

SKYSCRAPERS

ACTIVITY GUIDE

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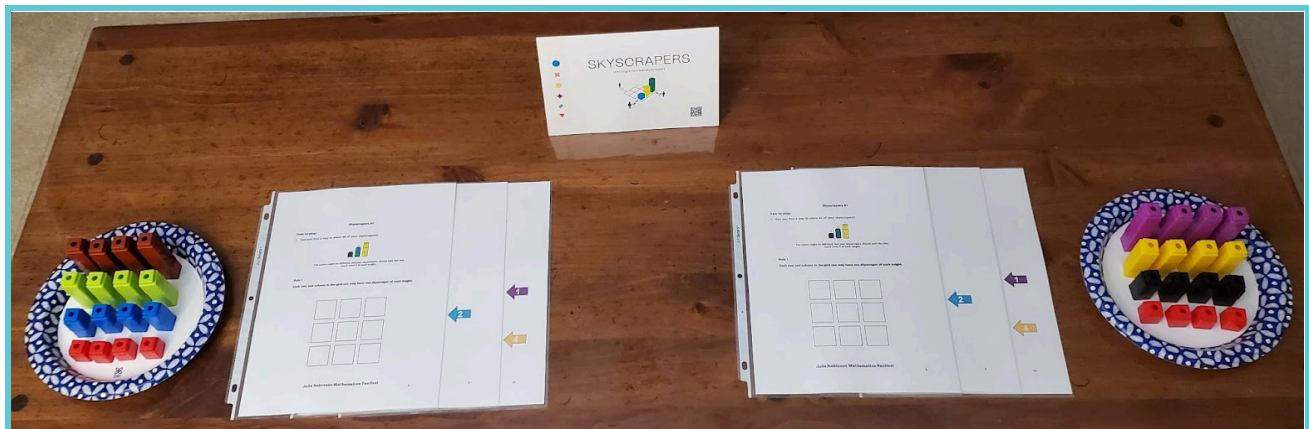
**Julia Robinson
Mathematics
Festival**

Materials and Setup

Per table (assuming 5 students per table), you will need:

Per Table	Material Preparation	
200 linking cubes in 5 small containers	Pre-build 16 towers for each container (4 x 4 blocks high; 4 x 3 blocks; 4 x 2 blocks; 4 x 1 block)	
3 copies of Instructions	1 page each	p. 6
5 copies of Tasks	8 pages each <i>can be printed double-sided</i>	p. 7-14
1 copy of Table Sign	1 page <i>print on cardstock for sturdiness</i>	p. 15

Per Table	Purchasing Materials		
200 linking cubes	pack of 500 for \$31.96		
23 plastic sheet protectors	pack of 100 for \$7.67	pack of 500 for \$26.99	These are recommended in order to protect the documents that students will be handling.





Objective

Use the arrow clues to correctly place all the skyscrapers in the grid.

Rules:

1. Place a skyscraper in each square.
2. For each arrow, pretend you're a small person standing on the arrow. The number in the arrow tells you how many skyscrapers you should be able to see.
3. In each row and column, skyscrapers must be different heights.

Materials

Each Skyscrapers table should be prepped for 5 stations.

Each station needs:

1. 16 pre-built skyscrapers in a small container.
2. Skyscrapers instructions.
3. Skyscrapers tasks.

How to Play

We strongly encourage you to explore the activity yourself ahead of time.

You can try our digital version here: jrmf.org/puzzle/skyscrapers

Introduce the activity without overexplaining it and without telling what strategies students might want to use. As much as possible, avoid giving away answers. Students should be encouraged to explore, experiment, and learn from their mistakes.

1. Have ready to go 9 towers and the first 3 x 3 grid. (Leave the extra towers aside).
2. Demonstrate the rules by placing some of the skyscrapers on the grid.
3. Ask the student to try finishing placing the rest of the skyscrapers on the grid. Encourage them to explain their thinking out loud as they place the skyscrapers.
4. Have the student explore the second task, using the linking cubes to solve. Point out that as the grids get larger, they'll need more skyscrapers and taller skyscrapers.

Standards

1. Make sense of problems and persevere in solving them. CCSS.MP1
2. Construct viable arguments and critique the reasoning of others. CCSS.MP3
3. Model with mathematics. CCSS.MP4
4. Attend to precision. CCSS.MP6



Asking Good Questions

1. Ask questions about confidence.
 - a. When a student asks you “Is this right?”, instead of saying “yes” or “no” right away, ask them how confident they are in their answer. Here are some examples:
 - i. “Maybe. What do you think? How confident are you?”
 - ii. “On a scale of 1-5, how confident are you in your answer?”
 - b. If a student is not confident in their answer, follow up by asking “What would help you feel more confident in your answer?” or “Why do you not feel confident?” This helps you determine how best to help the student through their explorations.
2. Ask students about choices.
 - a. When a student is stuck or shows you a wrong answer, instead of jumping in and showing the student the correct answer, start by asking about the choices that the student made along the way. Here are some suggested steps to follow:
 - i. Start from the beginning.
 - ii. Ask students to show you what they’ve tried so far.
 - iii. When the student gets to a point where they have different choices, ask the student “What other choices can you make here?”
 - iv. Have the student make a different choice and try to solve the puzzle. This helps the student see that they have the power to make different choices during an activity, and they’ll start to do this on their own in the future.
 - v. If you’re familiar with the puzzle or a particular solution, stop the student only when a different choice will help them get to the solution. This will help them feel successful faster without you giving away too much of the answer.
3. Ask students about strategies.
 - a. If a student is getting into the activity and has been doing it for a while, ask the student if there are any strategies they’ve come up with to help them solve the puzzle or win the game.
 - b. Follow up by asking if they think their strategies will work for all puzzles and/or larger puzzles, more complex puzzles, etc. Have the student explore more complex puzzles to test out their strategies.
 - c. This is a great way to encourage a student to dive deeper into an activity and to start looking for patterns, structure, and proofs.

Answers

Puzzle Solutions:

The number in a square tells you the height of the skyscraper in that square.

Puzzle #1

3	1	2
1	2	3
2	3	1

Puzzle #2

1	3	2
3	2	1
2	1	3

Puzzle #3

1	2	3
2	3	1
3	1	2

Puzzle #4

2	3	1
3	1	2
1	2	3

Puzzle #5

1	2	3
3	1	2
2	3	1

Puzzle #6

3	1	2
2	3	1
1	2	3

Puzzle #7

2	3	1
3	1	2
1	2	3

Puzzle #8

3	2	1
2	1	3
1	3	2

Puzzle #9

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

Puzzle #10

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

Puzzle #11

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

Puzzle #12

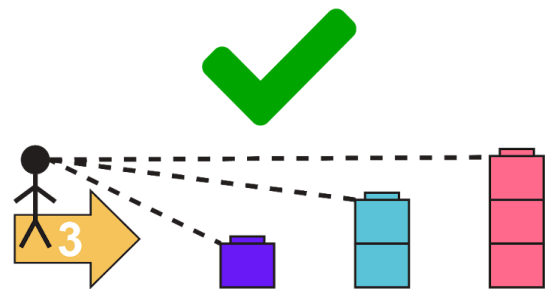
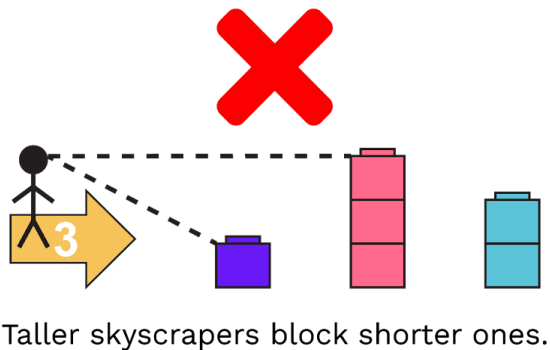
2	4	1	3
1	3	2	4
4	1	3	2
3	2	4	1

Skyscrapers Instructions

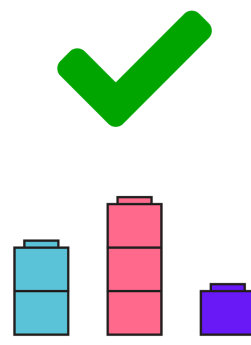
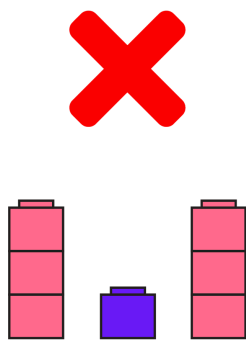
Rules:

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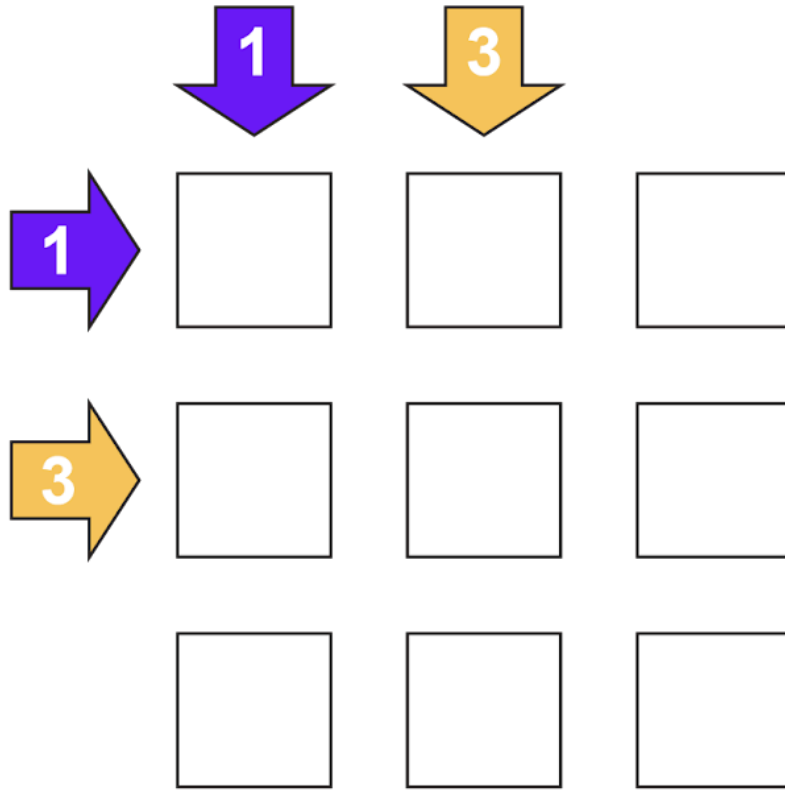


3. In each row and column, skyscrapers must be different heights.

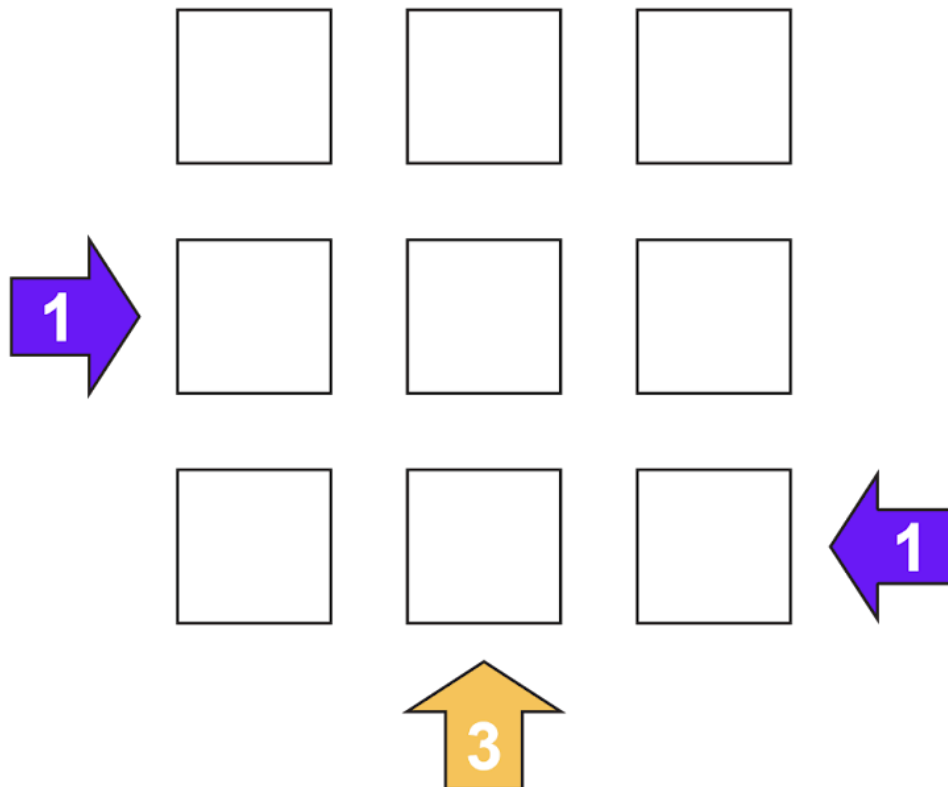


Skyscrapers

Puzzle #1

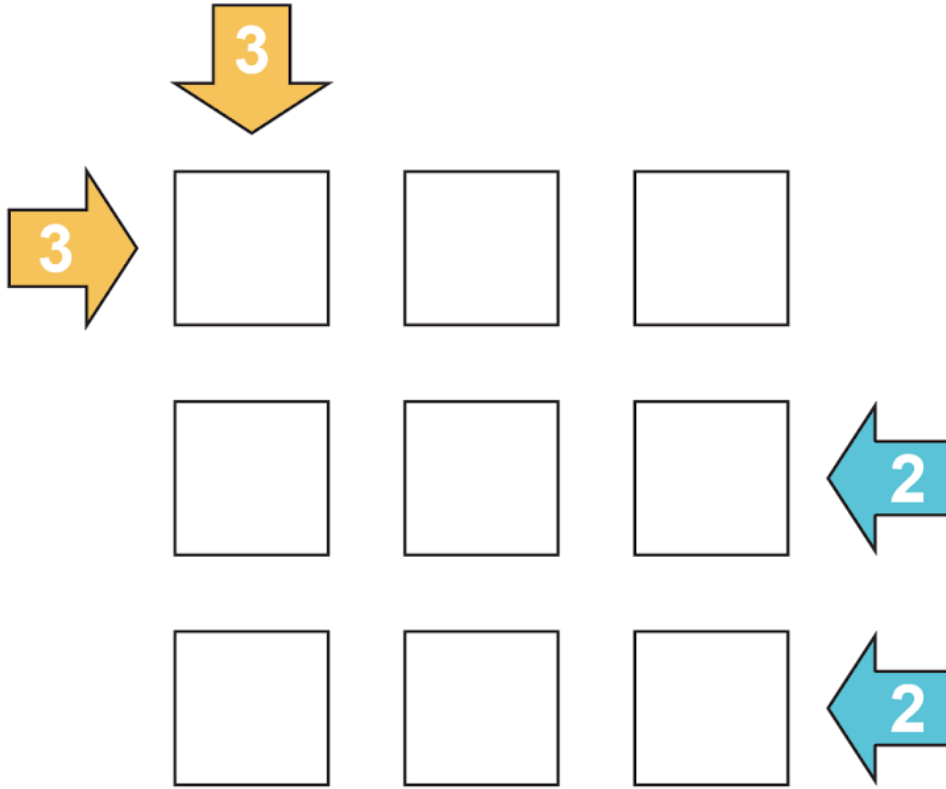


Puzzle #2

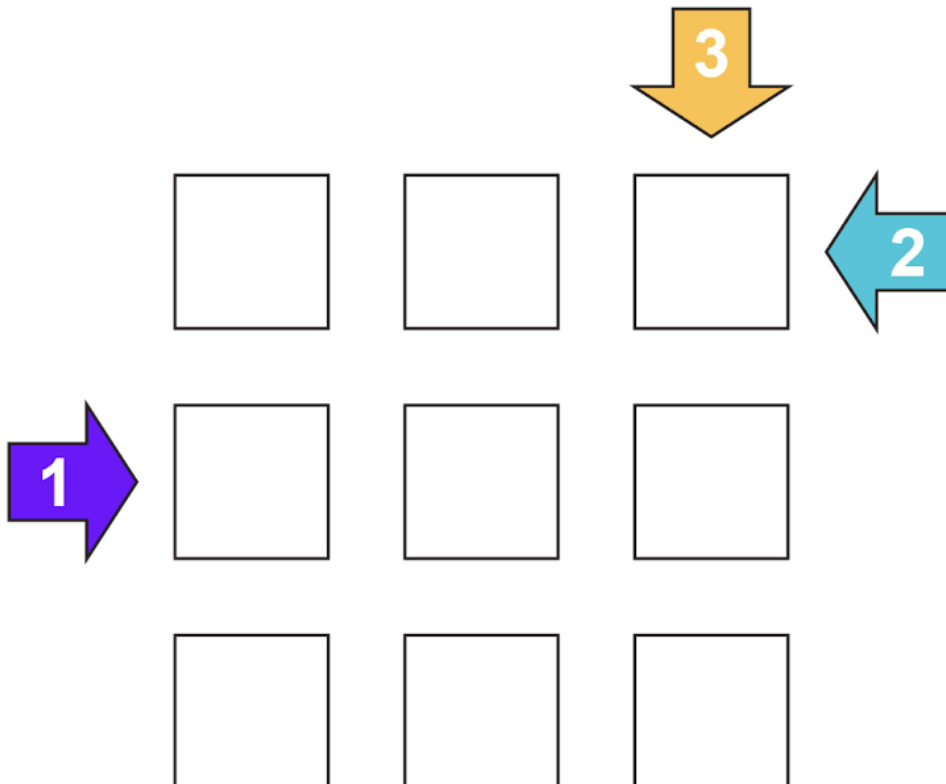


Skyscrapers

Puzzle #3

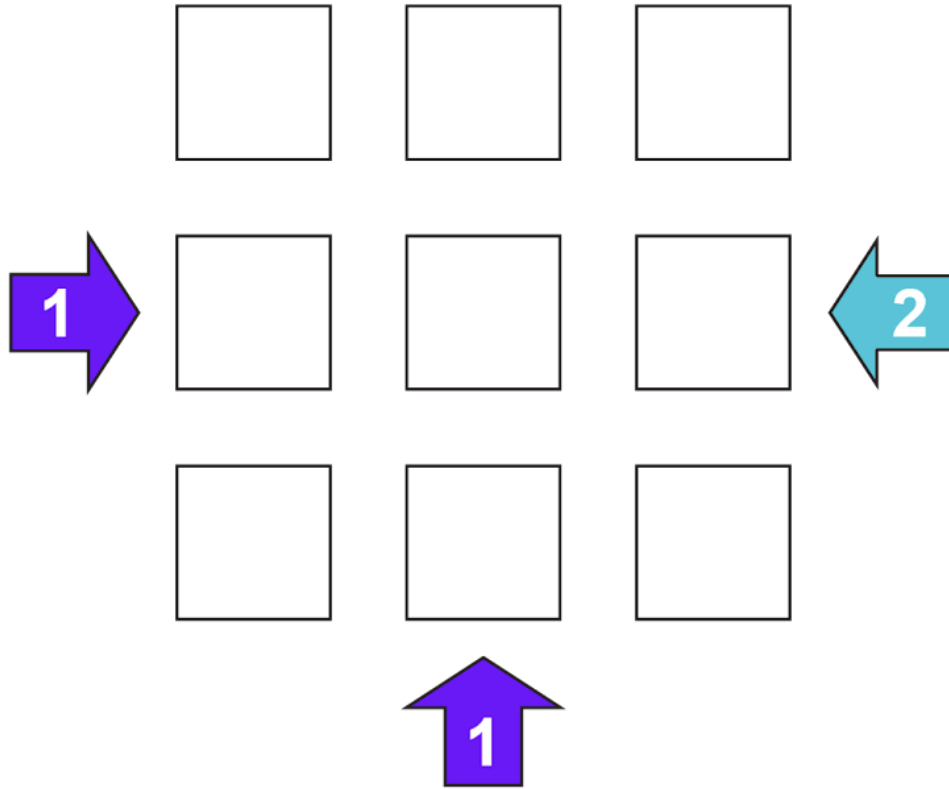


Puzzle #4

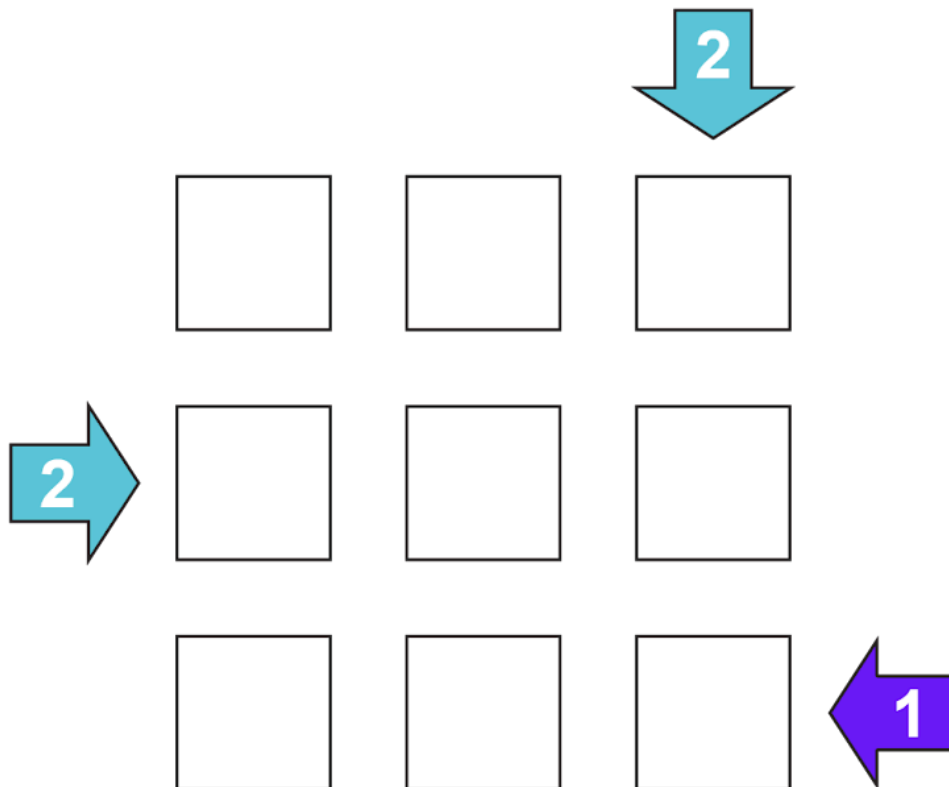


Skyscrapers

Puzzle #5

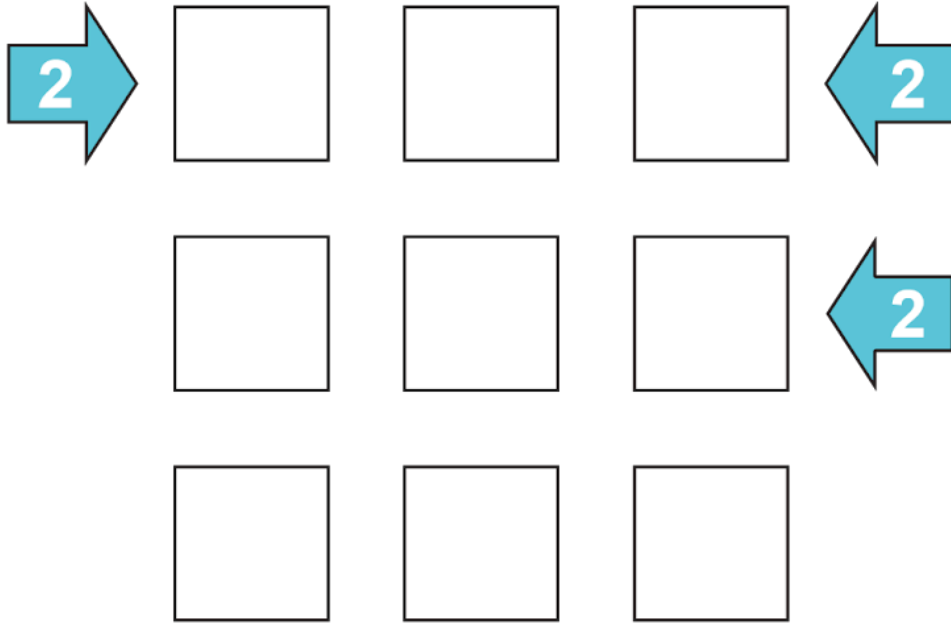


Puzzle #6

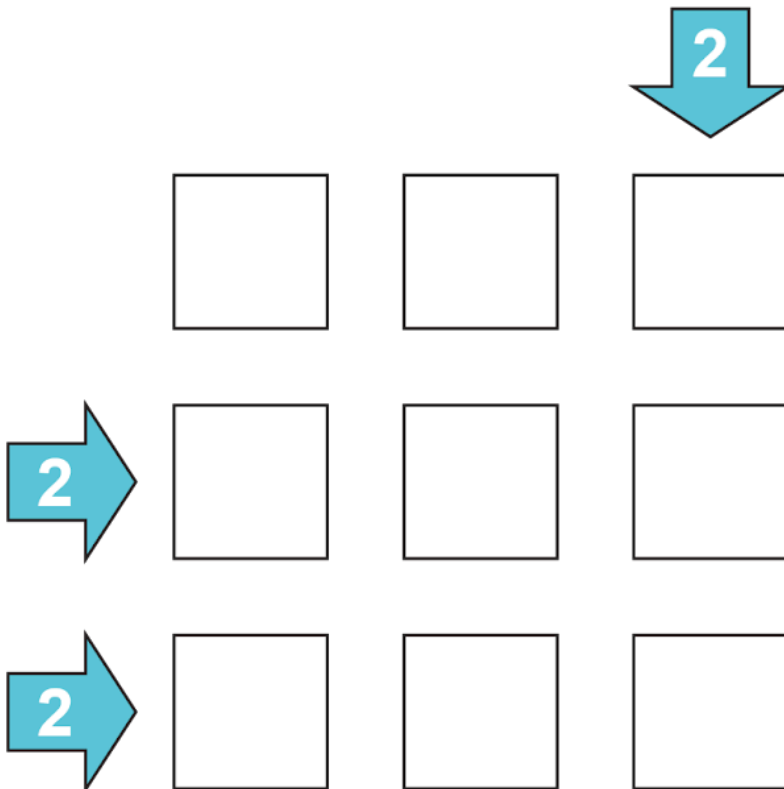


Skyscrapers

Puzzle #7

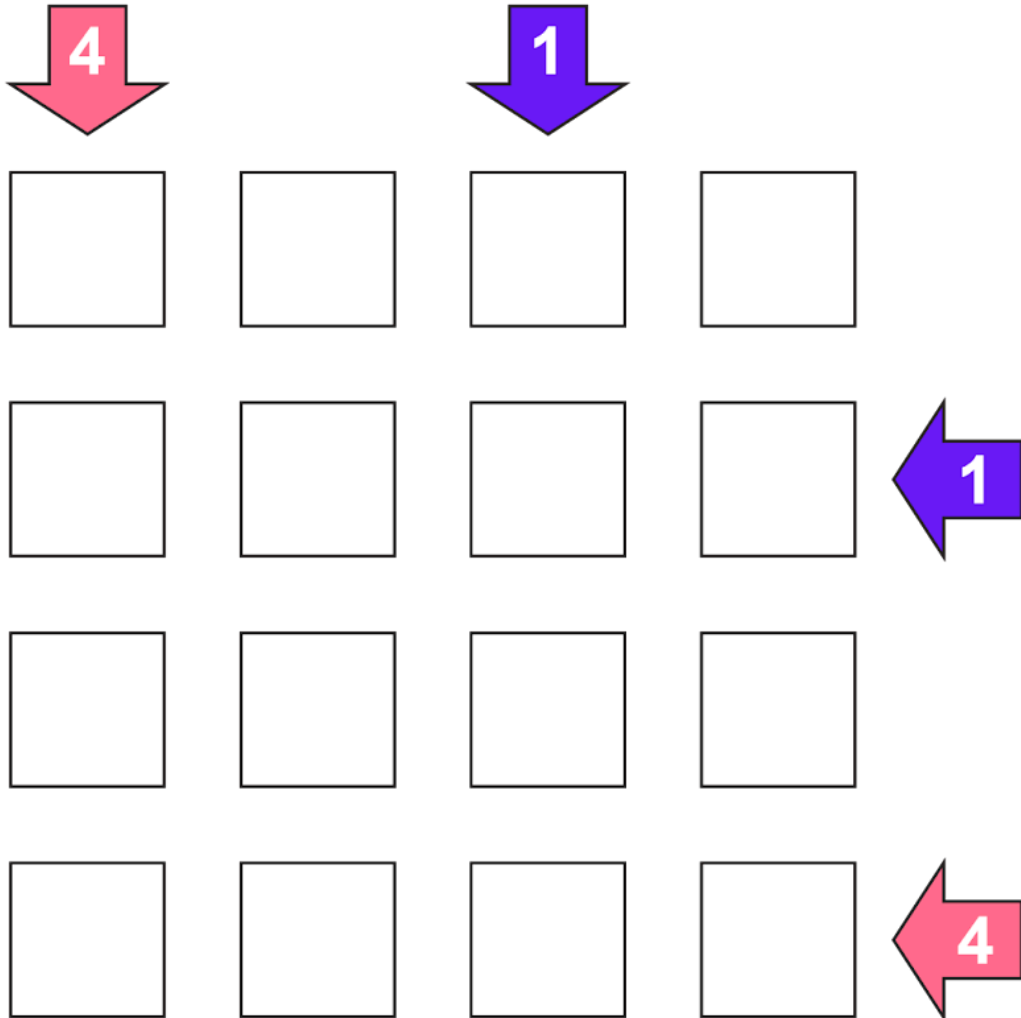


Puzzle #8



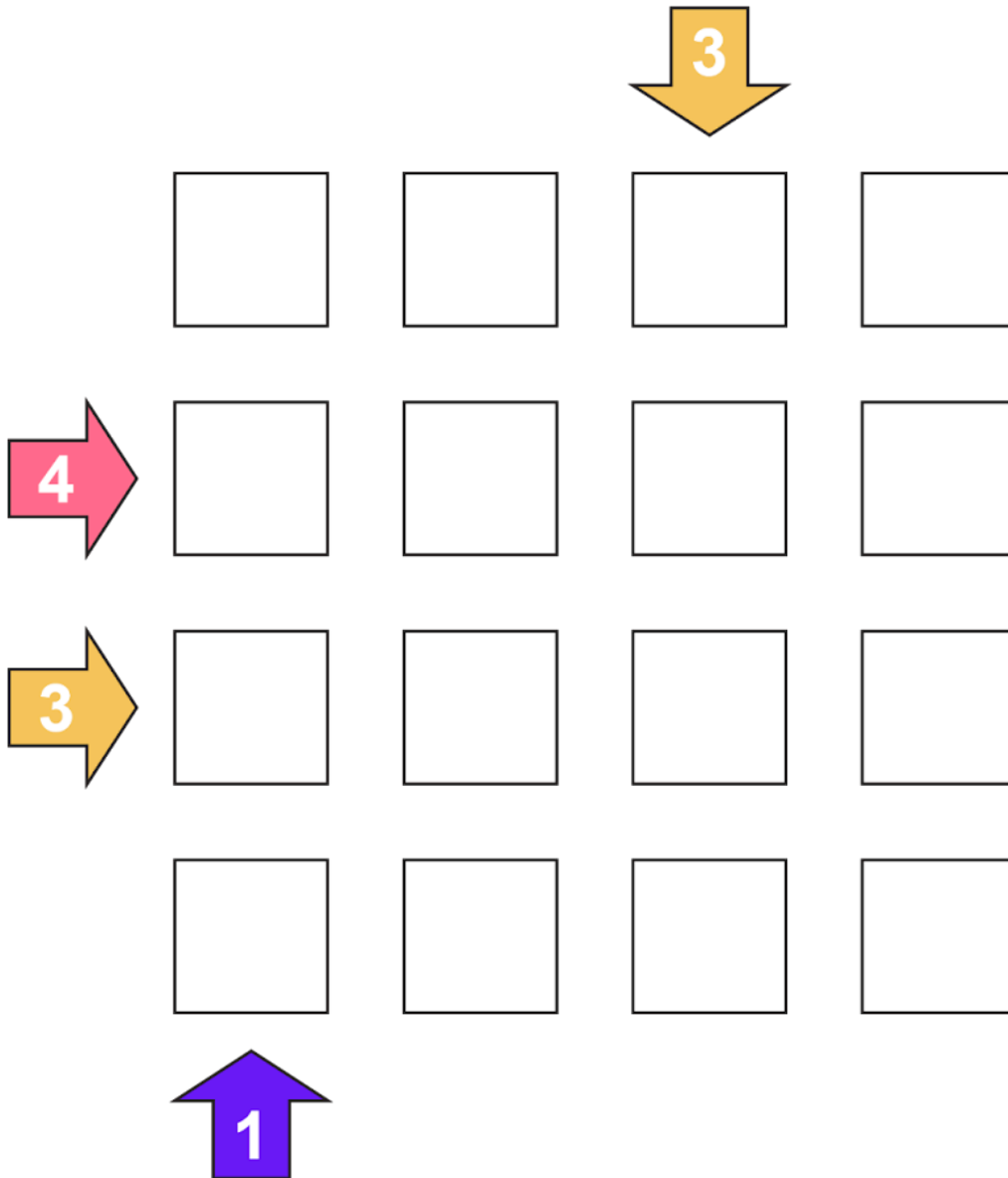
Skyscrapers

Puzzle #9



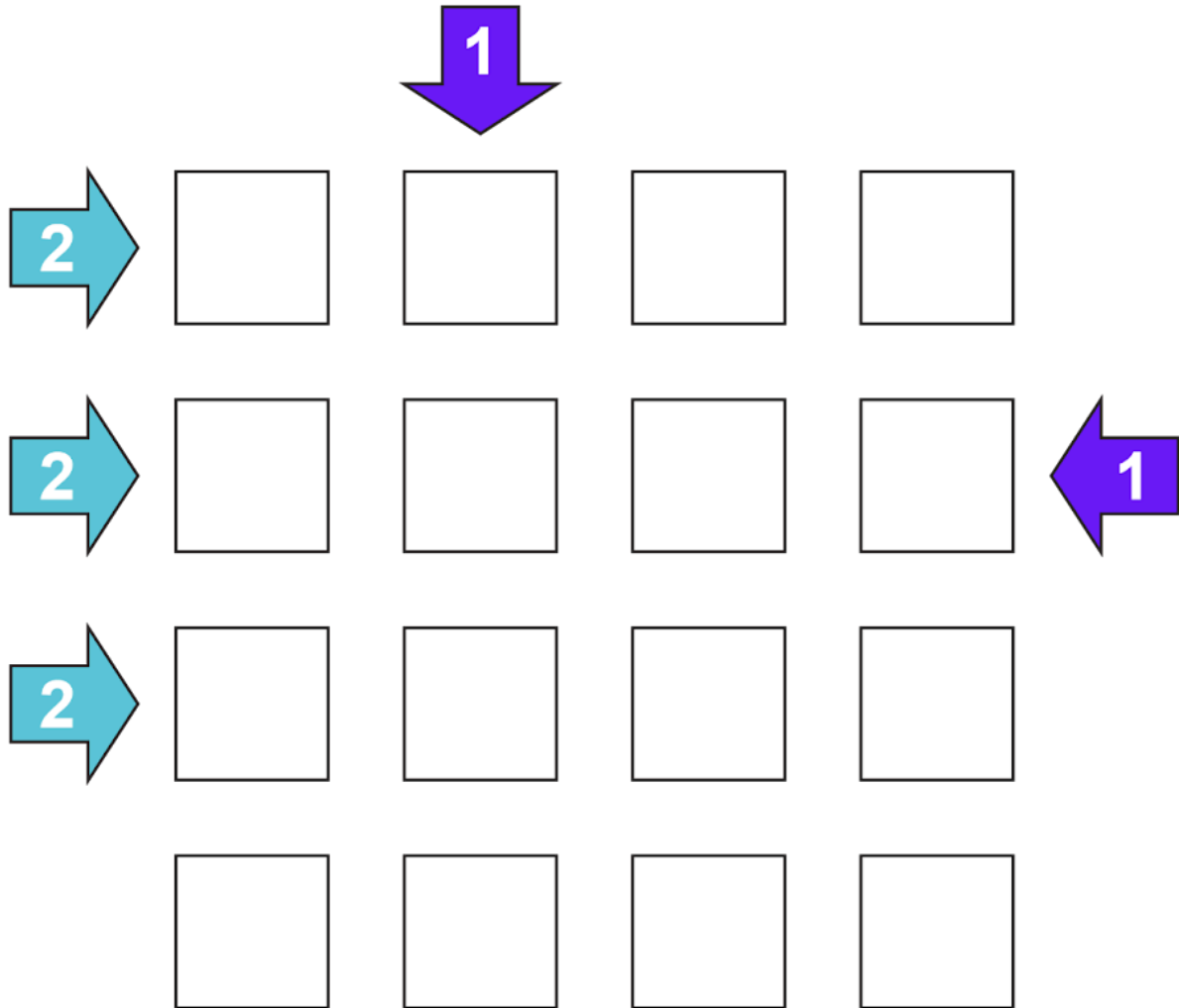
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Puzzle #10



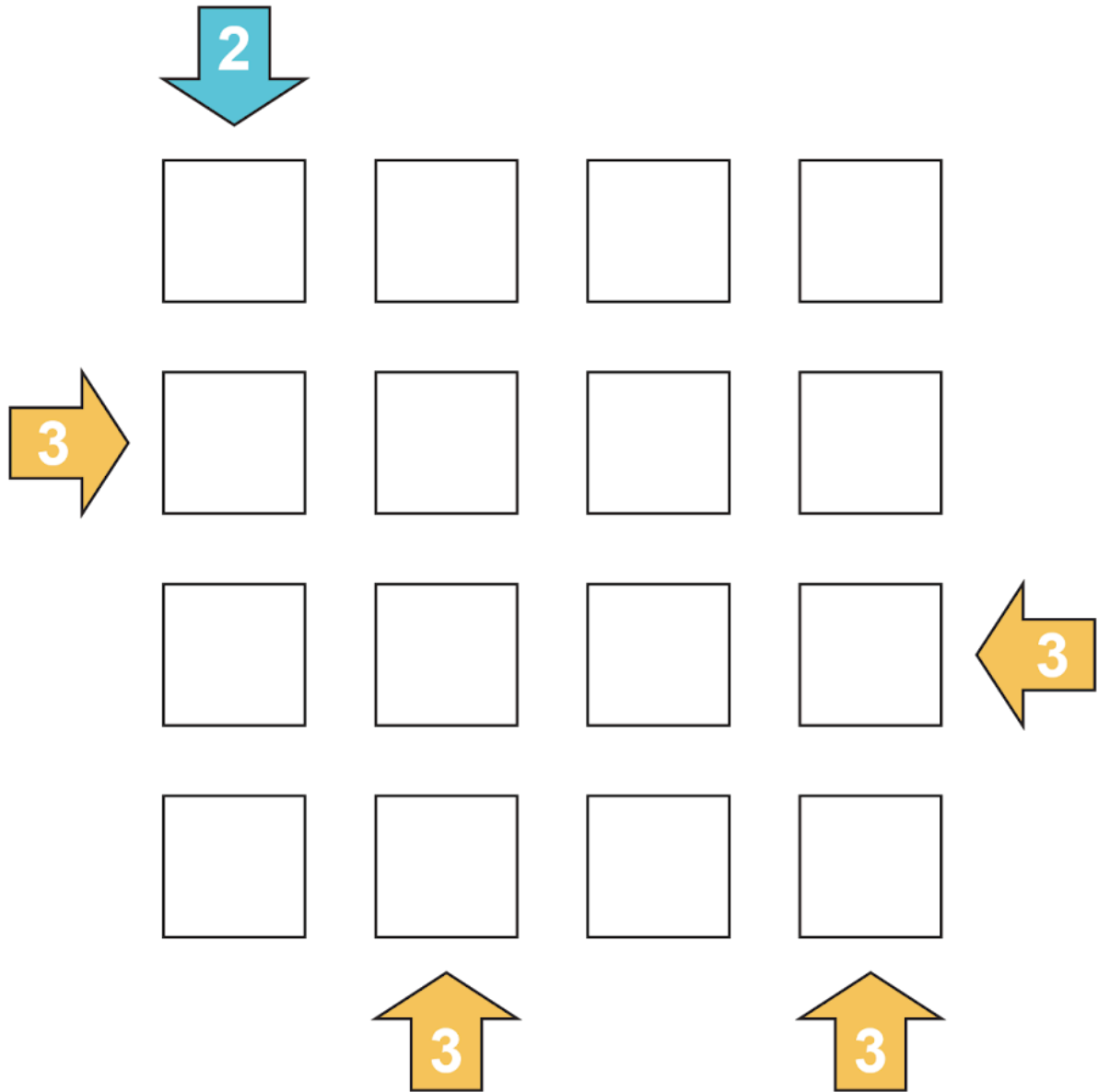
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Puzzle #11



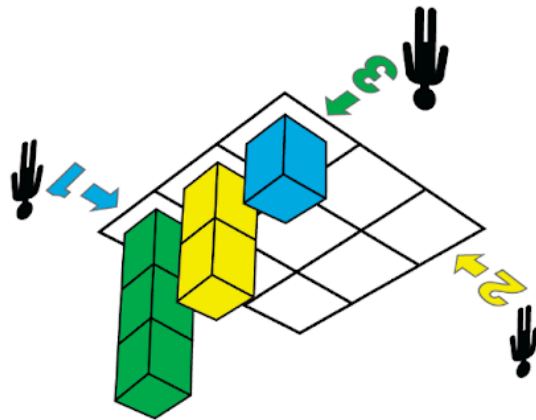
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Puzzle #12





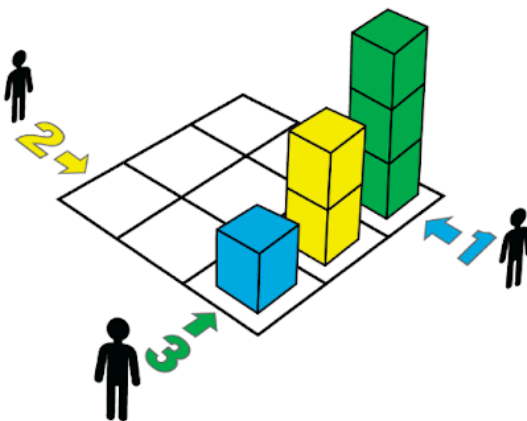
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