Ezgi showed me a puzzle where dominoes are placed to form a rectangle such that there is no line that separates the dominoes into two rectangles.

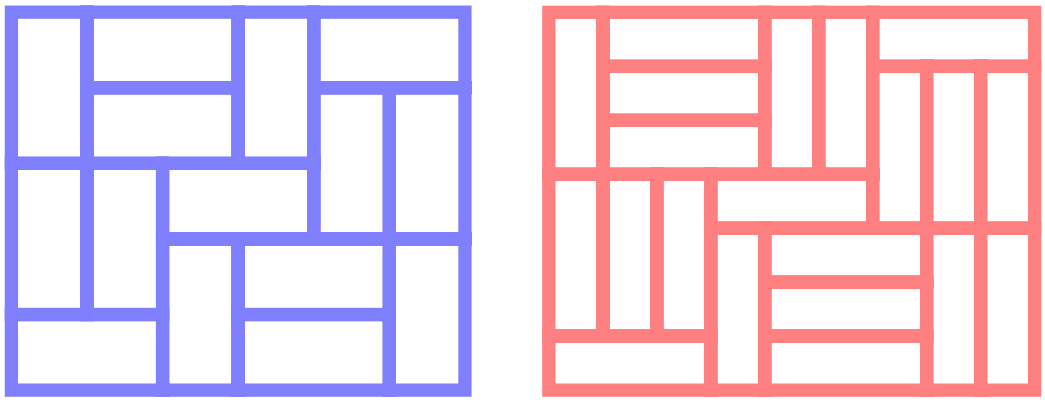

Figure 1: On the right is the smallest way to place dominoes into a rectangle such that there is no way to partition the dominoes into two rectangles. Is the left a minimal configuration with 1×3 triominoes?

Question. What size grids have such configurations?

Related.

1. How many configurations exist for a given grid size?
2. What if other rectangular polyominoes are used? (e.g. 3×2 hexominoes)
3. Are there analogous problems for triangular grids? Higher dimensions?

Note. These are sometimes called "Fault-free domomino tilings".

References.

Project Euler, Problem 215.

`http://mathworld.wolfram.com/Fault-FreeRectangle.html`