WPF SUDOKU/PUZZLE **GRAND PRIX** 2017

ROUND 7C

WPF PUZZLE GP 2017 COMPETITION BOOKLET

Host Country: Bulgaria

Author: Alexander Angelov, Deyan Razsadov

Special Notes: No special notes this round.

C1-2. Mastermind [Alexander Angelov, Deyan Razsadov] (14, 19 points)

Each row represents a guess at a secret code. A black dot represents a digit in the guess that is in the same position as a digit in the secret code. A white dot represents a digit in the guess that is in the secret code, but not in the same position. The dots are given in no specific order, and each digit in the secret code contributes at most one dot with black dots given priority over white dots in case of ambiguity (for example, if the guess was 12334 and the codeword was 53363, the puzzle would display 1 black and 1 white). Each digit in the secret code appears in at least one guess.

5	1	3	○
4	3	6	
2	1	4	○ ○
3	2	1	● ○
1	**2**	**2**	● ● ●

The last line with empty space for the secret code is given for aesthetic reasons only.

Answer: Enter the secret code.

Example Answer: 122

1

1	3	0	9	○
9	1	2	4	●
3	5	6	9	○
8	9	0	7	● ●
1	2	7	3	○
				● ● ● ●

2

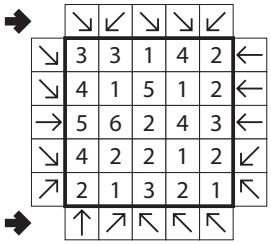
7	9	4	6	●
5	8	2	3	● ○
3	4	1	9	●
2	0	4	5	●
8	7	3	0	○
				● ● ● ●

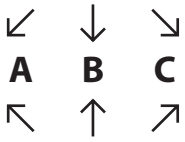
C3-4. Arrows [Deyan Razsadov] (24, 51 points)

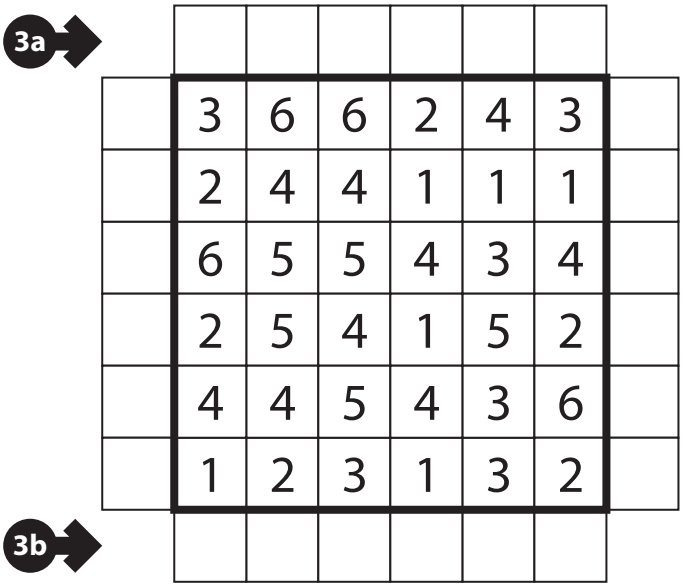
Draw an arrow in each of the empty cells outside the main grid. Each arrow must point in one of the eight standard directions, and must point to at least one numbered cell. Each numbered cell must be pointed at by exactly that number of arrows.

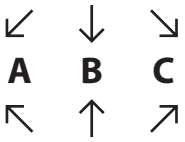
Answer: The contents of indicated rows, from left to right. Use 'A' for an arrow pointing diagonally left, a 'B' for an arrow pointing orthogonally, and 'C' for an arrow pointing diagonally right.

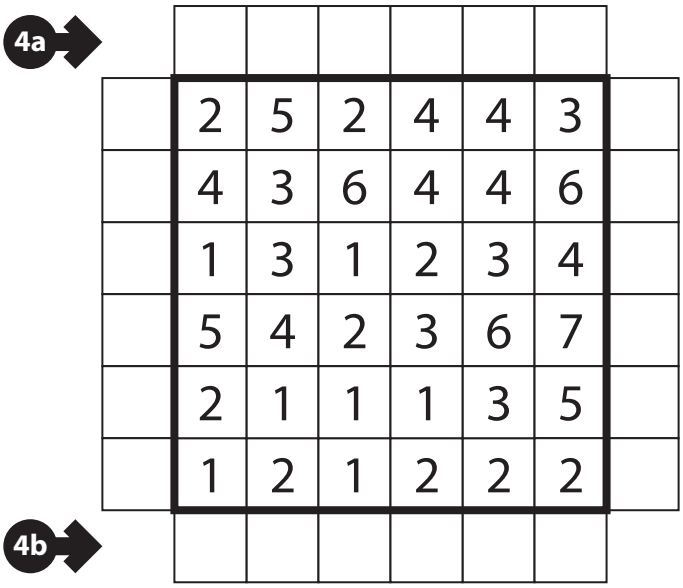
Example Answer: CACCA, BCAAA









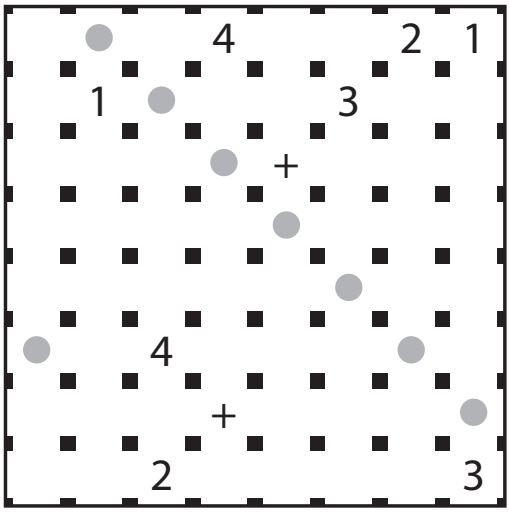


C5-6. Arukone with Crossings [Alexander Angelov] (7, 32 points)

Some cells in the grid are marked with numbers; each number appears exactly twice and no cell contains more than one number. For each pair of identical numbers, draw a path that connects those two numbers. The paths must go through orthogonally adjacent cells. Cells marked with a cross must be visited by two different paths, which cross over each other at those cells. All other cells may be visited by at most one path, and may not be visited more than once by that path. (It is permissible for a cell to not be visited by any path.)

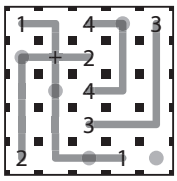
The dots in the diagram are for Answer purposes only.

Answer: Enter one digit for each of the dotted cells, from left to right. If the path does not go through the cell, enter a single digit '0'. Otherwise, enter the number associated with the path that goes through the cell. Use only the last digit for two digit numbers; e.g., use '0' if the dot is on the path that connects 10 and 10.

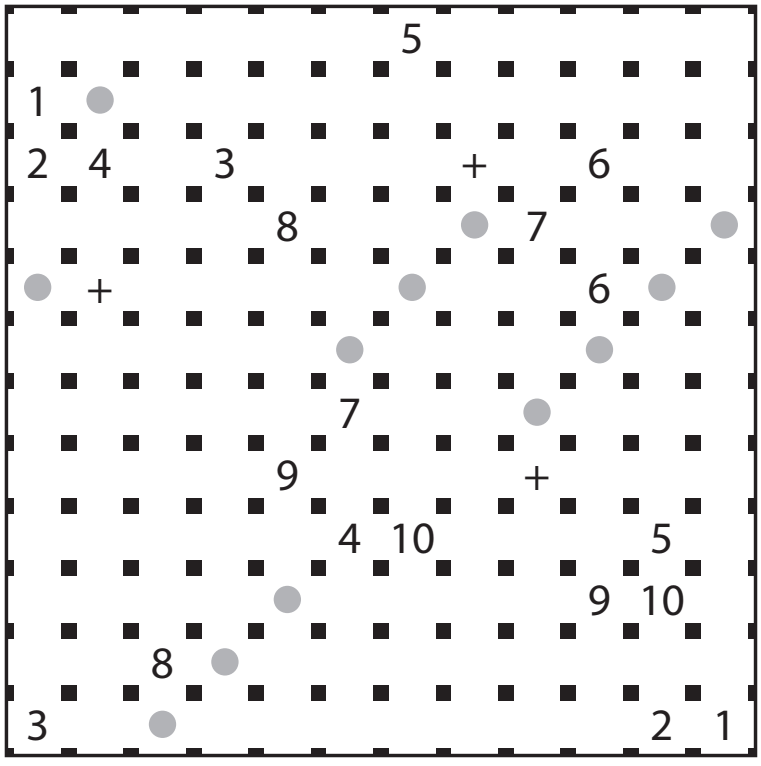


5 ➡ ○○○○○○○

Example Answer: 21140



➡ (2)(1)(1)(4)(0)

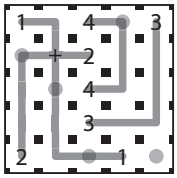


6 ➡ ○○○○○○○○○○

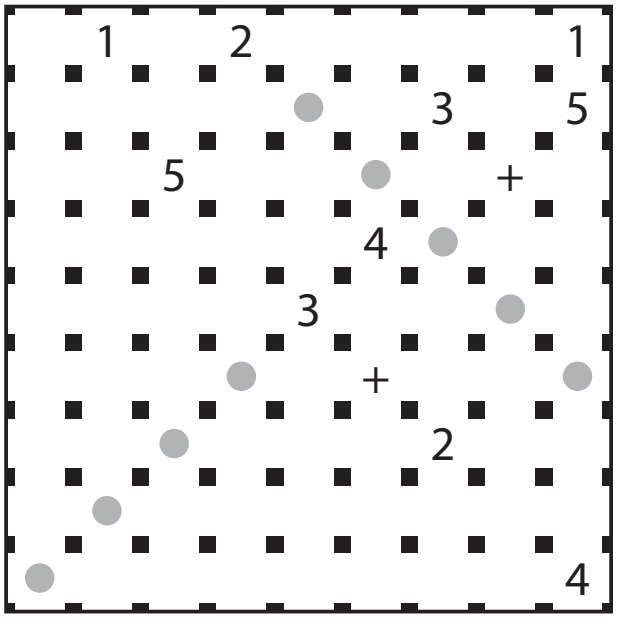
C7-8. Arukone with Crossings [Alexander Angelov] (9, 11 points)

Answer: Enter one digit for each of the dotted cells, from left to right. If the path does not go through the cell, enter a single digit '0'. Otherwise, enter the number associated with the path that goes through the cell. Use only the last digit for two digit numbers; e.g., use '0' if the dot is on the path that connects 10 and 10.

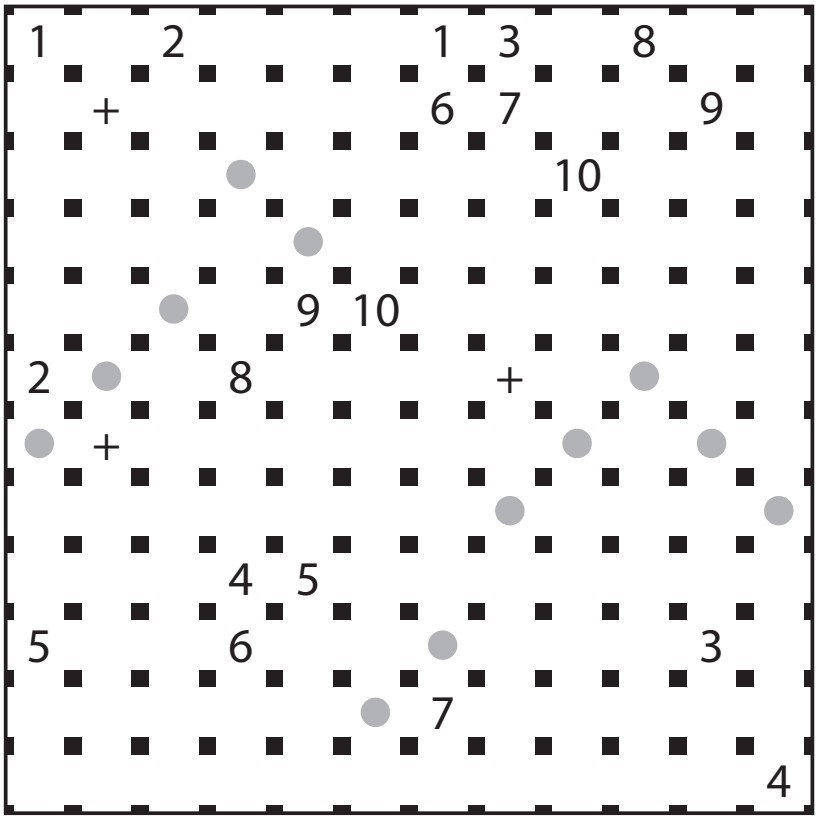
Example Answer: 21140



➡ 2 1 1 4 0



7➡ ○○○○○○○○○



8➡ ○○○○○○○○○○

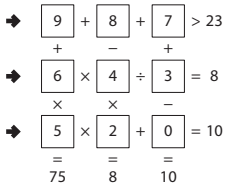
C9-10. Arithmetic Square with Zero [Alexander Angelov] (21, 19 points)

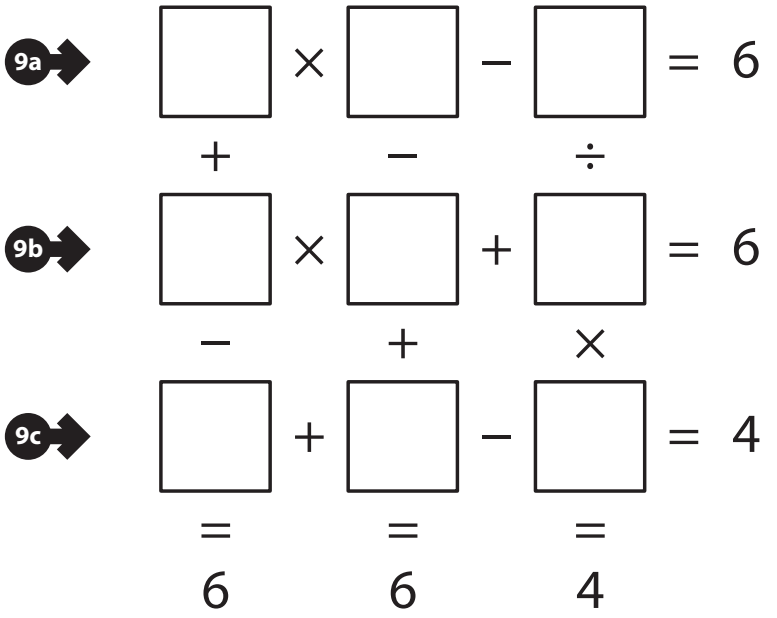
Place a number from 0 to 9 into the cells (a different single number in each cell) so that the indicated equations/relations are correct. (One number will not be used.) Evaluate from left-to-right and top-to-bottom (ignore the usual precedence of the operators).

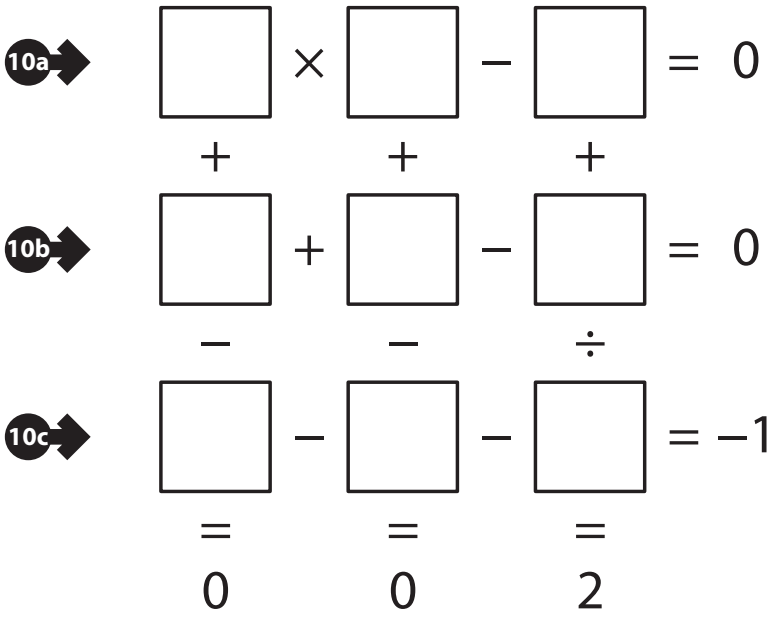
It is possible for expressions and partial expressions to be negative or non-integral.

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

Example Answer:
987,643,520





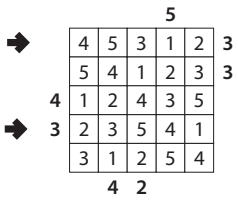


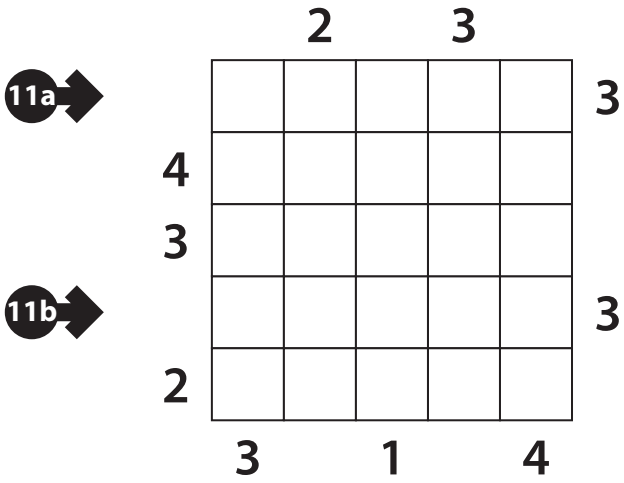
C11-13. Skyscrapers [Deyan Razsadov, Deyan Razsadov, Alexander Angelov] (9, 24, 28 points)

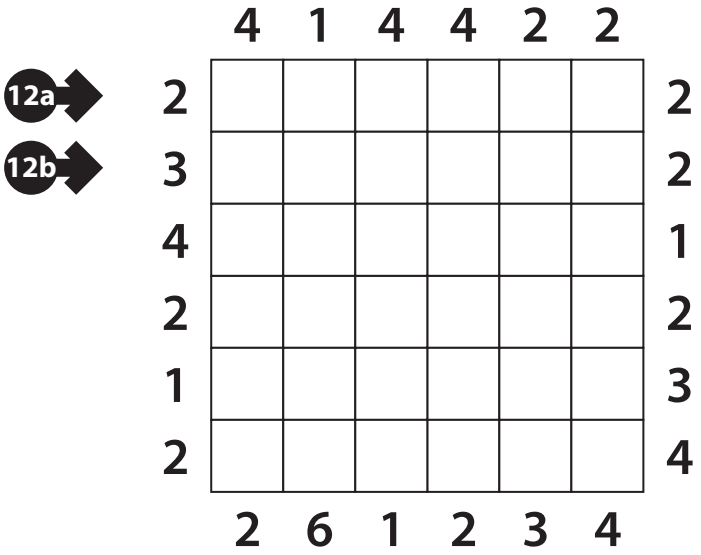
Place a number from 1 to X (integers only) into each cell so that each number appears exactly once in each row and column. (X is the number of cells in each row.) Each number represents a skyscraper of its respective height. The numbers outside the grid indicate how many skyscrapers can be seen in the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

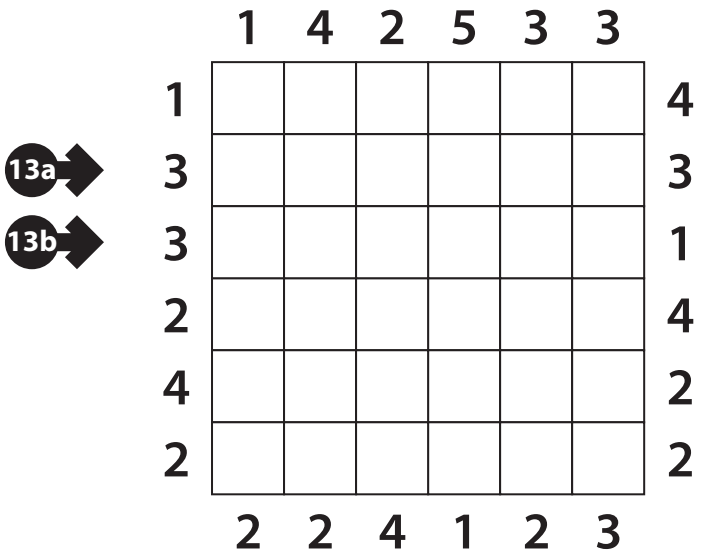
Answer: For each designated row, enter its contents. Do *not* include any numbers outside the grid.

Example Answer: `45312,23541`









C14. Skyscrapers with Diagonals [Alexander Angelov] (27 points)

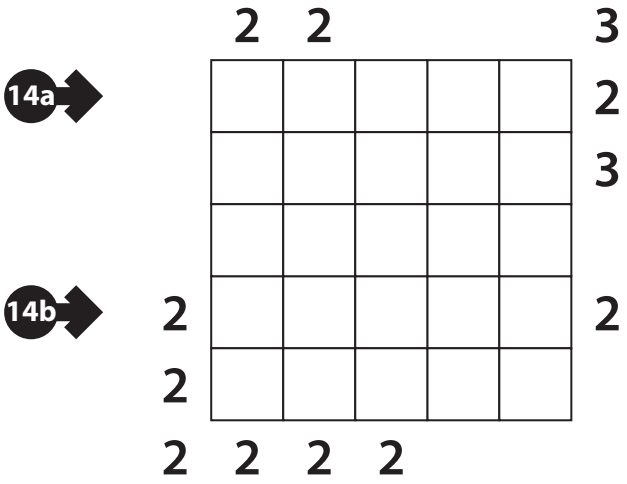
Regular Skyscrapers rules apply, with the following addenda:

Numbers at the corner of the grid indicate how many skyscrapers can be seen along the long diagonal; smaller skyscrapers are hidden behind higher ones. (Note that diagonals may have repeated numbers; skyscrapers hide other skyscrapers of the same height.)

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

Example Answer: `45312,23541`

	1				5	2
→		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	
	2		4	2			1



C15. Multiview Skyscrapers [Deyan Razsadov] (91 points)

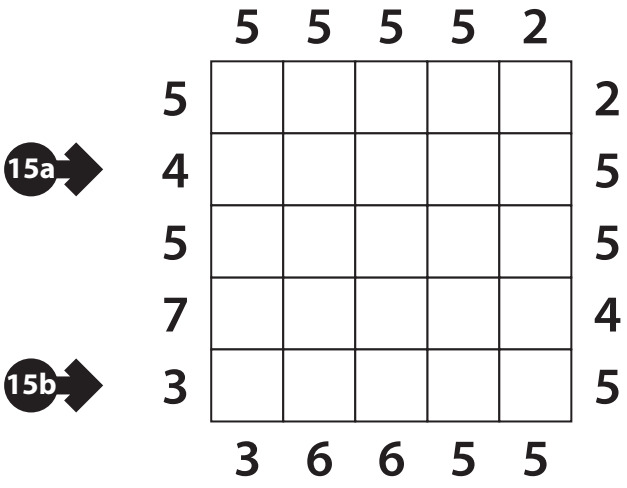
Regular Skyscrapers rules apply, with the following addenda:

Each number outside the grid also includes any skyscrapers seen diagonally from that number; smaller skyscrapers are hidden behind higher ones. (Note that diagonals may have repeated numbers; skyscrapers hide other skyscrapers of the same height.)

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

Example Answer: `1423,4132`

		4	4	4	3	
→	3	1	4	2	3	3
	4	3	2	1	4	4
	6	2	3	4	1	4
→	2	4	1	3	2	5
		3	5	5	3	



C16-17. Uncounted Skyscrapers [Deyan Razsadov] (60, 138 points)

Regular Skyscrapers rules apply, with the following addenda:

Some skyscrapers are uncounted (shaded in the example solution); that is, when a number outside the grid sees an uncounted skyscraper, it adds 0 to the count instead of 1. (However, uncounted skyscrapers still hide smaller skyscrapers behind it.) There is exactly one uncounted skyscraper in each row, exactly one in each column, and all uncounted skyscrapers have different numbers.

Answer: For each designated row, enter its contents. Do *not* include any numbers outside the grid. You do not need to indicate which skyscraper is uncounted.

Example Answer: `2143,1234`

		2	2	0	2	
➡	1	2	1	4	3	1
	1	3	4	1	2	2
	1	4	3	2	1	3
➡	3	1	2	3	4	1
		2	2	1	1	

		3	3	1	1	3	
	3						2
	1						1
16a ➡	1						3
	1						1
16b ➡	2						2
		2	1	1	2	1	

		1	3	2	1	2	1	
	2							3
17a ➡	1							4
	4							0
	3							2
	2							4
17b ➡	2							2
		2	1	2	4	1	2	