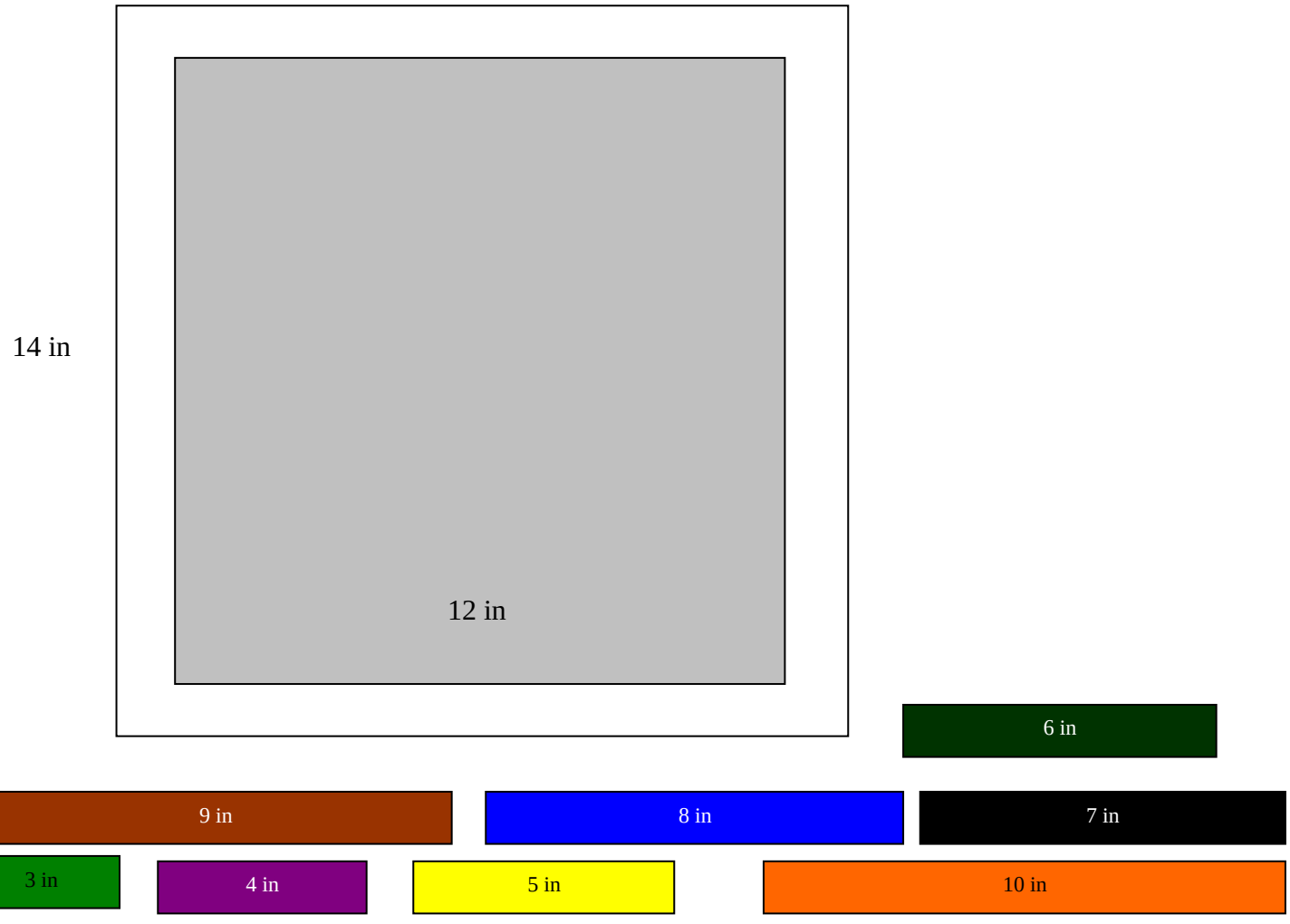
Miles of Tiles

Level A

You have a picture frame. You would like to decorate the frame by gluing tiles on it. The frame is a square shape.

The frame is 1 inch wide all around. The inside of the frame is a 12-by-12-inch square. The outside of the frame is a 14-by-14-inch square.

There are 8 tiles, each a different length (3, 4, 5, 6, 7, 8, 9, and 10 inches).



Determine how the tiles could be placed in order to cover the frame with tiles. How many different arrangements can you make? Explain how you found your answers.

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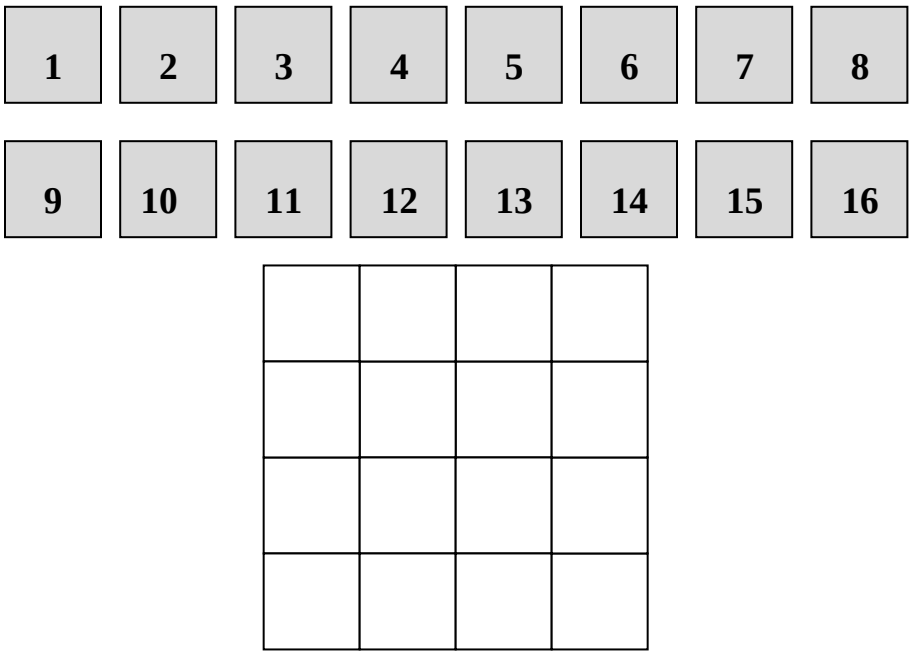
Miles of Tiles

Level B

You work for a puzzle company and your job is to write the solutions to the puzzles that have been designed.

You have been assigned to determine the solution to the puzzle called Totaling Tiles. The puzzle provides 16 tiles, each with a different number written on the tile (1–16). It also provides a board with sixteen squares. The task is to arrange the tiles in the table so that each row, column, and diagonal adds to the same amount.



Explain how you found your solution.

Are there more possible arrangements that fit the conditions? If so, find others; if not, explain why you believe there is only one solution.

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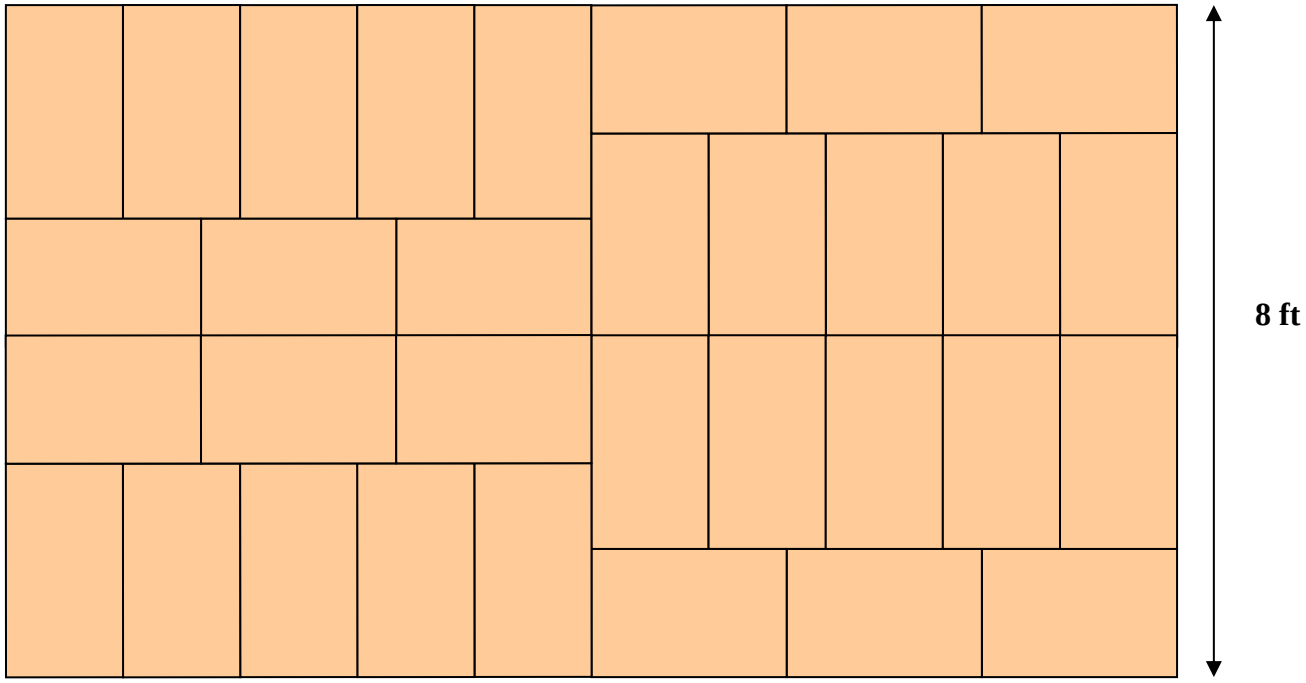
Miles of Tiles

Level C

You work for a tile company that makes tiles for patios. A customer sent you the following picture of his patio. He said the patio is made up of the same tiles, positioned either vertically or horizontally. He said he wants to replace three tiles that are cracked. He didn't tell you the dimensions of the tiles but did tell you that the width of the patio is 8 feet.



Determine the dimensions of a tile in the patio.

Explain how you found your solution.

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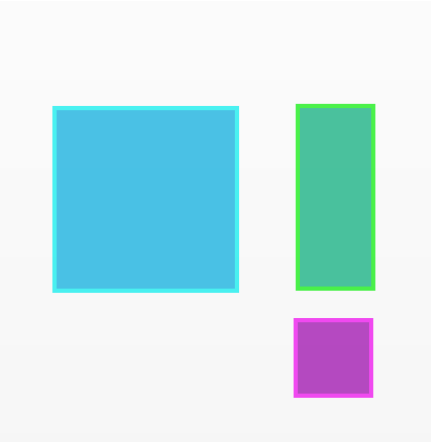
Miles of Tiles

Level D

You work for a tile manufacturing company. The company has overstocked a certain set of tiles. There are three different tiles in this particular set. One is a large square tile, the second is a small square tile, and the third is a rectangle. The length of the rectangle is the same length as one side of the large square. The width of the rectangle is the same size as one side of the small square.



This happens to be good news. A set of these tiles can be arranged into rectangular configurations to create nice tile patterns.

Suppose you have 6 large squares and 4 small squares, along with a certain number of rectangles. How many larger rectangle configurations can you make? How many small rectangles are needed to make each larger rectangular configuration? Explain how you know.

Illustrate all the different configurations that can be created.

Explain how you know that you have found all possible rectangular configurations.

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Miles of Tiles

Level E

Your boss is proud of how you handled the overstocked tile problem. Your boss wants to know your secret, so the boss has given you the following job:

Write a memo to your boss that answers the following questions:

- Given any number of large squares and small square tiles, how can you create enough rectangular tiles to make various rectangular configurations?
- Given a specific number of large squares, small squares, and rectangles, can you always make a rectangular configuration from those tiles? If so, why, and if not, how would you know for sure?
- Can you make rectangular configurations given any number of large and small squares? Explain why or why not.

Remember your tiling career hangs in the balance, so you need to use mathematics to explain your reasoning.

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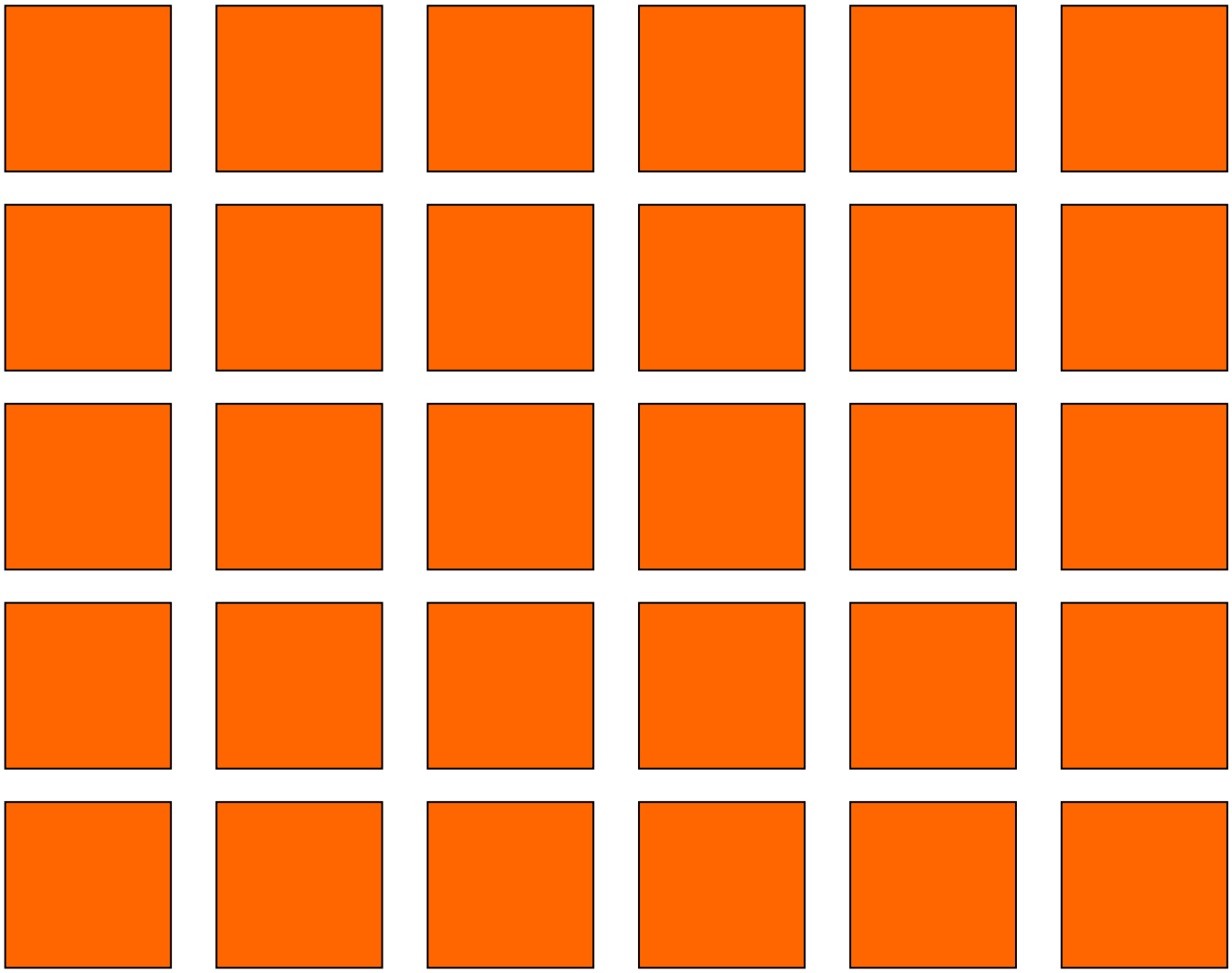
Miles of Tiles

Manipulatives



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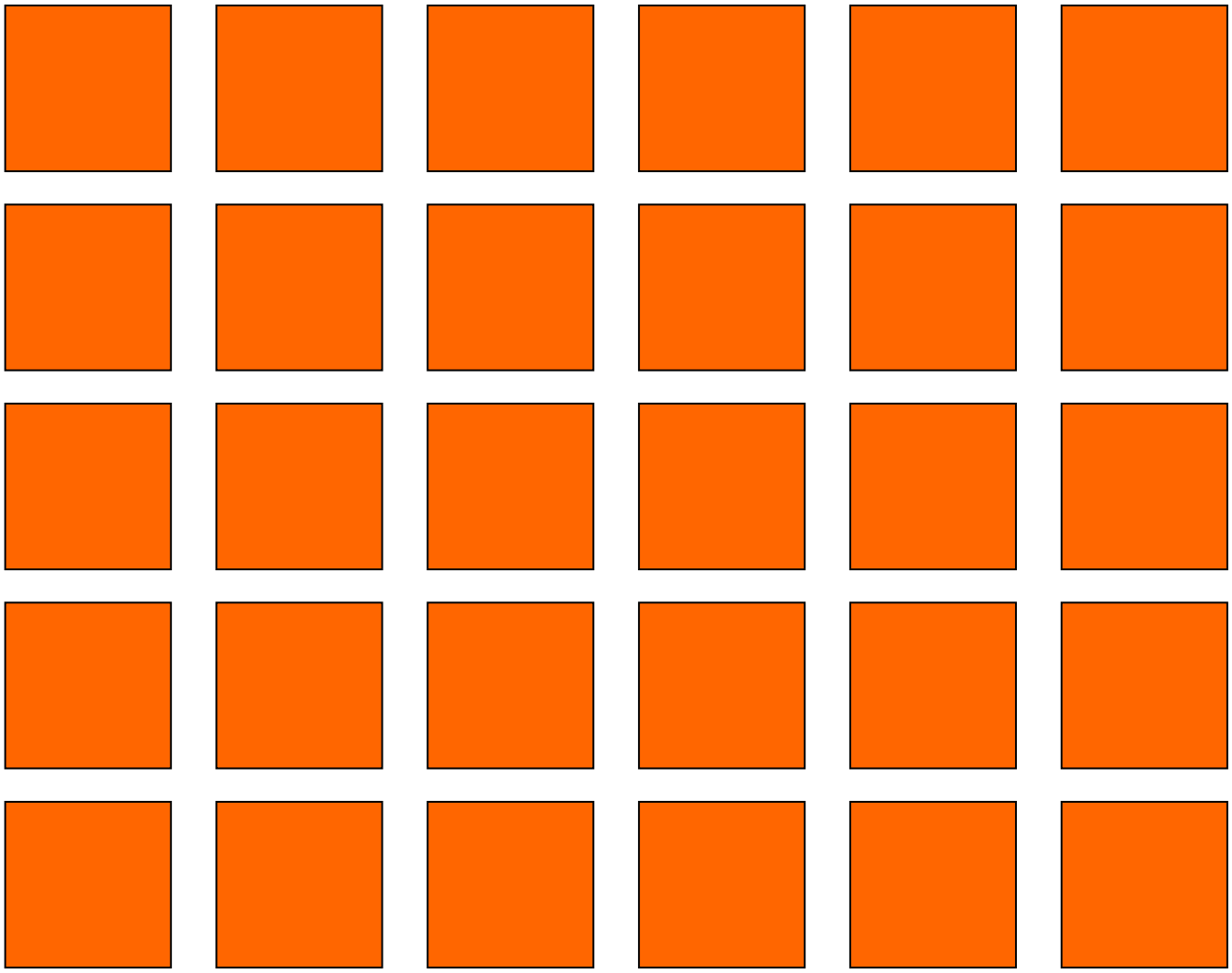

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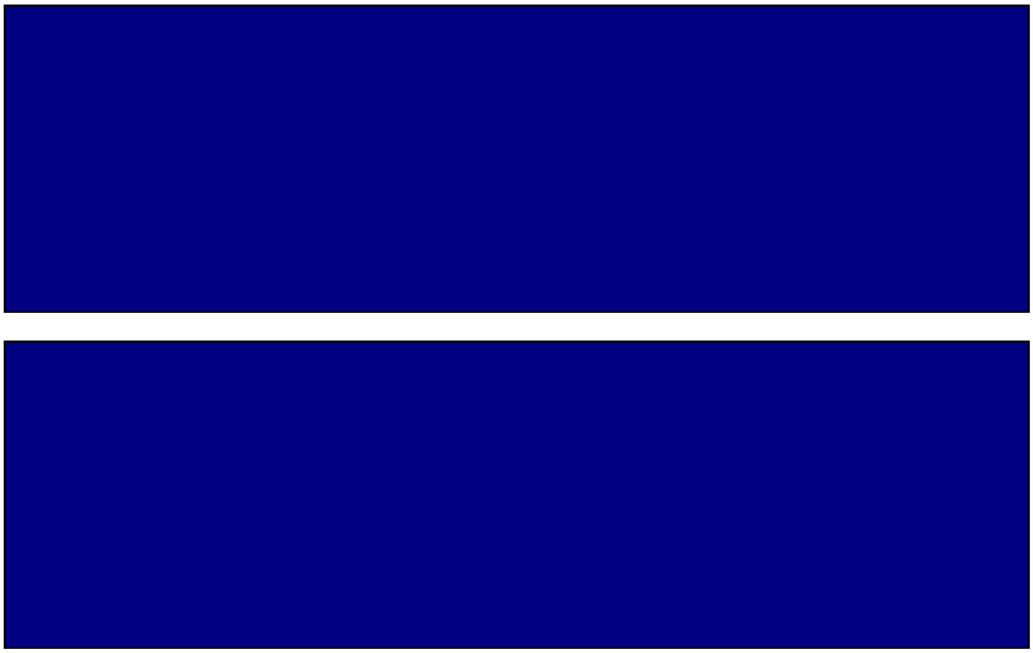

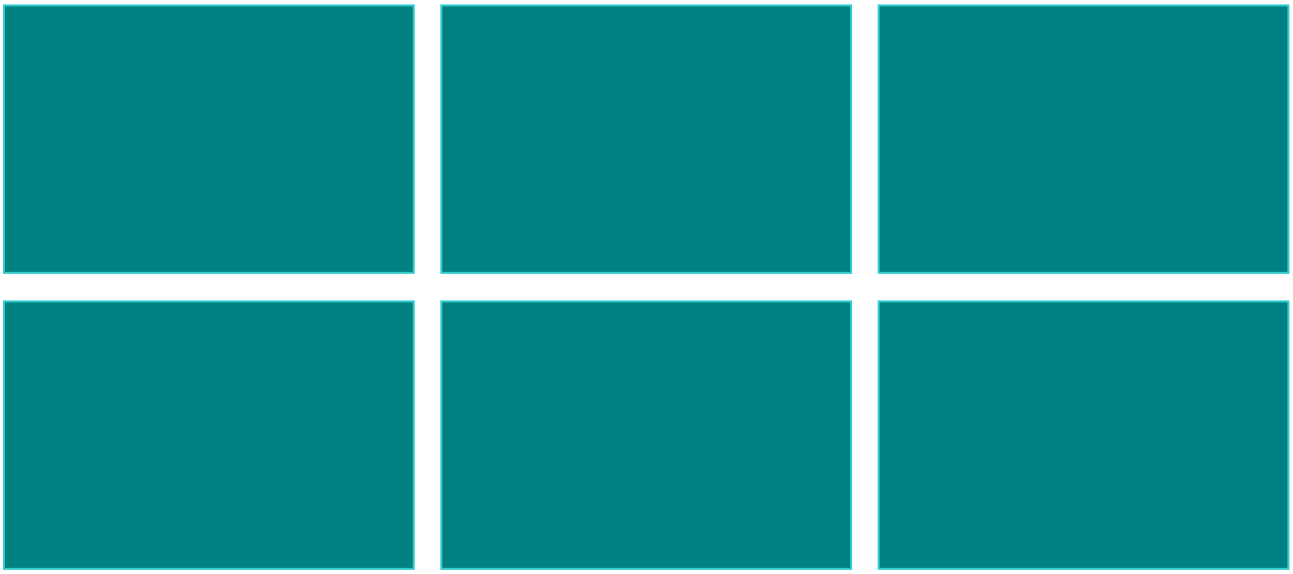

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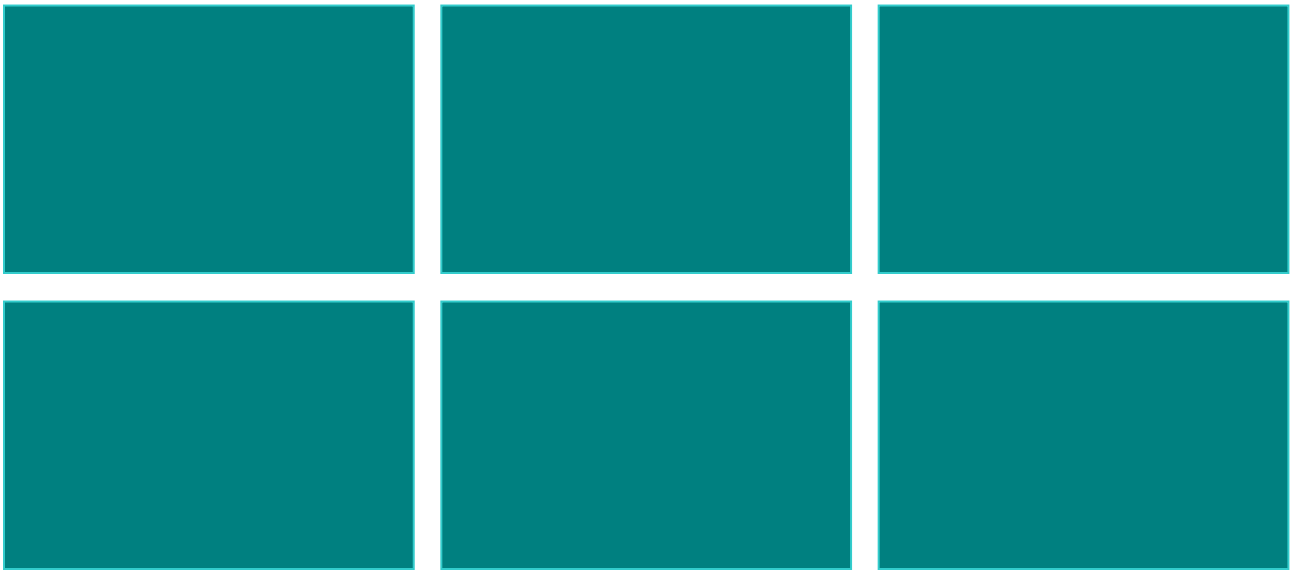

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