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

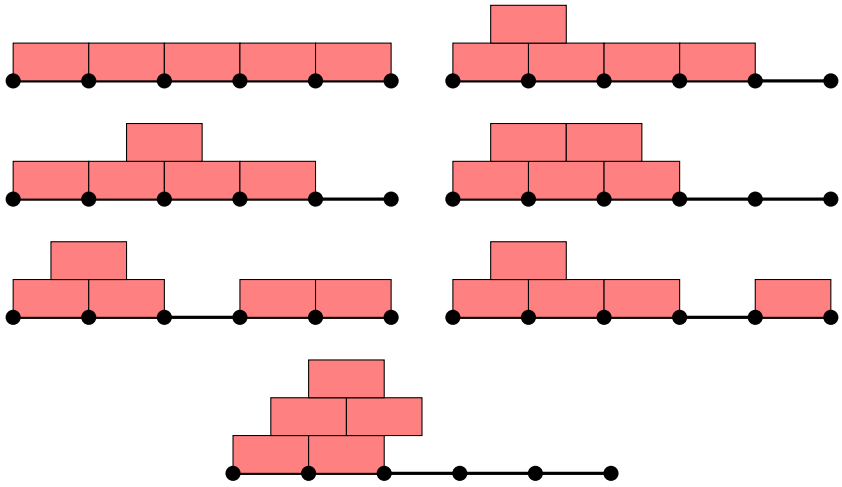

Figure 1: Seven examples of five length 2 bricks on a length 5 platform.

Question. How many different stacks exist for these shapes?

Related.

1. What if we use triangular blocks?
   (a) What if  and  are considered to be distinct?
   (b) What if  and  are considered to be the same (because one turns into the other by "sliding".)
   (c) What if "upside-down" triangles can be placed in the gaps?
   (d) What if "upside-down" triangles *must* be placed in the gaps in order to stack on top?
2. What about bricks of length 3?
3. What about tetrahedra and cuboids?
4. What if bricks can be stacked directly on top of each other?
5. What if the stack must be connected?
6. What if reflections are considered to be the same?

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.

References.

`https://oeis.org/A005169` (Connected triangles on arbitrarily long platform)

`https://oeis.org/A168368`

`https://math.stackexchange.com/q/2731692/121988`