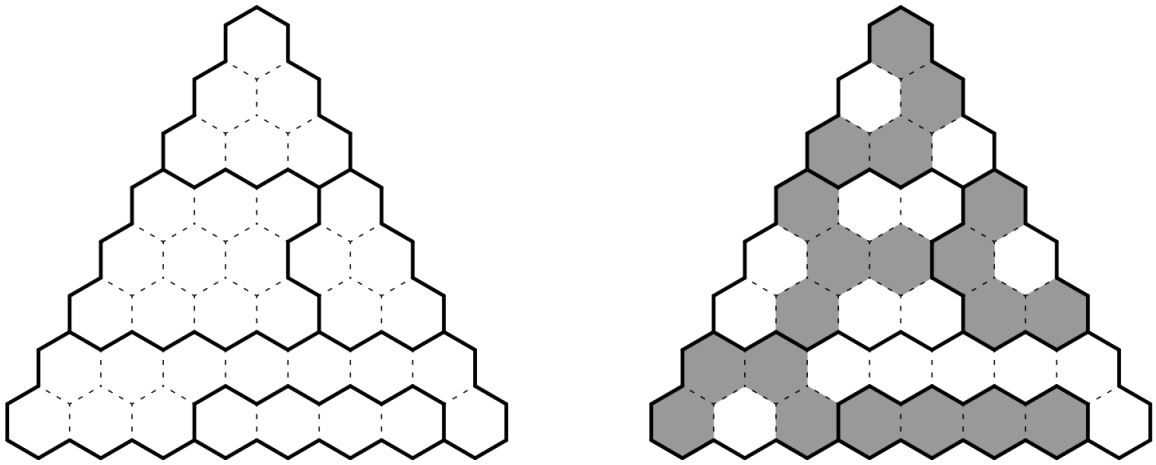
## B.07 SLICY

**700**pts

四格骨墙

Example by Yuan Yao

Exactly one tetrahex is shaded in each region so that the shaded cells form one connected group and no vertex is entirely surrounded by three shaded cells. No two congruent shaded tetrahexes in different regions may be adjacent.



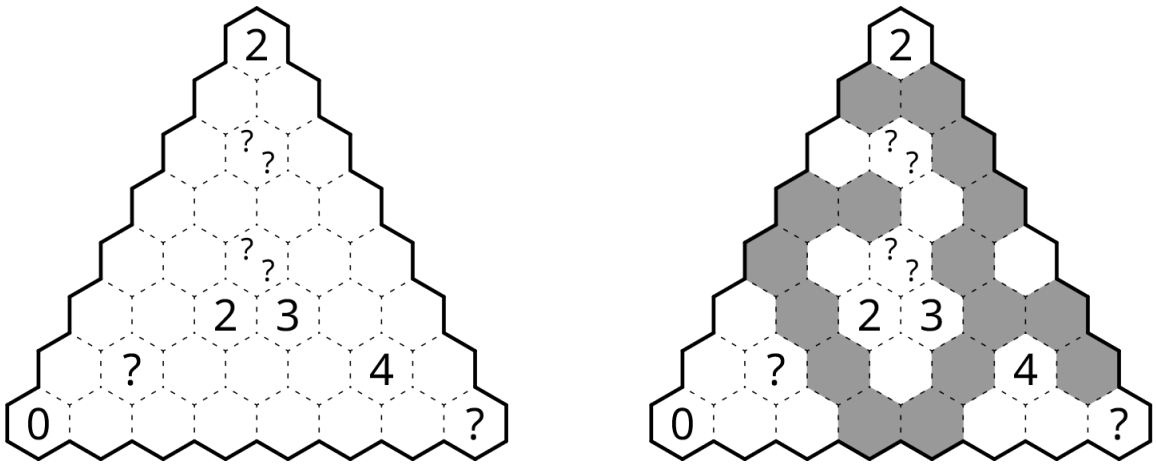
## B.08 Tapa

**700**pts

土派艺术

Example by Yuan Yao

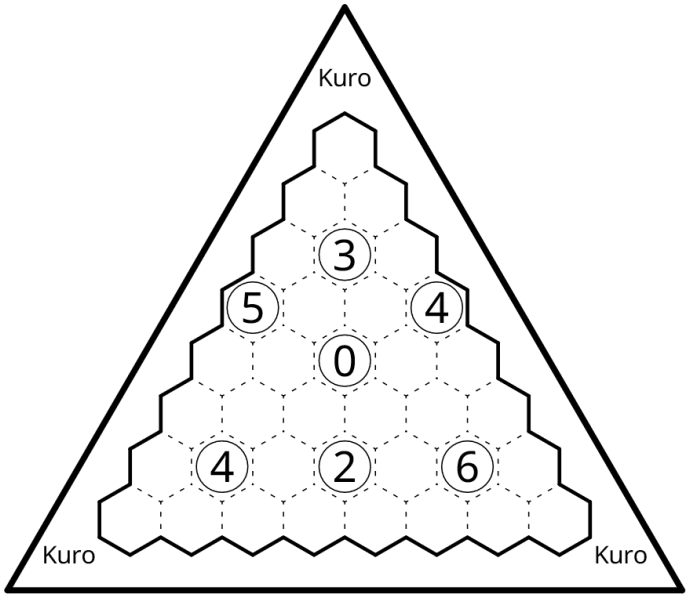
The shaded cells in the grid form one connected group, and no vertex is entirely surrounded by three shaded cells. Numbers indicate the lengths of groups of consecutive shaded cells in the ring of (up to) six adjacent cells around the cell, in no particular order. As a special case, a single “0” indicates that there are no shaded cells adjacent to the cell. A single question mark in a cell without any other numbers or question marks may represent “0”.

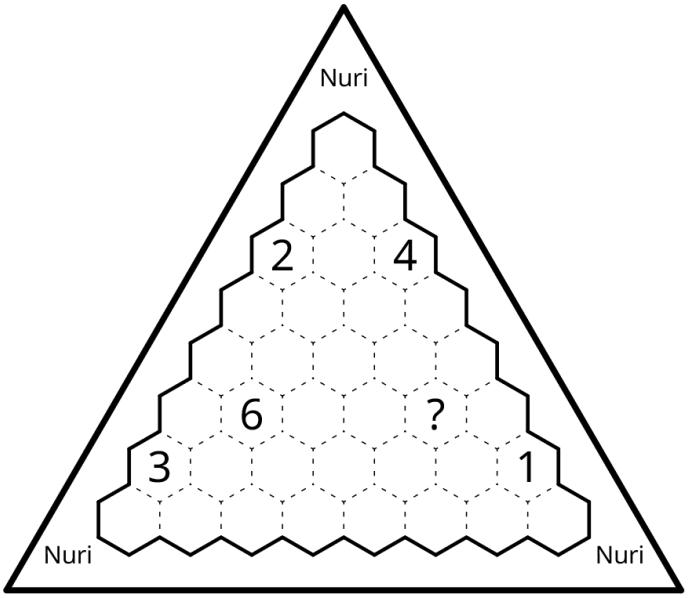


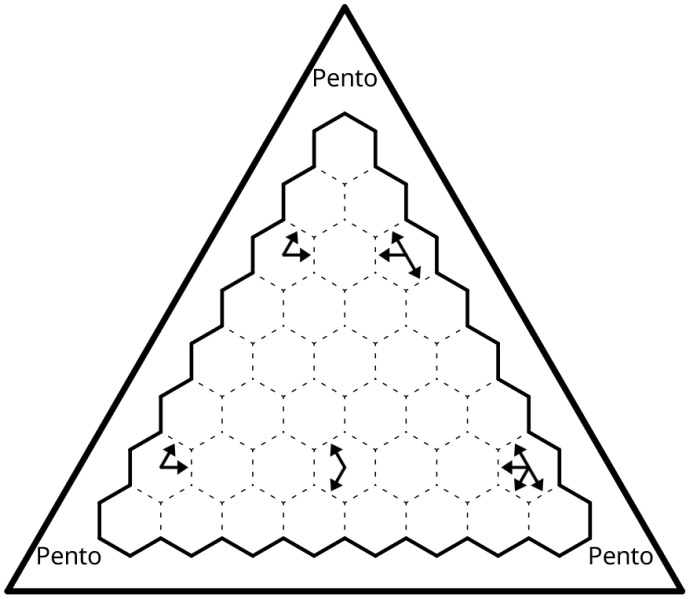
# Round Example

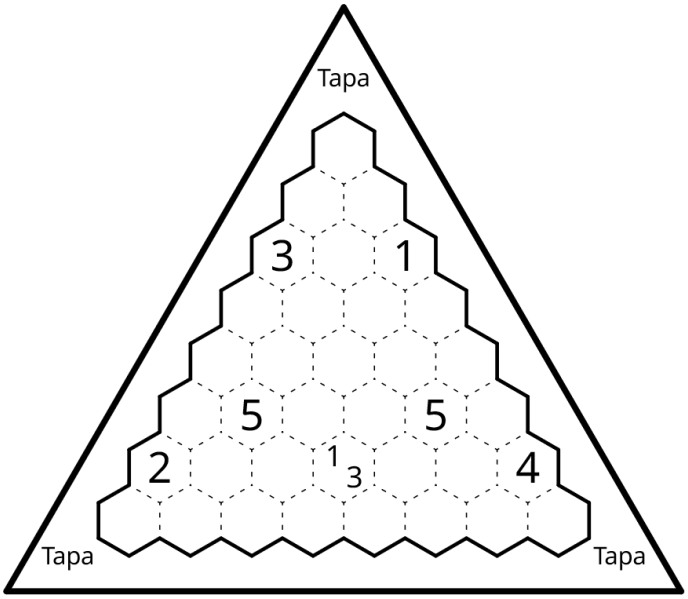
Example by Xu Chenhao

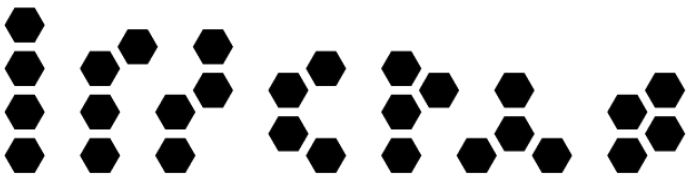
This example uses four grids: Kurotto, Nurikabe, Pentopia, Tapa. The task is to assemble a tetrahedron (i.e. triangular pyramid) satisfying the same edge rule: the two rows of hexes closest to each edge must have completely identical or completely inverted shading patterns. The corners of each grid are labeled with the first few letters of the genre names (in the same orientation as the number clues).



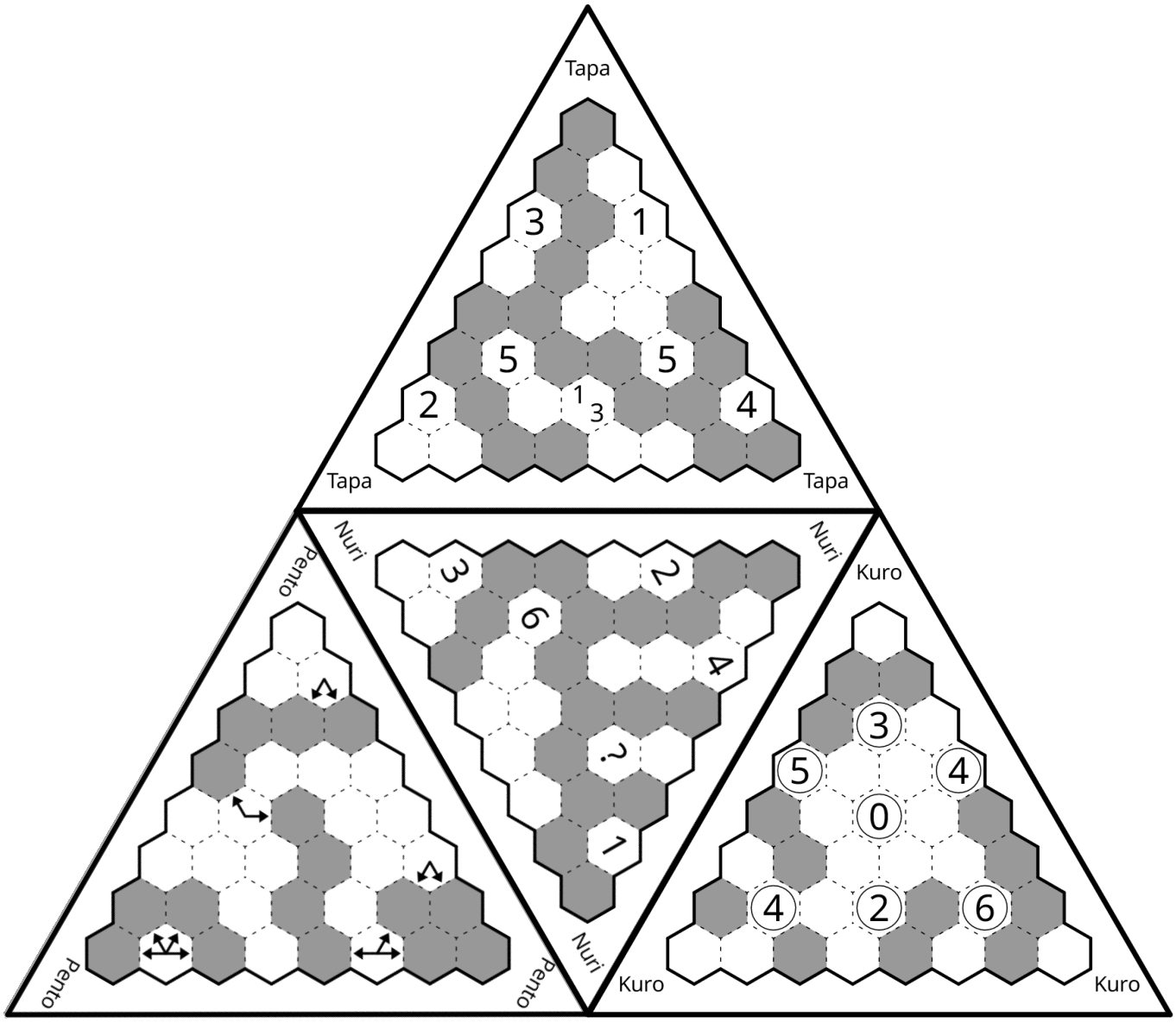



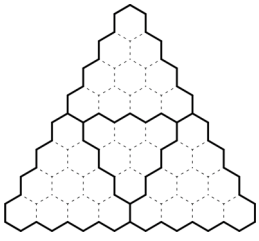
# Round Example Solution

Example by Xu Chenhao

This is the net of the tetrahedron when unfolded.




Sub-grids will look like this:



Team Round C

# Reunion

分久必合

18 Puzzles

60 Minutes

**4800** Points

| | | |
|---|---|---|
| T1 | Countries | **400** |
| W1 | Lohkous | **250** |
| W2 | Shape Division | **100** |
| W3 | Araf | **150** |
| W4 | Spiral Galaxies | **300** |
| S1 | Araf | **250** |
| S2 | Spiral Galaxies | **100** |
| S3 | Compass | **300** |
| S4 | Pentominous | **150** |

| | | |
|---|---|---|
| P1 | Compass | **300** |
| P2 | Pentominous | **125** |
| P3 | NIKOJI | **175** |
| P4 | Shikaku | **50** |
| C1 | NIKOJI | **350** |
| C2 | Shikaku | **75** |
| C3 | Lohkous | **50** |
| C4 | Shape Division | **75** |
| T2 | Shape Jigsaw | 32 × **50** |

*"Unity succeeds division and division follows unity. One is bound to be replaced by the other after a long span of time. This is the way with things in the world."*

— *Opening line of* Romance of the Three Kingdoms

This round proceeds in three stages. In Stage 1 the team works together to solve a Countries puzzle with four regions (labeled W, S, P, C). In Stage 2, the four team members each takes a region from Stage 1 and work (mostly) individually to solve four puzzles (16 puzzles total) by placing the region they have in each of the four grids and then dividing the remaining grid along dashed gridlines using the individual puzzle rules. Each of the puzzles in Stage 2 contains two grey cells; each of them will be in a region in the solved puzzle, giving 32 regions containing a grey cell. These regions will be assembled in Stage 3 to fill one large grid by the whole team, again without rotation or reflection.

The precise rules of each stage will be explained in further detail in the next page.

## General Rules

1. Team members in different stages may not communicate with each other.
2. Regions extracted from one stage must be used in the next stage without rotation or reflection. Clear plastic sheets (40 per team) and markers (4 per team) will be provided for players to transfer the regions between stages (make sure to label the orientations to prevent accidental rotation/reflection).

## Stage 1 — Team (Puzzle T1)

1. When a team submits the puzzle (either by solving it or by abandoning it), they will receive an envelope with the solution to the puzzle (4 copies per team).
2. Team members are allowed to enter Stage 2 before Puzzle T1 is submitted (e.g. after determining one of the four regions). The last player to enter Stage 2 should submit Puzzle T1 before they do so. Once a player enters Stage 2, they may not return to Stage 1.

## Stage 2 — Individual (Puzzles W/S/P/C+1/2/3/4)

1. There will be four areas labeled W, S, P, C, each with four puzzles. When a team member enters Stage 2, they may choose any of the four areas to work on, subject to the constraint that there may not be more than two players in the same area at any time. Team members in different areas may not communicate with each other, but members in the same area may.
2. After a player enters an area, they may not leave the area unless they submit all four puzzles in the area. Unlike Stage 1, the answers to the submitted puzzles will not be given. (The submitted puzzles will not be collected, but will be marked as "submitted" and remain in the area.)
3. When a player leaves an area, they may either enter Stage 3 or enter another area that still has puzzles (subject to the same constraint above).
4. The region corresponding to the area should be placed completely inside each of the four puzzle grids in a grid-aligned fashion, without overlapping with any of the clues, grey cells, or holes (black cells). This region will be treated as holes (i.e. not part of the grid) for solving purposes. It is possible for the placement to disconnect the grid. In the solution, this region can be notated just like any other region (and there is no need to distinguish it from the other regions).
5. In the solution to each puzzle, each grey cell will belong to one of the regions in the solution. These regions should be copied and carried into Stage 3. If both grey cells belong to the same region, this region should be copied twice. It might be possible to determine these two regions without fully solving the puzzle, but credits for the puzzle are only given for a complete solution.

## Stage 3 — Team (Puzzle T2)

1. Players may not enter Stage 3 when there are still teammates in Stage 1. Players in Stage 3 may return to areas of Stage 2 where the puzzles have been submitted to check their work, but may not modify any of their submitted solutions.
2. While Puzzle T2 is about assembling the regions from Stage 2 to fill the grid, the solution is still notated like in a region division puzzle. **50** points will be given for each correctly located region (even if the region was not identified in Stage 2), defined by drawing all of its borders correctly (without extraneous internal borders) or drawing lines connecting all the cells in the region. Hence, it is possible to "accidentally" get credit for an unlocated region by drawing borders for all adjacent regions.

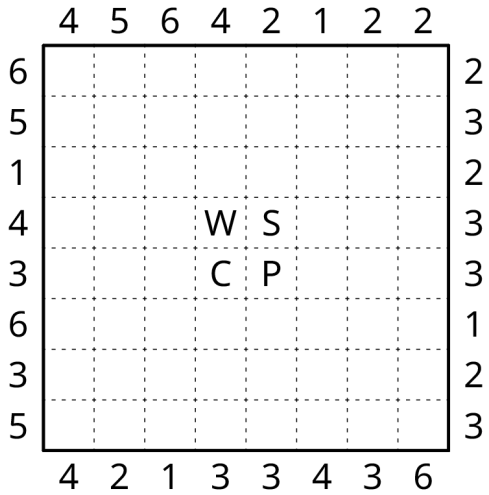
# C.T1 Countries

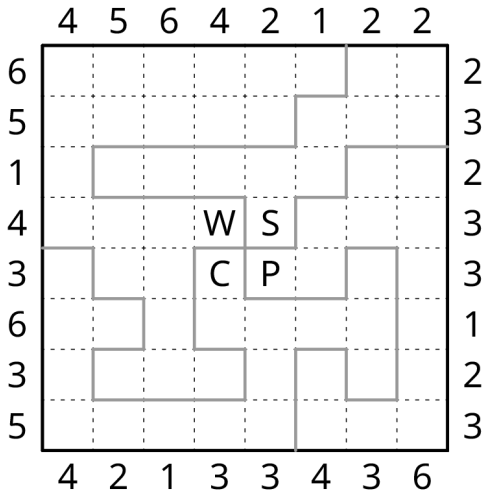
**400**pts 国家

Example from PGP 2023 R1

Divide the grid into regions along dashed gridlines so that each region contains exactly one letter. Numbers outside the grid indicate the number of cells in the row or column that are in the same region as the closest cell to the number, including the cell itself.

*The resulting regions from this puzzle are to be used in each of the Stage 2 puzzles whose ID has the same letter as the region's letter.*




The next 8 example puzzles (one for each genre) will each use one of the regions from this example puzzle's solution. Each example puzzle will have a letter next to the grid indicating which region should be used. The placed region will be in dark grey in the example solutions (although it is not necessary to shade them in your solutions.)

## C.W1 C.C3 Lohkous

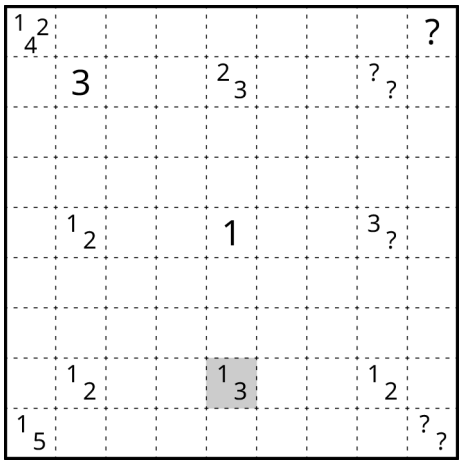
**250**pts **50**pts

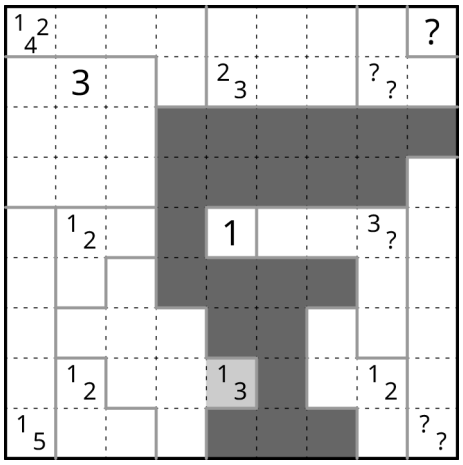
长宽度量

Example by Yao Yuan

Divide the grid into regions along dashed gridlines so that each region contains exactly one numbered cell. Numbers indicate the set of all lengths of horizontal and vertical blocks of cells in the region. Numbers (including unknowns) do not repeat in a region.

W





## C.W2 C.C4 Shape Division

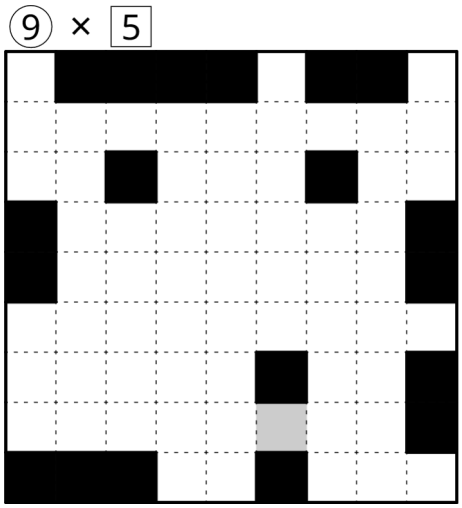
**100**pts **75**pts

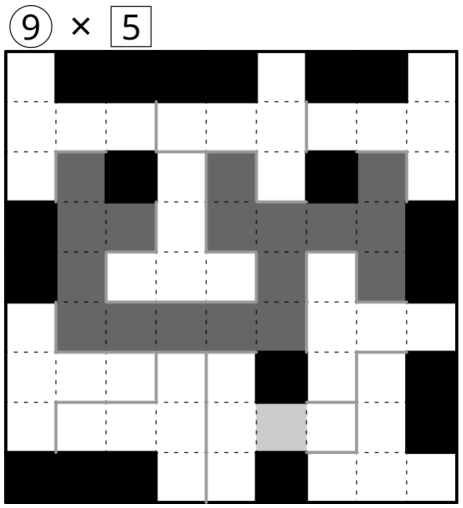
全等分割

Example by Yao Yuan

Divide the grid into some congruent regions along dashed gridlines. The number of regions is given in a circle outside the grid, and the area of each region is given in a box outside the grid.

C



## C.S1 C.W3 Araf

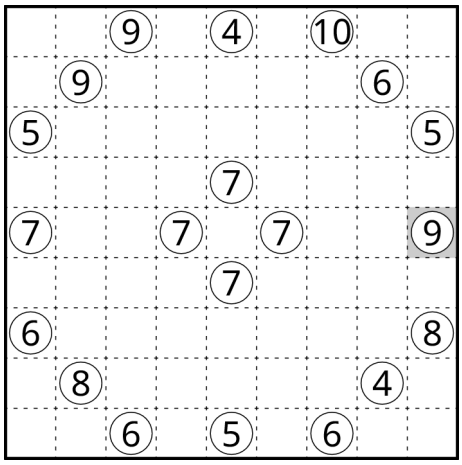
**250**pts **150**pts

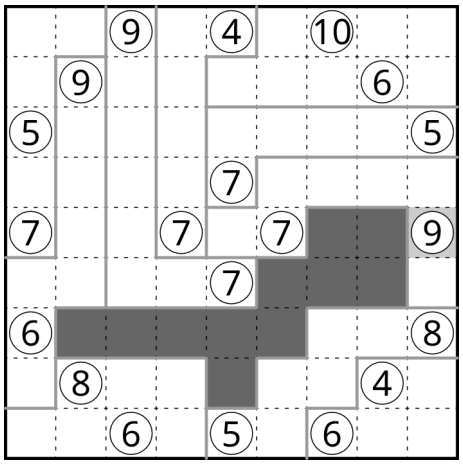
炼狱

Example by Yao Yuan

Divide the grid into regions along dashed gridlines so that each region contains exactly two numbers in circles. The area of each region must be strictly between the two numbers in the region (in particular, neither number can be equal to the area).

S





## C.S2 C.W4 Spiral Galaxies

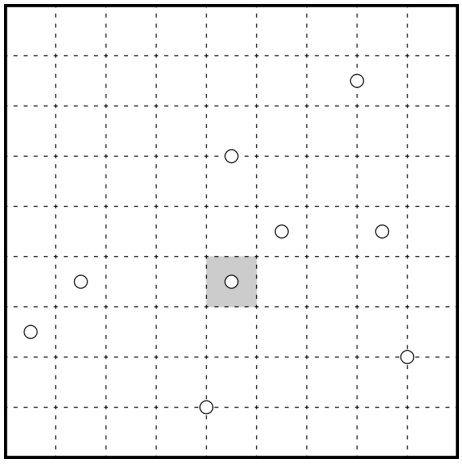
**100**pts **300**pts

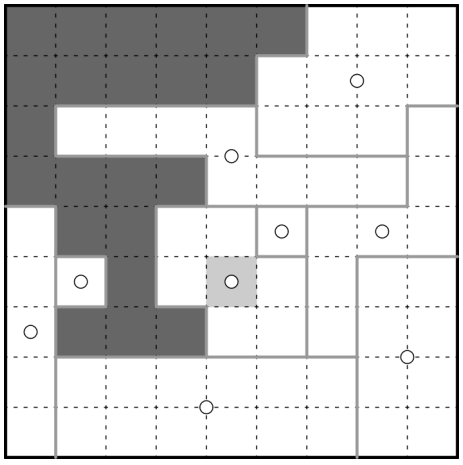
星系

Example by Yao Yuan

Divide the grid into regions along dashed gridlines so that each region contains exactly one dot. No dot may be on the boundary of a region. All regions must have 180° rotational symmetry, where a dot must be at the point of symmetry of its region.

W





## C.P1 | C.S3 Compass

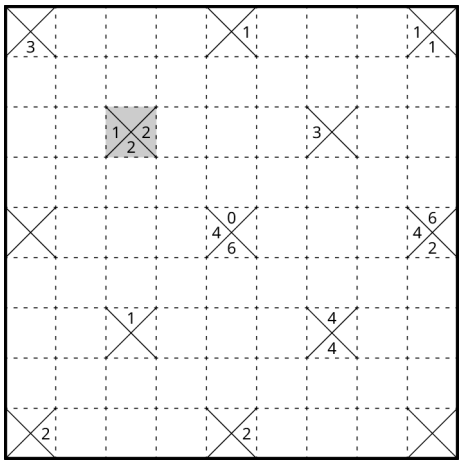
**300**pts | **300**pts

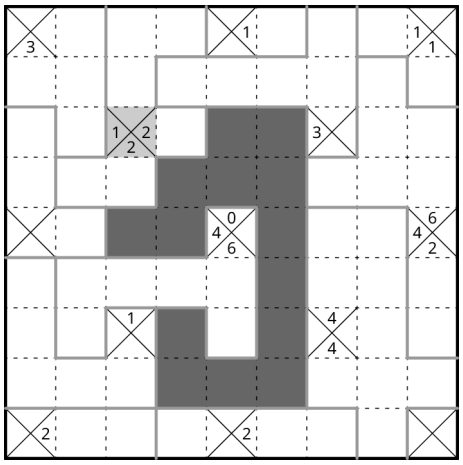
指南针

Example by Yao Yuan

Divide the grid into regions along dashed gridlines so that each region contains exactly one cell with a cross (representing a compass). Numbers in compasses indicate the number of cells in the region that are strictly further in the indicated (orthogonal) direction than the compass itself, ignoring offsets in perpendicular directions. (For example, a number in the top section of the compass indicates the number of cells in the same region that is in a strictly higher row than the compass, regardless of the columns they are in.)

P





## C.P2 | C.S4 Pentominous

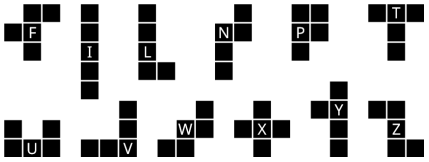
**125**pts | **150**pts

五格拼板

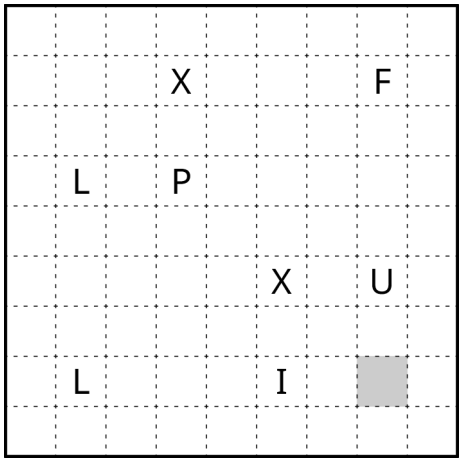
Example by Yao Yuan

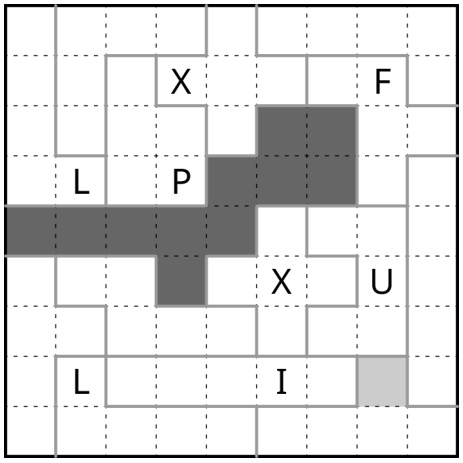
Divide the grid into pentominoes along dashed gridlines so that no two adjacent pentominoes are congruent. Letters indicate the shape of the region that it belongs to.

*The correspondence between pentominoes and letters is provided. For full credit, it is sufficient to draw the dividing lines OR fill each cell with a letter indicating the shape of its region.*




S





## C.C1 C.P3 NIKOJI

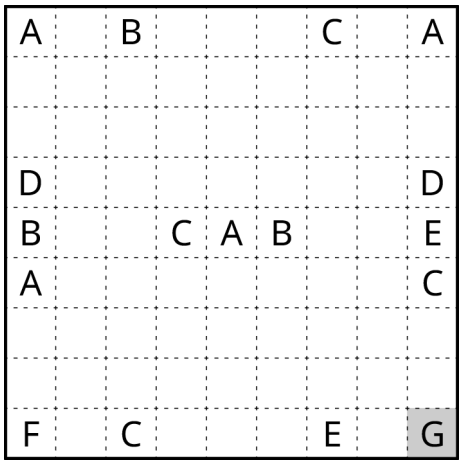
**350**pts **175**pts

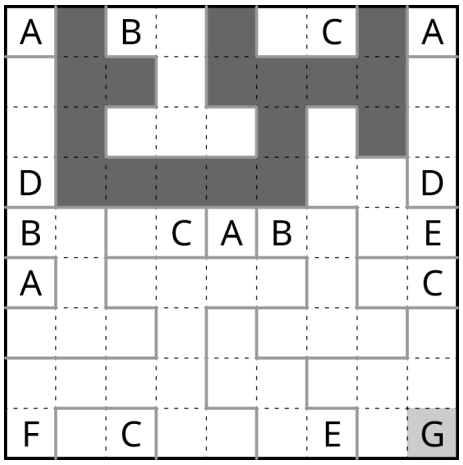
異同分割

Example by Yao Yuan

Divide the grid into regions along dashed gridlines so that each region contains exactly one letter. Regions containing the same letter must be translationally congruent, including the relative positions of the letters in those regions. Regions containing different letters must not be congruent in any way.

C




## C.C2 C.P4 Shikaku

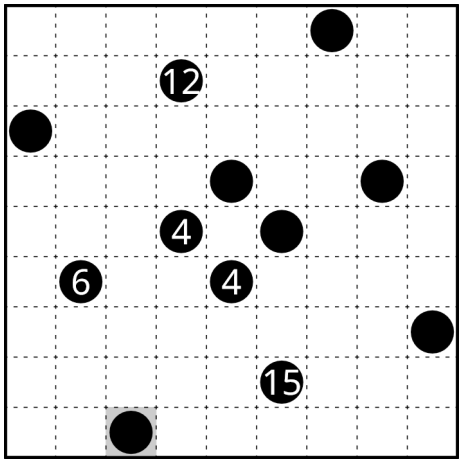
**75**pts **50**pts

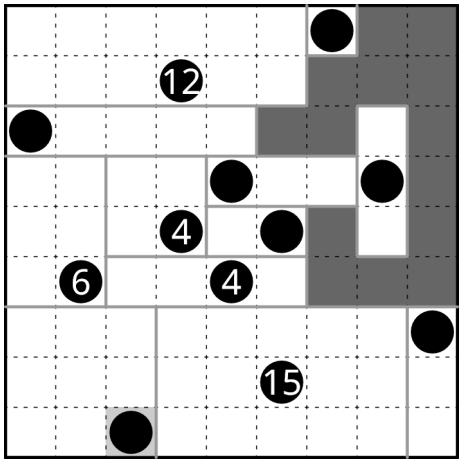
数方

Example by Yao Yuan

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one clue. Numbers in black circles indicate the area of the rectangle that it belongs to.

P



# C.T2 Shape Jigsaw

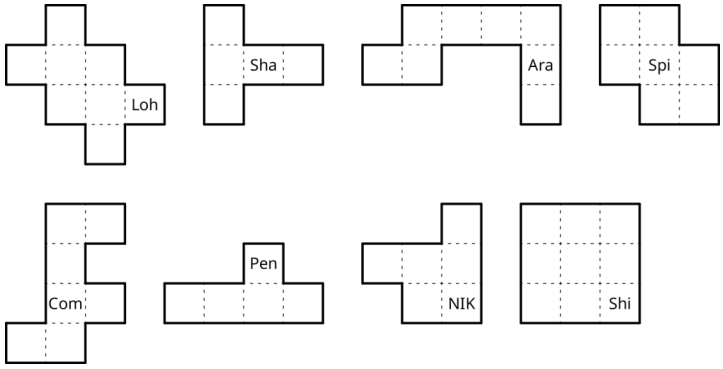
**1600**pts 图形拼图

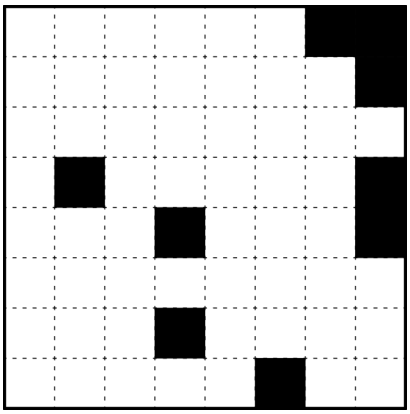
Example by Yao Yuan

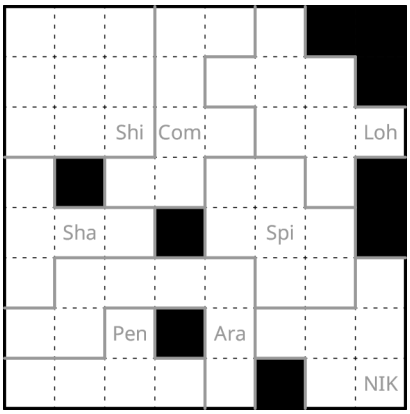
Divide the grid into regions along dashed gridlines so that each region is translationally congruent to a region that contains a grey cell from Stage 2, and each such region is appears exactly once.

***50*** *points will be given for each correctly located region. It is not necessary to label which puzzle each region comes from.*

The shapes to be extracted from the previous 8 example puzzles (each containing a grey cell) are reproduced below for reference, each labeled with the first three letters of the genre name:





# Team Round D

# Marathon

车轮战

40 Puzzles

70 Minutes

**5600** Points

| | | |
|---|---|---|
| 01 Yajilin | **10** | |
| 02 Akari | **15** | |
| 03 Numberlink | **15** | |
| 04 Meadows | **15** | |
| 05 X-Sums | **20** | |
| 06 Anglers | **20** | |
| 07 Battleships (Minesweeper) | **20** | |
| 08 Square Jam | **25** | |
| 09 Spokes | **30** | |
| 10 Heyawake | **30** | |
| 11 Lohkous | **30** | |
| 12 Gaps | **30** | |
| 13 Geradeweg | **35** | |
| 14 Pentominous | **40** | |
| 15 Kurotto | **40** | |
| 16 Statue Park | **50** | |
| 17 Hidato | **55** | |
| 18 Simple Gako | **60** | |
| 19 Scrin | **60** | |
| 20 Vertigo | **75** | |
| 21 Nagenawa | **85** | |
| 22 Hashi (Cipher) | **95** | |
| 23 Look-Air | **115** | |
| 24 Mintonette | **115** | |
| 25 Rectangle Slider | **115** | |
| 26 Masyu | **140** | |
| 27 Fillomino (Matching Splitter) | **165** | |
| 28 Sukoro | **165** | |
| 29 Tren | **170** | |
| 30 Coral (Fish) | **185** | |
| 31 Falling Letters | **200** | |
| 32 Double Choco | **225** | |
| 33 Japanese Sums | **250** | |
| 34 Magnets | **275** | |
| 35 Slitherlink (Knapp Daneben) | **325** | |
| 36 Snake (Wide) | **375** | |
| 37 Arrows (Killer) | **375** | |
| 38 Magnets (Liar) | **450** | |
| 39 One to X | **500** | |
| 40 Letter Weights | **600** | |

*There were many puzzles that we could not fit into the individual rounds for various reasons but also didn't want to reject entirely, so we made another round out of them.*

This round is split into 8 sets, each with 5 independent puzzles. Each team can only work on one set of puzzles at a time, starting from the first set, and once they submit a set (even if not all puzzles are solved), they will receive the next set, but also will not be allowed to return to a previous set. The overall difficulty and point values of each set increase from one to the next.

*Remember that individual puzzle point values have been doubled due to this being a team round. Moreover, puzzles in later sets are slightly further inflated to encourage more attempts.*

At the beginning, teams will each send one person to retrieve the first set of puzzles from one of the judging tables, distributed evenly around the competition hall to reduce variance in distances. The same judging table will be used to submit finished sets and retrieve new sets.

*This round is eligible for the more lenient partial bonus for having at least 20 puzzles.*

## D.01 Yajilin

**10**pts | 仙人指路 | See Puzzle 03.03

Draw a non-intersecting loop that passes orthogonally through centers of some empty cells. No two adjacent empty cells may be both unused by the loop. Numbers with arrows in grey cells indicate the number of unused empty cells in the indicated direction from the cell.

*It is not necessary to shade the unused empty cells.*

## D.02 Akari

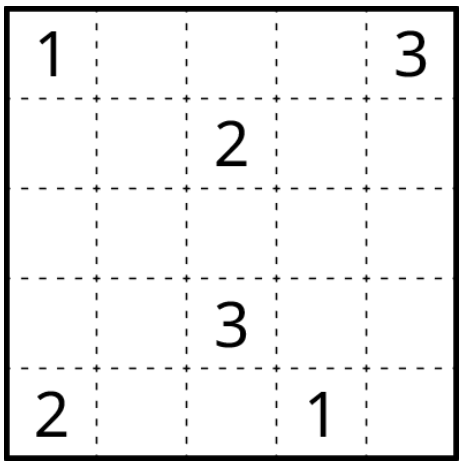
**15**pts | 美术馆 | See Puzzle 02.06

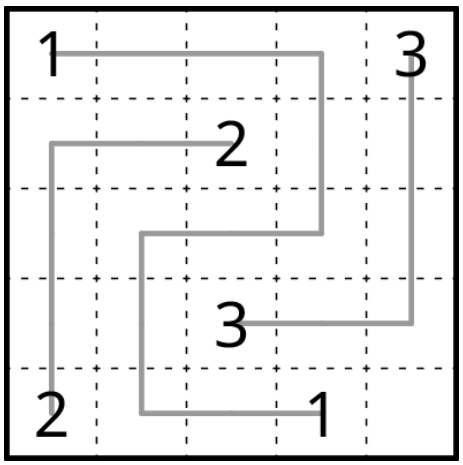
Place a light bulb in some empty cells so that all empty cells are illuminated. A light bulb in a cell illuminates all cells that are connected in a straight orthogonal line to the cell without any black cells in between, including the cell itself. No two light bulbs may illuminate each other. Numbers in black cells indicate the number of light bulbs in adjacent cells.

## D.03 Numberlink

**15**pts | 数连 | Example from PGP 2018 R3

Draw an orthogonal path from each number to its equal counterpart, passing through centers of adjacent cells. The paths may not intersect themselves or each other, including at the endpoints.



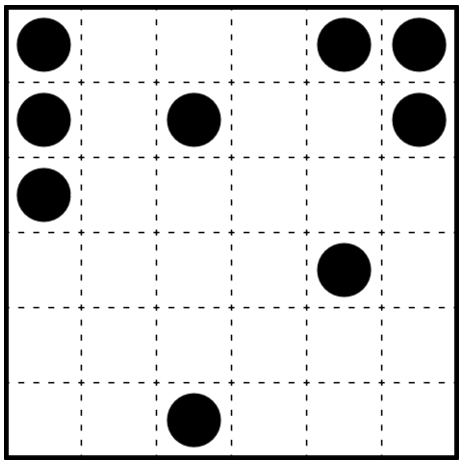
## D.04 Meadows

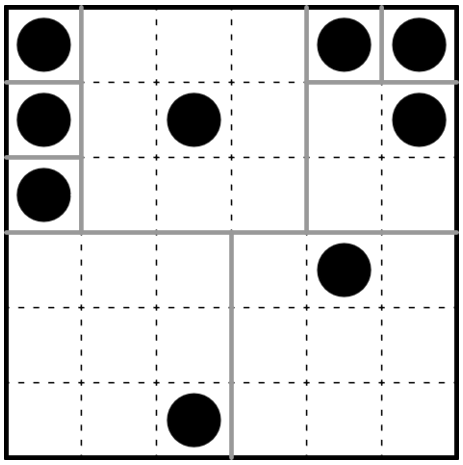
**15**pts

裁方块

Example from PGP 2024 R7

Divide the grid into square regions along dashed gridlines so that each region contains exactly one black circle.





## D.05 X-Sums

**20**pts

X和

See Puzzle 04.06

Fill each cell with a number from 1 to N, where N is the number of cells in each row or column, so that each number appears exactly once in each row and column. Numbers outside the grid indicate the sum of the first X numbers in the row or column from the respective direction, where X is the number in cell that is closest to the clue.

## D.06 Anglers

**20**pts

渔夫

See Puzzle 05.02

Draw an orthogonal path from each number outside the grid to a fish, passing through centers of adjacent cells. Each fish must be connected to by exactly one number. The paths may not intersect themselves or each other, including at the endpoints. All cells must be used by exactly one path. Numbers indicate length of the path (which is equivalent to the number of cells its path uses, including the cell with the fish).

# D.07 Battleships (Minesweeper)

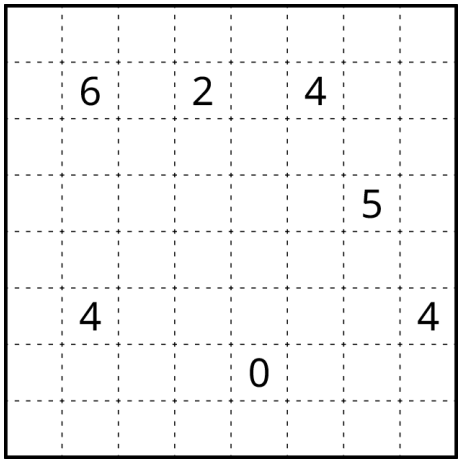
**20**pts

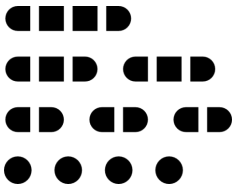
战舰（扫雷）

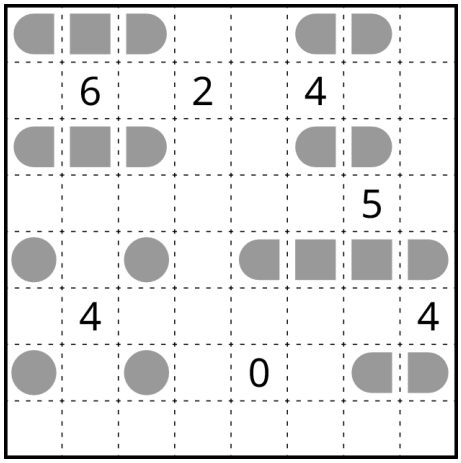
Example by Yao Yuan

Place the given shapes (representing ships) into the grid so that no two shapes overlap or touch each other. Some of the ship segments may be given in the grid; all corners of the ship pieces that are not adjacent to another ship piece are rounded. Water wave symbols indicate that the cell must not be occupied.

Numbers indicate the number of occupied cells that are touching the cell. Numbered cells may not be occupied by ships.





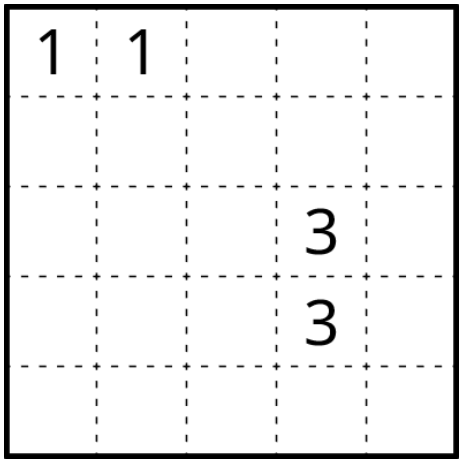

# D.08 Square Jam

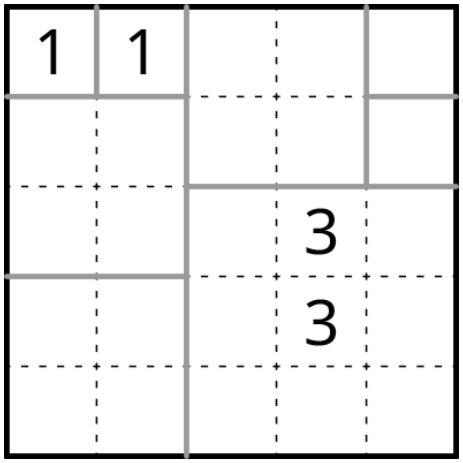
**25**pts

正方密铺

Example from PGP 2024 R7

Divide the grid into square regions along dashed gridlines. No vertex may be shared by four different squares. Numbers indicate the side length of the square it is in.



## D.09 Spokes

**30**pts

辐条

See Puzzle 08.07

Connect all black circles into one network by drawing straight segments between circles along dashed lines (in the compass directions). Segments may not intersect each other. Numbers in circles indicate the number of segments that are connected to the circle.

## D.10 Heyawake

**30**pts

数间

See Puzzle 03.02

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. No horizontal or vertical block of unshaded cells may cross two or more region borders. Numbers indicate the number of shaded cells in the region.

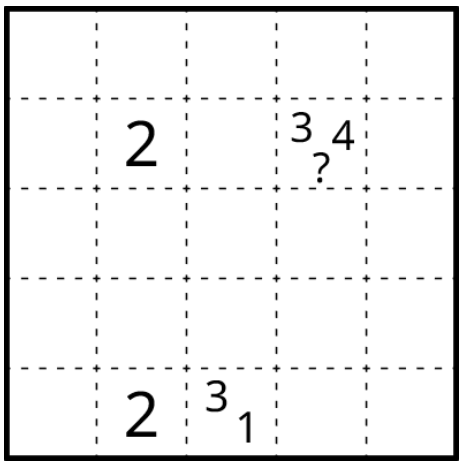
## D.11 Lohkous

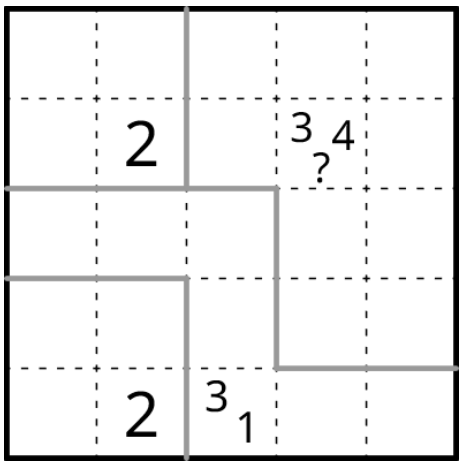
**30**pts

长宽度量

Example adapted from puzz.link

Divide the grid into regions along dashed gridlines so that each region contains exactly one numbered cell. Numbers indicate the set of all lengths of horizontal and vertical blocks of cells in the region. Numbers (including unknowns) do not repeat in a region.



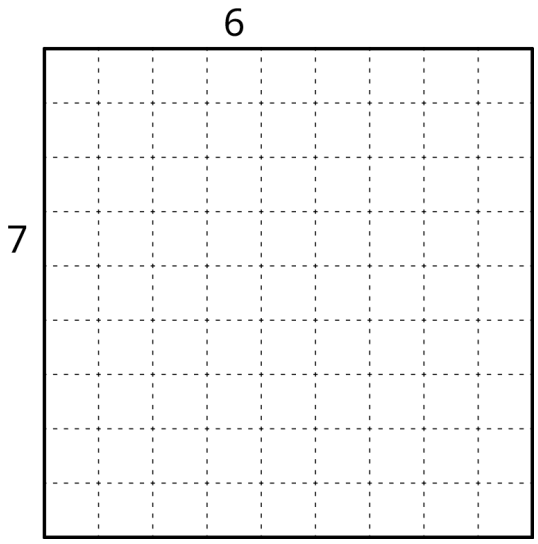
## D.12 Gaps

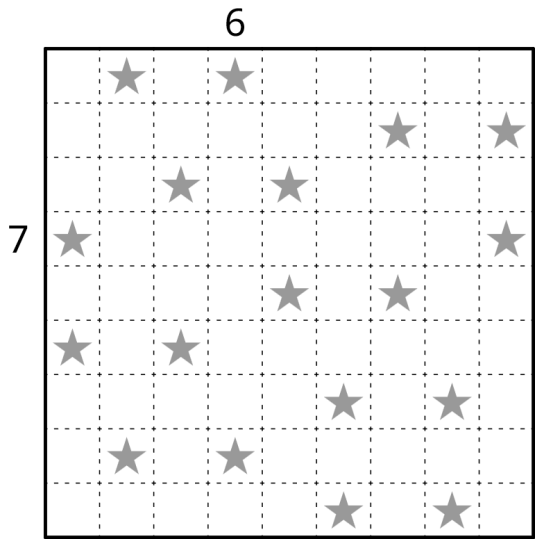
**30**pts

空隙

Example from PGP 2024 R1

Place a star in some cells so that there are exactly two stars within each row and each column. No two stars can be placed in touching cells. Numbers outside the grid indicate the number of cells between the two stars in the row or column (not including the cells with stars).



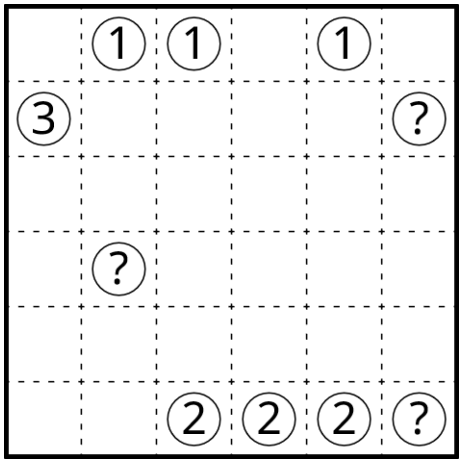

## D.13 Geradeweg

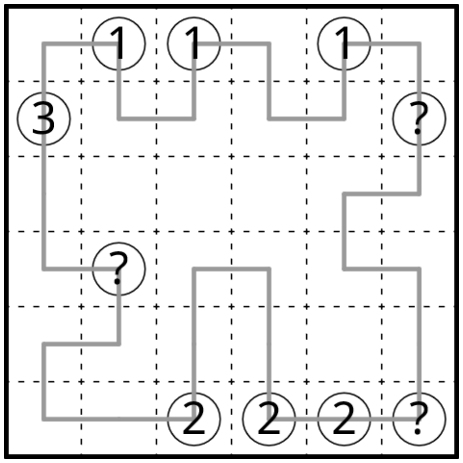
**35**pts

直线回路

Example adapted from PGP 2024 R7

Draw a non-intersecting loop that passes orthogonally through centers of some cells, including all cells with circles. The length of any straight segment that intersect with a circle must be equal to the number in the circle.



# D.14 Pentominous

**40**pts

五格拼板

See Puzzle 03.09

Divide the grid into pentominoes along dashed gridlines so that no two adjacent pentominoes are congruent. Letters indicate the shape of the region that it belongs to.

*The correspondence between pentominoes and letters is provided. For full credit, it is sufficient to draw the dividing lines OR fill each cell with a letter indicating the shape of its region.*

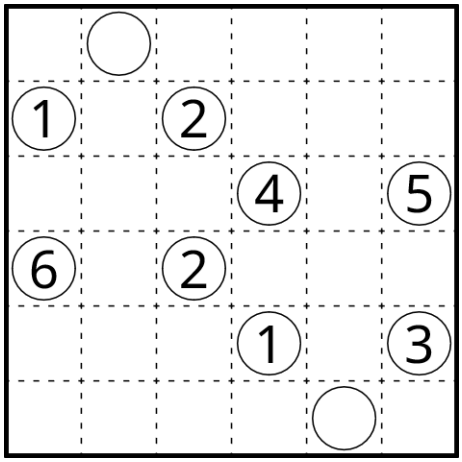
# D.15 Kurotto

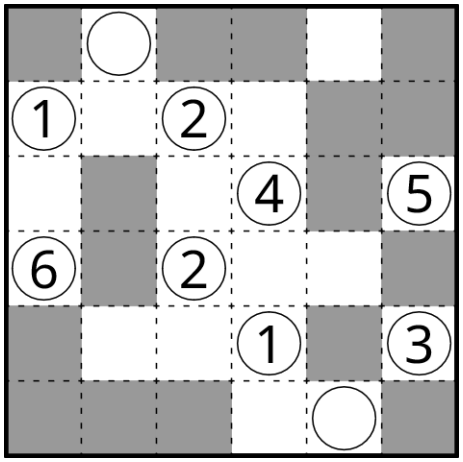
**40**pts

凝块

Example adapted from PGP 2022 R5

Shade some empty cells. Numbers indicate the total area of all connected groups of shaded cells adjacent to the cell.




# D.16 Statue Park

**50**pts

雕像公园

See Puzzle 05.10

Place the given shapes into the grid so that no two shapes overlap or are adjacent to each other (but may touch each other at a point), and the remaining unoccupied cells form one connected group. The shapes may be rotated or reflected before being placed in the grid. Cells with black circles must be occupied by a shape, and cells with white circles cannot be occupied.

## D.17 Hidato

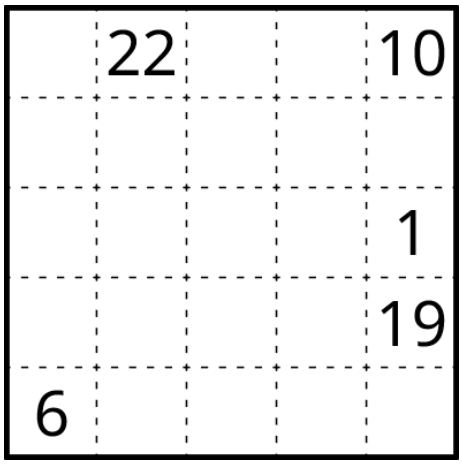
**55**pts

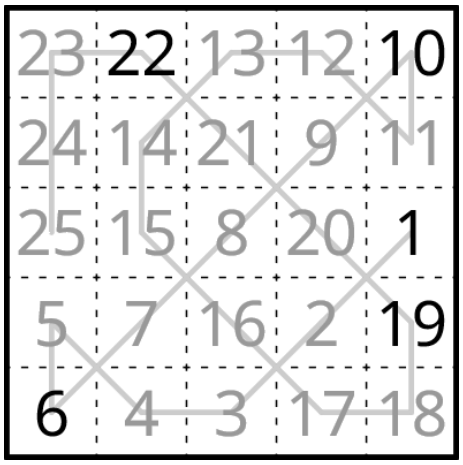
一笔画

Example from PGP 2022 R7

Place a number in each empty cell so that each number from 1 to N appears exactly once, where N is the number of cells in the grid. Every pair of consecutive numbers in this range must be in touching cells. Some numbers may be already placed in the grid.

*For full credit, it is sufficient to place all numbers OR draw a path from 1 to N in numerical order.*



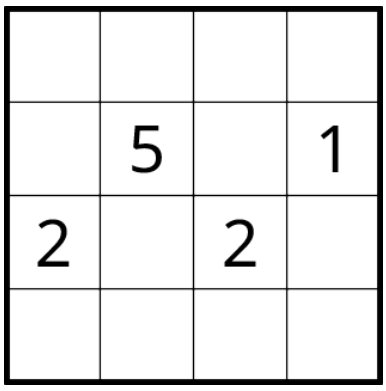

## D.18 Simple Gako

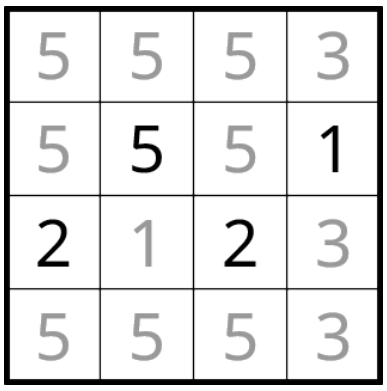
**60**pts

简单计数

Example from puzz.link

Place a number in each empty cell so that each number is equal to the total number of cells in its row and column that has the same number as the cell (including the cell itself).



## D.19 Scrin

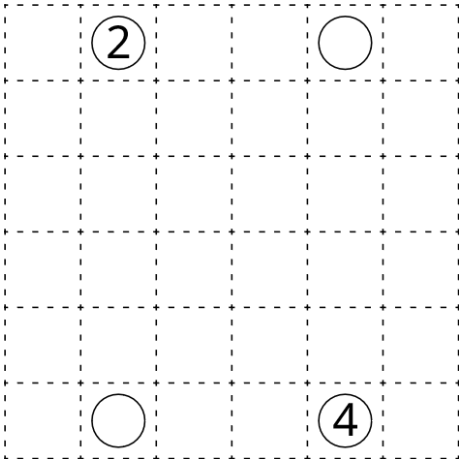
**60**pts

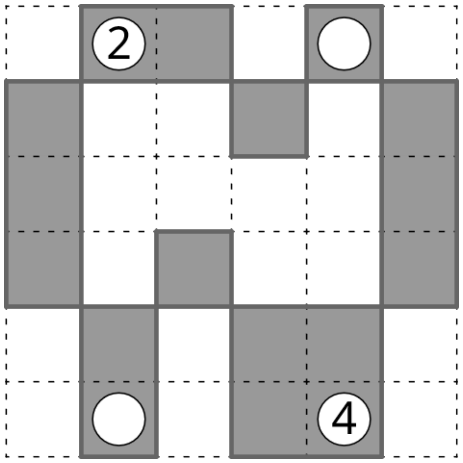
屏风

Example from puzz.link

*We removed the rule that the loop must contain at least five rectangles.*

Shade some cells so that each connected group of shaded cells is rectangular and contains at most one circle. All circles must be in shaded cells. Each shaded rectangle must be diagonally adjacent to exactly two other shaded rectangles, and all rectangles must be diagonally connected (forming a loop). Numbers in circles indicate the area of the rectangle it is in.




## D.20 Vertigo

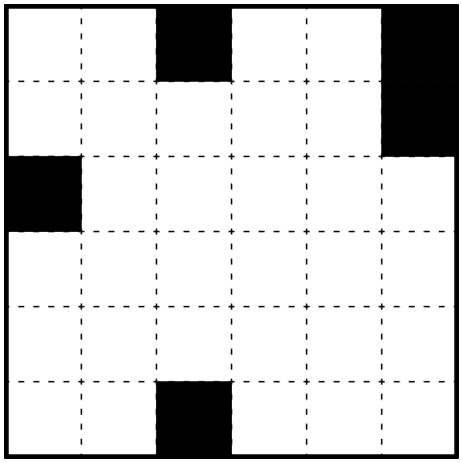
**75**pts

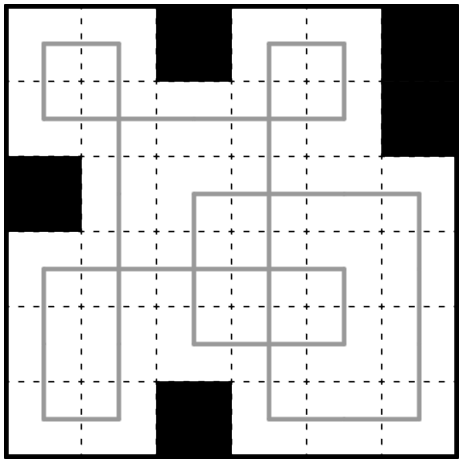
晕头转向

Example by Yao Yuan

Draw a loop that passes orthogonally through the centers of all empty cells at least once (and no other cells). The loop may intersect itself orthogonally at any cell. When traveling along the loop in one direction, all turns must be in the same direction (i.e. all left-turns or all right-turns).

*It is not necessary to indicate direction of travel.*





# D.21 Nagenawa

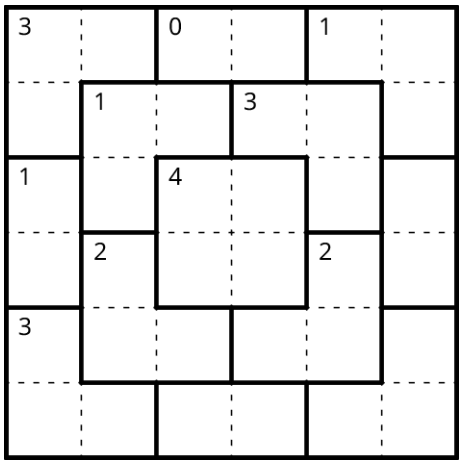
**85**pts

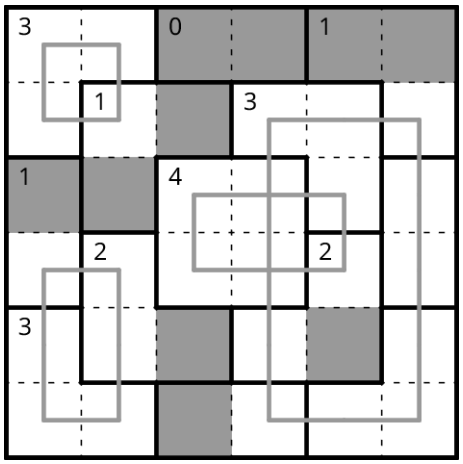
套索

Example from puzz.link

Draw some loops that pass orthogonally through centers of cells so that each loop is a rectangle. Loops may intersect each other orthogonally but may not overlap in other ways, including at corners. Numbers in regions indicate the number of cells in the region that are used by at least one loop.

*It is not necessary to shade the unused empty cells.*




# D.22 Hashi (Cipher)

**95**pts

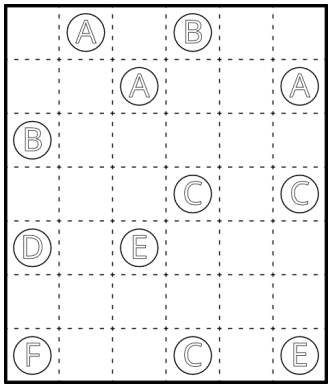
数桥（加密）

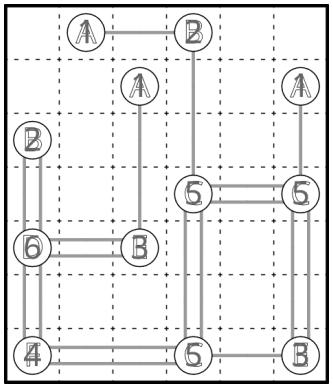
Example from PGP 2018 R2

Connect all circles into one network by drawing one or two straight orthogonal segments (representing bridges) between some pairs of circles. Segments may not intersect each other or go over other circles.

Numbers in circles indicate the number of segments that are connected to the circle. However, the numbers are replaced by letters. The same letter represents the same number, and different letters represent different numbers.

*The letters are hollow to make it easy to write numbers over them, but it is not necessary to write the corresponding numbers in your solution.*

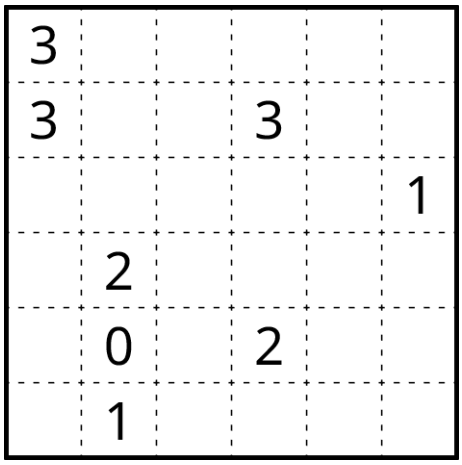


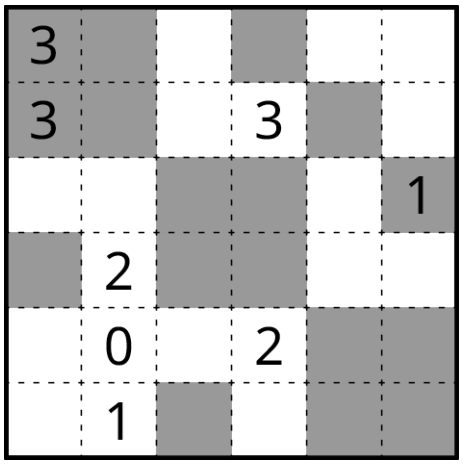



## D.23 Look-Air

**115**pts 观云 Example from puzz.link

Shade some cells so that each connected group of shaded cells is a square. Within each row or column, any two shaded cells separated by at least one unshaded cell and no other shaded cells can be in two congruent shaded squares (i.e. no two congruent shaded squares can “see” each other). Numbers represent the number of shaded cells that are either its own cell or an adjacent cell.

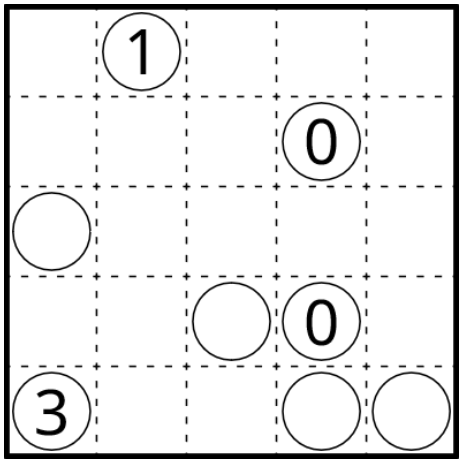


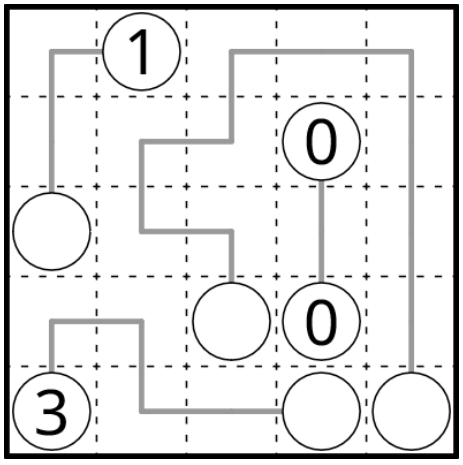




## D.24 Mintonette

**115**pts 排球 Example by Yao Yuan

Connect the circles into pairs with orthogonal paths that pass through centers of adjacent cells. The paths may not intersect themselves or each other, including at the endpoints. All cells must be used by exactly one path. Numbers in circles indicate the number of turns that the path connected to it makes.



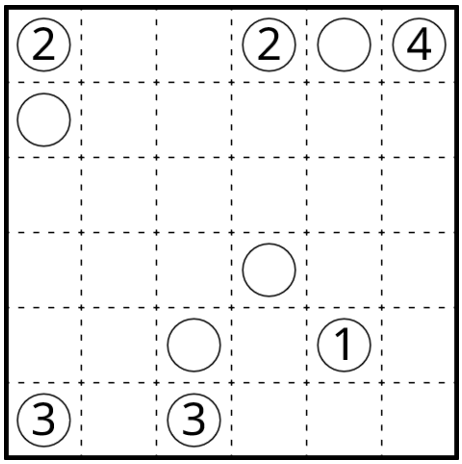
## D.25 Rectangle Slider

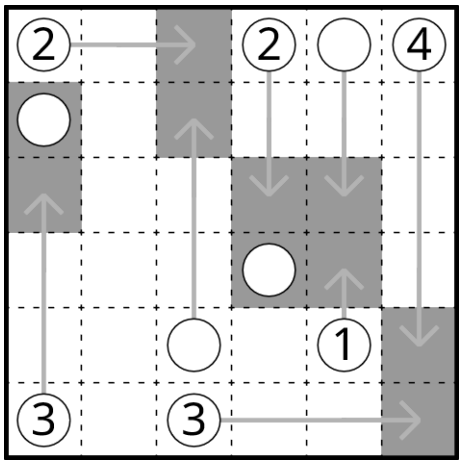
**115**pts

长方滑动

Example from puzz.link

Move some circles orthogonally so that after all movements, each connected group of cells occupied by circles is rectangular and has area at least two. The paths of the circles may not intersect each other, including at endpoints, and may not visit cells occupied by unmoved circles. Numbers in circles represent the distance that the must be moved by (0 represents that the circle must not be moved).




## D.26 Masyu

**140**pts

珍珠

See Puzzle 02.10

Draw a non-intersecting loop that passes orthogonally through centers of some cells, including all cells with circles. The loop must turn on cells with black circles, and travel straight through both adjacent cells along the loop. The loop must go straight through cells with white circles, and turn on at least one of the two adjacent cells along the loop.

## D.27 Fillomino (Matching Splitter)

**165**pts

码牌（对等分盘）

See Puzzle 06.16

Divide the grid into two connected sub-grids along dashed gridlines, then divide each sub-grid into regions along dashed gridlines so that no two adjacent regions in the same sub-grid have the same area. Any two adjacent regions in different sub-grids must have the same area. Numbers in cells indicate the area of the region that it belongs to.

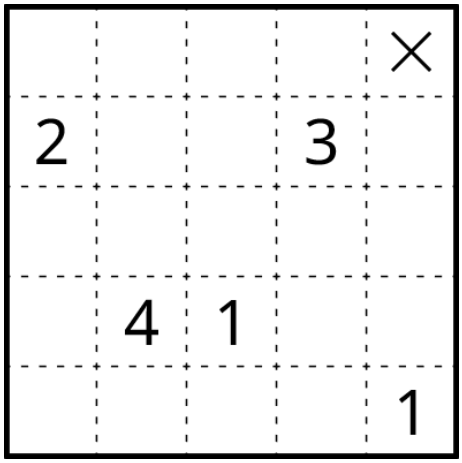
*For full credit, please clearly differentiate the notation used for dividing sub-grids and dividing regions.*

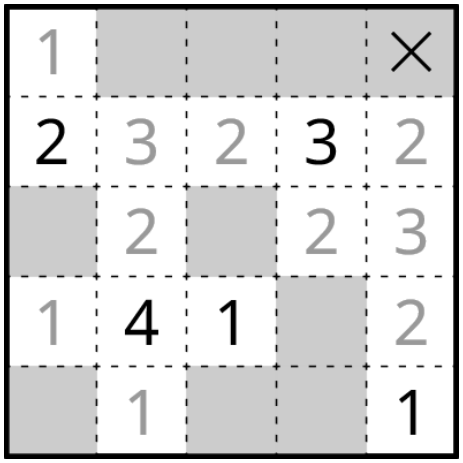
## D.28 Sukoro

**165**pts 数殖 Example from PGP 2024 R4

Place a number in some cells so that all cells with numbers form one connected group. Each number must be equal to the number of adjacent cells with numbers, and no two adjacent cells may contain the same number. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

*For full credit, it is sufficient to mark all cells that contain numbers without actually writing numbers in them.*

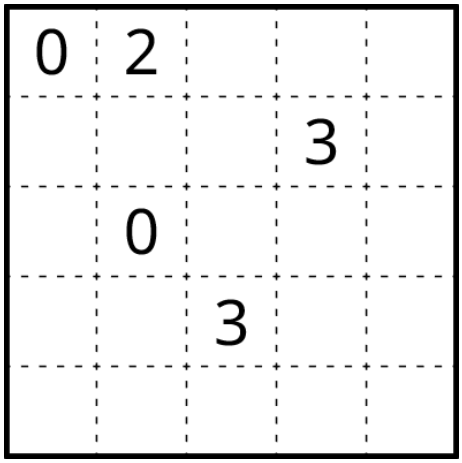


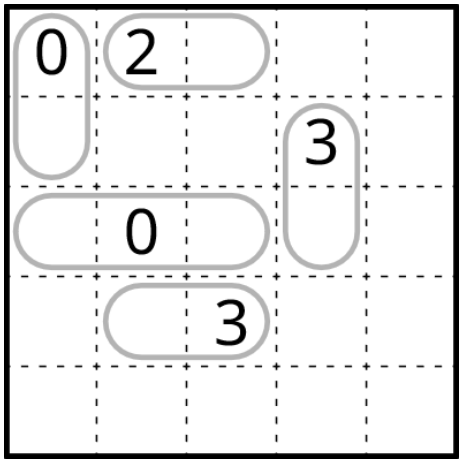


## D.29 Tren

**170**pts 停车场 Example from PGP 2023 R3

Place some rectangular cars in the grid so that each car occupies either two or three cells. Each car must contain exactly one numbered cell, and each numbered cell must be occupied by a car. Each car has two sides of length 1, and is able to move in perpendicular directions to those sides. Numbers in cars indicate the total number of cells the car is able to move in the two possible directions without overlapping with other cars.





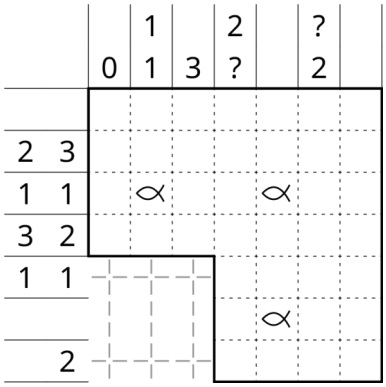
# D.30 Coral (Fish)

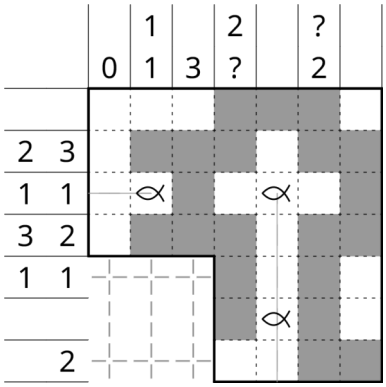
**185**pts 珊瑚（鱼） Example by Qin Jiaqi

Shade some empty cells so that all shaded cells form one connected group and no 2×2 group of cells is entirely shaded. The unshaded cells must be connected to the grid boundary. Numbers outside the grid indicate the lengths of blocks of consecutive shaded cells in the row or column, in no particular order. As a special case, a single "0" indicates that there are no shaded cells in the row or column.

For each fish in the grid, there must be exactly one orthogonal direction for which the fish is directly connected to the grid boundary along unshaded cells (without turning), possibly going through other fish.

*It is not necessary to draw the path for each fish in your solution.*



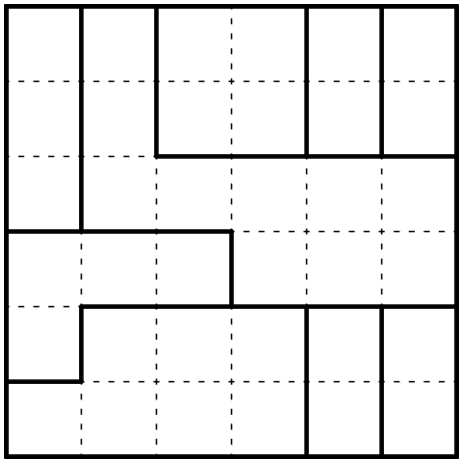



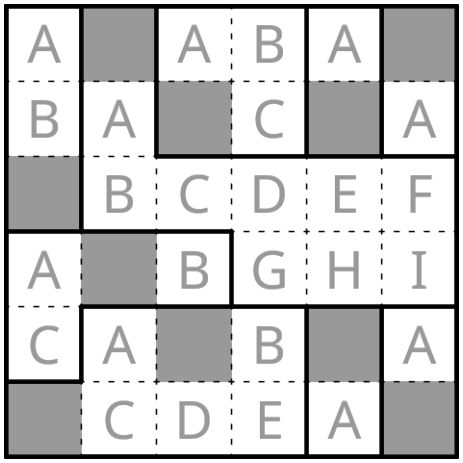

# D.31 Falling Letters

**200**pts 递降字母 Example by Wang Mingyi

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. Each region must contain at least one shaded cell. When the unshaded cells in each region are filled with letters in alphabetical order starting from A and in the usual reading order (left to right, top to bottom, one letter per cell, no two cells adjacent across region borders may contain the same letter.

*It is not necessary to write the letters in your solution.*





## D.32 Double Choco

**225**pts

双巧克力

See Puzzle 04.11

Divide the grid into regions along dashed gridlines so that each region contains exactly one connected group of grey cells and one connected group of white cells, and the two groups are adjacent and congruent to each other. Numbers indicate the area of one such connected group in the region that it belongs to (that is, it is equal to half of the area of the entire region).

## D.33 Japanese Sums

**250**pts

日本和

See Puzzle 04.05

Place a number in the indicated list into some empty cells so that each number appears at most once in each row and column. Numbers outside the grid indicate the sums of blocks of consecutive cells with numbers in the row or column, in order. Question marks represent any single such sum (which may be zero as long as it corresponds to a block of at least one number). As a special case, a single dash ('-') indicates that there are no numbers in the row or column. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

## D.34 Magnets

**275**pts

磁铁

See Puzzle 03.04

Place a plus sign and a minus sign in some two-cell regions (one sign per cell) of the main grid, so that no two adjacent cells contain the same sign. Numbers outside the grid indicate the number of plus signs or minus signs in the row or column.

*It is not necessary to shade the remaining empty cells.*

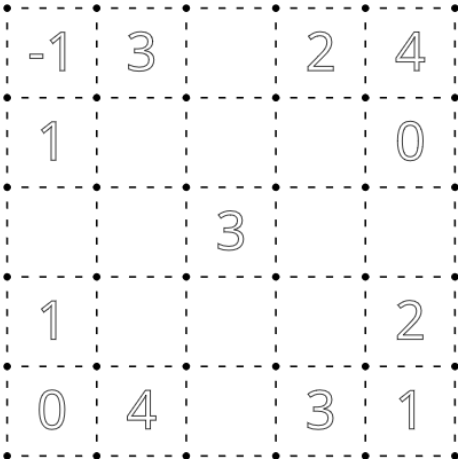
# D.35 Slitherlink (Knapp Daneben)

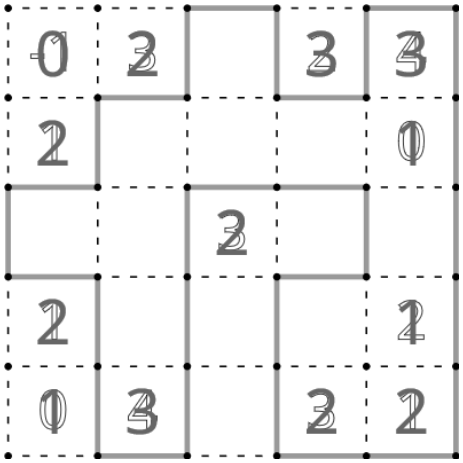
**325**pts 数回（差一） Example by Yao Yuan

Draw a single non-intersecting loop along the dashed gridlines. Numbers indicate the number of edges adjacent to the cell that are used by the loop.

However, all numbers are off by one (either one higher or one lower than the correct value).

*The numbers are hollow as a reminder that they are incorrect. It is not necessary to write the correct numbers in your solution.*



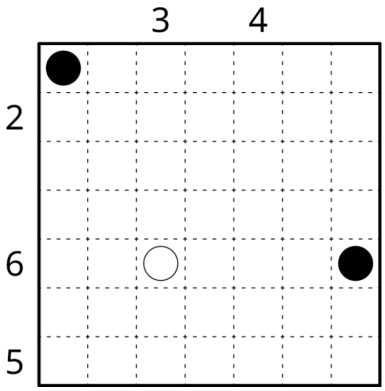



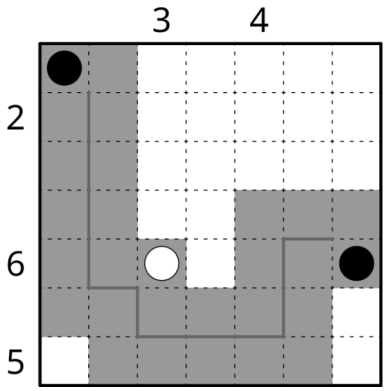

# D.36 Snake (Wide)

**375**pts 数蛇（加宽） Example by Yao Yuan

Shade a two-cell-wide snake that does not touch itself. (Precisely, the snake consists of all cells touching a path drawn along gridlines where the path does not touch the grid boundary. If the path makes two turns in the same direction, the segment in between has length at least three. All unshaded cells must be orthogonally connected to the grid boundary.) Black circles indicate that the cell is part of an end of the snake (i.e. it only touches an endpoint of the path), and white circles indicate that the cell is part of the body (and not at an end). Numbers outside the grid indicate the number of shaded cells in the row or column.

*For full credit, it is sufficient to either shade all cells of the snake OR draw the path at the center of the snake.*



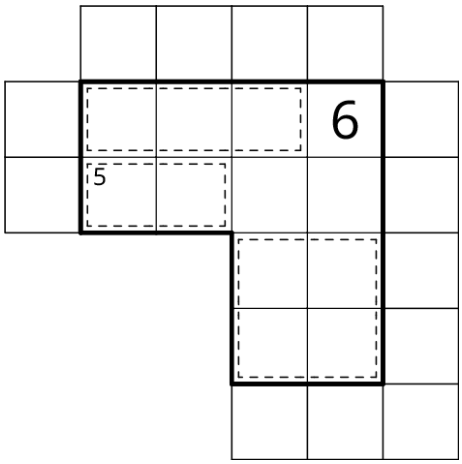
# D.37 Arrows (Killer)

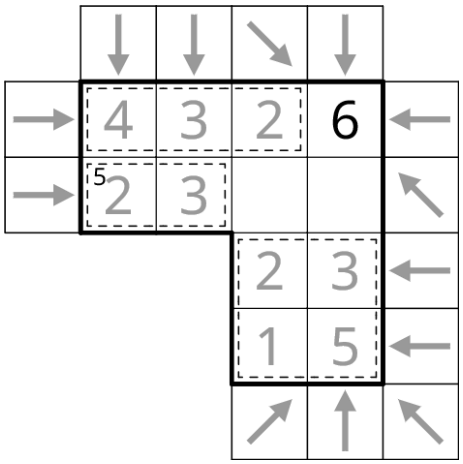
**375**pts 数箭（杀手） Example by Qin Jiaqi

Place an arrow in each of the cells outside the outlined main grid, pointing in one of the eight compass directions. Each arrow must point at at least one cells of the main grid. The value of each cell in the main grid is equal to the number of arrows pointing at the cell. Some values may be already given in the grid.

Moreover, some cells of the main grid are in dashed cages. The values of cells inside each cage may not repeat. Small numbers in cages indicate the sum of values of all cells inside the cage.

*It is not necessary to write the values for cells without a given value in your solution.*



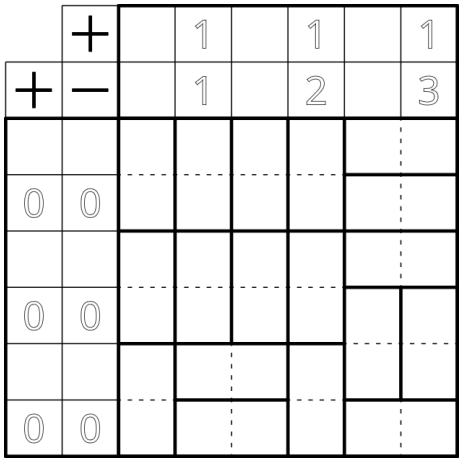

# D.38 Magnets (Liar)

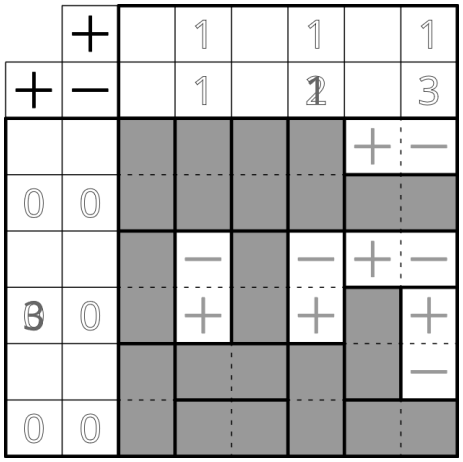
**450**pts 磁铁（谎言） Example by Qin Jiaqi

Place a plus sign and a minus sign in some two-cell regions (one sign per cell) of the main grid, so that no two adjacent cells contain the same sign. Numbers outside the grid indicate the number of plus signs or minus signs in the row or column.

However, exactly one of the numbers for plus signs and one of the numbers for minus signs are incorrect.

*The numbers are hollow as a reminder that they are not all correct. It is not necessary to write the correct values for the incorrect clues in your solution.*



## D.39 One to X

**500**pts

一到X

See Puzzle 04.07

Place a number into each empty cell so that each region contains the numbers from 1 to X, where X is the number of cells in the region. Identical numbers may not be placed in adjacent cells. Numbers outside the grid indicate the sum of all numbers in the row or column. Some numbers may be already placed in the grid.

## D.40 Letter Weights

**600**pts

字母和

See Puzzle 01.07

Match the letters with the given list of numbers (in an outlined box), so that the sum of all letters in each given word is equal to the corresponding number.

Individual Rounds X/Y/Z

# Playoffs

决赛

8/8/8 Puzzles*

20/25/45 Minutes

**Champion**

| Round X (20 min) | | Round Y (25 min) | | Round Z (45 min) | |
|---|---|---|---|---|---|
| 01 Shakashaka | 20 | 01 Kurotto | 25 | 01 Barns | 40 |
| 02 Aquapelago | 20 | 02 Yin-Yang | 30 | 02 Fillomino | 40 |
| 03 Sukoro | 20 | 03 FiveCells | 30 | 03 Lohkous | 40 |
| 04 Square Jam | 25 | 04 Shikaku | 35 | 04 Kurodoko | 50 |
| 05 Dominoes | 25 | 05 Geradeweg | 35 | 05 Doppelblock (Anti-Knight) | 60 |
| 06 Koburin | 30 | 06 Slitherlink | 35 | 06 Cave | 60 |
| 07 Spokes | 35 | 07 Easy as | 40 | 07 Kropki Pairs | 75 |
| 08 Pentopia | 35 | 08 Star Battle | 45 | 08 Statue Park (Hitori) | 90 |

These playoff rounds feature puzzle genres that have appeared in previous individual and team rounds (possibly as variations or with twists).

**Only half of the listed puzzles will actually be solved, as chosen by the playoff players.*

*The playoff puzzles will be somewhat enlarged compared to normal individual round puzzles, in order to make them a bit easier to see for viewers.*

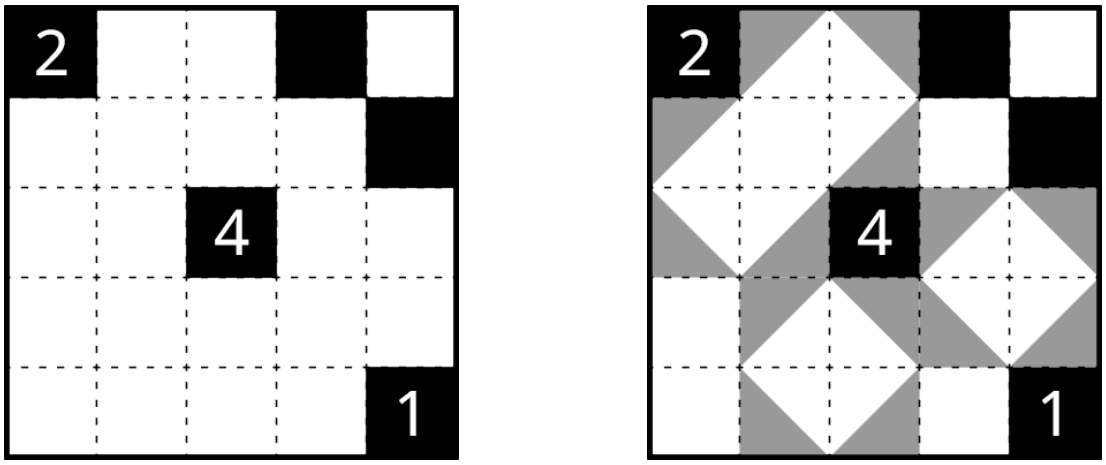
# X.01 Shakashaka

**20**pts

摇啊摇

Example from PGP 2022 R3

Shade some halves of some empty cells (that are right isosceles triangles), so that all remaining unshaded areas are all rectangles, either orthogonal or diagonal. Numbers in black cells indicate the number of empty cells adjacent to the cell that are half-shaded.




# X.02 Aquapelago

**20**pts

千岛湖

See Puzzle 06.06

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. No 2×2 group of cells may be entirely unshaded. Black circles must be in shaded cells, and numbers in those circles indicate the number of shaded cells in the same diagonally connected group as the cell, including the cell itself.

# X.03 Sukoro

**20**pts

数殖

See Puzzle D.28

Place a number in some cells so that all cells with numbers form one connected group. Each number must be equal to the number of adjacent cells with numbers. No two equal numbers may be in adjacent cells. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

*For full credit, it is sufficient to mark all cells with numbers (without actually fill in the numbers) or all cells without numbers.*

## X.04 Square Jam

**25**pts | 正方密铺 | See Puzzle D.08

Divide the grid into square regions along dashed gridlines. No vertex may be shared by four different squares. Numbers indicate the side length of the square it is in.

## X.05 Dominoes

**25**pts | 多米诺 | See Puzzle 06.14

Divide the grid into dominoes along dashed gridlines so that every possible (unordered) pair of numbers in the indicated list appears in the same domino exactly once.

*A list of all possible pairs is provided for convenience.*

## X.06 Koburin

**30**pts | 仙人指邻 | See Puzzle 11.22 (no circle markings)

Draw a non-intersecting loop that passes orthogonally through centers of some empty cells. No two adjacent empty cells may be both unused by the loop. Numbers in grey cells indicate the number of unused empty cells adjacent to the cell.

*It is not necessary to shade the unused empty cells.*

## X.07 Spokes

**35**pts | 辐条 | See Puzzle 08.07

Connect all black circles into one network by drawing straight segments between circles along dashed lines (in the compass directions). Segments may not intersect each other. Numbers in circles indicate the number of segments that are connected to the circle.

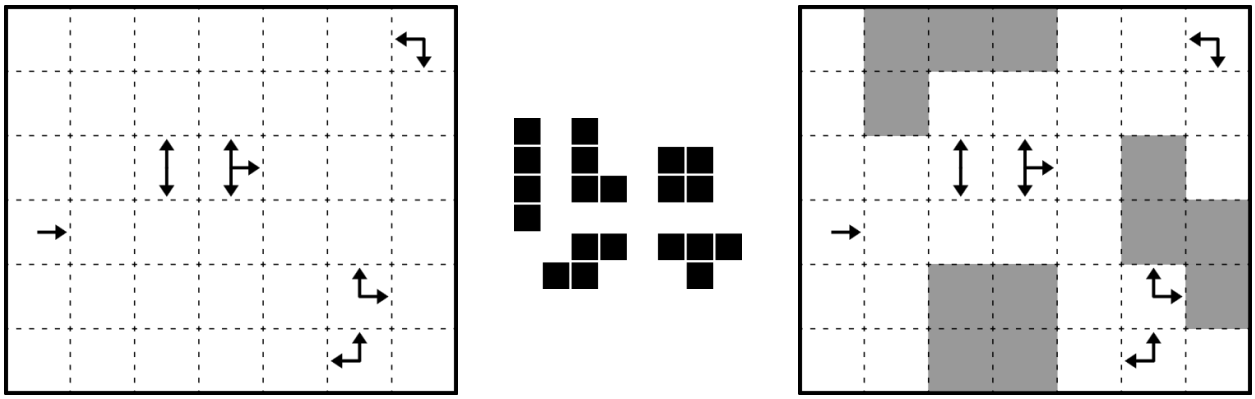
## X.08 Pentopia

**35**pts

近视五格

Example from puzz.link

Place some (not necessarily all) of the given shapes into the grid so that no two shapes touch each other. Cells with arrows may not be occupied. Arrows in a cell indicate all orthogonal directions where an occupied cell appears closest to the cell.



## Y.01 Kurotto

**25**pts

凝块

See Puzzle D.15

Shade some empty cells. Numbers indicate the total area of all connected groups of shaded cells adjacent to the cell.

## Y.02 Yin-Yang

**30**pts

阴阳

See Puzzle 07.01

Shade some cells so that all shaded cells form one connected group and so do all unshaded cells. No 2×2 group of cells is entirely shaded or entirely unshaded. Cells with black circles must be shaded and cells with white circles must be unshaded.

## Y.03 FiveCells

**30**pts

五格分区

See Puzzle 06.18

Divide the grid into pentominoes along dashed gridlines. Numbers indicate the number of adjacent edges that are region borders.

## Y.04 Shikaku

**35**pts

数方

See Puzzle 02.11

Divide the grid into rectangular regions along dashed gridlines so that each region contains exactly one clue. Numbers in black circles indicate the area of the rectangle that it belongs to.

## Y.05 Geradeweg

**35**pts

直线回路

See Puzzle D.13

Draw a non-intersecting loop that passes orthogonally through centers of some cells, including all cells with circles. The length of any straight segment that intersect with a circle must be equal to the number in the circle.

## Y.06 Slitherlink

**35**pts

数回

See Puzzle 02.08

Draw a single non-intersecting loop along the dashed gridlines. Numbers indicate the number of edges adjacent to the cell that are used by the loop.

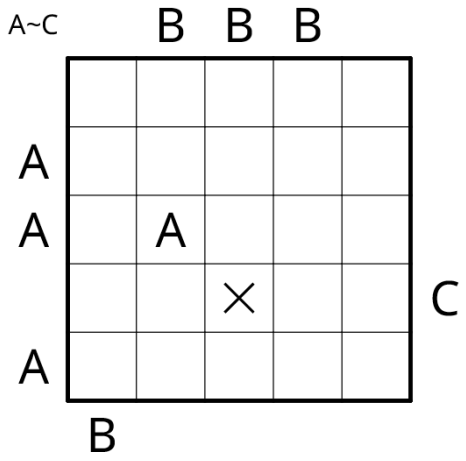
## Y.07 Easy as

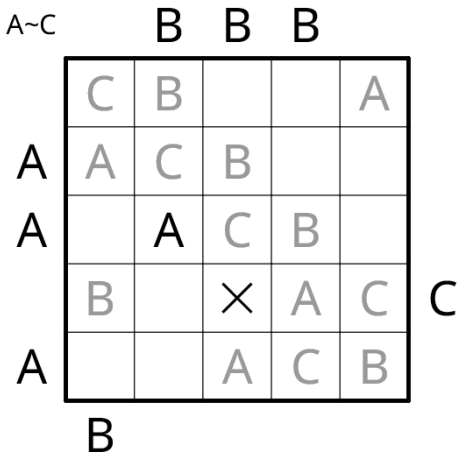
**40**pts

简单字符

Example from PGP 2024 R8

Place a character from the indicated list into some empty cells so that each character in the list appears exactly once in each row and column. Characters outside the grid indicate the first character in the row or column from the respective direction. Some characters may be already placed in the grid. Cells marked with a cross cannot contain a character.




## Y.08 Star Battle

**45**pts

星战

See Puzzle 01.06

Place a star in some cells so that the number of stars within each row, each column, and each region is equal to the given number outside the grid. No two stars can be placed in touching cells.

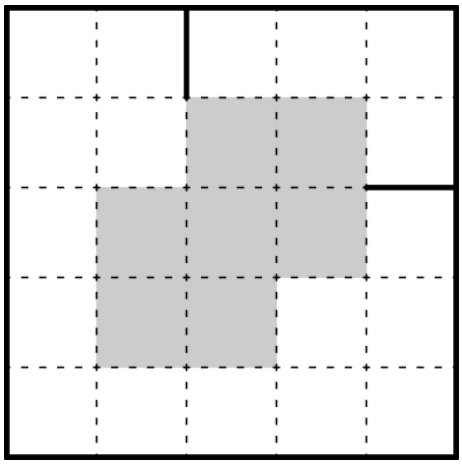
## Z.01 Barns

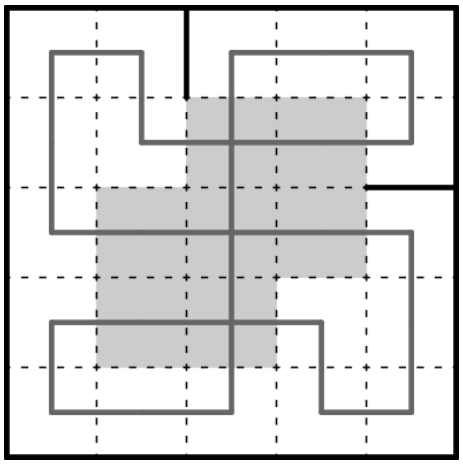
**40**pts

冰宫巡行

Example from puzz.link

Draw a loop that passes orthogonally through the centers of all cells. The loop may not cross any thick borders. The loop may not intersect itself on white cells. The loop may not turn on grey (“icy”) cells, but may intersect itself orthogonally on such cells.





## Z.02 Fillomino

**40**pts

码牌

See Puzzle 06.13

Divide the grid into regions along dashed gridlines so that no two adjacent regions have the same area. Numbers indicate the area of the region that it belongs to.

*For full credit, it is sufficient to draw the dividing lines OR fill each cell with a number indicating the area of its region.*

## Z.03 Lohkous

**40**pts

长宽度量

See Puzzle D.11

Divide the grid into regions along dashed gridlines so that each region contains exactly one numbered cell. Numbers indicate the set of all lengths of horizontal and vertical blocks of cells in the region. Numbers (including unknowns) do not repeat in a region.

## Z.04 Kurodoko

**50**pts

田鼠挖洞

See Puzzle 11.03

Shade some cells so that no two shaded cells are adjacent and the unshaded cells form one connected group. Numbers in white circles must be in unshaded cells, and indicate the number of unshaded cells connected in a straight orthogonal line to the cell without any shaded cells in between, including the cell itself.

## Z.05 Doppelblock (Anti-Knight)

**60**pts

双黑格（无马）

See Puzzle 09.04

Place a number from the indicated list into some empty cells so that each number in the list appears exactly once in each row and column. Numbers outside the grid indicate the sum of all numbers between the two empty cells in the row or column. Some numbers may be already placed in the grid. Cells marked with a cross cannot contain a number.

Identical numbers may not be placed in cells that are a knight's move apart. (A knight moves two cells in an orthogonal direction and one cell in a perpendicular direction.)

*It is not necessary to shade the remaining empty cells.*

## Z.06 Cave

**60**pts

山洞

See Puzzle 11.20 (no circle markings)

Draw a single non-intersecting loop along the dashed gridlines. Numbers must be inside the loop, and indicate the number of cells inside the loop connected in a straight orthogonal line to the cell without any loop segments in between, including the cell itself.

# Z.07 Kropki Pairs

**75**pts

黑白点对

See Puzzle 07.16

Fill each cell with a number from 1 to N, where N is the number of cells in each row or column, so that each number appears exactly once in each row and column. White dots between two cells indicate that the two numbers in those two cells have an absolute difference of 1 and black dots indicate that the two numbers are in a 1:2 ratio (in some order). Not all possible dots are necessarily given. Some numbers may be already given in the grid.

# Z.08 Statue Park (Hitori)

**90**pts

雕像公园（数壹）

See Puzzle 09.08

Place the given shapes into the grid so that no two shapes are adjacent to each other (but may touch each other at a point), and the remaining unoccupied cells form one connected group. The shapes may be rotated or reflected before being placed in the grid.

No two unoccupied cells in the same row or column may contain the same number.