

WPF PUZZLE GP 2022 COMPETITION BOOKLET

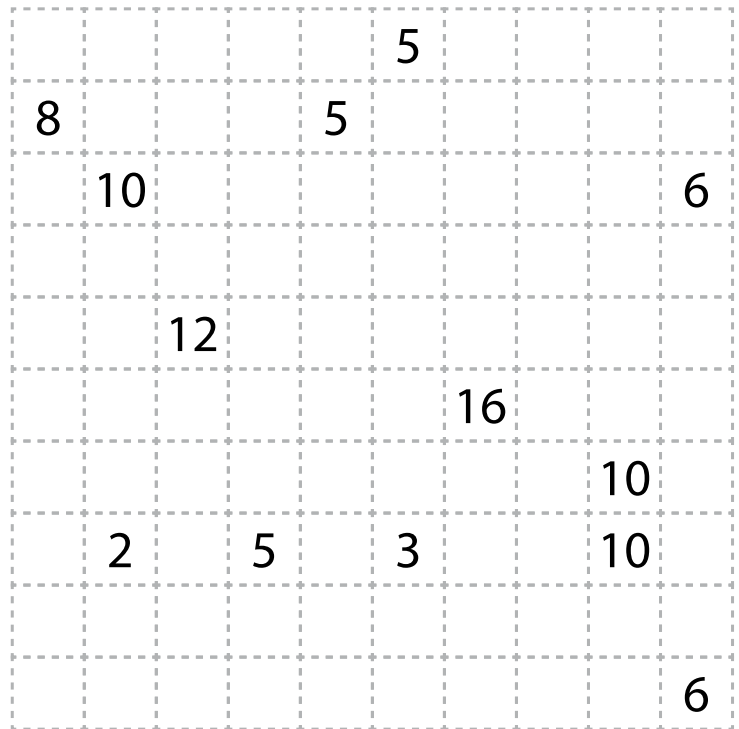
Host Country: Bulgaria

Deyan Razsadov

Special Notes: An earlier version of the instruction booklet was missing the small letters in the cipher puzzles (4, 10, 14), and the title page erroneously stated the round number as "X". These have now been fixed.

1. Cave (34 points)

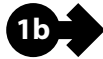
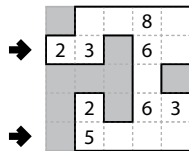
Shade some cells to leave behind a single orthogonally-connected group—the cave—with no shaded cells enclosed within the cave. In other words, all shaded cells must be connected edge-wise by other shaded cells to an edge of the grid. All numbered cells must be a part of the cave (and therefore not shaded). Each number indicates the total count of non-shaded cells connected in line vertically and horizontally to the numbered cell *including the cell itself*.



Answer: For each designated row, enter its contents. Use O for an (unshaded) cell occupied by the cave and X for a (shaded) cell not occupied by the cave. You may use two other letters or numbers, as long as they are distinct.

Example Answer:

OOXOO, XOOOO

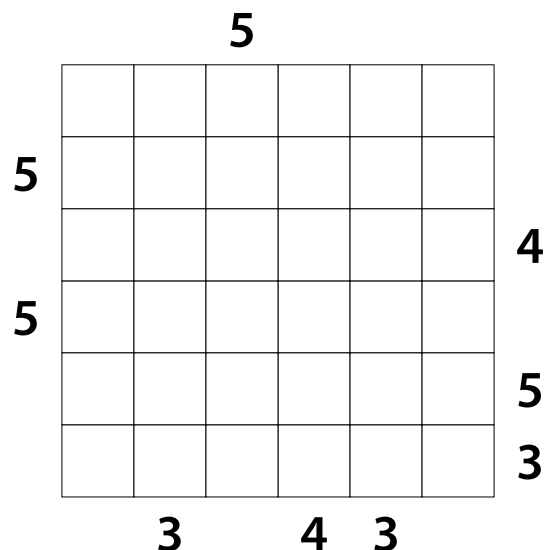
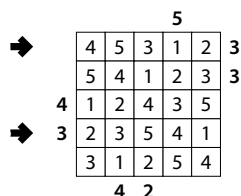


2. Skyscrapers (23 points)

Place a number from 1 to X (integers only) into each cell so that each number appears exactly once in each row and column. (X is the number of cells in each row.) Each number represents a skyscraper of its respective height. The numbers outside the grid indicate how many skyscrapers can be seen in the respective row or column from the respective direction; smaller skyscrapers are hidden behind higher ones. Some numbers may already be filled in for you.

Answer: For each designated row, enter its contents from left to right. Do *not* include any numbers outside the grid.

Example Answer: 45312, 23541



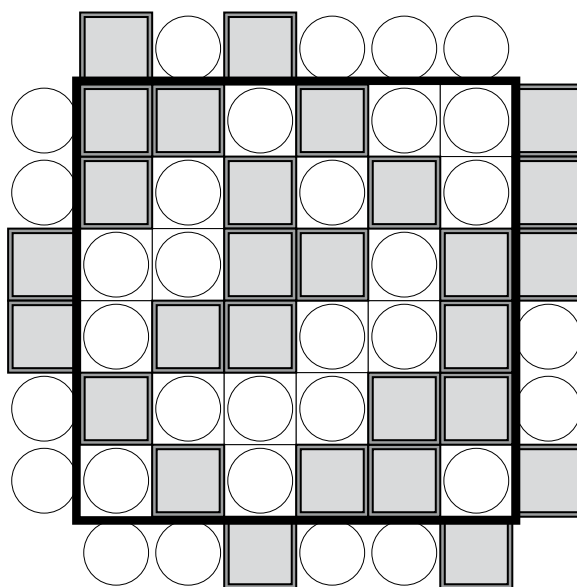
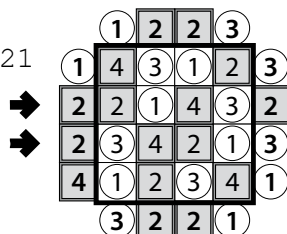
3. Skyscrapers (Even/Odd) (35 points)

Place a number from 1 to X (integers only) into each cell so that each number appears exactly once in each row and column. (X is the number of cells in each row.) Each number represents a skyscraper of its respective height. The numbers outside the grid indicate how many skyscrapers can be seen in the respective row or column from the respective direction; smaller skyscrapers are hidden behind higher ones. Some numbers may already be filled in for you.

A gray-shaded square inside a cell or outside the grid indicates an even number; a circle inside a cell or outside the grid indicates an odd number.

Answer: For each designated row, enter its contents from left to right. Do *not* include any numbers outside the grid.

Example Answer: 2143, 3421



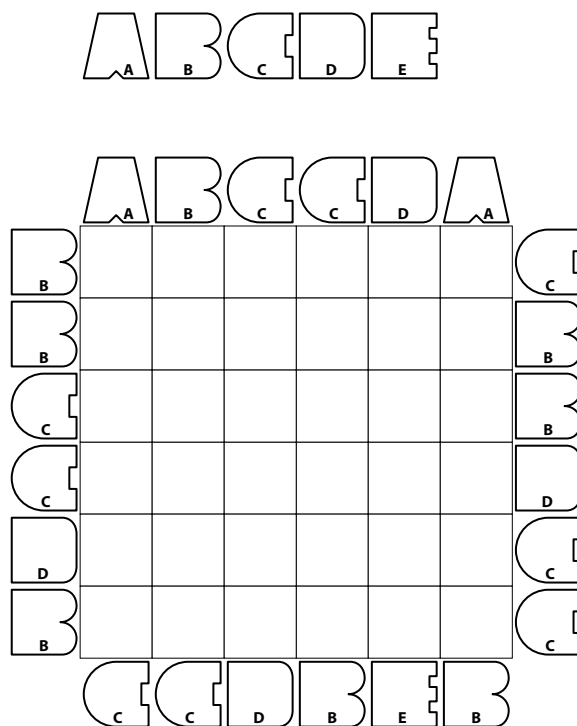
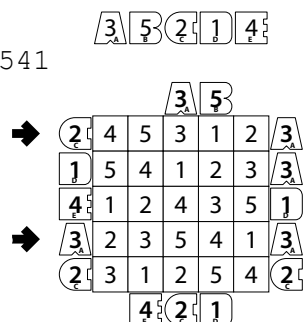
4. Skyscrapers (Cipher) (33 points)

Place a number from 1 to X (integers only) into each cell so that each number appears exactly once in each row and column. (X is the number of cells in each row.) Each number represents a skyscraper of its respective height. The (encoded) numbers outside the grid indicate how many skyscrapers can be seen in the respective row or column from the respective direction; smaller skyscrapers are hidden behind higher ones. Some numbers may already be filled in for you.

Each digit has been encoded to a different (letter-like) shape, and each shape stands for a different digit. The mapping has not been supplied for you. Multi-digit numbers do not start with 0. A list of shapes is provided for your solving convenience.

Answer: For each designated row, enter its contents (as numbers). Do *not* include any numbers outside the grid.

Example Answer: 45312, 23541





7. Pentomino (Tapa) (27 points)

Shade some cells black so that the black cells form the shapes of twelve different pentominoes. Each pentomino shape is used exactly once, but can be rotated or reflected. Pentominoes cannot touch along edges, but may touch at corners.

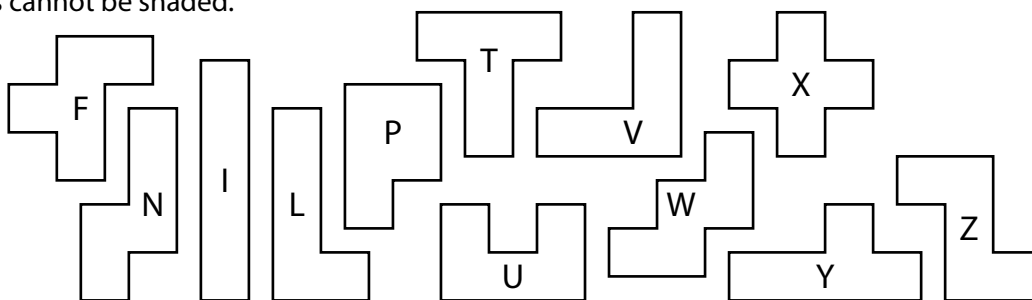
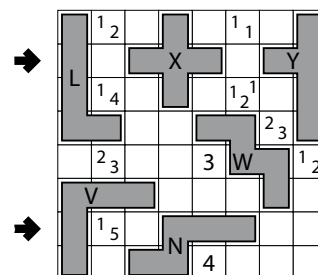
Numbers in a cell indicate the lengths of contiguous black cell groups along the "ring" of 8 cells touching that cell (fewer for cells along the outside edge). If there is more than one number in a cell, then there must be at least one white (unshaded) cell between the black cell groups. The numbers are given in *no particular order*. As a special case, if the number given in a cell is a zero (0), it means that none of the cells around that cell can be shaded black.

Cells with numbers cannot be shaded.

The example puzzle, unlike the competition puzzle, does not use a full set of pentominoes.

Answer: For each designated row, enter the letter for each pentomino that appears in that row, from left to right. Within a row, if a pentomino occupies more than one cell, only enter that pentomino's letter once. If there are no pentominoes in that row, enter a single letter 'A'.

Example Answer: LX^Y, VN



7a →

							1 ₁ 1 ₁				
					1 ₃ 1 ₁						
			1 ₃ 1 ₁				3 ₃				
	1 ₄										
								3 ₃			
		1 ₂									
									1 ₁		
			2					2 ₄			
						2					
				5							

7b →

8. Pentomino (Battleship) (44 points)

Shade some cells black so that the black cells form the shapes of twelve different pentominoes. Each pentomino shape is used exactly once, but can be rotated or reflected. Pentominoes cannot touch along edges or corners.

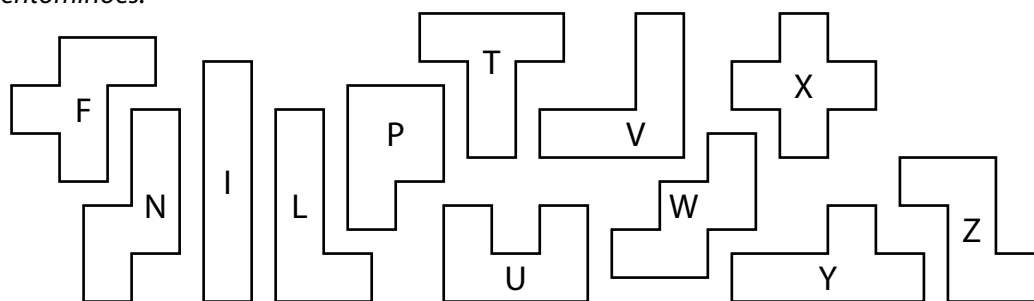
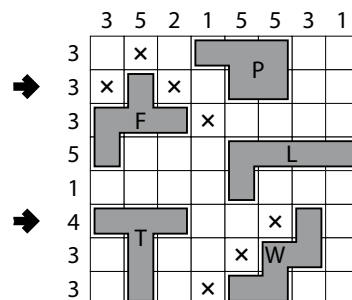
The contents of some cells are given for you. A cross in a cell indicates that no pentomino uses that cell.

Each number to the top and left of the grid reveals the number of cells in that row or column that are used by a pentomino (including any that might be given for you).

The example puzzle, unlike the competition puzzle, does not use a full set of pentominoes.

Answer: For each designated row, enter the letter for each pentomino that appears in that row, from left to right. Within a row, if a pentomino occupies more than one cell, only enter that pentomino's letter once. If there are no pentominoes in that row, enter a single letter 'A'.

Example Answer: FP, TW



4 8 4 3 8 3 5 4 5 6 6 4

8a →

7											x	
4		x				x				x		
3	x				x		x		x			x
6				x				x				x
4		x	x					x			x	
6		x		x			x					
1						x				x		
8					x				x			
5		x			x				x			
3	x			x			x		x	x		
8b →	7			x				x			x	
6							x					

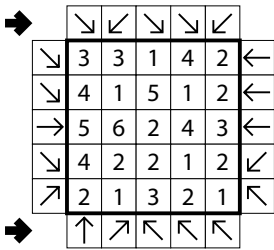


9. Arrows (25 points)

Draw an arrow in each of the empty cells outside the main grid. Each arrow must point in one of the eight standard directions, and must point to at least one cell in the main grid (inside the thick outline). Each numbered cell must be pointed at by exactly that number of arrows.

Answer: The contents of indicated rows, from left to right. Use 'A' for an arrow pointing diagonally left, a 'B' for an arrow pointing orthogonally, and 'C' for an arrow pointing diagonally right. Alternatively, you may use any three characters instead of 'ABC', as long as they are distinct.

Example Answer: CACCA, BCAAA



10. Arrows (Cipher) (96 points)

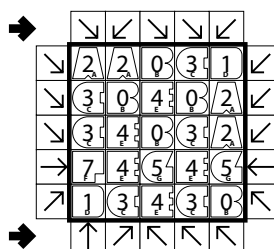
Draw an arrow in each of the empty cells outside the main grid. Each arrow must point in one of the eight standard directions, and must point to at least one cell in the main grid (inside the thick outline). Each numbered cell must be pointed at by exactly that number of arrows.

Each digit has been encoded to a different (letter-like) shape, and each shape stands for a different digit. The mapping has not been supplied for you. Multi-digit numbers do not start with 0. A list of shapes is provided for your solving convenience.

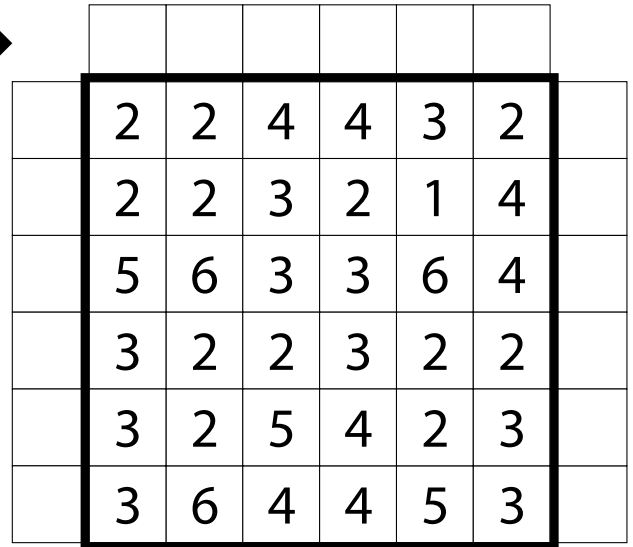
Answer: The contents of indicated rows, from left to right. Use 'A' for an arrow pointing diagonally left, a 'B' for an arrow pointing orthogonally, and 'C' for an arrow pointing diagonally right. Alternatively, you may use any three characters instead of 'ABC', as long as they are distinct.

Example Answer: CACCA, BCAAA

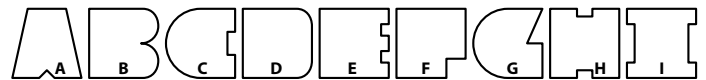
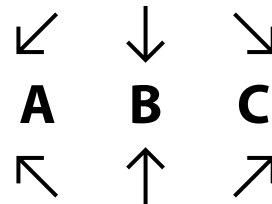
2 0 3 1 4 7 5



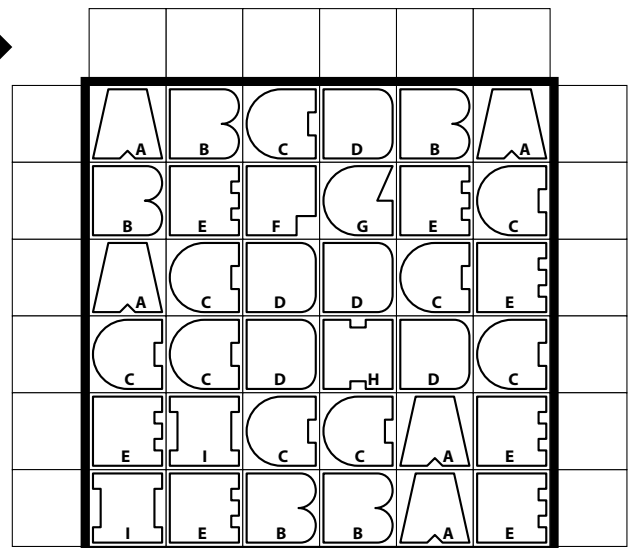
9a



9b



10a



10b



14. Japanese Sums (Cipher) (127 points)

Place a number from the specified list into some cells so that no number appears more than once in each row or column. Cells may remain empty. Numbers outside the grid indicate all sums of continuous groups of numbers (including "sums" of a single number) along that row or column, in positional order. These groups are separated by empty cells. A question mark (?) indicates an unspecified (but non-zero) sum. Some cells might be marked with a cross; do not put any numbers into those cells.

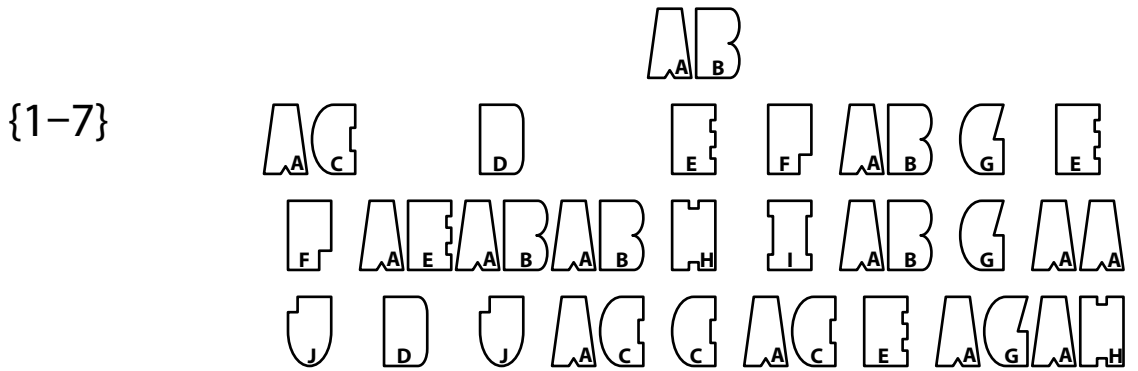
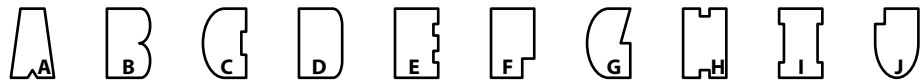
Each digit has been encoded to a different (letter-like) shape, and each shape stands for a different digit. The mapping has not been supplied for you. Multi-digit numbers do not start with 0. A list of shapes is provided for your solving convenience.

Answer: For each designated row, enter its contents, using 'x' for an empty cell. Do not include any numbers outside the grid.

Example Answer: X7615, 5X467

A B C D E F G H I J

		A B	C	
(1-7)	B B	?	?	2
7	C	3	4	7
7	B	7	6	1
7	B	7	1	x
7	B	1	2	7
5	B	5	4	6



G	I	I	I						
	A	J	A	J		X			
C	H	A	A	G					
	F	F	F				X		
H	I	A	A	C		X			
	A	C	A	C			X		
	I	I	I						
G	I	G	G						
		H	F						

14a →

14b →

15. Magnets (49 points)

Locate some magnets in the grid. A magnet is two square cells that touch along an edge; one cell must be marked with only a "positive" (+) symbol and the other cell must be marked with only a "negative" (-) symbol. Cells that share an edge cannot contain the same symbol.

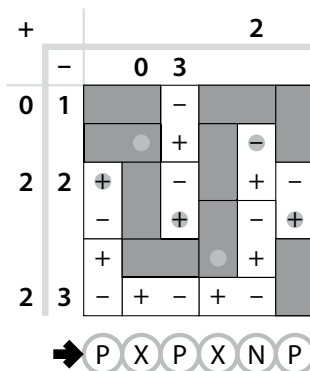
The grid is divided into regions; each region has an area of 2 cells. (Note that region borders are drawn and cell borders are not). Each region either fully contains a magnet or is left empty.

The numbers above and to the left of the grid indicate the exact number of symbols of the specified type that must be placed in each column or row, respectively. If a number is not given, there might be any number of symbols of the specified type

The dots in cells are only used for entering your answer.

Answer: Enter the contents of each dotted cell, reading the dots from left to right. (Ignore which row the dots are in.) Use 'P' for a "positive" (+) symbol, 'N' for a "negative" (-) symbol, and 'X' for an empty cell. Alternatively, you may use any three characters instead of 'PNX', as long as they are distinct.

Example Answer: PXPXNP



	+		4	3	2	2	4	4	3	2	5	4
	-	4	3	3	3	3	3	3	3	3	3	5
4	4				●				●			●
4	5											
2	3											
3	3											
3	1											
3	4					●						
4	2										●	
2	3	●	●	●					●			
4	4						●					
4	4											

15 → ○ ○ ○ ○ ○ ○ ○ ○ ○ ○



16. Magnets (Regions) (90 points)

Locate some magnets in the grid. A magnet is two square cells that touch along an edge; one cell must be marked with only a "positive" (+) symbol and the other cell must be marked with only a "negative" (-) symbol. Cells that share an edge cannot contain the same symbol.

The grid is divided into regions. Every magnet must be fully within some region (but a single region may contain any number of magnets, including zero). No cell belongs to more than one magnet (that is, magnets must not overlap).

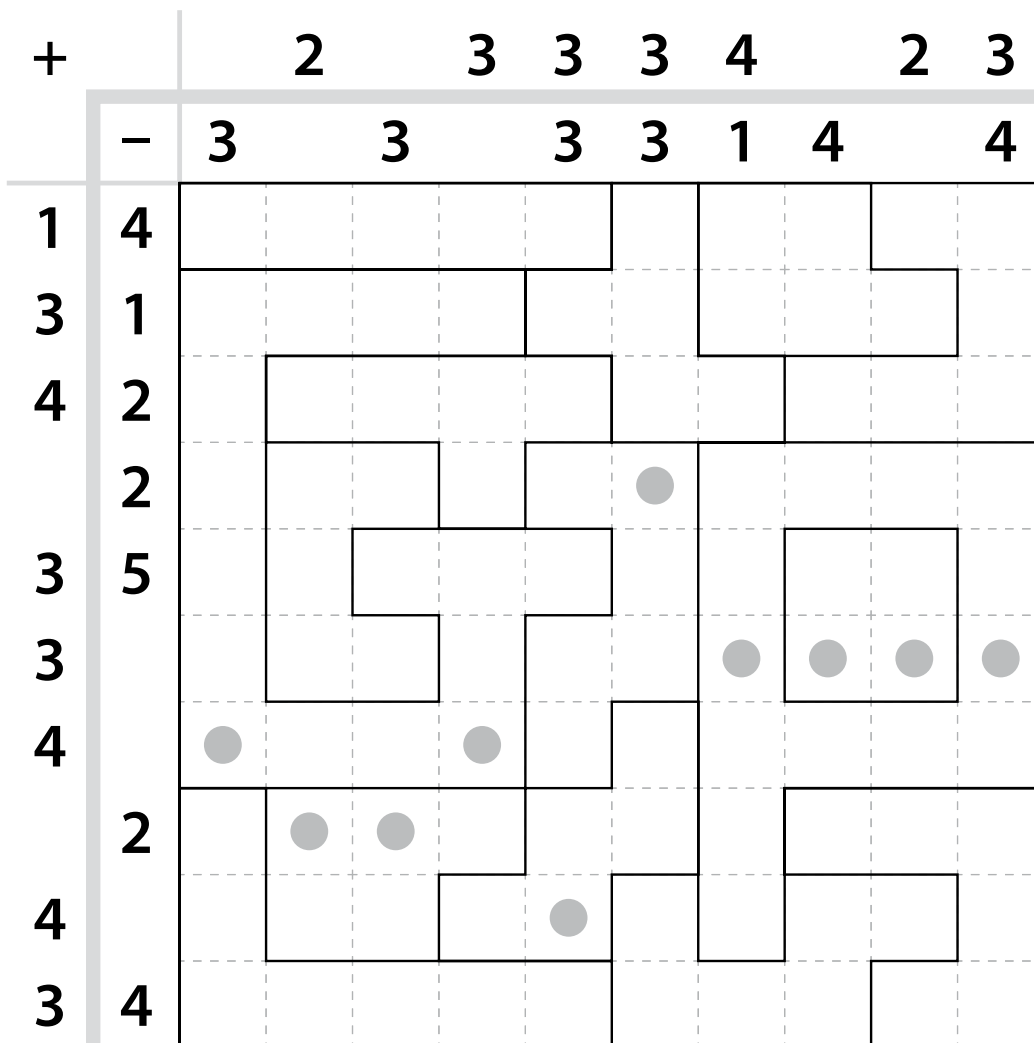
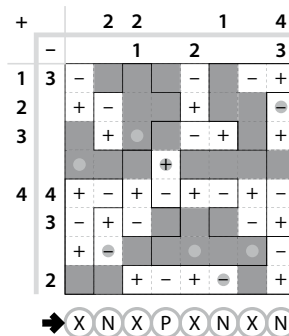
The numbers above and to the left of the grid indicate the exact number of symbols of the specified type that must be placed in each column or row, respectively. If a number is not given, there might be any number of symbols of the specified type.

The dots in cells are only used for entering your answer.

Answer: Enter the contents of each dotted cell, reading the dots from left to right. (Ignore which row the dots are in.) Use 'P' for a "positive" (+) symbol, 'N' for a "negative" (-) symbol, and 'X' for a domino with no symbol. Alternatively, you may use any three characters instead of 'PNX', as long as they are distinct.

Example Answer:

XNXPXNXN



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ROUND 8



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