Consider all of the ways to stack "blocks" of different shapes on a platform of length n.

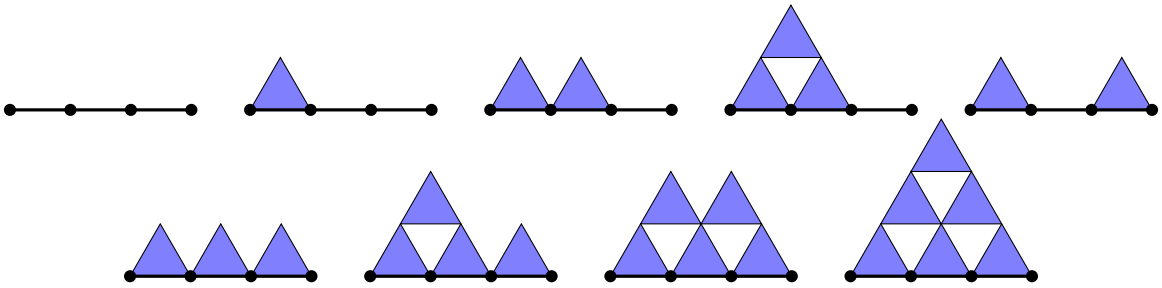

Figure 1: All towers of equilateral triangles on a platform of width 3.

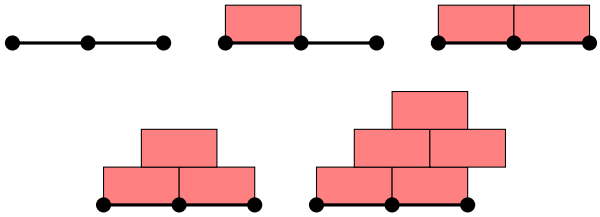

Figure 2: All five towers of length 2 bricks on a length 4 platform. (No row can be a vertical shift of another row, otherwise arbitrarily tall stacks are possible.)

Question. How many different stacks exist for these shapes?

Related.

1. What if  and  are considered to be distinct?
2. What if  and  are considered to be the same (because one turns into the other by "sliding".)
3. What if "upside-down" triangles can be placed in the gaps?
4. What if "upside-down" triangles *must* be placed in the gaps in order to stack on top?
5. What about bricks of length 3?
6. What about tetrahedrons and cuboids?
7. What if the number of bricks is the constraint instead of the size of the platform?

Note. The triangle stacking problem appears to be counted by Catalan numbers. If cantilevers are not allowed, the brick stacking problem reduces to the triangle stacking problem.