WPF SUDOKU/PUZZLE **GRAND PRIX** 2019

ROUND 4

WPF PUZZLE GP 2019 INSTRUCTION BOOKLET

Host Country: Russia

Andrey Bogdanov, Dmitry Grishchenko, Ivan Grishchenko, Andrey Lemesh

Special Notes: None.

Points:

1.	**Arithmetic Separation**	**19**
2.	**Clouds**	**30**
3.	**Clouds**	**46**
4.	**Arithmetic Square (Unassigned)**	**28**
5.	**Arithmetic Square (Unassigned)**	**43**
6.	**Four Winds**	**20**
7.	**Four Winds**	**56**
8.	**Skyscrapers**	**20**
9.	**Skyscrapers**	**23**
10.	**Slitherlink (Unequal Lengths)**	**39**
11.	**Slitherlink (Unequal Lengths)**	**62**
12.	**Snake (Striped, Length, Ends)**	**59**
13.	**Snake (Striped, Length, Ends)**	**78**
14.	**Doppelblock**	**30**
15.	**Doppelblock (Variable)**	**80**
16.	**Doppelblock (Parquet, Liar)**	**57**
17.	**Slalom**	**64**
18.	**Goats and Wolves**	**50**
19.	**Arithmetical City**	**151**
TOTAL:		**955**

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1. Arithmetic Separation [Andrey Lemesh] (19 points)

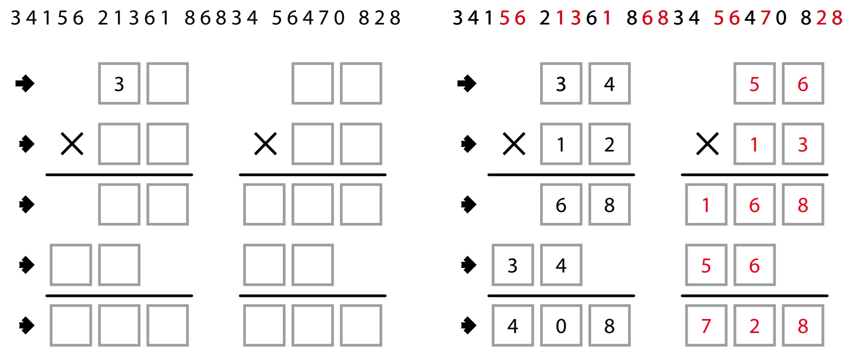
Place the given list of digits into the blanks to form two valid long multiplication calculations. Each digit must go in exactly one of the two calculations, and the digits for each calculation must appear in the list in the same order they appear in the calculation, reading the top row of digits from left-to-right, then the second row of digits from left-to-right, and so on until reading the bottom row from left to right -- but (likely) with digits from the other calculation in between.

It is possible for there to be more than one way to choose digits from the original list to make valid calculations, but there is only one valid set of calculations.

Some digits of the calculation may already be supplied for you. A full description of long multiplication can be found at: http://mathworld.wolfram.com/LongMultiplication.html .

Answer: Enter the original sequence corresponding to the right-most calculation.

Example Answer: 561316856728



2-3. Clouds [Andrey Bogdanov] (30, 46 points)

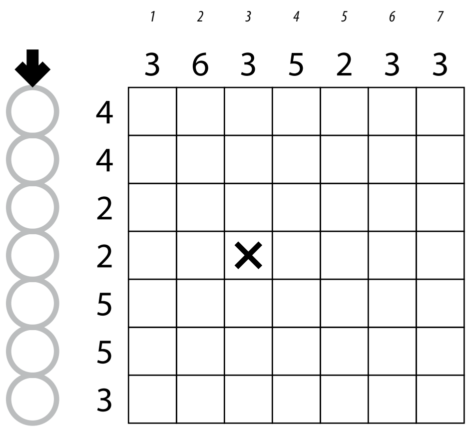
Locate some "clouds" in the grid. A cloud is a rectangular-shaped (possibly square) group of cells; each cloud must have a height of at least two cells and a width of at least two cells. Clouds do not touch each other, not even diagonally (that is, if two cloud pieces are in adjacent cells, they must be part of the same cloud). The contents of some cells are given for you.

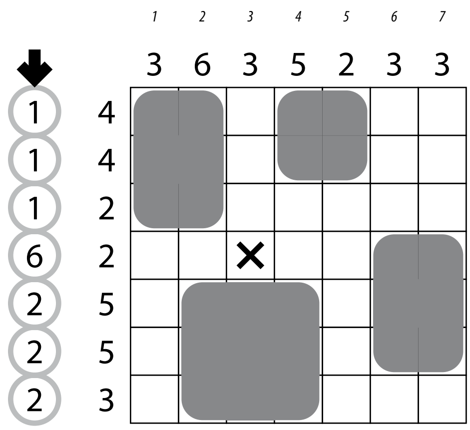
Each number to the left and top of the grid reveals the number of cloud pieces that must be located in that row or column (including any that might be given for you).

The numbers on top of the diagram are for Answer purposes only.

Answer: For each row from top to bottom, enter the number of the first column from the left where a cloud piece appears (the number on top of that column). Use only the last digit for two-digit numbers; e.g., use '0' if the first cloud piece appears in column 10. If the row is empty, enter '0'.

Example Answer: `1116222`





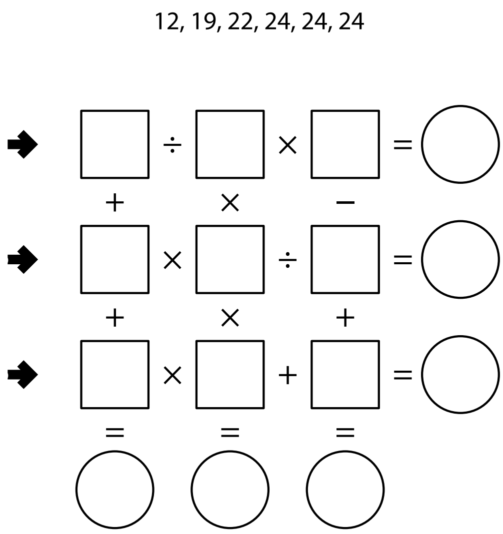
4-5. Arithmetic Square (Unassigned) [Andrey Lemesh] (28, 43 points)

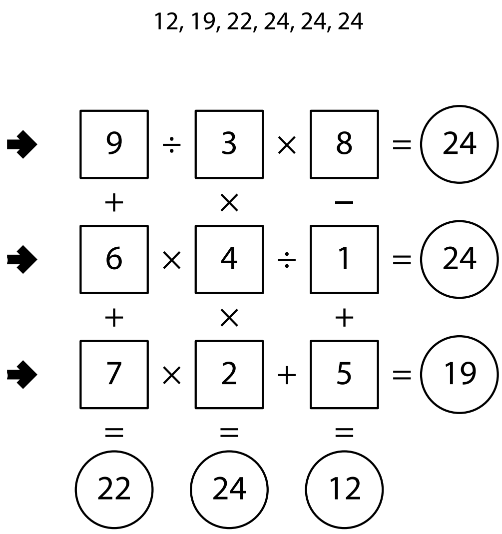
Place the numbers from 1 to 9 into the square cells (a different single number in each cell), and place the given list of six numbers into the circular cells (not necessarily in the same order), so that the indicated equations are correct. Evaluate from left-to-right and top-to-bottom (ignore the usual 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 *square* (not circular) cells, in order from left to right.

Example Answer:
`938,641,725`





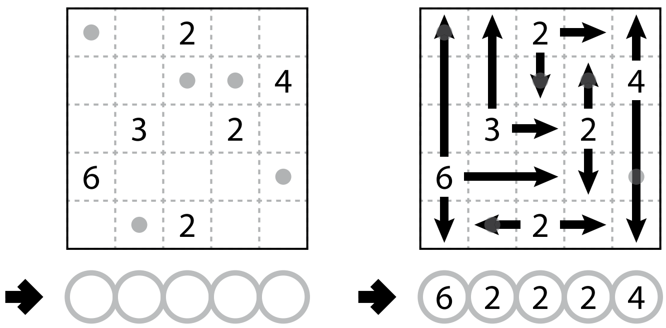
6-7. Four Winds [Ivan Grishchenko] (20, 56 points)

Draw arrows in the empty cells in the grid. Arrows can only go in the four standard directions and must begin at the edge of a cell with a number. Each empty cell must be covered by exactly one arrow. Each number indicates the total length of all the arrows that begin at an edge next to that number's cell.

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

Answer: Enter the number whose arrow covers the dot, reading the dots *from left to right*. (Ignore which row the dots are in.) Use only the last digit for two-digit numbers; e.g., use '`0`' for a number labeled 10.

Example Answer: `62224`



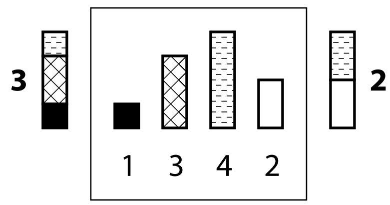
8-9. Skyscrapers [Andrey Bogdanov] (20, 23 points)

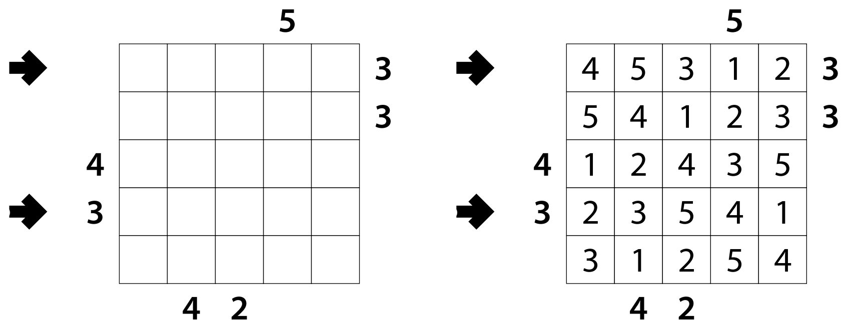
Place a number from 1 to X (integers only) into each cell so that each number appears exactly once in each row and column. (X is the number of cells in each row.) Each number represents a skyscraper of its respective height. The numbers outside the grid indicate how many skyscrapers can be seen in the 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. Do *not* include any numbers outside the grid.

Example Answer: `45312,23541`

Skyscraper Clue Examples





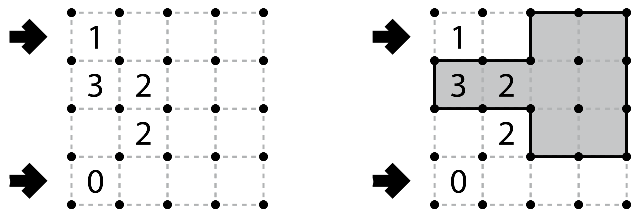
10-11. Slitherlink (Unequal Lengths) [Dmitry Grishchenko] (39, 62 points)

Draw a single, non-intersecting loop that only consists of line segments between the dots along the dotted lines. A number inside a cell indicates how many of the edges of that cell are part of the loop.

The loop goes straight through a different number of dots (possibly zero) before and after each turn of the loop. (In other words, if you write down the distance between two consecutive turns of the loop in the order in which you go around the loop, you will never write down two of the same number in a row.)

Answer: For each designated row, enter its contents from left-to-right. Use '`O`' for a cell inside the loop and '`X`' for a cell outside the loop.

Example Answer: `XXOO,XXXX`



12-13. Snake (Striped, Length, Ends) [Andrey Bogdanov] (59, 78 points)

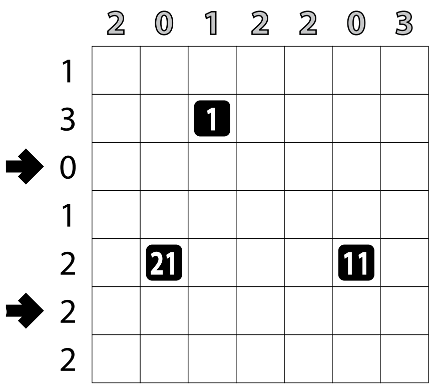
Locate a "snake" in the grid. The snake is a path that starts in a cell, goes through some number of cells orthogonally, and ends in a cell. Each cell is used at most once by the snake. The snake may not loop around to touch itself, not even diagonally. (In other words, if two cells in the snake touch orthogonally, then they must be exactly one cell apart along the path of the snake, and if two cells in the snake touch diagonally, then they must be exactly two cells apart along the path of the snake.)

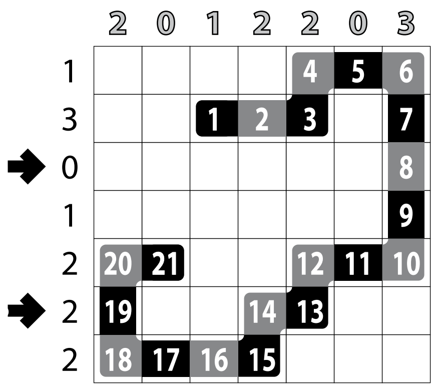
The cells of the snake are numbered with consecutive numbers starting with 1, along the body of the snake. The head, tail, and middle of the snake are given.

The snake is colored in an alternating black-and-gray pattern, one color per cell. The head and tail of the snake are black. Numbers to the left of the grid, if given, indicate how many cells in that row are black. Numbers to the top of the grid, if given, indicate how many cells in that column are gray.

Answer: For each designated row, enter its contents. Use `O` for a cell occupied by the snake and `X` for a cell not occupied by the snake. (If you wish, you may reverse `O` and `X`, but you must be consistent within the same puzzle.)

Example Answer: `XXXXXXO`, `OXXOOXX` (or `OOOOOOX`, `XOOXXOO`)



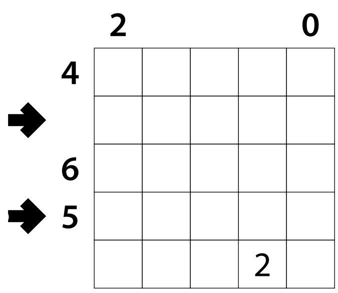


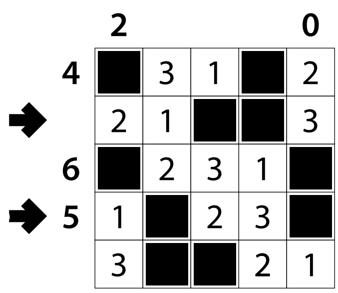
14. Doppelblock [Dmitry Grishchenko] (30 points)

Place either a block or a number from 1 to X (integers only) into each cell so that each number appears exactly once in each row and each column. (X is two fewer than the number of cells in each row.) Each row and each column will therefore have exactly two cells with blocks in them. The numbers outside the grid indicate the sum of the numbers between the two blocks in that row or column. Some cells may already be filled in for you.

Answer: For each designated row, enter its contents from left to right. Use 'X' to denote a block. Use only the last digit for two-digit numbers; e.g., use '0' for the number 10. Do not include any given numbers outside the grid.

Example Answer: `21XX3,1X23X`



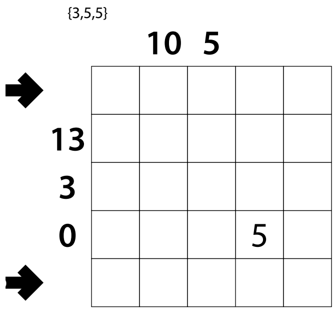


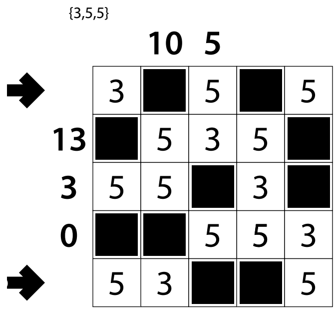
15. Doppelblock (Variable) [Dmitry Grishchenko] (80 points)

Place either a block or a number from into each cell so that the numbers in each row and each column are precisely the numbers in the provided list (not necessarily in the same order). Each row and each column will have exactly two cells with blocks in them. The numbers outside the grid indicate the sum of the numbers between the two blocks in that row or column. Some cells may already be filled in for you.

Answer: For each designated row, enter its contents from left to right. Use 'X' to denote a block. Use only the last digit for two-digit numbers; e.g., use '0' for the number 10. Do not include any given numbers outside the grid.

Example Answer: `3X5X5,53XX5`





16. Doppelblock (Parquet, Liar) [Dmitry Grishchenko] (57 points)

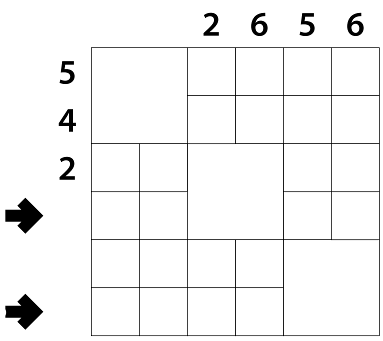
Place either a block or a number from 1 to X (integers only) into each cell so that each number appears exactly once in each row and each column. (X is two fewer than the number of cells in each row.) Each row and each column will therefore have exactly two cells with blocks in them. The numbers outside the grid indicate the sum of the numbers between the two blocks in that row or column. Some cells may already be filled in for you.

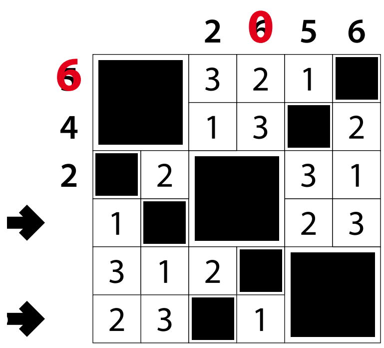
Some cells are of different size and can be in multiple rows and/or columns.

One of the given row sums is incorrect and is either 1 or S off from its correct value. (S is the sum of all numbers from 1 to X.) One of the given column sums is incorrect and is either 1 or S off from its correct value.

Answer: For each designated row, enter its contents from left to right. Use 'X' to denote a block. Use only the last digit for two-digit numbers; e.g., use '0' for the number 10. Do not include any given numbers outside the grid.

Example Answer: `1XX23,23X1X`



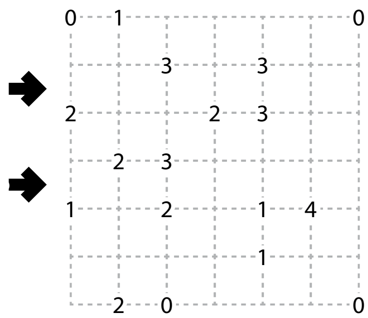


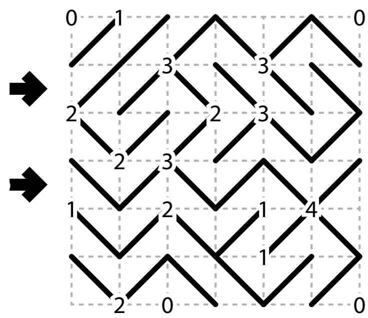
17. Slalom [Ivan Grishchenko] (64 points)

Draw one of the two possible diagonals in every cell. All internal corners (where four cells meet) are connected to the outer edge of the grid through some drawn diagonals (in other words, do not draw any closed loop of diagonals). A number on a cell corner indicates how many drawn diagonals should directly touch that corner.

Answer: For each designated row, enter its contents from left-to-right. Use 'N' for a diagonal that connects upper-left to lower-right, and 'Z' for a diagonal that connects lower-left to upper-right.

Example Answer: ZZNNNN, NZNZNZ



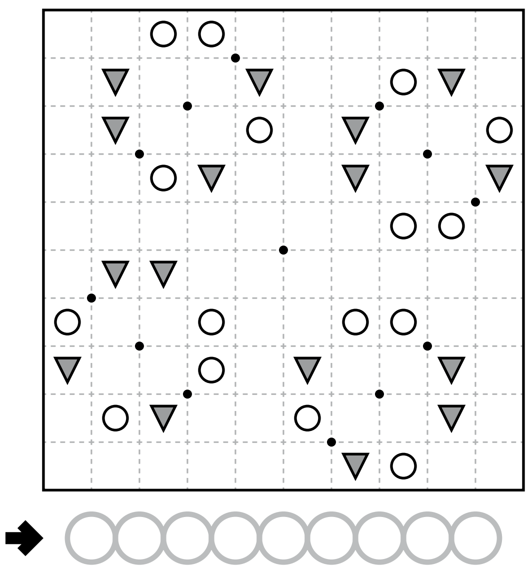


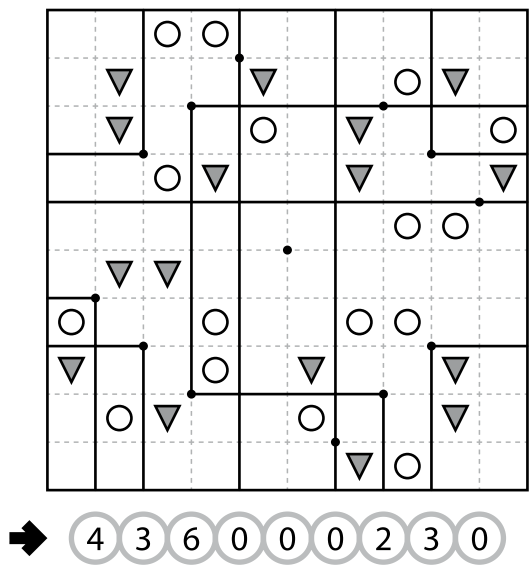
18. Goats and Wolves [Ivan Grishchenko] (50 points)

Draw paths along the grid lines such that the grid is separated into separate regions. Each region must contain at least one symbol, and no region may contain different symbols. (Adjacent regions may contain the same symbol.) Paths must start and end at the border of the grid (but not necessarily the same edge). Dots are provided on the grid at cell corners; you may not add more dots to the grid. Paths may only turn at dots. Paths may intersect other paths, but they may not do so at a dot. (It is possible for a path to go straight through a dot, or for a dot not to be used at all.)

Answer: For each vertical column of cell edges from left-to-right, enter the length of the longest vertical line segment along a drawn path. If there are no vertical line segments in that column, enter the single digit '0'. Use only the last digit for two-digit numbers; e.g., use '0' if the longest segment has length 10.

Example Answer: 436000230





19. Arithmetical City [Ivan Grishchenko] (151 points)

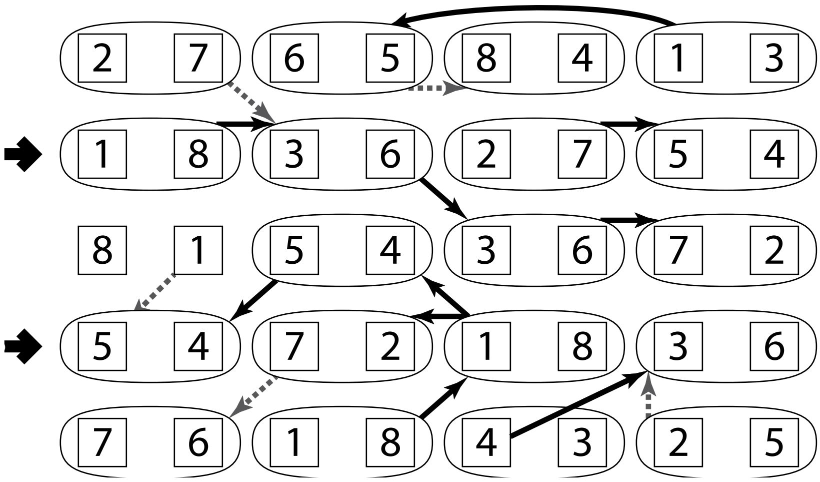
Place a number from the provided set into each (square) cell so that each number appears at most once (but possibly zero times) in each row and column. Some groups of numbers are surrounded with ovals along rows and columns; those ovals should be considered to represent multi-digit numbers, reading the squared numbers from left-to-right (for rows) or top-to-bottom (for columns). Multi-digit numbers may not start with 0.

Some cells and/or ovals are connected with arrows. A dotted arrow points from a smaller number to a larger number (the two numbers may not be equal). A solid arrow points from a number to a positive multiple of that number (the two numbers *are* allowed to be equal, but neither number can be 0).

Answer: For each designated row, enter the contents of the (square) cells, from left-to-right. Use only the last digit for two-digit numbers; e.g., use '0' when the cell contains the number 10.

Example Answer: `18362754,54721836`

{1,2,3,4,5,6,7,8}



{1,2,3,4,5,6,7,8}