



# MARATHON

**JANUARY 2012 LMI PUZZLE TEST**

**ONE WEEK · MANY PUZZLES · HUGE SIZES**

## 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 slightly 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 week.

## SCORING

Each puzzle is worth 100 points. A correct submission for a puzzle will be awarded with 100 points. Additionally bonus points will be awarded for submitting a puzzle correctly within an hour, 1 point per minute saved (computed upto seconds). Final score for a puzzle will be 100 points + any bonus points – any penalty.

Total score for a player will be computed by summing individual puzzle scores. For players who submit all 10 puzzles correctly, their worst puzzle score will be discarded.

## 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

- 0.5 minutes penalty for each of the first two wrong submissions
- 2 minutes penalty for each of the subsequent wrong submissions

## CONCEPT

Deb Mohanty

Please note that each answer key is of “fixed length”. That means if red warning is displayed while submitting, the submission can never be correct.

## WITH INPUTS FROM

Horvath Zoltan  
Rohan Rao  
Serkan Yurekli

## DIFFICULTY OF THE PUZZLES

Each puzzle can be solved independently of others. So specifying difficulty of puzzles is not important. However, what is important to mention is, no puzzle is extra hard to solve. They are just large in size. The real challenge is to solve the large grid without making mistakes.

## PUZZLE AUTHORS

David Millar  
Deb Mohanty  
Horvath Zoltan  
Prasanna Seshadri  
Serkan Yurekli  
Tom Collyer  
Vladimir Portugalov

## 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) All answer keys follow top to bottom and left to right direction
- 2) If both rows and columns are marked, row answer key need to be entered first
- 3) If any row has a double digit answer for (Tapa, Loop The Loops), only the unit (right-most digit) digit needs to be entered.

## LOGO DESIGN

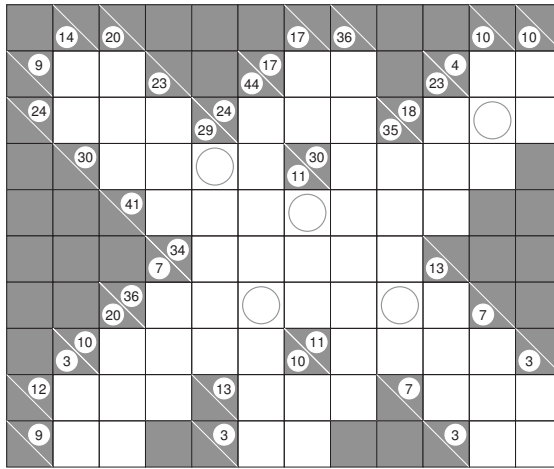
David Millar



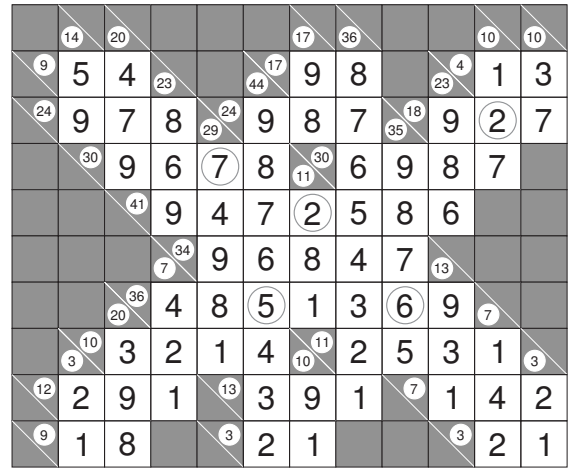
## KAKURO

Place a digit from 1 to 9 in each cell so that the sum of each horizontal/vertical group of cells equals the number given on its left/top. Digits must not repeat within any sum. (Ignore the circles while solving. They are used for answer key purposes only.)

*Answer key: Some columns have one circled cell. Enter the digits in circled cells from left to right. For the example, answer key is 75262*



○ ○ ○ ○ ○



⑦ ⑤ ② ⑥ ②

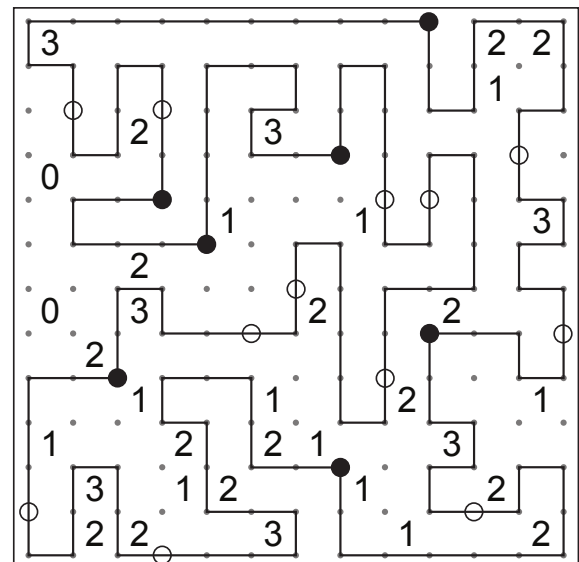
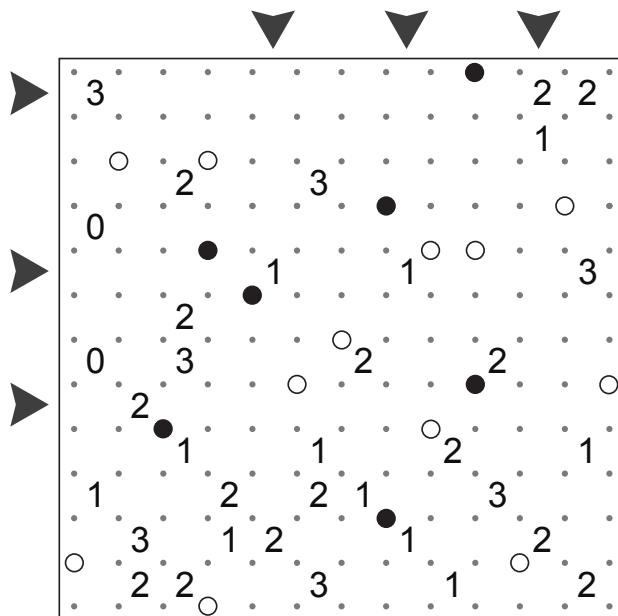


## LOOP THE LOOPS

Draw a single closed loop that connects neighboring dots horizontally or vertically. The loop cannot intersect or overlap with itself. Some numbers appear in the grid as clues; as in a Slitherlink puzzle, a digit indicates exactly how many of its four edges are used by the loop. Some circles (either white or black) also appear in the grid as clues; as in a Masyu puzzle, the loop must pass through all of these circles. When passing through a black circle, the path must make a 90 degree turn and extend at least two dots in both directions. When passing through a white circle, the path must go straight and must turn at least one of the adjacent dots.

*Answer key 1: For each marked row, enter the number of cells of the longest horizontally connected group of cells inside the loop in that row. For the example, answer key is 935*

*Answer key 2: For each marked column, enter the number of cells of the longest vertically connected group of cells inside the loop in that column. For the example, answer key is 137*



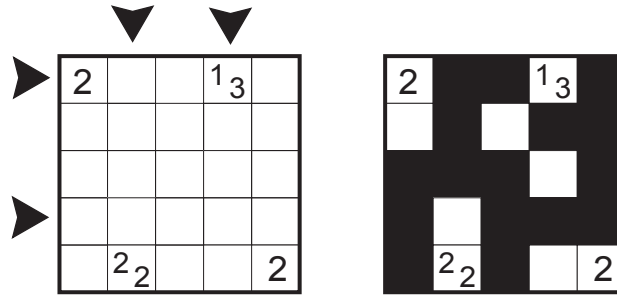


## TAPA

Paint some cells black to create a continuous wall. Number(s) in a cell indicate the length of black cell blocks on its neighbouring cells. If there is more than one number in a cell, there must be at least one white cell between the black cell blocks. No 2X2 square can have all black cells. There is no wall segment on cells containing numbers.

*Answer key 1: Enter the lengths of longest horizontal shaded cell block for the marked rows. For the example answer key is 23*

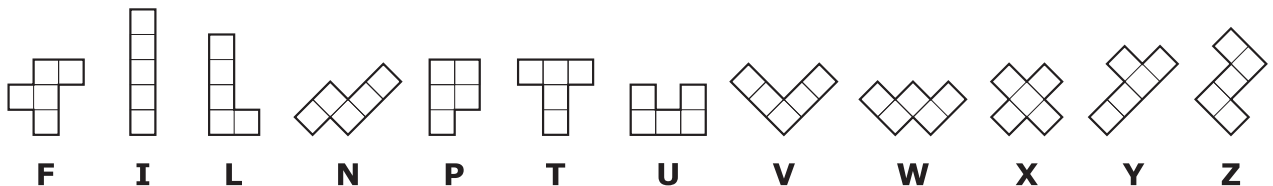
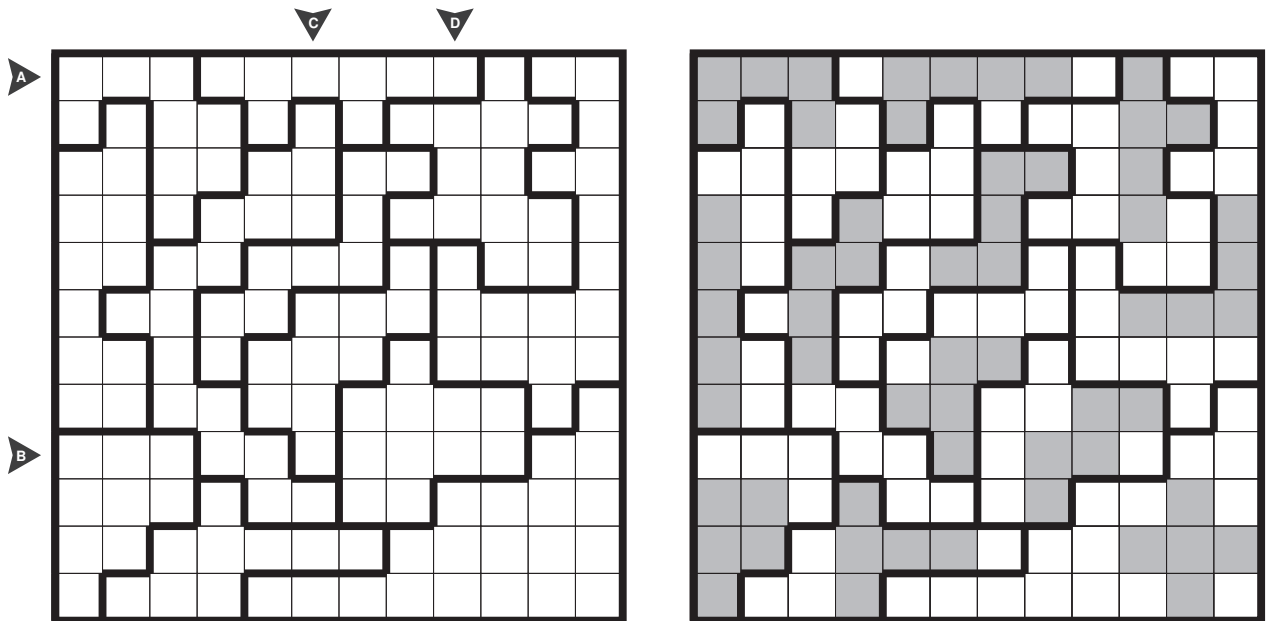
*Answer key 2: Enter the lengths of longest vertical shaded cell block for the marked columns. For the example answer key is 31*



## PENTOMINO AREAS

Place two complete pentomino sets, one in each of the outlined area. Pieces can be rotated and / or reflected, but they cannot touch each other even at a point. (The example uses one set)

*Answer key: Enter the first **three** pentominos seen by the marked arrows. Enter “-” if less than 3 pentominos present. For the example the answer key is ULY, FW-, LZF, W--*

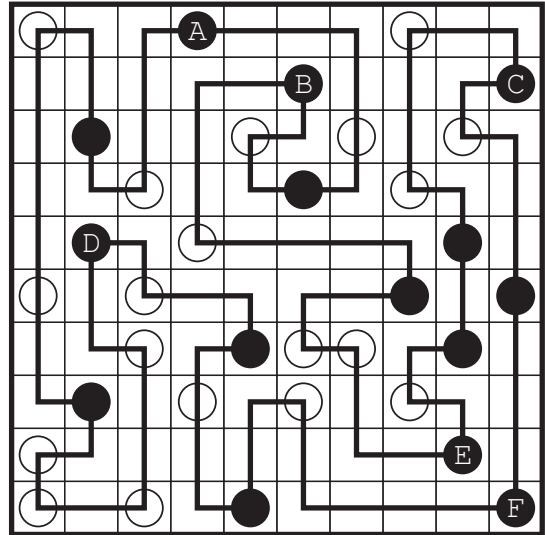
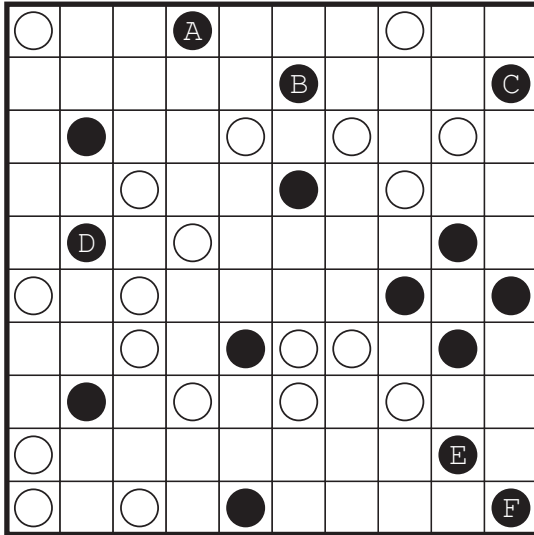




### BLACK AND WHITE LOOP

Draw a loop which passes all cells exactly once. Between two circles with same colour the loop cannot turn. Between 2 circles with different colours, the loop must turn exactly once.

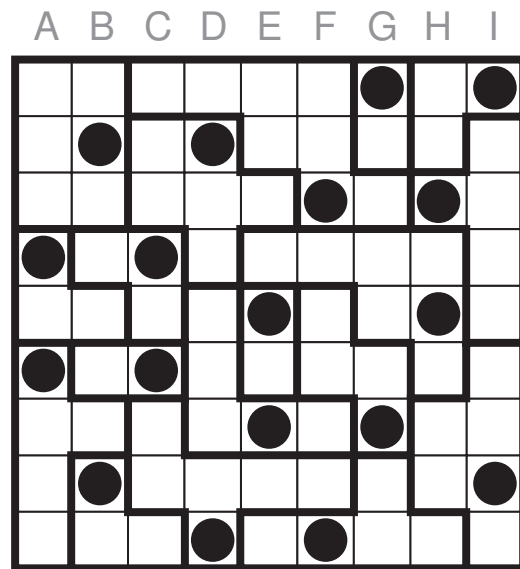
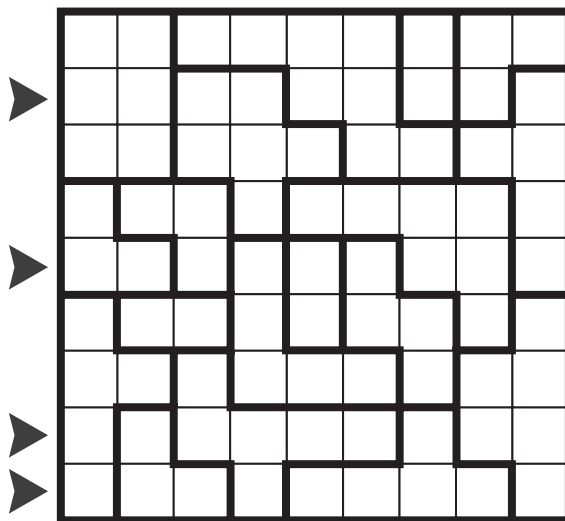
*Answer key : Starting with A and traveling clockwise around the loop, enter the order the letters are visited  
For the example, answer key is ABECFD*



### STAR BATTLE SMALL REGIONS

Mark several cells with stars so that there are 3 stars in each row and column. Stars may not touch each other, not even diagonally. Every outlined region contains exactly one star.  
(The example uses 2 stars per row and column)

*Answer key: Starting from top to bottom, for each marked row, enter the column containing the 2<sup>nd</sup> star in that row. For the example, answer key is DHIF*





# SAMURAI SUDOKU

Place the digits 1 through 9 into the empty cells in the grids so that each digit appears exactly once in each of the rows, columns, and bold outlined regions. In Odd Sudoku, shaded cells have odd digits (13579) only. In Extra Region Sudoku, each digit also appears exactly once in each group of shaded cells. In Diagonal Sudoku, each digit also appears exactly once in each of the marked diagonals. Some 3X3 regions are common to two grids.

*Answer key: Enter the digits (including the givens) along the marked rows.  
For the example, the answer key is 198653274, 728465319, 165938274, 862491735*

**A**

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

Odd

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

Extra Region

**C**

				2	1		
				9		8	
					5	7	

Diagonal

**D**

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

Irregular

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

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

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

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

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



## BRILLE WORD SEARCH

Find all except 2 words in the grid using Braille. Words must be found going across or down, but not diagonally. Words may appear left-to-right or right-to-left, and also top-to-bottom or bottom-to-top. Partial or full letters may overlap.

Answer key 1: Enter the first **three** letters of the missing words in alphabetical order. For the example answer key is BEE, JUJ

Answer key 2: Enter the number of words that use dots in the marked rows. For the example answer key is 21

### Alphabet

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
⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠	⠠



## GRAFFITI SNAKE

Paint some cells black to create walls. The numbers outside the grid indicate the lengths of blackened cell blocks in the corresponding directions, in order; as in a Paint By Number puzzle. If there is more than one blackened block in a row or column, there must be at least one white cell between the blocks. After all black cells are determined, a snake should travel through all the unoccupied cells, moving horizontally or vertically without touching itself, even diagonally. The head and the tail of the snake are given in circles.

Answer key: For each marked row, enter the number of cells in the longest continuous horizontal group belonging to the snake in that row, starting from the top and continuing to the bottom.

For the example, the answer key is 331

1 2

1 1

2 2

▶

▶

4

▶

1 2

1 1

2 2

4



## DIFFERENT NEIGHBOURS

Place the digits 1 through 4 into the empty cells in the grid so that identical digits do not touch each other, not even diagonally. Some cells are span across multiple rows / columns. (Ignore the circles while solving. They are used for answer key purposes only.)

*Answer key: Some columns have one circled cell. Enter the digits in circled cells from left to right. For the example, answer key is 41431*

4			4			2
						○
○		○			○	
				○		
3			3			4

○ ○ ○ ○ ○

4	2		4	1	4	2
3		1	2	1	3	○1
1	2	4	3	4	2	4
○4	3	○1	2	1	○3	1
1	2	4	3	○4	2	4
		1	2		1	3
3	4	3	4	2	4	

○4 ○1 ○4 ○3 ○1

## SOURCES OF EXAMPLES USED IN THIS BOOKLET

- Kakuro – Nikoli Selection 2011 IB
- Loop The Loops – Double Decathlon IB
- Tapa – Puzzle Jackpot IB
- Pentomino Areas – Horvath Zoltan's blog
- Black And White Loop - Horvath Zoltan
- Star Battle Small Regions – World Puzzle Championship 2011 IB
- Samurai Sudoku – Indian Sudoku Championship 2010
- Braille Word Search – David Millar
- Graffiti Snake – Snake Variations Contest 2011
- Different Neighbours – Indian Puzzle Championship 2010