A   N E   2
P   O   T S   0 2
R I L   C   T 4

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Submissions should be sent on the answer page at LMI not later than 23:59 (of India time) April 21 2024

1. SUDOKU WITH MIXED HINTS   5 pt

Apply Classic Sudoku rules. The symbol given between two cells is formed by superimposing the digits from these cells on each other. For making the symbol, the digits may be superimposed from any direction, up/down/left/right/centre, and this has no bearing on the order of digits within the cells.

Example

Solution
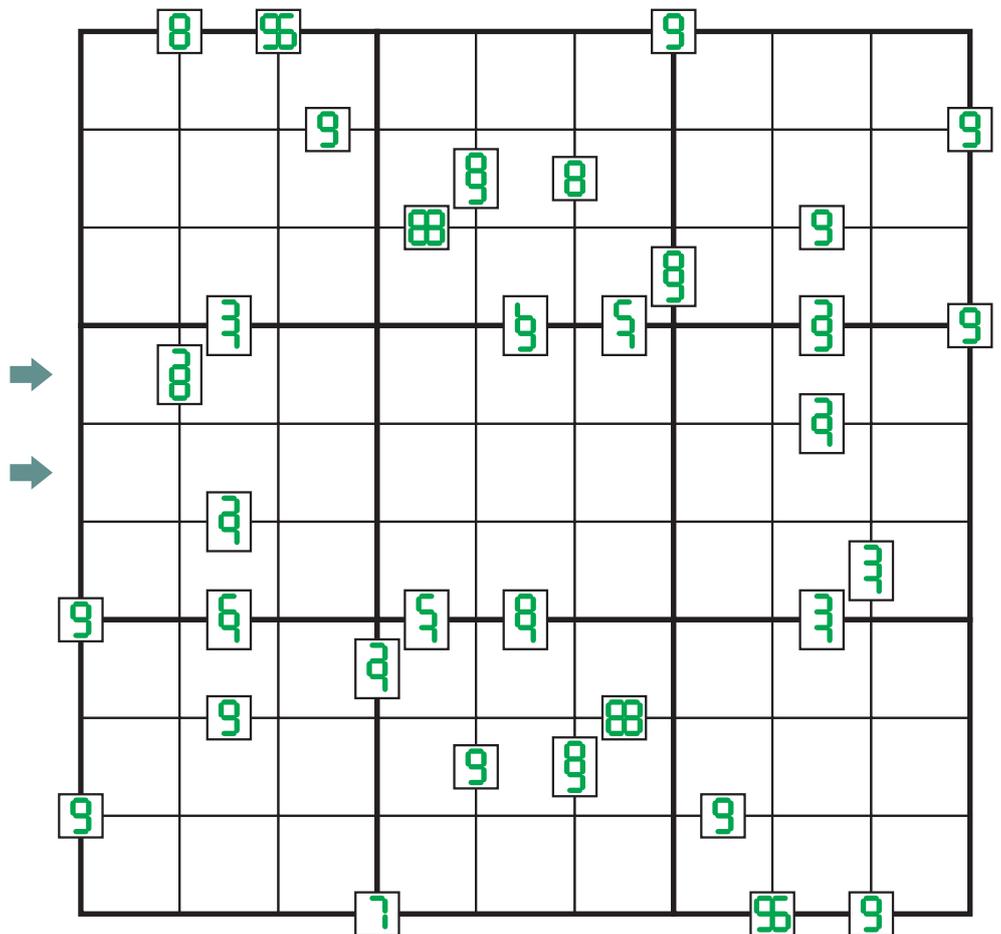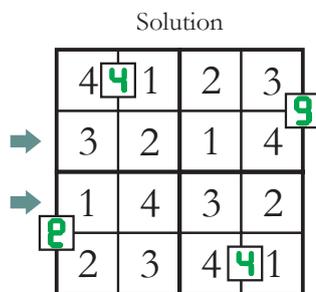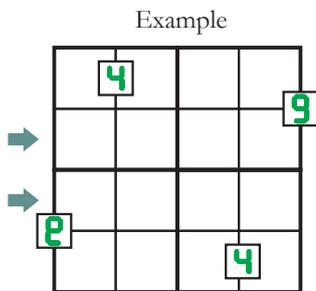
Answer format: Write the content of the marked rows from left to right. For the example: 3214, 1432.

2. LUNAR ARITHMETIC   3 pt

Place the given 5 phases of the Moon in each cell so that they do not repeat in rows and columns. Also, enter the numbers 10, 20, 30, 40 and 50 in each cell so that they do not repeat in rows and columns. A clue outside the grid indicates the sums of numbers in all cells in the direction of the arrow. A number placed with a quarter-moon phase (A or E) counts as 1/4th of the number, while a number placed with a half-moon phase (B or D) counts as half of the number.

Phases of the Moon:

A B C D E
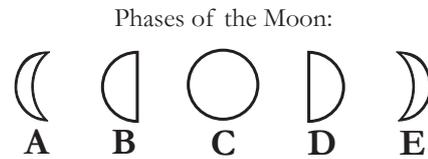
Example
with numbers 10 and 20

Solution

Answer format: Write the content of the marked columns from top to bottom. For the example: E20C10.

3. TOURIST   4 pt

Draw a loop passing through the centers of some white cells. The loop does not touch itself and does not intersect. The loop can turn in 8 directions: N, NE, E, SE, S, SW, W, NW. The directions of the segments that start at the cell centers of the corresponding rows and columns are given outside the grid in alphabetical order. The direction of the loop is to be determined while solving.

NW N NE
W   E
SW S SE
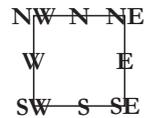
Example

Solution

Answer format: Moving from top to bottom, write the directions of the segments starting from the cell centers of the marked column. Use "-" for empty cell. For the example: SE-SEWW.

4. HYDRA
4 pt

Some cells of the grid are divided diagonally into two triangles, and you have to divide all other cells similarly. In each case, darken only one of the pair of triangles so that the entire dark area is connected (each dark triangle must have at least one segment in common with another dark triangle).

Example

Solution

Types of triangles

A   B   C   D

Answer format: Write the number of right triangles of the type A. For the example: 5.

5. BUTTONS
6 pt

Each thread has its own number from 1 to 16, enter them in the corresponding squares. The number in the circle is equal to the sum of all the numbers on the threads coming from this circle.

Example

Solution

Answer format: Write the numbers in cells A, B, C, D. For the example: 41.

Puzzles 6 and 7 are dedicated to Mikhail Khotiner (1958–2023), whom we friendly called Misha. He was the permanent organizer of the Ukrainian Puzzle and Crossword Championships, in which I participated regularly and had the honour of winning several times.
R.I.P.

6. EASY AS FIRST AND SECOND   5 pt

Fill both grids with the letters M, I, S, H, A so that each row and column contains each letter once. Three cells in each direction will remain empty. Enter a letter into the circles so that they become the given for both grids. A clue outside the left grid represents the first letter seen in the corresponding direction. A clue outside the right grid represents the second letter seen in the corresponding direction.
The circles are highlighted in yellow for expressiveness.

Example with letters L, M, I   Solution
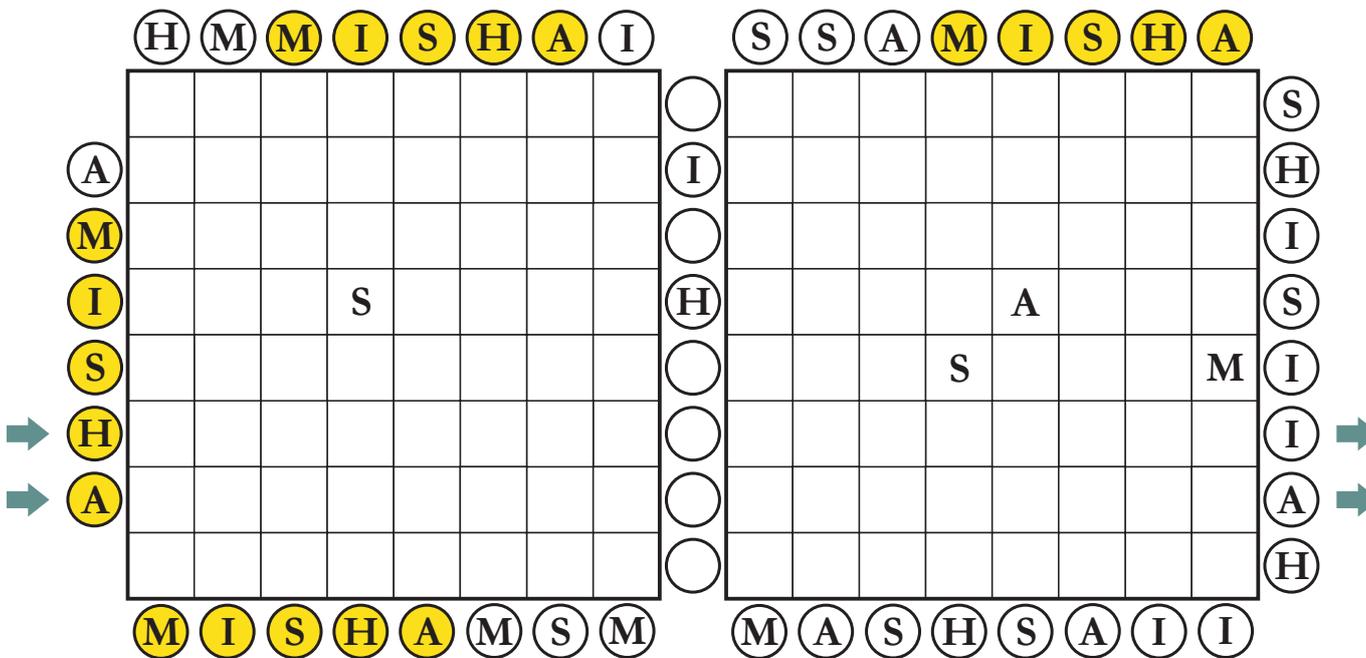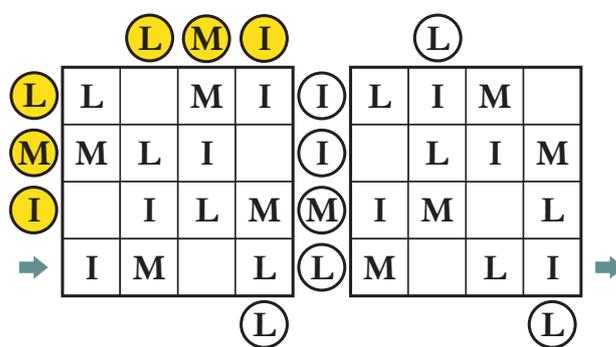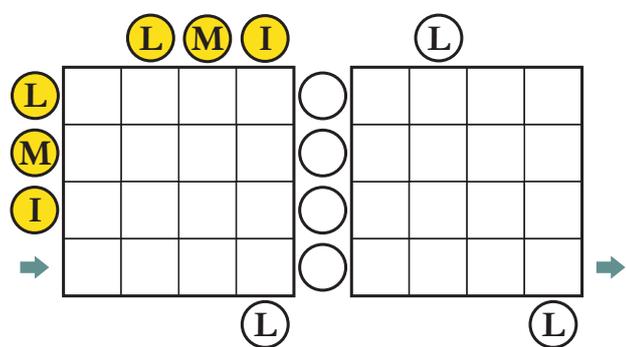
Answer format: Write the content of the marked rows from left to right using "-" for empty cell. For the example: IM-LM-LI.

7. ASSORTED ENCRYPTION   6 + 6 pt

Solve the puzzles Battleships and Pentominoes. The letters A, H, I, K, L, M and S each represent a different digits from 1 to 7.

A. Battleships: Place the given set of ships into the white cells of the grid. Ships cannot touch each other, not even diagonally. Some ship segments are given. Clues outside the grid show the number of cells occupied by ships in the corresponding direction.

B. Pentominoes: Place the 12 given pentominoes in the white cells of the grid. Pentominoes can be rotated and reflected. They cannot touch each other, not even diagonally. Digits outside the grid show the number of cells occupied by pentaminoes in the corresponding rows and columns.

7A
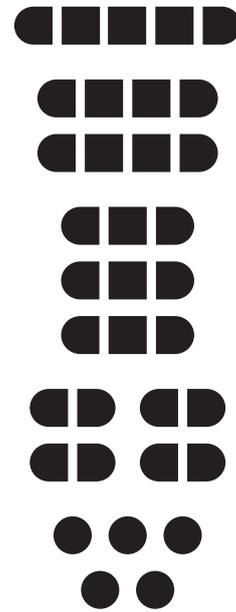
Answer format: Write the content of the marked diagonal from top to bottom. Use B for the cell occupied by the ship and "-" for each other cell.

7B

Answer format: Write the content of the marked columns from top to bottom. For the cell occupied by the pentomino, use the corresponding letter. Use "-" for each other cell.

8. BUILD A CROSSWORD   7 pt

Blacken some cells in the grid. White cells should form a single interconnected area. Digits outside the grid show the lengths of all continuous blocks of white cells in corresponding directions, but not necessarily in order. There should be at least one black cell between two white blocks. The sign "?" means any positive digit. Place all words from the list into the grid such that all white cells have one letter each. Words should read from left to right, or top to bottom. Each word intersects by at least two others. Words cannot be repeated and no other words should be formed in a crossword.

Example

BUS
BUTTY
DEB
EICHT
NEB
OBEAH
PIN
POD
STYLE
TIL
TRIBE

Solution

B	U	S		P	O	D
U		T	R	I	B	E
T		Y		N	E	B
T	I	L			A	
Y		E	I	G	H	T

Word list:

AET
ANDREY
ARIMATSU
ATTILA
DAVE
EWELINA
HUDAK
HUGO
INNA
IRINA
JAAN
JIAQI
JOSEPH
KAAS
KEN
KONSTANTIN
KWAK
LI
LIANE
MANEA
MCMILLAN
MIROSLAV
MURAT
NAOKI
NATAR
NEIL
NELLY
NIKOLA
RAKESH
RENDI
RICK
SWAGATAM
TAIGO
TANTAN
TAURI
TAWAN
VIRGI
YUKA
ZOLBAYAR

Answer format: Write the content of the marked row from left to right and column from top to bottom. Use "-" for the black cell. For the example: TIL--A-, U--I-.

9. KAKURO WITH STARS

12 pt

Fill the grid with digits 1–9 and stars. In each block of white cells, the digits are not repeated. Numbers in the black cells show the sum of the digits in the corresponding white blocks. There should be 3 stars in each row and in each column. The cells with stars cannot touch each other, not even diagonally.

Example with 1 star

Solution

Answer format: Write the content of the marked rows from left to right. Use S for star and ignore black cells. For the example: 89S, S164.

10. BY COMPASS

Fill the 7 x 7 grid with digits from 1 to 7 so that each row and column contains each digit once. Then draw various separate loops passing through the centers of some cells that do not touch or intersect themselves. A loop can turn in 8 directions as shown below. For each row, write 1 or 2 possible directions of the segments that start from the centers of cells of the corresponding row. These clues count only if the loop "stops" in a cell of that row, in which case it must continue only in one of the directions written, and travel a length of N cells (where N is the digit in the cell of the turn) before the next "stop". Considering that any loop is a polygon, you get P points where P is the number of sides of the polygon. Maximize the sum of points.

NW N NE
W   E
SW S SE

	A	B	C	D	E	F	G	
								H
								I
								J
								K
								L
								M
								N

Example

		A	B	C	D	E	
E	SE	5	1	2	3	4	F
S	W	4	5	3	2	1	G
S		1	3	5	4	2	H
SE		3	2	4	1	5	I
N	W	2	4	1	5	3	J

P=5

		A	B	C	D	E	
E	SE	5	1	2	3	4	F
S	W	4	5	3	2	1	G
S		1	3	5	4	2	H
SE		3	2	4	1	5	I
N	W	2	4	1	5	3	J

P=4

		A	B	C	D	E	
E	SE	5	1	2	3	4	F
S	W	4	5	3	2	1	G
S		1	3	5	4	2	H
SE		3	2	4	1	5	I
N	W	2	4	1	5	3	J

P=4
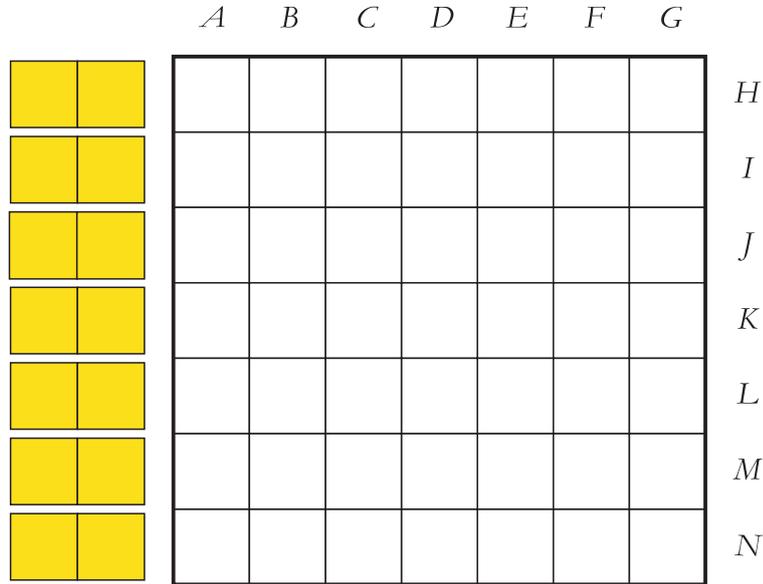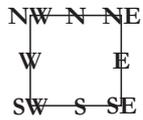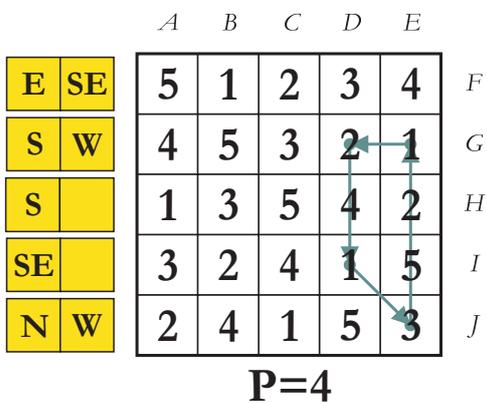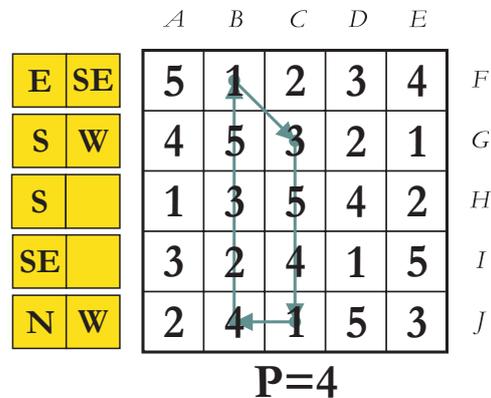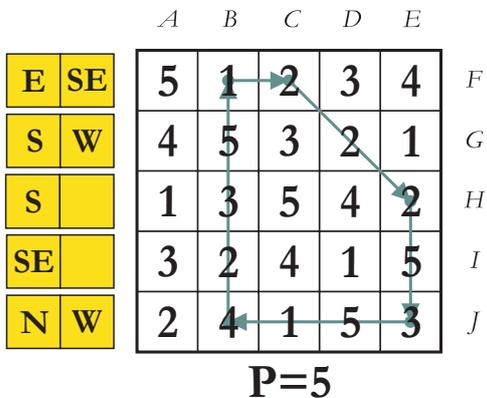
Such a construction of 5 segments is a quadrilateral and will give 4 points
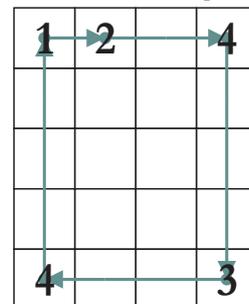
Answer format: Write the sum, then describe the grid line by line from left to right and the P-gons using the starting coordinate and directions. For the example: 13, E/SE 51234, S/W 45321, S/- 13542, SE/- 32415, N/W 24153, 5: BF-E-SE-S-W-N, 4: BF-SE-S-W-N, 4: EG-W-S-SE-N.
Only polygons declared by the participant will be checked.

11. EASY AS OPTI
14, 11, 8, 5, 2 pt for best solutions

Create an Easy as First and Second puzzle with a unique solution. Its rules: Fill both 6 x 6 grids with the digits 1, 2, 3, 4 so that each row and column contains each digit once. Two cells in each direction will remain empty. In some circles, enter a number. Some of them will be the given for both grids. A clue outside the left grid represents the first letter seen in the corresponding direction. A clue outside the right grid represents the second letter seen in the corresponding direction.

Digits may be given in cells within the grids too. Minimize the expression C + 5S, where C is the sum of all the digits in the circles, and S is the sum of all the given digits in the squares.

Example

Solution

$C=24$
$S=0$

Answer format: Write the value of the expression C + 5S, then describe both grids line by line from left to right. Use "-" for empty cell. For the example: 24, -123-1--, 1----3-----, 2----3-----, 3----2-----, ----1-----, ---1---1.

12. COUNTING NAMES
14, 12, 10, 8, 6, 4, 2 pt for best solutions

Create a crossword – put some of the given puzzlers names into the 10 x 10 grid. Words should read from left to right, or top to bottom. Each name should intersect with at least one other. Words cannot be repeated. No other words should be formed in a crossword. Blacken unused cells. Then give all the letters one of the specified numeric values (for example, the letters D in some cases can be replaced by 10, and in others by 19). Calculate the sums of all the numbers in the cells of each row and column and write them in ovals. Maximize the expression S - B*(R - r)*(C - c), where S is the sum of all the numbers in the ovals, B is the total number of black cells, R and C are the maximum numbers in the ovals of rows and columns, r and c are the minimum, respectively.

Example

A	D	A	M
R	■	N	■
T	A	N	A
■	■	E	■

14	10	14	11	49
12	■	14	■	26
9	14	14	14	51
■	■	8	■	8

35 24 50 25

S=268, B=5, R=51,
r=8, C=50, c=24
268-5*(51-8)*(50-24)=-5322

Letter	Outlines	Numeric values
A	𝐀	14
B	𝐁 𝐁 𝐁	3/8/13
C	𝐆	6
D	𝐃 𝐃	10/19
E	𝐄	8
F	𝐅 𝐅	7/12
G	𝐆 𝐆	6/9
H	𝐇	14

I	I	1
J	J	9
K	K	16
L	L	1
M	M	11
N	N	14
O	O	0
P	P	10
Q	Q	2

R	R	12
S	S S S	5/6/9
T	T T T	1/7/9
U	U U	4/11
V	V	11
W	W	24
X	X X	7/11
Y	Y	4
Z	Z Z Z	2/3/8

ADAM
ADEM
ALBERTO
ANDREA
ANDREW
ANDREY
ANNE
ANURAG
ARNAUD
ART
AUBIN
BEATRICE
BRANKO
CHENXIU
CHERYL
CHRISTIAN
CONNOR
DEB
DENIS
DESIREE
DMITRY
DUC
EDOUARD
EVGENII
FABIEN
FERNANDO
FRANCOIS
FRIEDHELM
GARANCE
GIORGIA

GLIPERAL
HARMEET
HARRISON
HARSH
HIDEAKI
HOWARD
HUGO
HYUNMO
JAN
JEANBAPTISTE
JEFFREY
JELENA
JUDYTA
KAJA
KARTAL
KAZUYA
KEN
KOTA
LENNART
LIN
LIONEL
LUKASZ
MARTIN
MERLIJN
MICHAEL
NALEKIM
NAOKI
NGUYEN
NICOLAS
NIKOLA

OLGA
OLIVIER
PAUL
PHILIPPE
PRASANNA
RAKESH
REINIER
RIAD
RICARDO
RUBEN
SEOK

SERHII
SHINICHI
STEFANO
SWAGATAM
TAIGO
TANA
TAWAN
TIM
TIPHANIE
TIRALMO
TOMASZ

VALENTIN
VALERIE
VERONIKA
VLADIMIR
VOID
WOUTER
YOSHIAP
YUNGUOWOO
ZOLTAN

Answer format: Write the value of the expression S - B*(R - r)*(C - c) and describe the letter grid line by line from left to right, using "-" for black cell. Then describe the numeric grid. For the example: -5322, ADAM, R-N-, TANA, --E-, 14/10/14/11/49, 12/-/14/-/26, 9/14/14/14/51, -/-/8/-/8, 35/24/50/25.