



MARATHON

ONE WEEK - MANY PUZZLES - HUGE SIZES

**AUTHORS FOR
PUZZLE MARATHON
2016**

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ABOUT THE TEST

This is a differently designed LMI test.

- All puzzle grids in this test are marathon grids, i.e. they are much bigger in size than usual.
- There is no *fixed* time limit for any puzzle. The challenge for solvers is to solve all of them in least amount of time.
- The test will be open for more than a week, with the idea that everyone can get around to solve all puzzles conveniently.
- Each puzzle can be started, solved and submitted independent of others, and in any order, anytime during the contest duration.

SCORING

Each puzzle is worth 50 points. A correct submission for a puzzle will be awarded with 50 points. Additionally bonus points will be awarded for submitting a puzzle correctly within an hour. The bonus points rules is posted in forum (<http://logicmastersindia.com/forum/forums/thread-view.asp?pid=21374>).

There are 12 puzzles. Total score for a player will be computed by summing individual puzzle scores. For players who submit more than 10 puzzles correctly, their best 10 results will be considered for ranking.

INSTANT GRADING

Instant Grading is built-in in this test, which means no player will get 0 for solving the big puzzle correctly, but making an error while keying the answer. Each submission will be marked as “correct” or “wrong”.

Following penalty rules will be applicable for wrong submissions

- 1.5 minutes will be added to your final submission time for each of the first two wrong submissions
- 3 minutes will be added to your final submission time for each of the subsequent wrong submissions

Note that there is no penalty to the fixed 50 points, in case of wrong submissions.

PUZZLE PDFS

Each puzzle will have a separate password protected pdf, the passwords being different from each other. All pdfs will be available to download hours before the test starts. Since the grids are large, they will not include the example grids.

NOTES ABOUT ANSWER KEYS

- 1) Please note that each answer key has “fixed length” or “fixed sum”. While submitting, the length or the sum of the answer key is checked first. If red warning is displayed while submitting, the submission can never be correct.
- 2) All circled cells follow left to right direction. There will be maximum one circle per column marked.
- 3) All arrow marks follow top to bottom and, then left to right direction
- 4) If both rows and columns are marked, answer keys for rows need to be entered first.
- 5) **If any row/column/cell has a double or triple digit answer key, only the unit digit (right-most digit) should be entered. (This rule is applicable to Hex Slitherlink, Hidoku and Spiral Galaxy).**

IMPORTANT CHANGES IN 2016

Category	2012-2015	2016	Why?
Difficulty rating of puzzles	<p>The puzzles were ordered based on difficulty in the submission page. The top puzzle was the easiest and the bottom puzzle was the most difficult. Each puzzle was tagged with “Easy” or “Medium” or “Difficult”.</p>	<p>Puzzles will still be ordered based on perceived difficulty. However, they will not be tagged as “Easy” or “Medium” or “Difficult”.</p> <p>Instead, three numbers shall be shown next to each puzzle</p> <ol style="list-style-type: none"> a) Number of players who have started the puzzle. b) Number of players who have solved the puzzle. c) Number of players who have solved the puzzle within 60 minutes. 	<p>This is done based on the experiences in the past years. Some of the puzzles have turned out to be more difficult than the intended category.</p> <p>With the three numbers displayed and based on their skill levels, players can make an informed decision about the difficulty level of the puzzles. As more players take the test, this information will become more reliable.</p>
Rank Bonus	<p>All players solving the puzzle within 60 minutes got time bonus.</p> <p>All players solving the puzzle within 60 minutes got rank bonus.</p>	<p>All players solving the puzzle within 60 minutes continue to get time bonus.</p> <p>However, only the top 50 players solving within 60 minutes will get rank bonus. More than 50 players are expected to solve each puzzle within 60 minutes. However, if less than 50 players solve any puzzle within 60 minutes, only those players will get rank bonus.</p>	<p>There needs to be a cutoff time, after which there is no bonus. And this time is 60 minutes. This is done so that there is no uncertainty for players regarding how long they should wait for solving the puzzle.</p> <p>Rank bonus is restricted to top 50 participants so that they get additional points due to better performance in those puzzles. This bonus should be a differentiator for top solvers.</p>
Giving up on puzzles	<p>Players had to wait for a minimum period of 60 minutes before they could start a new puzzle.</p>	<p>Players do not have to wait for 60 minutes before giving up on a puzzle, and starting a new one. This would mean players can start multiple puzzles, with the risk of losing bonus points.</p>	<p>This is based on the opinions expressed by many participants last year.</p> <p>This will enable participants who do not expect to finish in 60 minutes to try another puzzle. Some participants may have limited time available or may not like the puzzle after looking at it, and want to try another one.</p>
Bonus for authors	<p>Worst 2 puzzles discarded for all players.</p> <p>Worst 1 puzzle discarded for authors.</p>	<p>Worst 2 puzzles will be discarded for all players, including authors.</p> <p>More specifically, for authors who solve 10 or 11 puzzles, the final score = (Total score in 9 best puzzles) * 10 / 9</p>	<p>Authors may make a mistake in a type or may not be good at certain type. They should not be penalized for helping out.</p> <p>This will eliminate any disadvantage to the author(s).</p>



**WORD SEARCH
SUDOKU**

Complete the grid so that each row and column contains the same set of 18 letters, given at the right side of the grid. In addition, the large grid is divided into nine 6x6 Sudoku grids each of which must contain a subset of the letters in every row, column and outlined block. In the final solved grid, it must be possible to read each of the following words in a straight line in one of eight possible directions horizontally, vertically, or diagonally. The example uses 12 letters and 4x4 Sudoku grids.

Answer key: Enter the letter in circled cells from left to right. For the example, the answer key is WSETPTUOND

	NORTH	SOUTH	EAST	WEST	UP	DOWN
			D P			
	U T		P O		R E	
	T W				E R	
D E		A U			P S	
H D		W A			S O	
P A				N U		
O P		S H		U W		
		H T				

○ ○ ○ ○ ○ ○ ○ ○ ○ ○

A
D
E
H
N
O
P
R
S
T
U
W

T S U W O D P N E H A R
W U T S N P O D A R E H
S T W U P N D O H E R A
U W S T D O N P R A H E
N H E D W U R A P S O T
D E H N R A U W O T P S
H D N E U W A R T P S O
E N D H A R W U S O T P
A R O P S T E H U W D N
O P A R H E S T D N U W
R O P A T S H E N U W D
P A R O E H T S W D N U

W S E T P T U O N D



**TWINS CO-
ORDINATES**

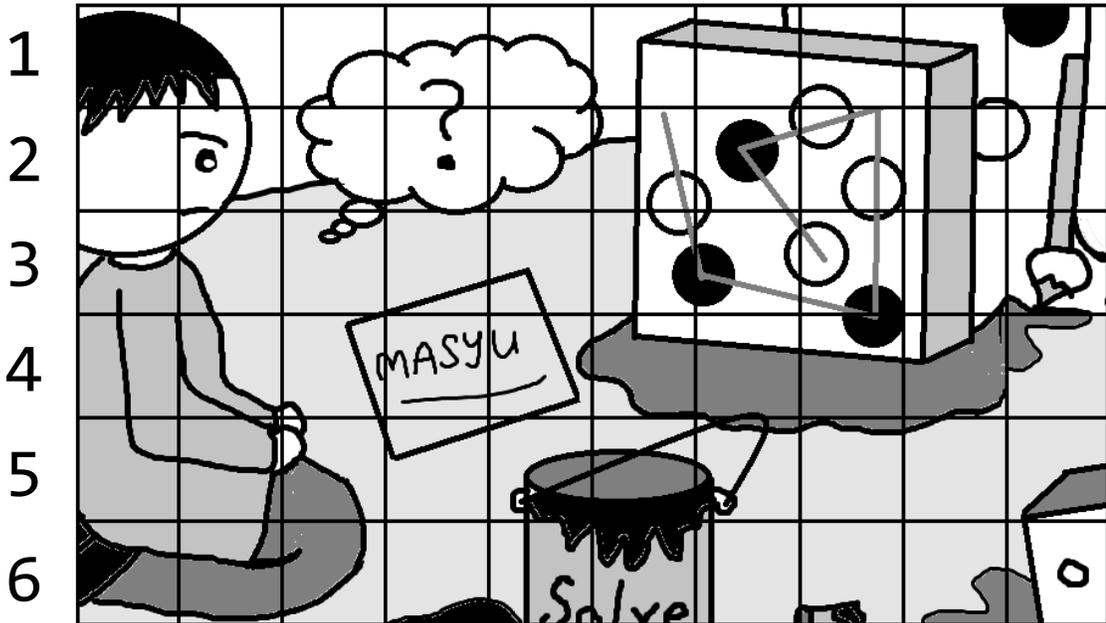
Find 5 pairs of cells that are identical to each other in the diagram below. Cells may be rotated, but not reflected. Ignore any minor pixelations.

Note: There are 6 identical pairs in the puzzle. The example has exactly 2 pairs.

Answer key: For any 5 pairs, enter the co-ordinate of any one cell. See last page for the solution of the example.

2
pairs

A B C D E F G H I J





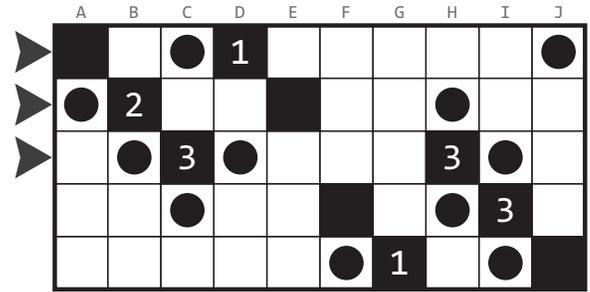
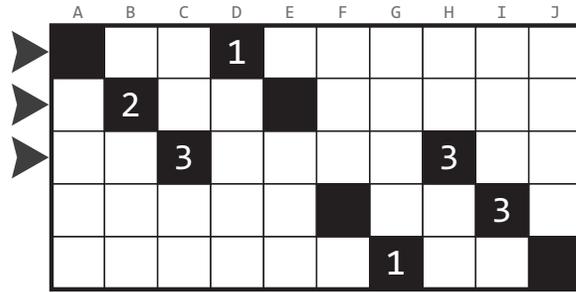
Place lightbulbs in some of the white cells so that all white cells are illuminated. Lightbulbs illuminate all cells they can see horizontally and vertically. They are blocked by black cells or the edge of the grid. No two lightbulbs may illuminate each other. Numbers in black cells indicate how many orthogonally adjacent cells contain a lightbulb.

Answer key: For every marked row from top to bottom, enter the column position of 2nd light bulb in that row. Enter "-" if less than 2 bulbs.

For every marked row from top to bottom, enter the column position of 3rd light bulb in that row. Enter "-" if less than 3 bulbs.

Use the letters given above the grid for column positions.

For the example, the answer key is JHD,--I

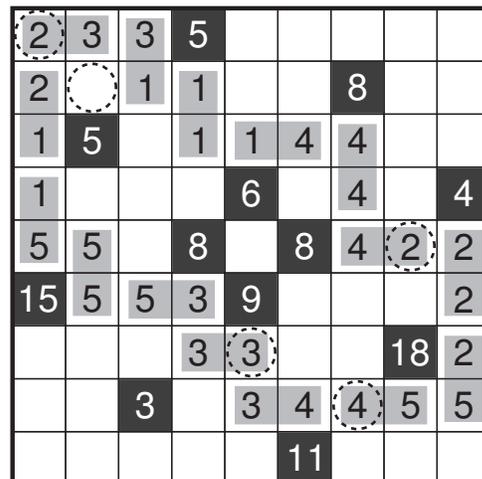
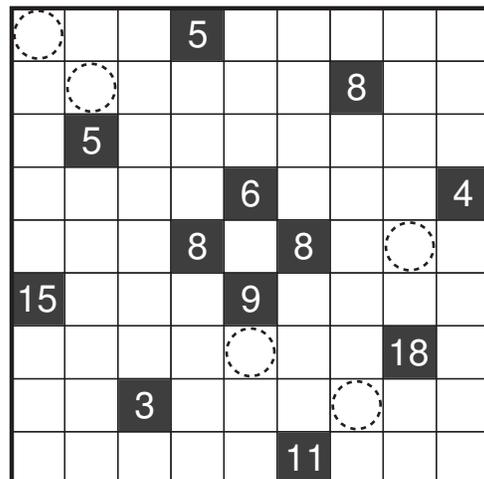
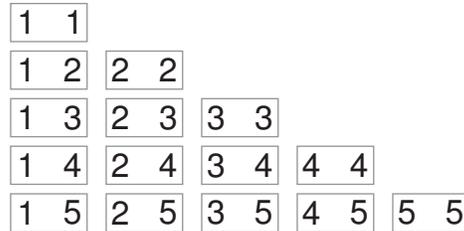


DOMINO LOOP

Create a snake-like loop using all the given dominoes. The snake like loop is one cell width and cannot touch itself, not even diagonally. Along the loop the dominoes touch each other by same values. The given clues show the sum of the half-dominoes that touch them orthogonally or diagonally.

Ignore the circles while solving.

Answer key: Enter the digits in circled cells from left to right. Enter - for blank cells. For the example, the answer key is 2-342



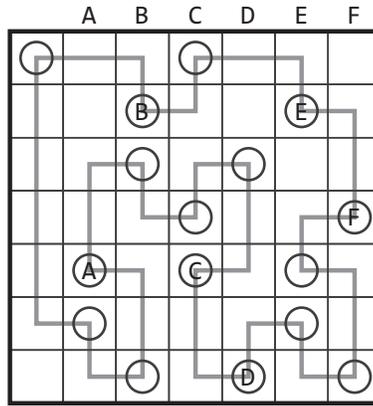
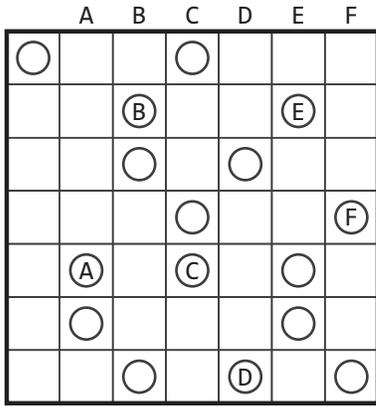


**EVERY
SECOND
BREAKPOINT**

Draw a single closed loop going horizontally or vertically through centers of some cells. The loop must visit all cells with circles and make a turn in those cells. There should be exactly one turn between every two consecutive circles the loop visits.

Ignore the letters while solving.

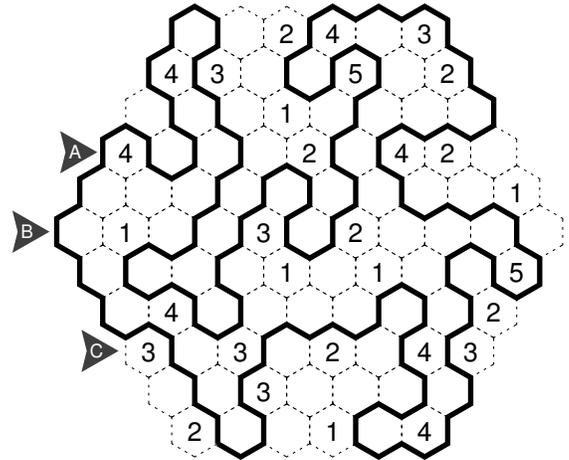
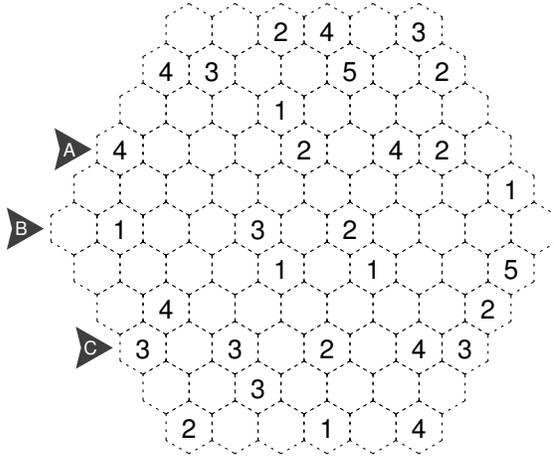
Answer key: Starting with A, enter the letters visited by the loop in order. For the example, the answer key is ACDFEB or ABEFDC



**HEX
SLITHERLINK**

Draw a single closed loop by connecting neighboring points along the grid lines. Each numbered cell indicates how many of its edges are used by the loop.

Answer key: Enter the lengths of consecutive blocks of cells separated by the loop (both those inside and those outside) for the marked rows, from left to right. For two digit numbers, only enter the last (unit) digit. For the example, the answer key is 11213,311141,12311





HIDOKU

Write a different number between 1 and 289 (25 in the example) into every cell of the diagram, using each number exactly once. Consecutive numbers must be in orthogonally or diagonally adjacent cells.

Ignore the circles while solving.

Answer key: Enter the digits in circled cells from left to right. For two or three digit numbers, only enter the last (unit) digit. For the example, the answer is 07321

Best of LMI Puzzle
Marathon 2015

13		24		4
	11	○		
○			○	
			1	○
8	○	18		

○	○	○	○	○
---	---	---	---	---

13	12	24	25	4
14	11	23	5	3
10	15	6	22	2
9	7	16	1	21
8	17	18	19	20

○	○	○	○	○
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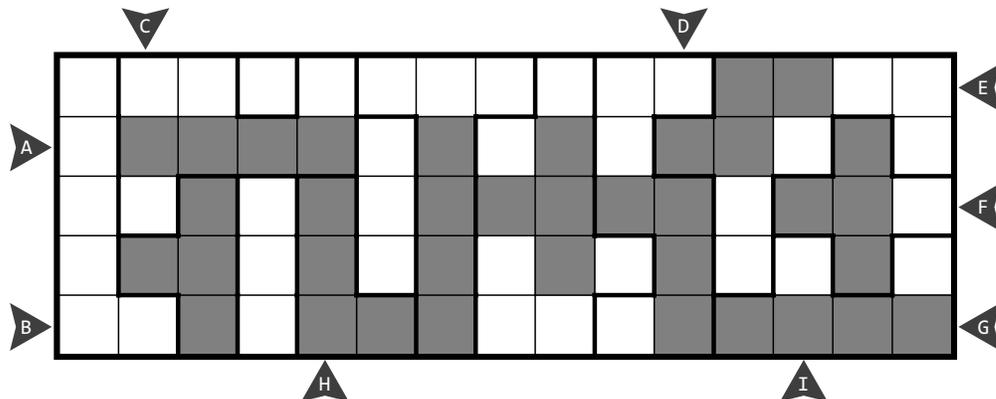
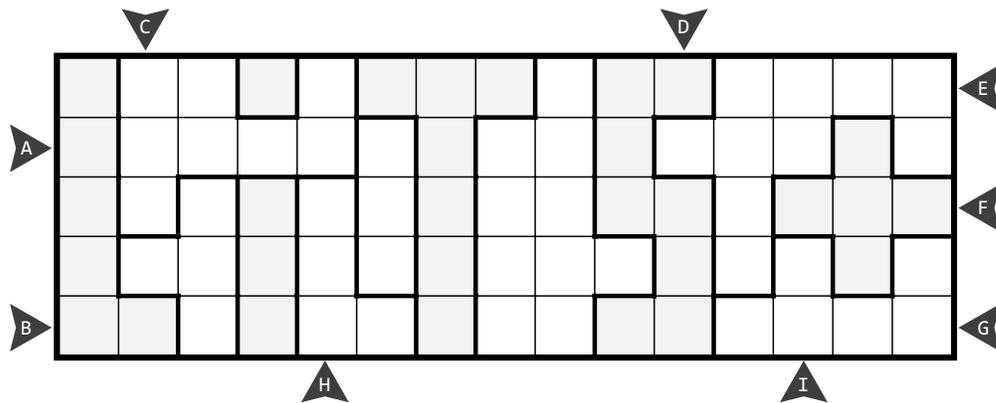
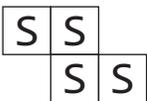
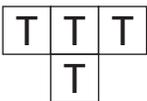
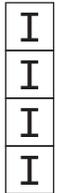


LITS+

Shade exactly four connected cells in some of the outlined regions, to form an L, I, T, or S tetromino. All shaded cells must be connected with each other. No 2 x 2 group of cells can entirely be shaded or remain unshaded. When two tetrominoes in adjacent regions share an edge, they must not be of the same type (L, I, T, or S), regardless of rotations or reflections.

Ignore any lightly shaded cells in the grid. They are used for decoration purpose only.

Answer key: Enter the first three tetrominoes seen from the marked directions. (- if not enough tetrominoes). For the example, the answer key is IIT,TLI,IT-,SL-,S--,TLT,ILI,LI-,ITS





Place digits 1–3 in the grid so that each digit appears five times (two times in the example) in every row and column. Digits in grey cells do not share an edge with a cell containing the same digit. Digits in white cells share an edge with at least one cell containing the same digit. All grey cells are given.

Answer key: Enter the digits in circled cells from left to right. For the example, the answer key is 2221

1					
	3				
		1			
			2		
				3	
					1

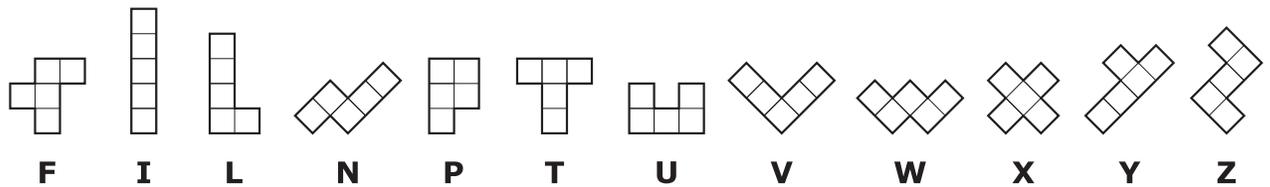


1	3	1	2	2	3
2	3	2	3	1	1
3	2	1	3	1	2
1	1	2	2	3	3
2	1	3	1	3	2
3	2	3	1	2	1



Place some pentominos in the grid so that they don't touch each other, not even diagonally. Pentominos can be rotated or reflected. Pentominos of the same shape may appear at most twice (in the example at most once). Clues in the grid indicate the direction(s) of the closest pentomino(s) when looking from that cell.

Answer key: Enter the first **three** pentominos seen from the marked directions. (– if not enough pentominos). For the example, the answer key is UY-,PLV,PLV,UP-,YVL





Assign one of the three (two in the example) given diagrams to each small grid, such that each diagram is used exactly once in each row/column.

Afterwards, solve each small grid as a Poset Futoshiki. Put a digit between 1-6 (1-3 in the example) to each cell such that every digit appears exactly once in each row / column, and all inequality signs are satisfied. For a small grid, if $x < y$, then in the diagram assigned to it, there is a path from x to y following the arrows.

Additionally, digits separated by a gap (between two adjacent small grids) must be identical.

Answer key: Enter the digit in circled cells from left to right. For the example, the answer key is 2331.

Diagram illustrating the Linked Poset Futoshiki puzzle setup. It shows four 3x3 grids with inequality signs and two poset diagrams. The poset diagrams show nodes 1, 2, 3 with arrows indicating relationships. Below are two 3x3 grids with numbers and inequality signs, and a 3x3 grid with numbers and inequality signs. The answer key is 2331.



Divide the grid into 180° symmetrical regions along the gridlines, so that each cell is part of only one region. Each region must contain exactly one circle, which represents the central symmetry point of the region. All circles are given and all cells must be part of a region.

The shaded cells are not part of any regions; they are used for decorative purpose.

Answer key: For each marked row/column, enter the number of different continuous region segments. If a region is separated by shaded cells or if a region appears multiple times in a row/column, they must be treated differently. For the example, the answer key is : 62,565

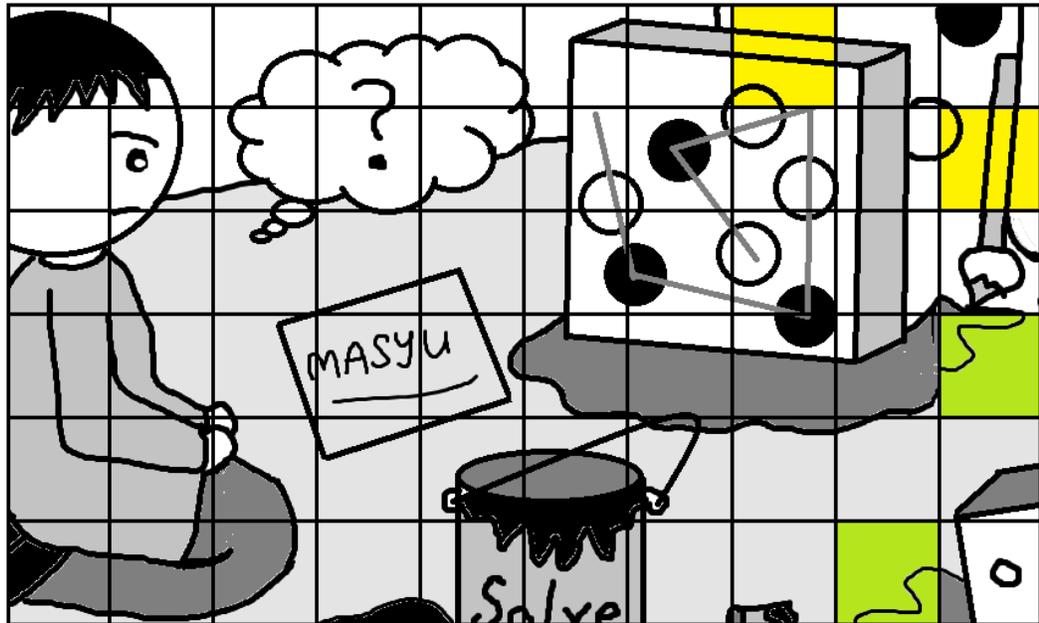
Diagram illustrating the Spiral Galaxy puzzle setup. It shows two 10x10 grids with shaded cells and circles. The grids are divided into regions by gridlines. The answer key is 62,565.



Answer key: For each pair, enter the co-ordinate of any one cell. For the example, the answer key is J2, J4

A B C D E F G H I J

1
2
3
4
5
6



H1
J2

I6
J4