



Creating Logic Puzzles for Your Classroom

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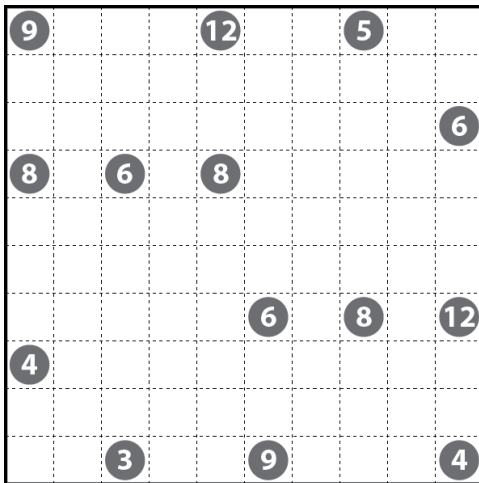
November 29, 2012

Chicago, IL

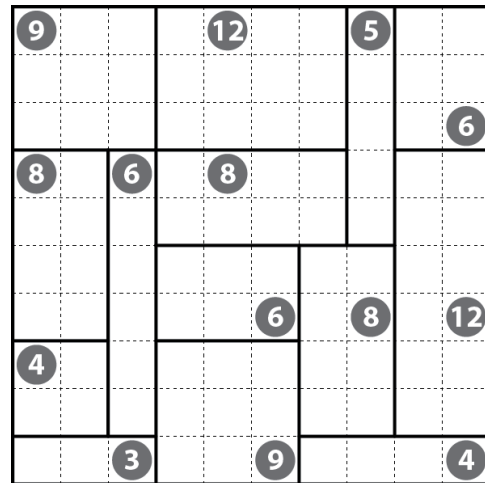
SHIKAKU

Shikaku puzzles were created by the Japanese puzzle magazine Nikoli. They have also been published in the United States as Partitions puzzles. "Shikaku ni kire" is Japanese for "divide by squares" or "divide by box", indicative of the broad goal of these puzzles.

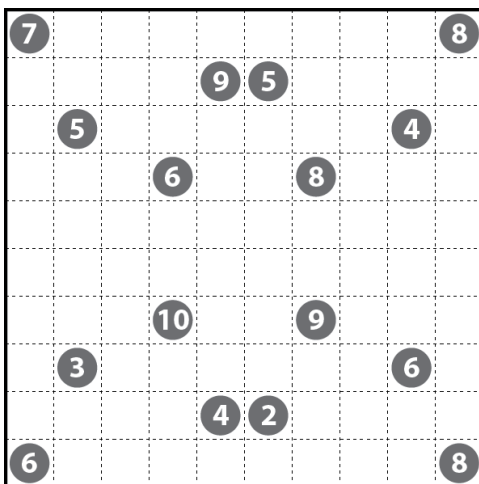
Two examples of Shikaku puzzles and their solutions are shown below. Look at the two examples and their unique solutions to determine both the goal of Shikaku and the rules that govern these puzzles.



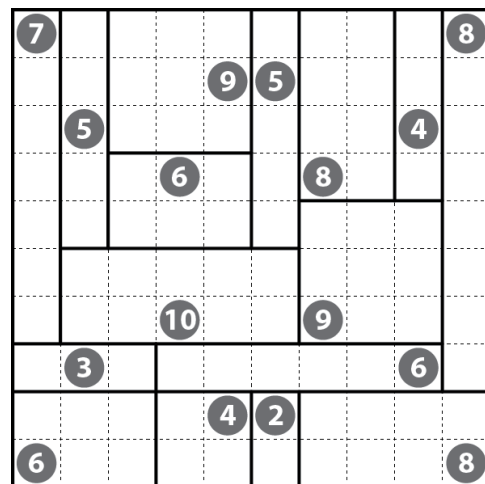
Shikaku Example A



Shikaku Example A - Solution



Shikaku Example B



Shikaku Example B - Solution

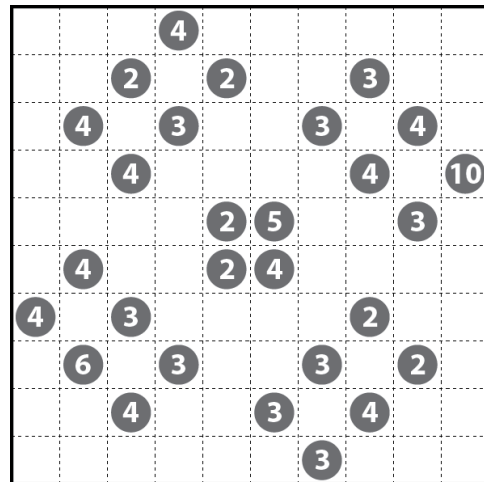
As you have probably already determined, the goal of a Shikaku puzzle is to divide the grid into rectangles—each containing exactly one circled number—such that the area of each rectangle is the circled number it contains. Each square of the grid must be included in exactly one rectangle; in other words, every grid square must be used but no rectangles may overlap. Each puzzle has exactly one correct solution.

Using deductive and spatial reasoning you should be able to determine each puzzle’s unique solution.

Starting points

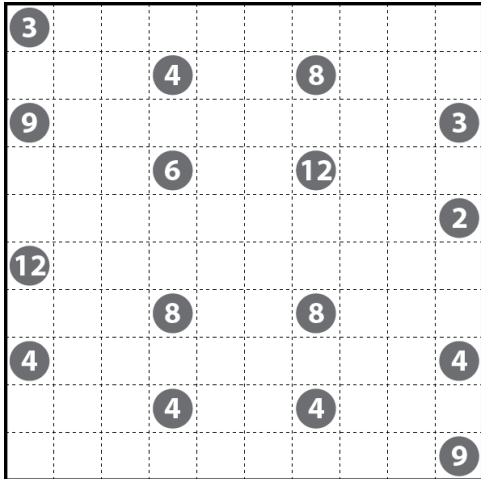
Look at the example puzzle below. There are several starting strategies in finding the solution to this puzzle:

- Single-option numbers – Are there some numbers in the starting grid that only have one option for an associated rectangle?
- Single-option grid squares – Are there any blank grid squares that can only be reached by the rectangle from one of the numbers?
- Prime numbers and square numbers – What is special about prime numbers in the starting grid? What is special about square numbers in the starting grid?

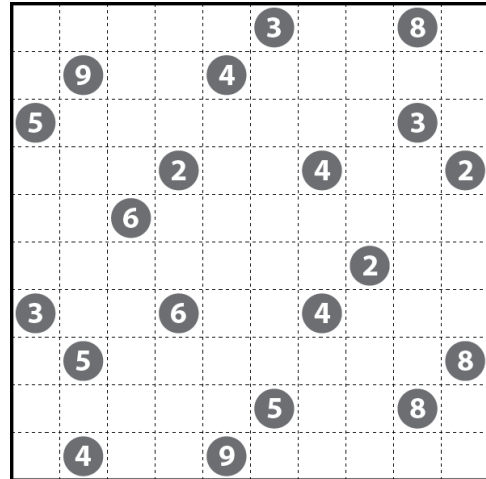


Shikaku Example C

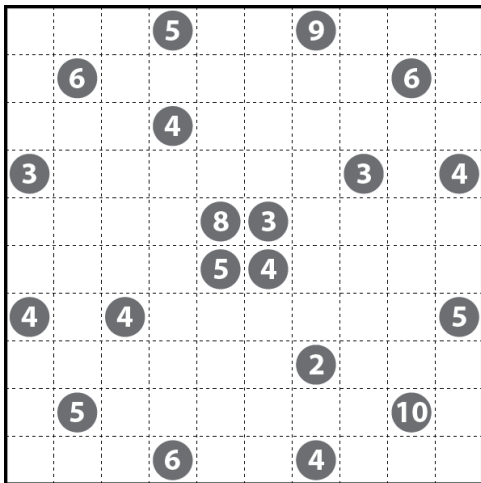
Remember that each puzzle has a unique solution. This fact can often be very useful in completing a puzzle.



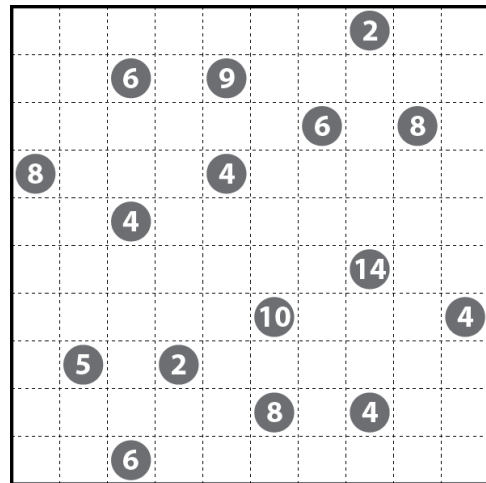
Shikaku Puzzle 1



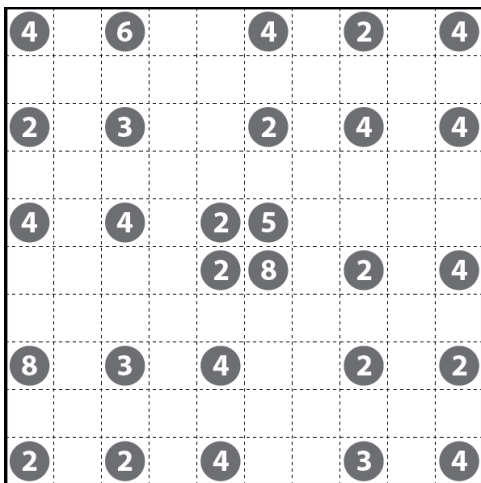
Shikaku Puzzle 2



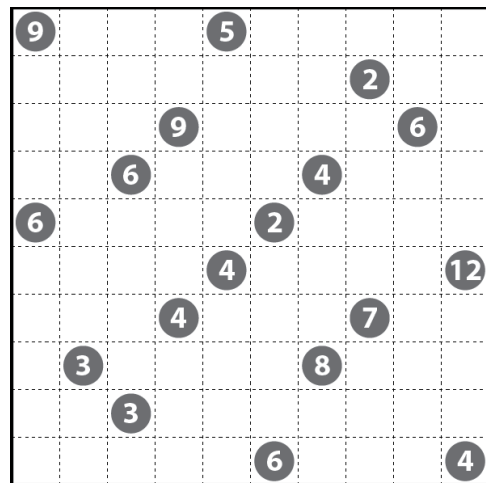
Shikaku Puzzle 3



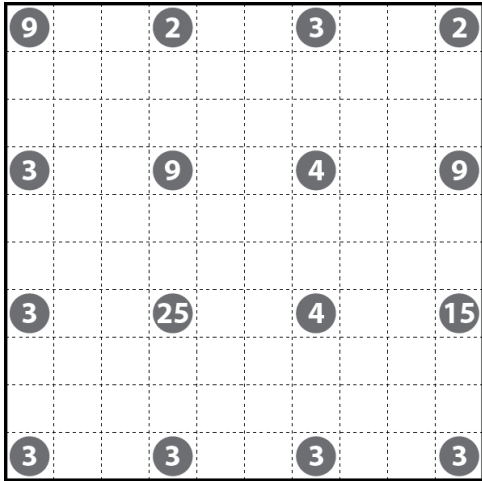
Shikaku Puzzle 4



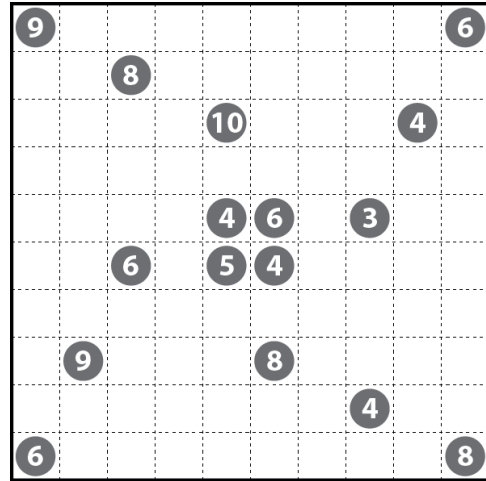
Shikaku Puzzle 5



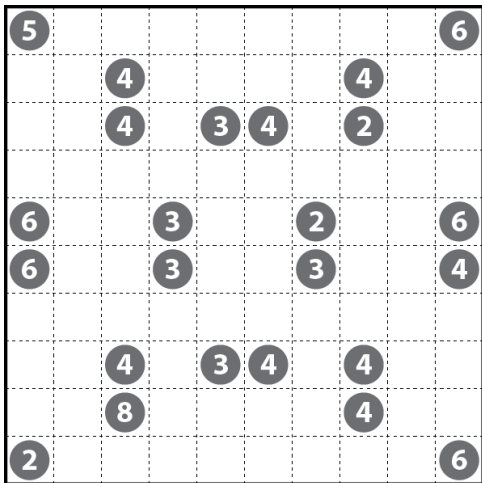
Shikaku Puzzle 6



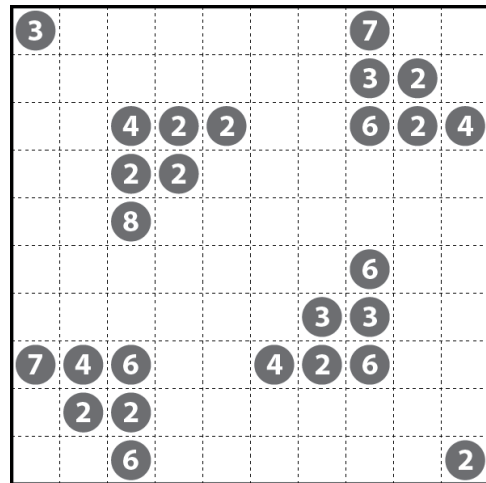
Shikaku Puzzle 7



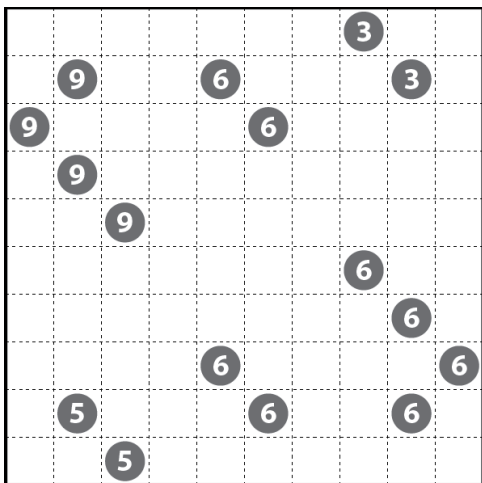
Shikaku Puzzle 8



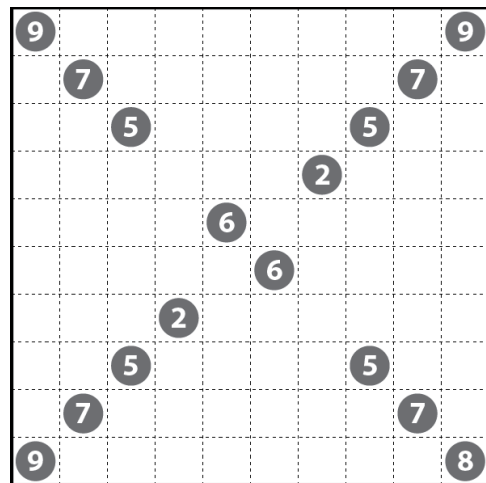
Shikaku Puzzle 9



Shikaku Puzzle 10

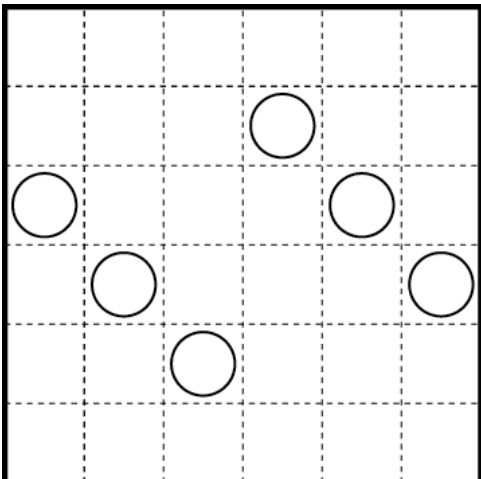
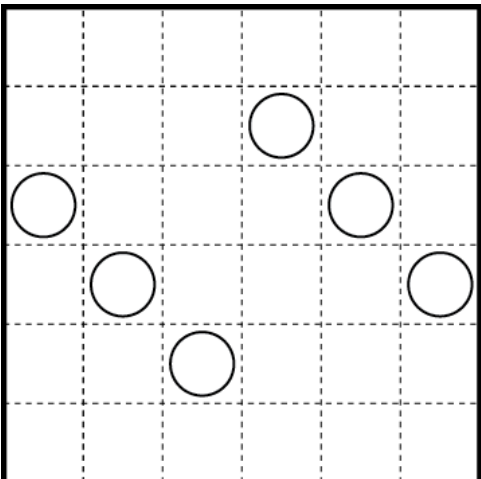
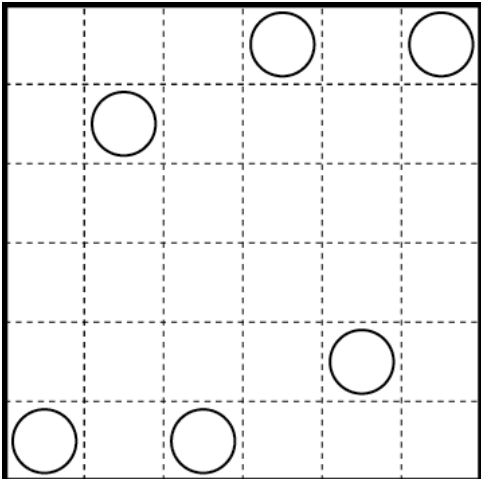
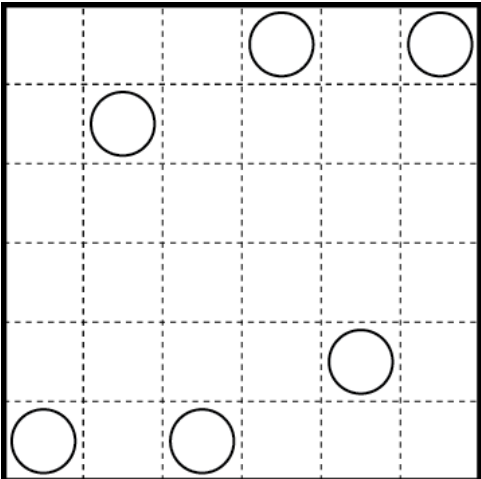
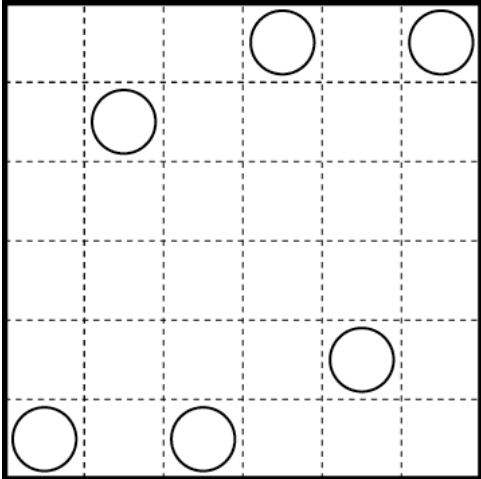
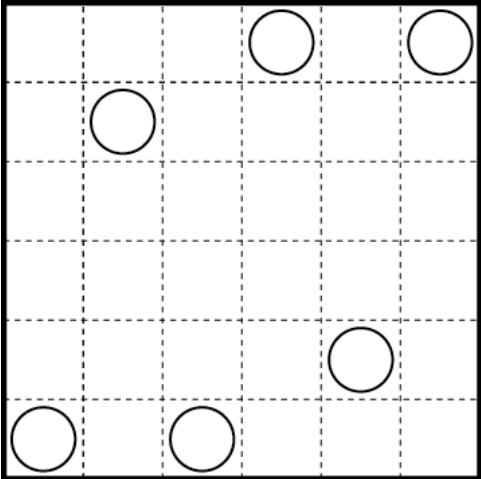


Shikaku Puzzle 11

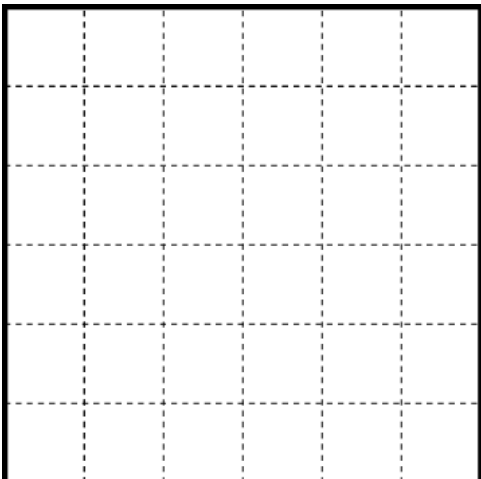
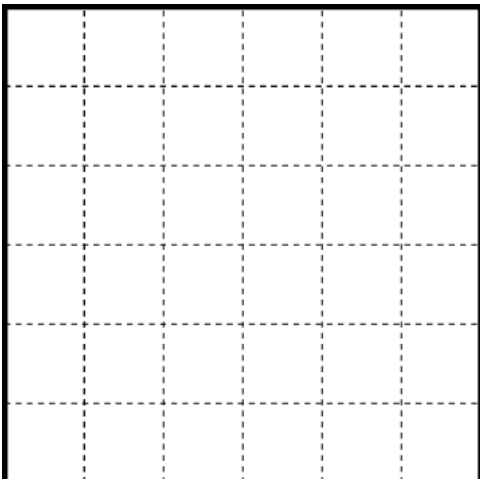
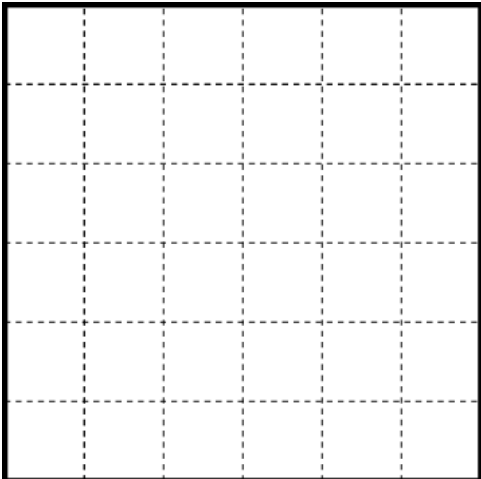
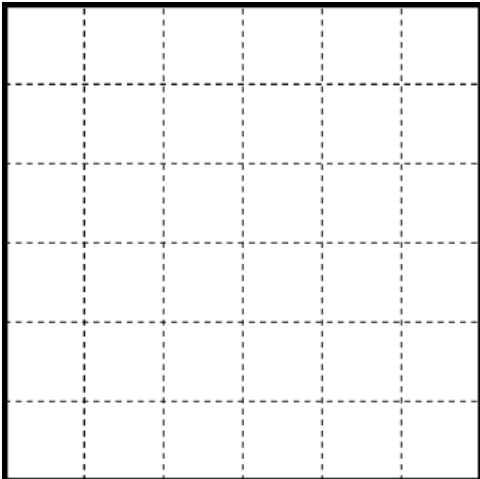
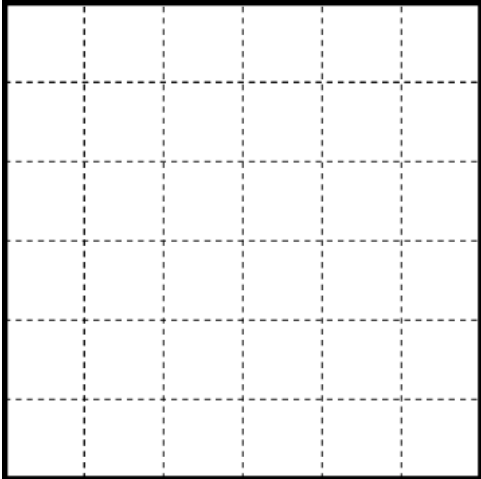
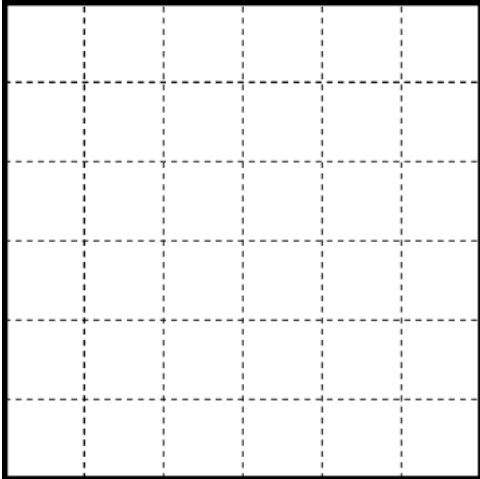


Shikaku Puzzle 12

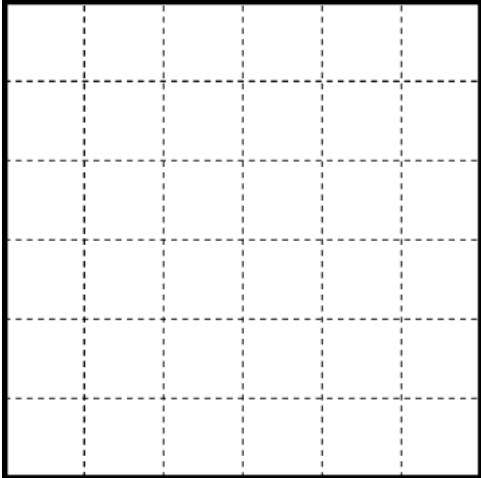
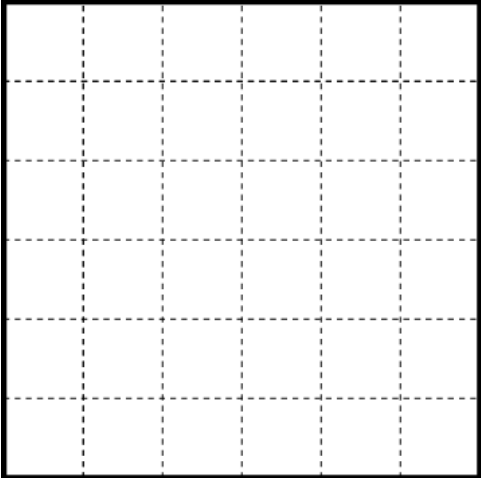
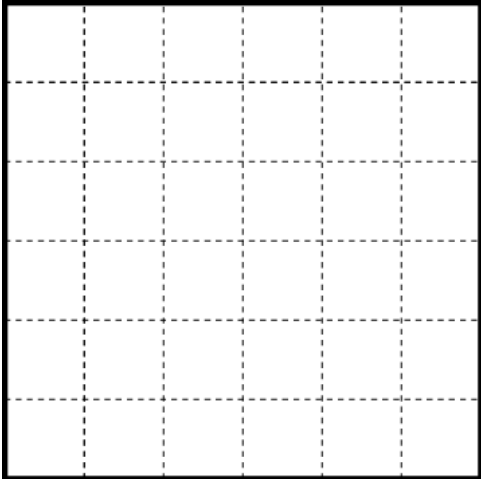
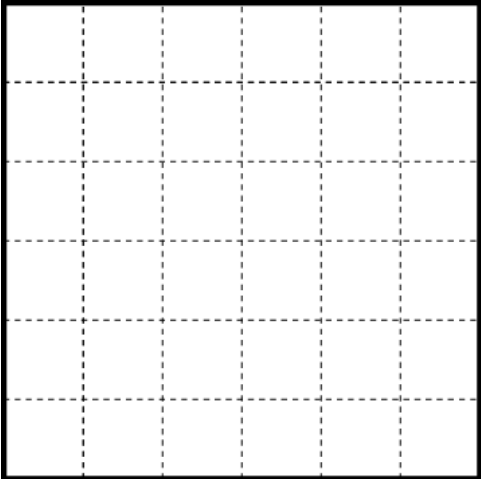
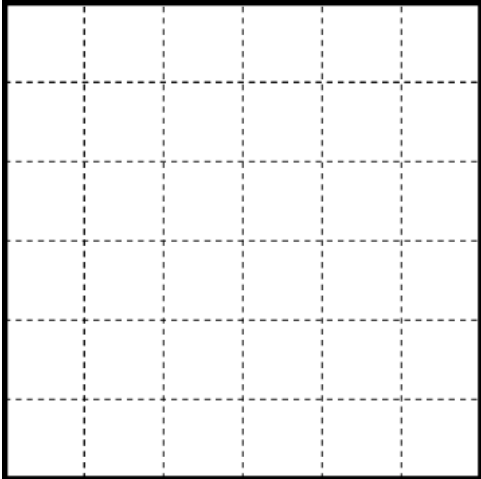
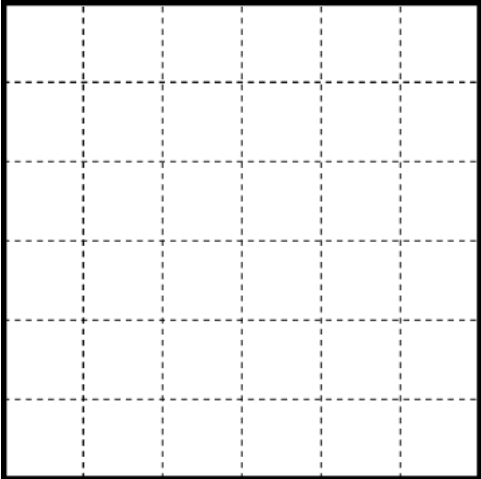
Blank Shikaku Templates (6 x 6)



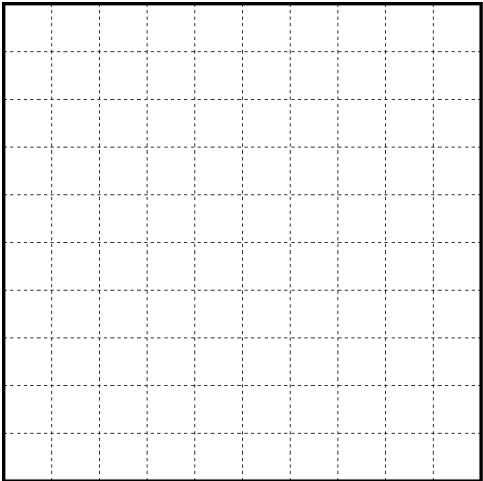
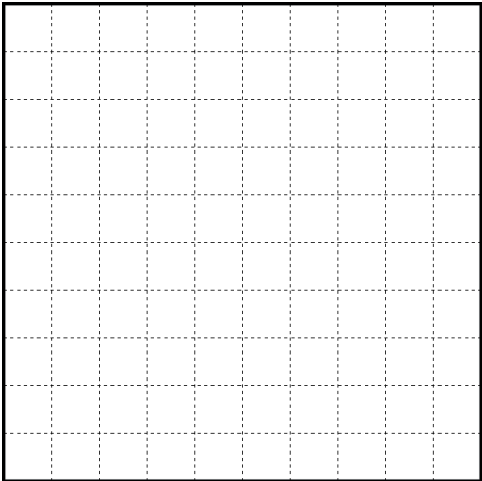
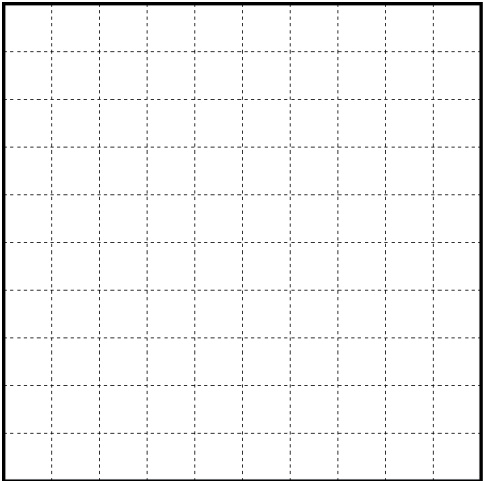
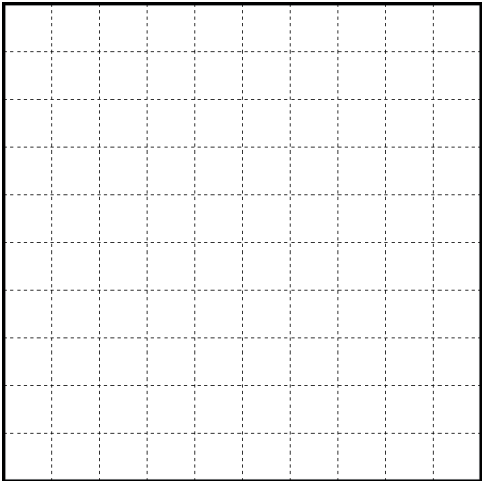
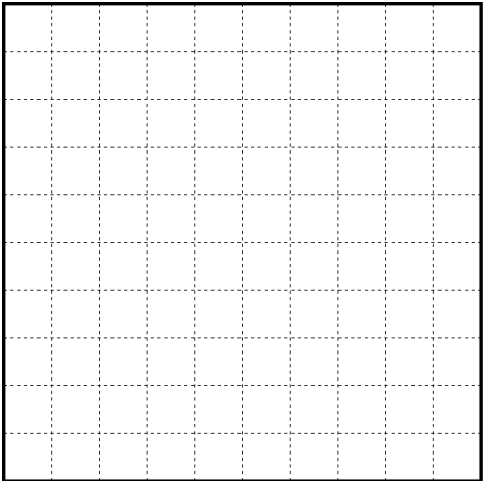
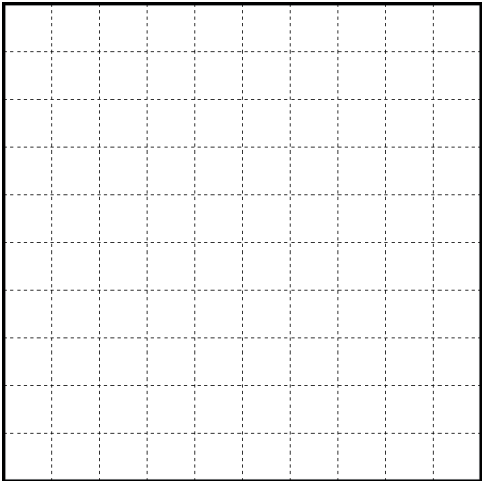
Blank Shikaku Templates (6 x 6)



Blank Shikaku Templates (6 x 6)



Blank Shikaku Templates (10 x 10)



RIPPLE EFFECT

Unlike many other logic puzzles that originated in Japan, Ripple Effect puzzles are more commonly known by an English name. They were created by the Japanese puzzle magazine *Nikoli* and first appeared in 1998.

Two examples of Ripple Effect puzzles and their solutions are shown below. Look at the two examples and their unique solutions to determine both the goal of Ripple Effect and the rules that govern these puzzles.

		3			
	2			2	
		4			
			1		
	2			2	
			4		

Ripple Effect Example A

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

Ripple Effect Example A - Solution

			3		
			1		
					3
2					
		2			
		1			

Ripple Effect Example B

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

Ripple Effect Example B - Solution

As you have probably already determined, the goal of a Ripple Effect puzzle is to fill each region in the grid with positive integers 1 through n (where n is the number of squares in a given region). The rules for placing the numbers are:

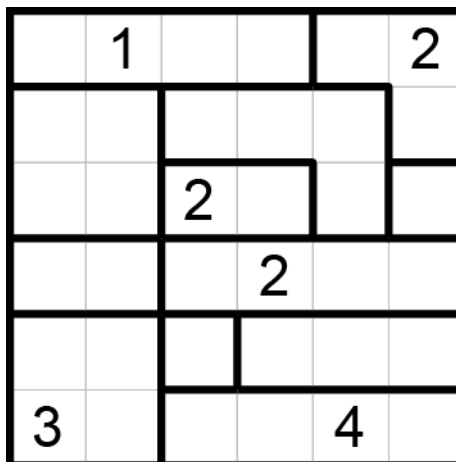
- Each number 1 through n appears exactly once in each region made up of n squares.
- If two identical numbers appear in the same row or column, at least that many cells with other numbers must separate them.

Using deductive and spatial reasoning you should be able to determine each puzzle's unique solution.

Starting points

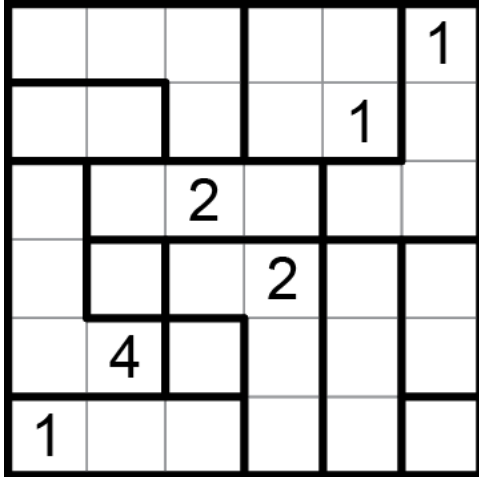
Look at the example puzzle below. There are several starting strategies in finding the solution to this puzzle:

- Single squares – What number has to go in a region with a single square?
- Eliminate location options – Find a region where a specific number could only be placed in one spot. For example, in the L-shaped region to the left and above the number 2 that is placed in this grid, what number can only be placed in one of the three squares?
- Eliminate number options – Find a square in a region where only one number could be placed. For example, in the region at the bottom right of the grid, which open square only has one number option remaining and why?

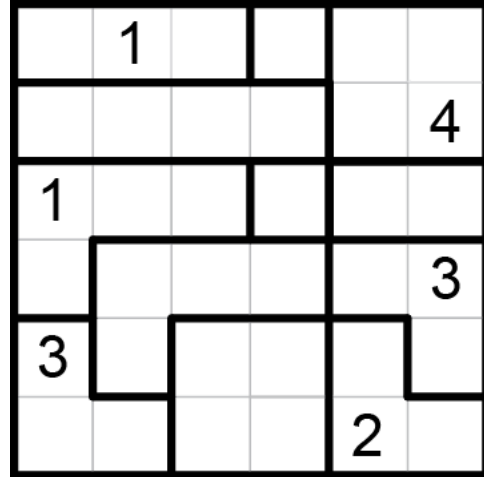


Ripple Effect Example C

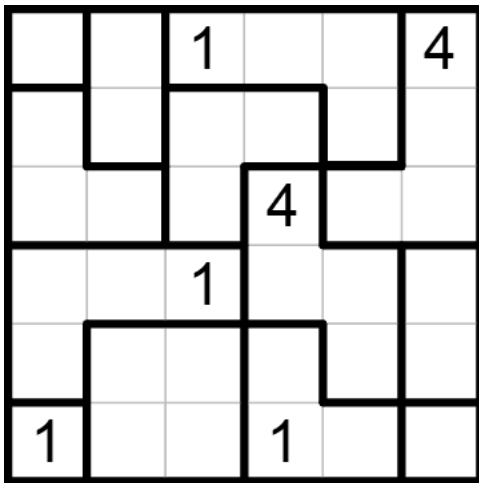
Remember that each puzzle has a unique solution. This fact can often be very useful in completing a puzzle.



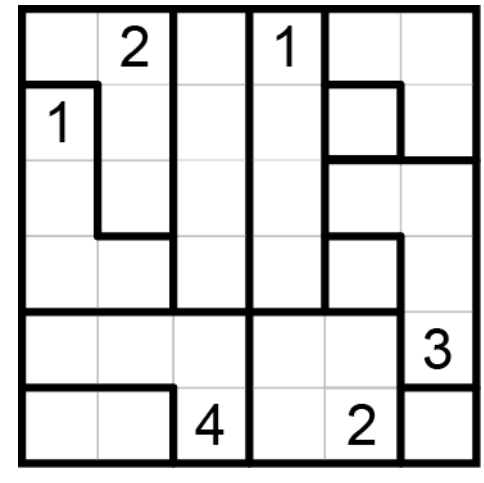
Ripple Effect Puzzle 1



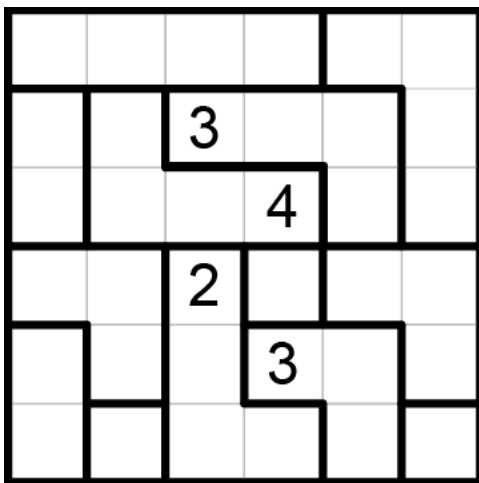
Ripple Effect Puzzle 2



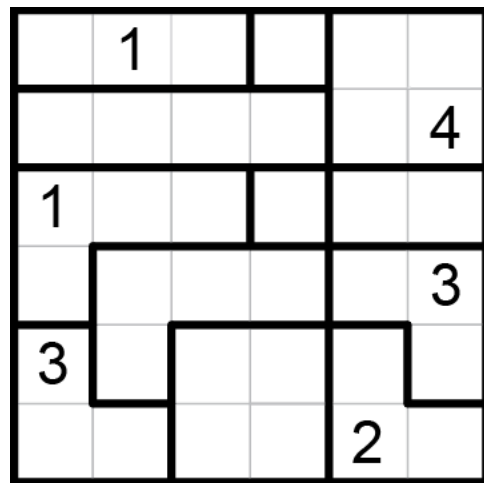
Ripple Effect Puzzle 3



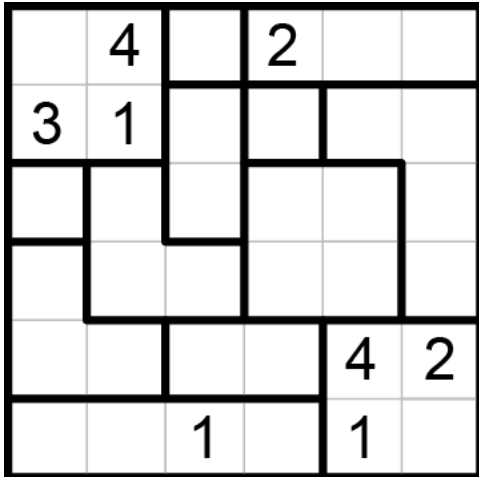
Ripple Effect Puzzle 4



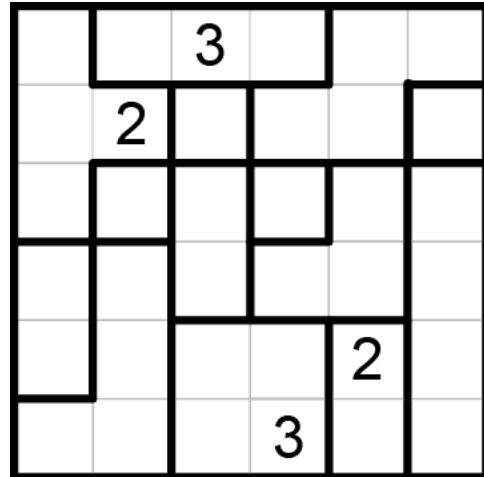
Ripple Effect Puzzle 5



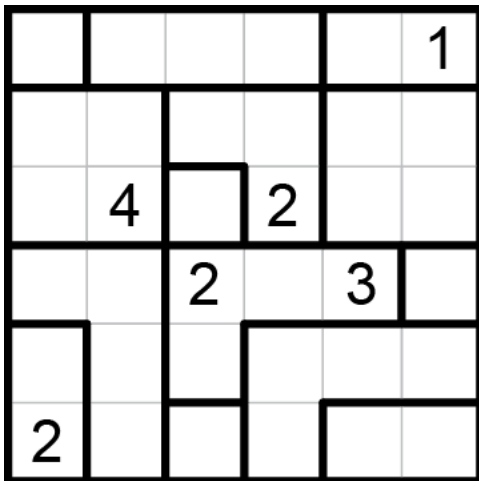
Ripple Effect Puzzle 6



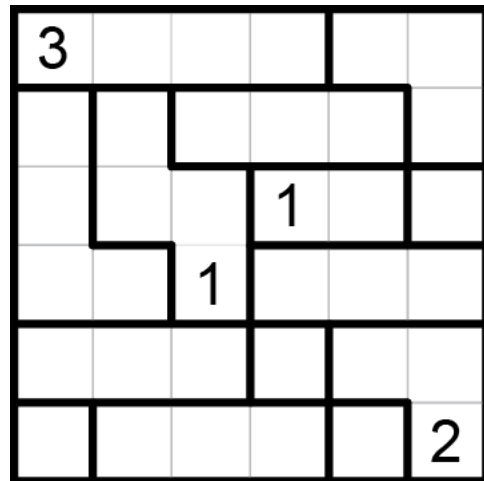
Ripple Effect Puzzle 7



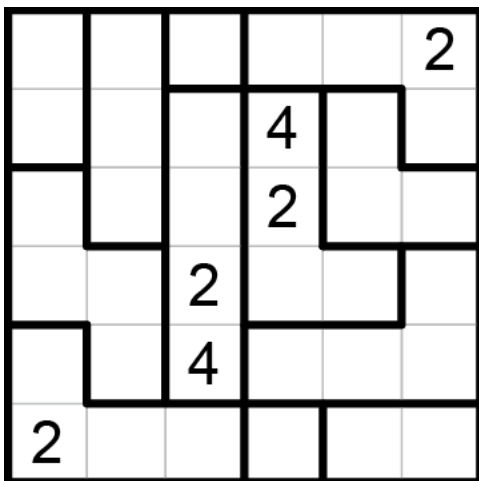
Ripple Effect Puzzle 8



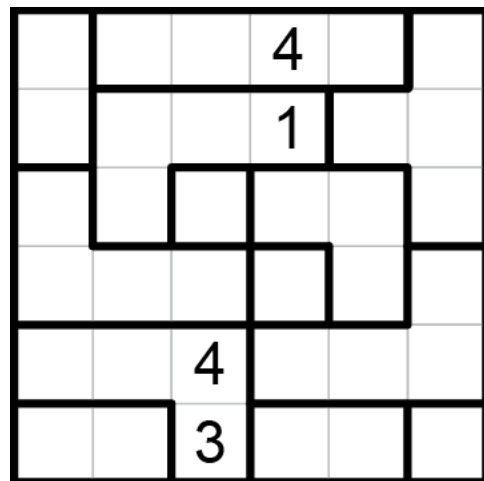
Ripple Effect Puzzle 9



Ripple Effect Puzzle 10

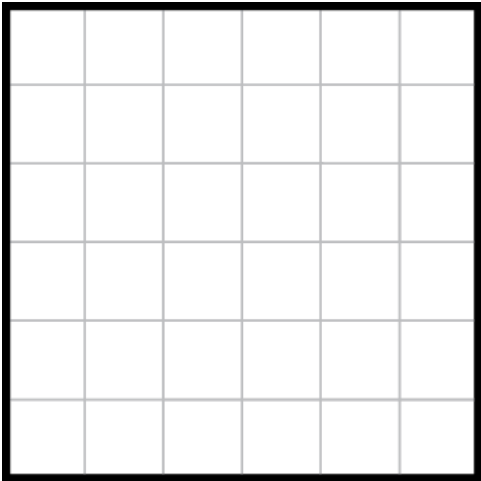
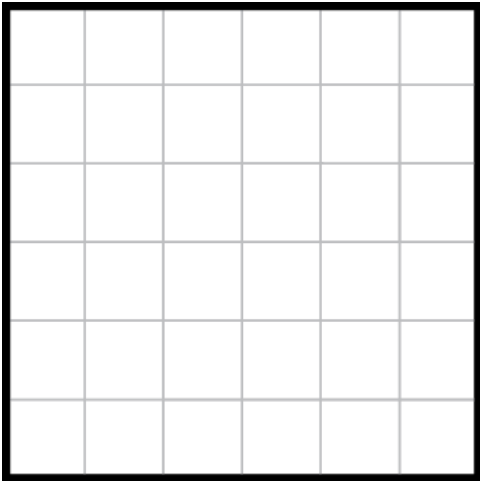
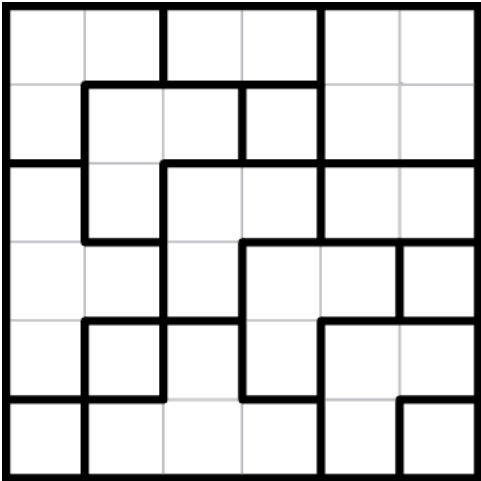
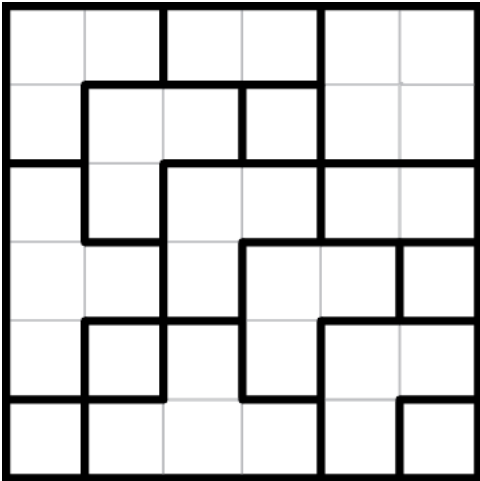
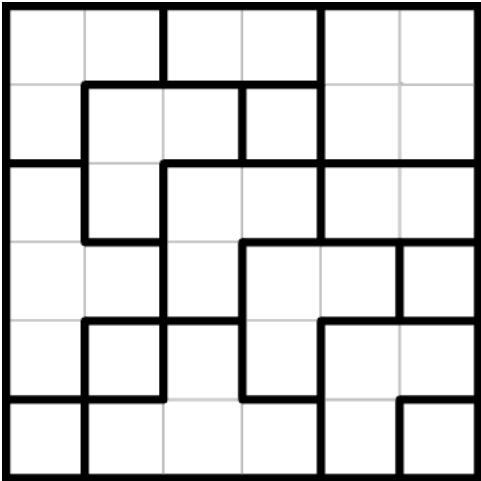
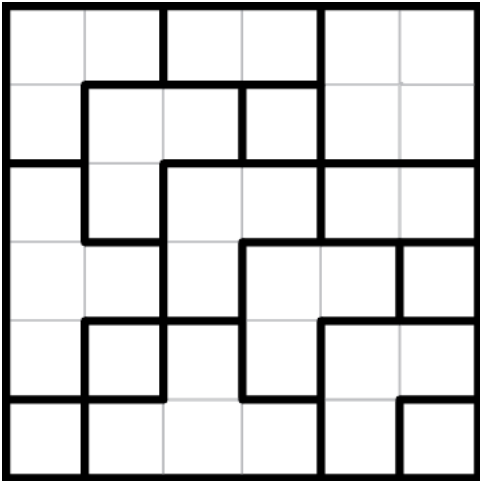


Ripple Effect Puzzle 11

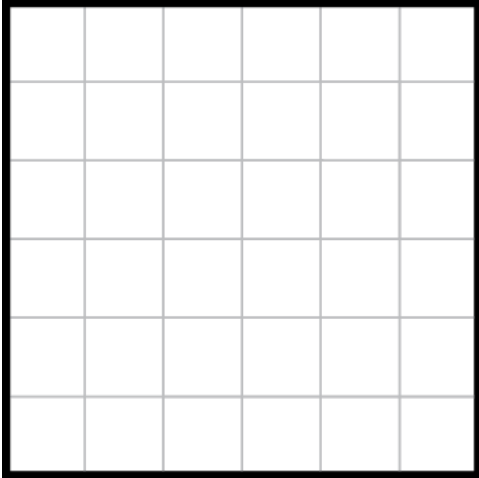
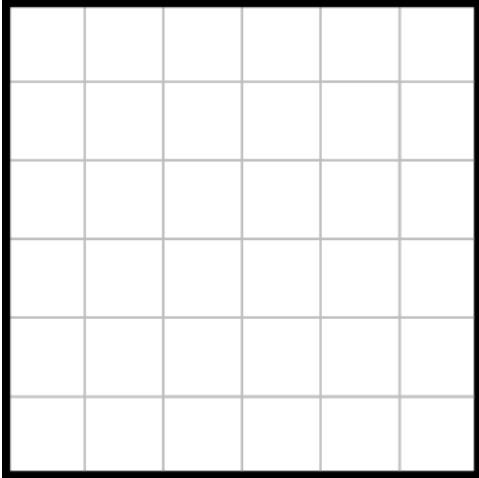
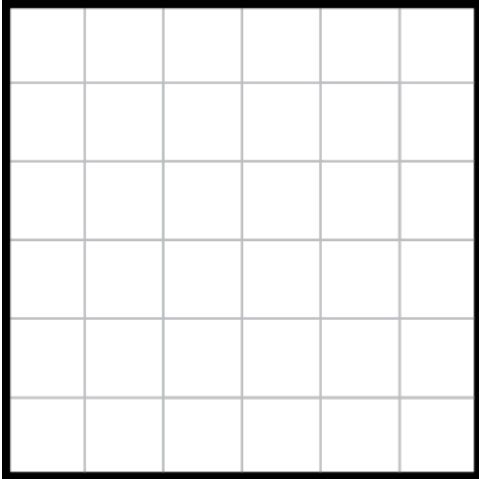
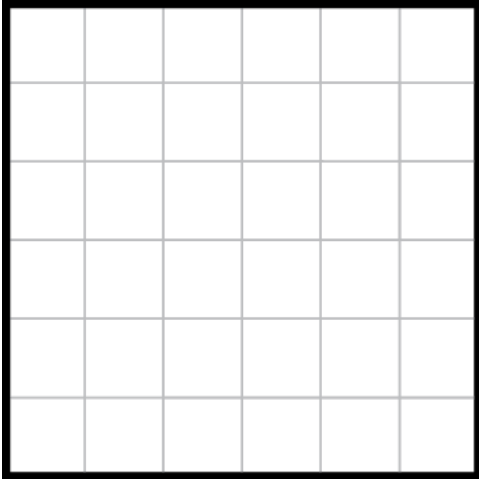
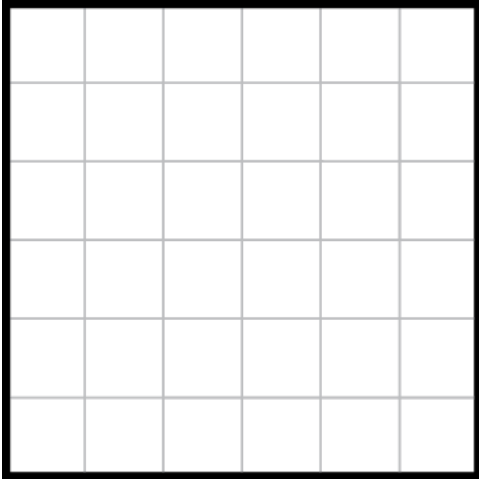
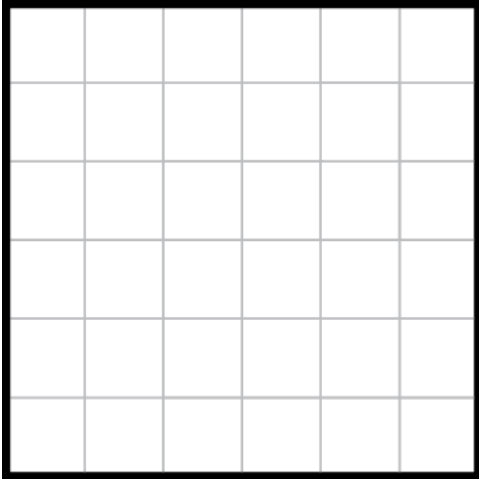


Ripple Effect Puzzle 12

Blank Ripple Effect Templates (6 x 6)

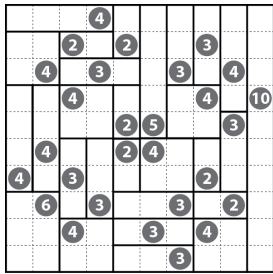


Blank Ripple Effect Templates (6 x 6)

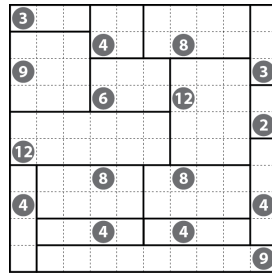


SOLUTIONS

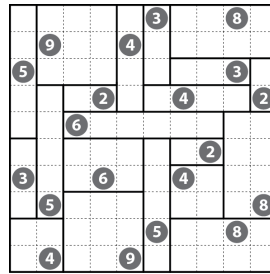
Shikaku



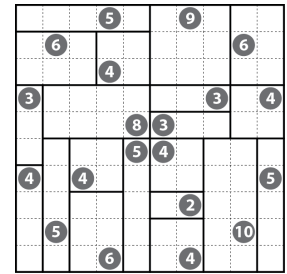
Puzzle C



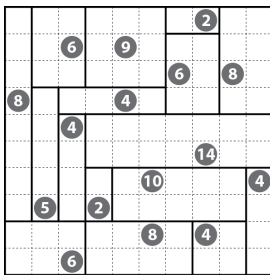
Puzzle 1



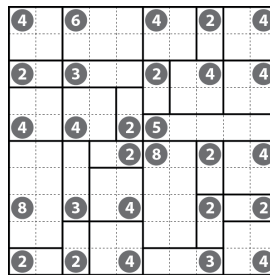
Puzzle 2



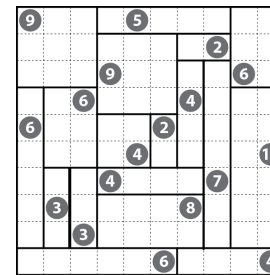
Puzzle 3



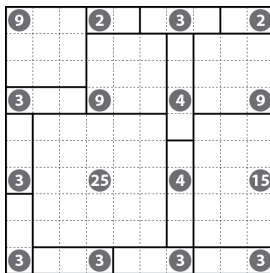
Puzzle 4



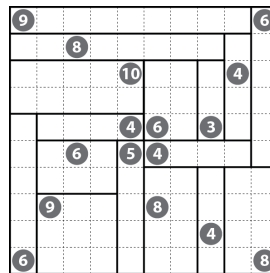
Puzzle 5



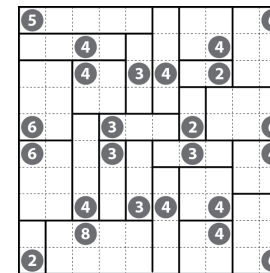
Puzzle 6



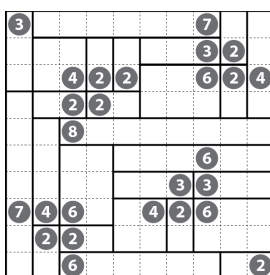
Puzzle 7



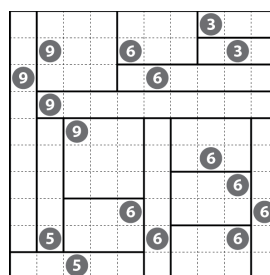
Puzzle 8



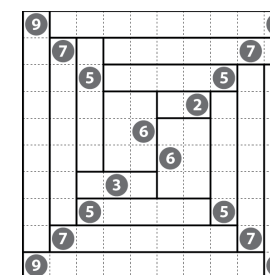
Puzzle 9



Puzzle 10



Puzzle 11



Puzzle 12

SOLUTIONS

Ripple Effect

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

Puzzle C

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

Puzzle 1

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

Puzzle 2

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

Puzzle 3

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

Puzzle 4

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

Puzzle 5

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

Puzzle 6

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

Puzzle 7

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

Puzzle 8

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

Puzzle 9

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

Puzzle 10

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

Puzzle 11

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

Puzzle 12