



Consider figures created out of “blocks” starting from some base state and with the rule that each new block needs to touch as many old blocks as possible.

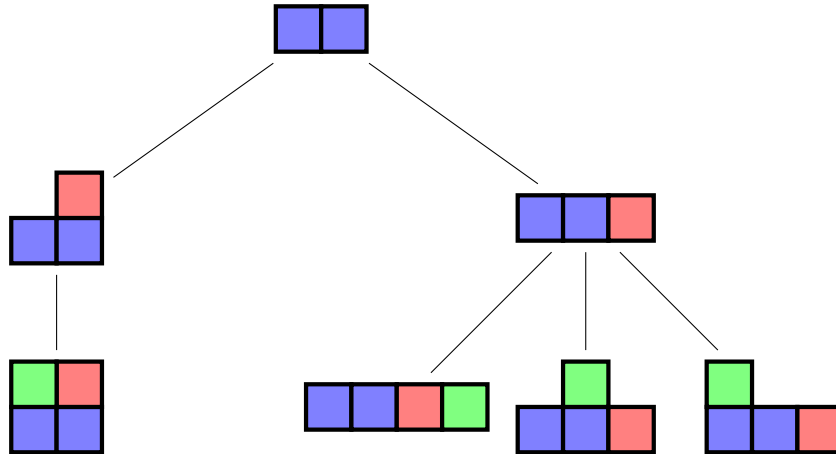


Figure 1: On the leftmost path, the final transition is from an “L” to a square, because the maximum number of faces that can touch is two, so the block must be added in the upper left corner. Counting the number of vertices gives $a(1) = 1$, $a(2) = 2$, and $a(3) = 4$.

Question. How many distinct figures (up to group action) can be made with n blocks, always following a greedy algorithm (with respect to number of faces touching)?

Related.

1. What if this is done with circles on a hexagonal grid? (Polyiamonds, etc.)
2. What if this is done in more than 2 dimensions?
3. What if the starting shape is different? (e.g. the “T” tetromino)
4. What if the blocks are different? (e.g. dominoes)
5. What if the constraint is changed? (e.g. each block must touch exactly two sides)

References.

Problem 65