

WPF PUZZLE GP 2020 COMPETITION BOOKLET

Host Country: France

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Special Notes: None.

1-2. Arithmetic Square (12, 27 points)

Place the numbers from 1 to 9 into the cells (a different single number in each cell) so that the indicated equations/relations are correct. Evaluate from left-to-right and top-to-bottom (ignore the usual precedence of the operators).

It is possible for expressions and partial expressions to be negative or non-integral.

Answer: For each designated row, enter the contents of the cells, in order from left to right.

Example Answer:

987, 643, 521

$$\begin{array}{l} \rightarrow \begin{array}{c} \boxed{9} + \boxed{8} + \boxed{7} > 23 \\ + \quad - \quad + \end{array} \\ \rightarrow \begin{array}{c} \boxed{6} \times \boxed{4} \div \boxed{3} = 8 \\ \times \quad \times \quad - \end{array} \\ \rightarrow \begin{array}{c} \boxed{5} \times \boxed{2} + \boxed{1} = 11 \\ = \quad = \quad = \\ 75 \quad 8 \quad 9 \end{array} \end{array}$$

$$\begin{array}{l} \text{1a} \rightarrow \begin{array}{c} \boxed{} - \boxed{} - \boxed{} = 0 \\ + \qquad \qquad \div \end{array} \\ \text{1b} \rightarrow \begin{array}{c} \boxed{} \quad \boxed{} \quad \boxed{} \\ + \qquad \qquad \div \end{array} \\ \text{1c} \rightarrow \begin{array}{c} \boxed{} \times \boxed{} \times \boxed{} = 36 \\ = \qquad \qquad = \\ 20 \qquad \qquad 1 \end{array} \end{array}$$

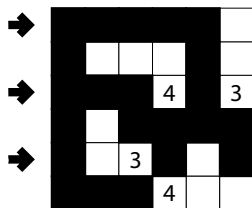
$$\begin{array}{l} \text{2a} \rightarrow \begin{array}{c} \boxed{} + \boxed{} \div \boxed{} = 2 \\ + \qquad + \qquad + \end{array} \\ \text{2b} \rightarrow \begin{array}{c} \boxed{} - \boxed{} - \boxed{} > 0 \\ + \qquad \div \qquad + \end{array} \\ \text{2c} \rightarrow \begin{array}{c} \boxed{} + \boxed{} \div \boxed{} = 2 \\ = \qquad = \qquad = \\ 17 \qquad 5 \qquad 16 \end{array} \end{array}$$

3-4. Nurikabe (23, 76 points)

Shade some empty (non-numbered) cells black (leaving the other cells white) so that the grid is divided into non-overlapping regions; cells of the same color are considered in the same region if they are adjacent along edges. Each given number must be in a white region that has the same area in cells as that number. Each white region must have exactly one given number. All black cells must be in the same region. No 2×2 group of cells can be entirely shaded black.

Answer: For each designated row, enter the lengths (number of cells) of the black segments from left to right. If there are no black cells in the row, enter a single digit '0'. Use only the last digit for two-digit numbers; e.g., use '0' for a black segment of length 10.

Example Answer: 5, 31, 111



1									1
		5				3			
								4	
	4								
								3	
	6								
			3				5		
1									1

[illegible]



5-6. Heyawake (Irregular) (24, 73 points)

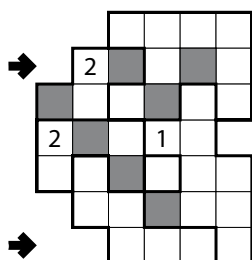
Shade some cells black so that all remaining cells are connected orthogonally and no two black cells share an edge. The grid is divided into regions by thick borders; a number in a region indicates exactly how many cells in that region must be shaded black. (Cells with numbers may or may not be shaded black.) Every "word" in the grid (a group of unblackened cells connected to each other either only horizontally or only vertically) may not cross more than one thick border.

Regions may be non-rectangular; the border-crossing rule applies even if the "word" re-enters a region more than once.

Answer: For each indicated row, enter its contents from left to right. Use 'O' for an unshaded cell and 'X' for a black cell. You may use two other letters or numbers, as long as they are distinct. Ignore borders and numbers when entering your answer.

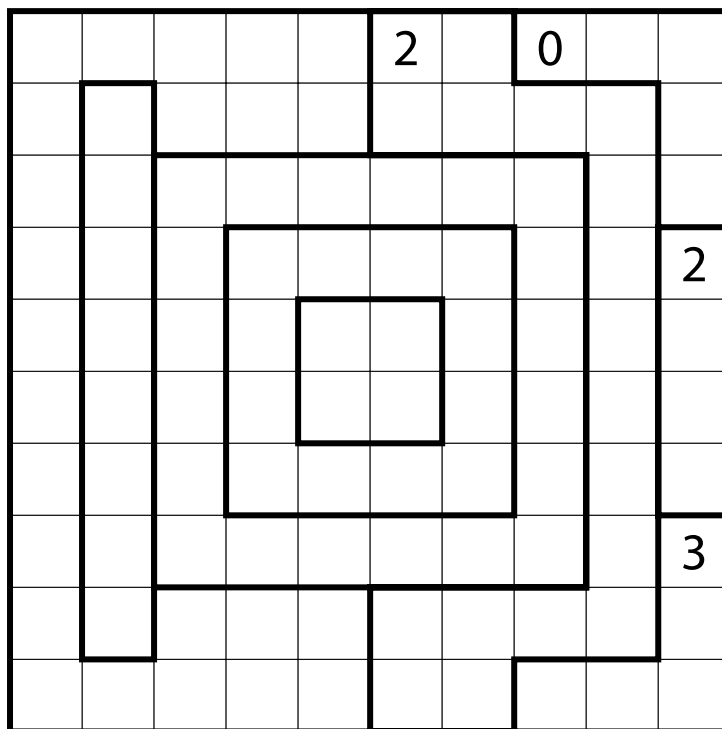
Example Answer:

OXOXO, OOOO



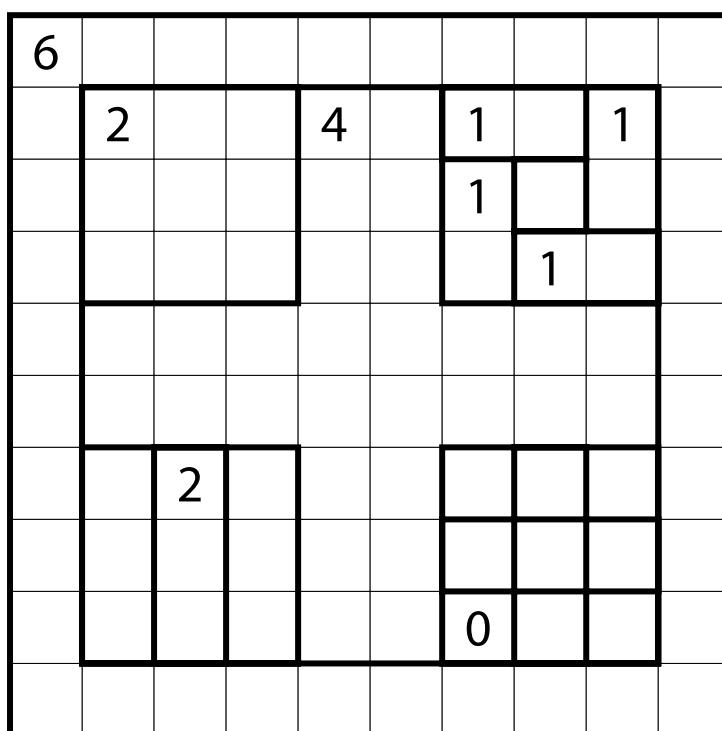
5a →

5b →



6a →

6b →



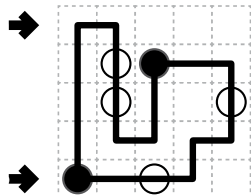
7-8. Masyu (28, 67 points)

Draw a single loop that passes orthogonally through centers of cells. The loop must go through all circled cells. The loop may not intersect itself or enter the same cell more than once. The loop must go straight through the cells with white circles, with a turn in at least one of the cells immediately before or after each white circle. The loop must make a turn in all the black circles, but must go straight in both cells immediately before and after each black circle.

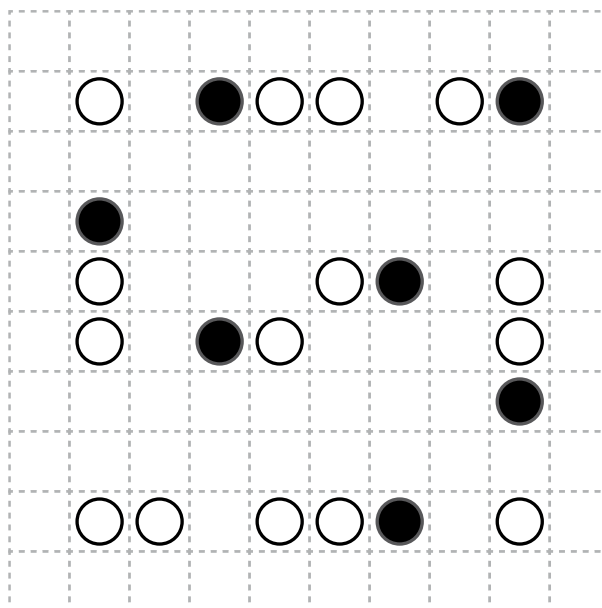
Answer: For each designated row, enter the letter for each cell, from left to right. The letter for a cell is 'I' if the path goes straight through the cell, 'L' if the path turns in the cell, and 'X' if the path does not go through the cell.

Example Answer:

LLXXX, LIILX

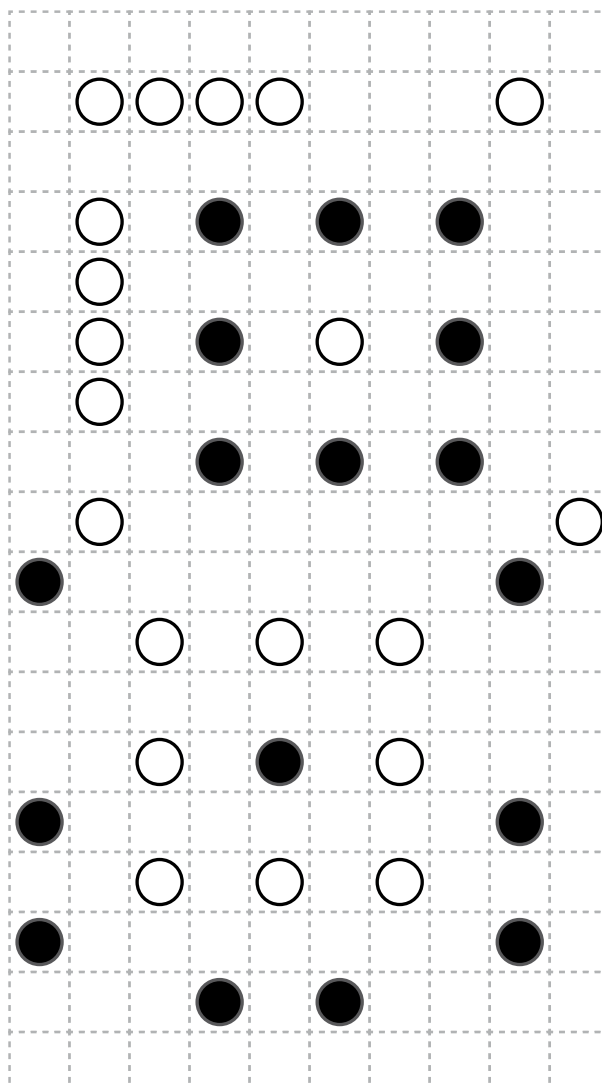


7a ➡



7b ➔

8a ➔





9-10. Pentopia (40, 56 points)

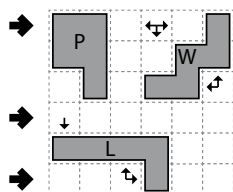
Shade some empty cells black so that the black cells form the shapes of different pentominoes. Each pentomino shape is used at most once, but can be rotated or reflected. Pentominoes cannot touch along edges or corners. Arrows in a cell indicate *all* closest shaded cell(s) to that cell along the four orthogonal directions (if there are multiple cells of the same closest distance to the cell, there will be multiple arrows).

The letters for the pentominoes, as will be provided in the diagram, are only used for entering your answer.

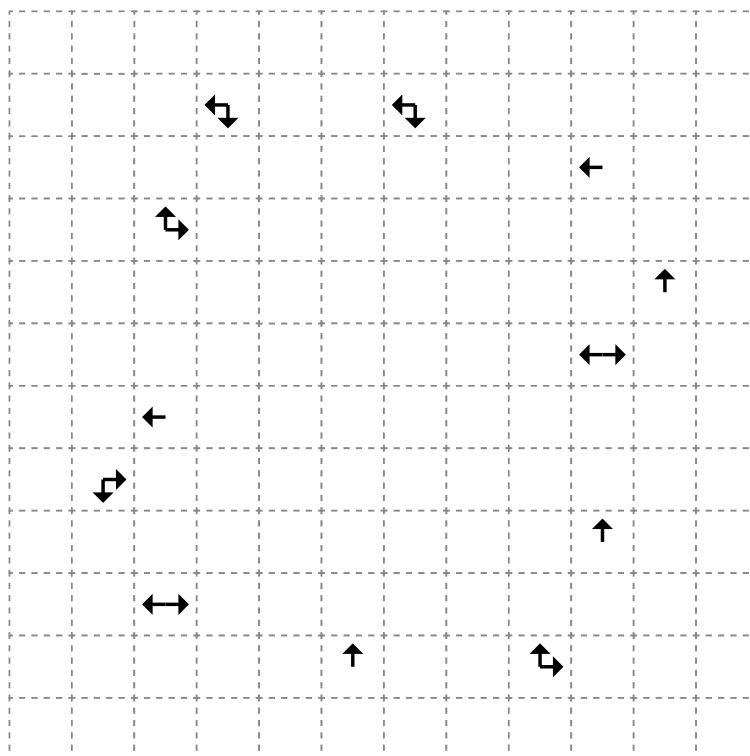
Answer: For each designated row, enter the letter for each pentomino that appears in that row, from left to right. Within a row, if a pentomino occupies more than one cell, only enter that pentomino's letter once. If there are no pentominoes in that row, enter a single letter 'A'.

Example Answer:

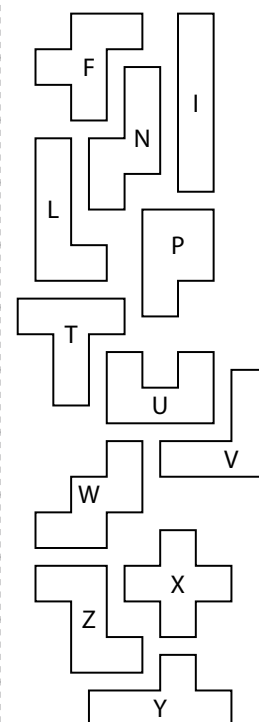
PW, A, L



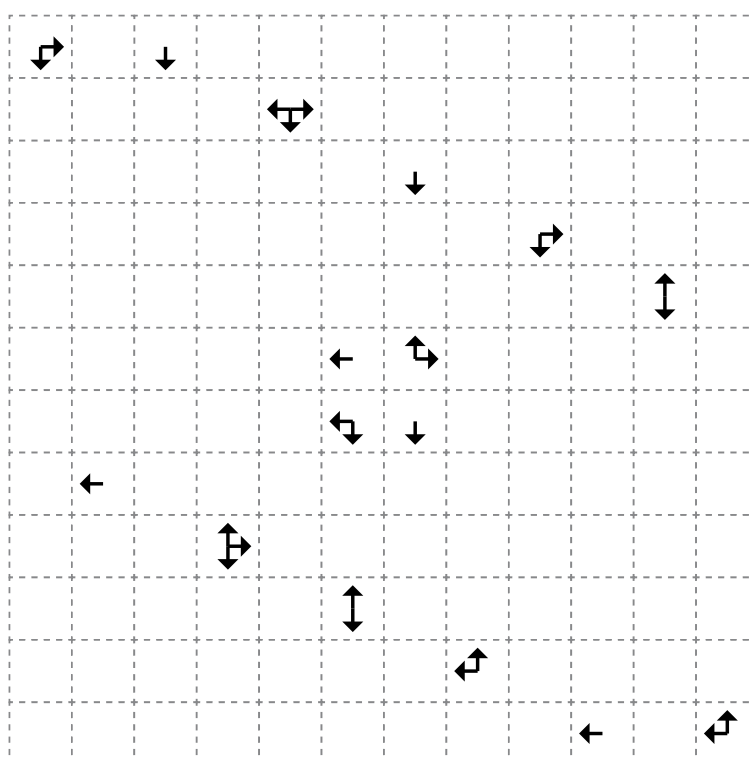
9a



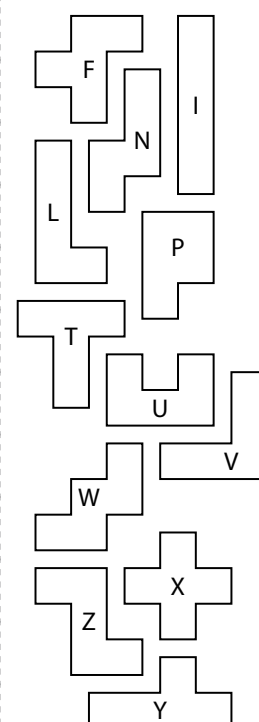
9b



10a



10b





11-12. Sudoku (35, 57 points)

Place a digit from 1-9 in each empty cell in the grid such that each row, column and marked 3×3 box contains each digit exactly once.

Answer: For each designated row, enter its contents.

Example Answer:

312485679, 256849137

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

11a →

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

11b →

12a →

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

12b →

13-14. Skyscrapers (48, 113 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. Do not include any numbers outside the grid.

Example Answer: 45312, 23541

➡

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

4 2

5

4 2

A 6x6 grid with the following labels:

- Row labels on the left: 4, 5, 5
- Row labels on the right: 2, 4, 5
- Column label at the bottom: 3
- Arrows on the left: 13a points to the first row, 13b points to the second row.

2

	6	4	2	5	6	2	
14a							
14b							
	3	5	6	2	2	3	

5
3
5
3

15-16. Loop (Portals) (21, 100 points)

Draw a single closed loop (without intersections or crossings) through the centers of all cells. Loop paths must be orthogonal.

Some cells are marked with oval-shaped portals; each portal will either be “inactive” (no number inside it) or “paired” (having a number that matches that on another portal). When the loop goes into a cell with an inactive portal, it must continue straight through that cell; when the loop goes into a cell with a paired portal, it disappears into that portal and comes out of that portal’s pair, in the same direction.

The letters in the grid are for Answer purposes only.

Answer: Starting at the “A” and heading to the right, enter all the letters in the grid in the order in which the loop encounters them, ending at the letter “A” (again).

Example Answer: AGCFEBHIKLJDA

