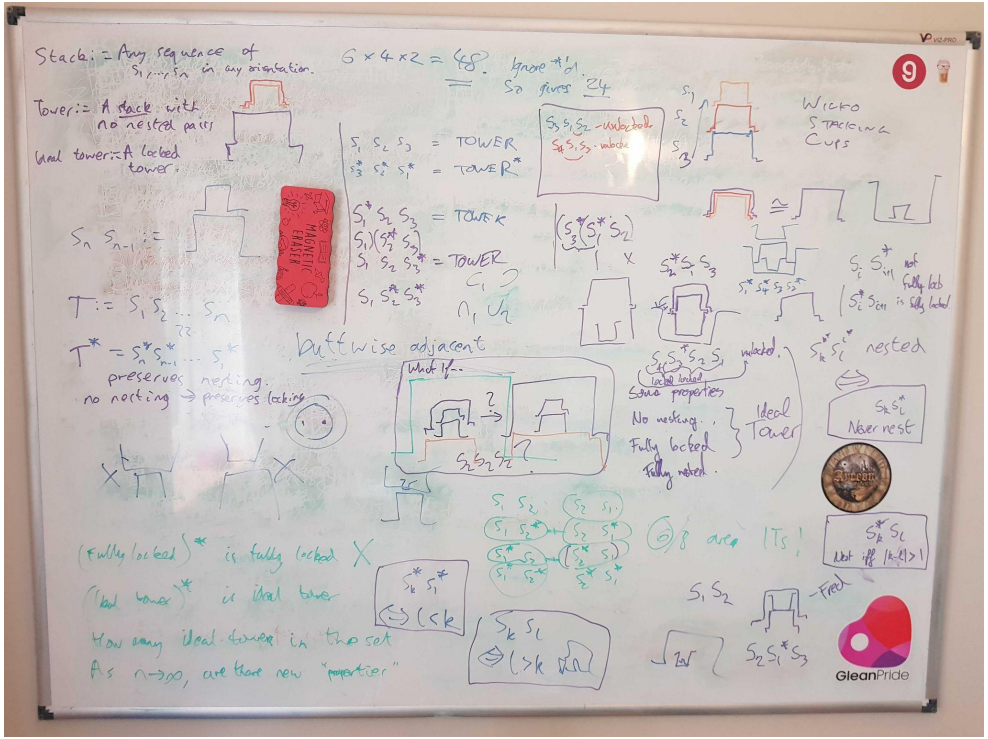
# Child’s Play?

The mathematics of stacking cups

# Things escalated...




# How do they work?







# Locking

✔

✖

Define an **ideal tower** to be

a stack where every pair is **locked** and **not nested**.


✔


✔


✖


✖

How many **ideal towers** are there?

# How many **ideal towers** are there?

2, 6, 10, 16, 26, 42, 68, 110, ...

2, 6, 10, 16, 26, 42, 68, 110, ...

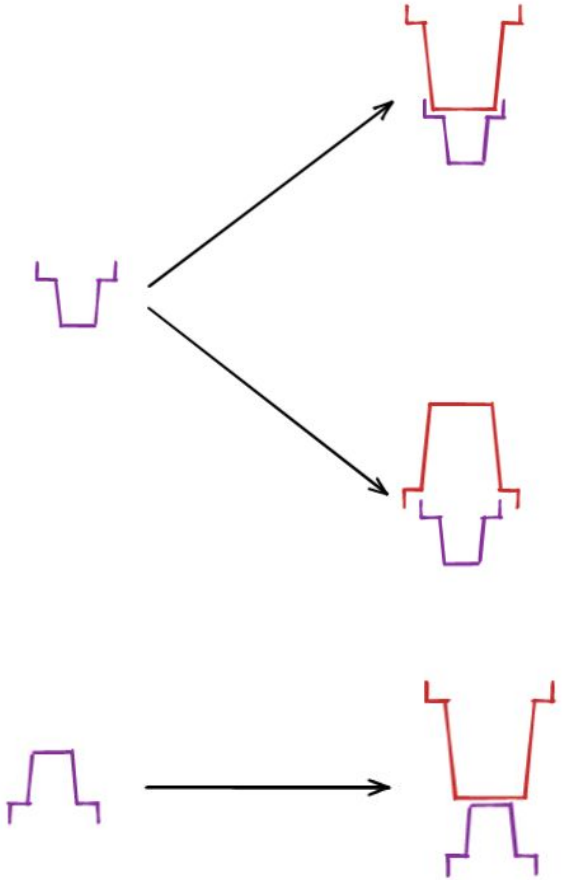
1, 3, 5, 8, 13, 21, 34, 55, ...

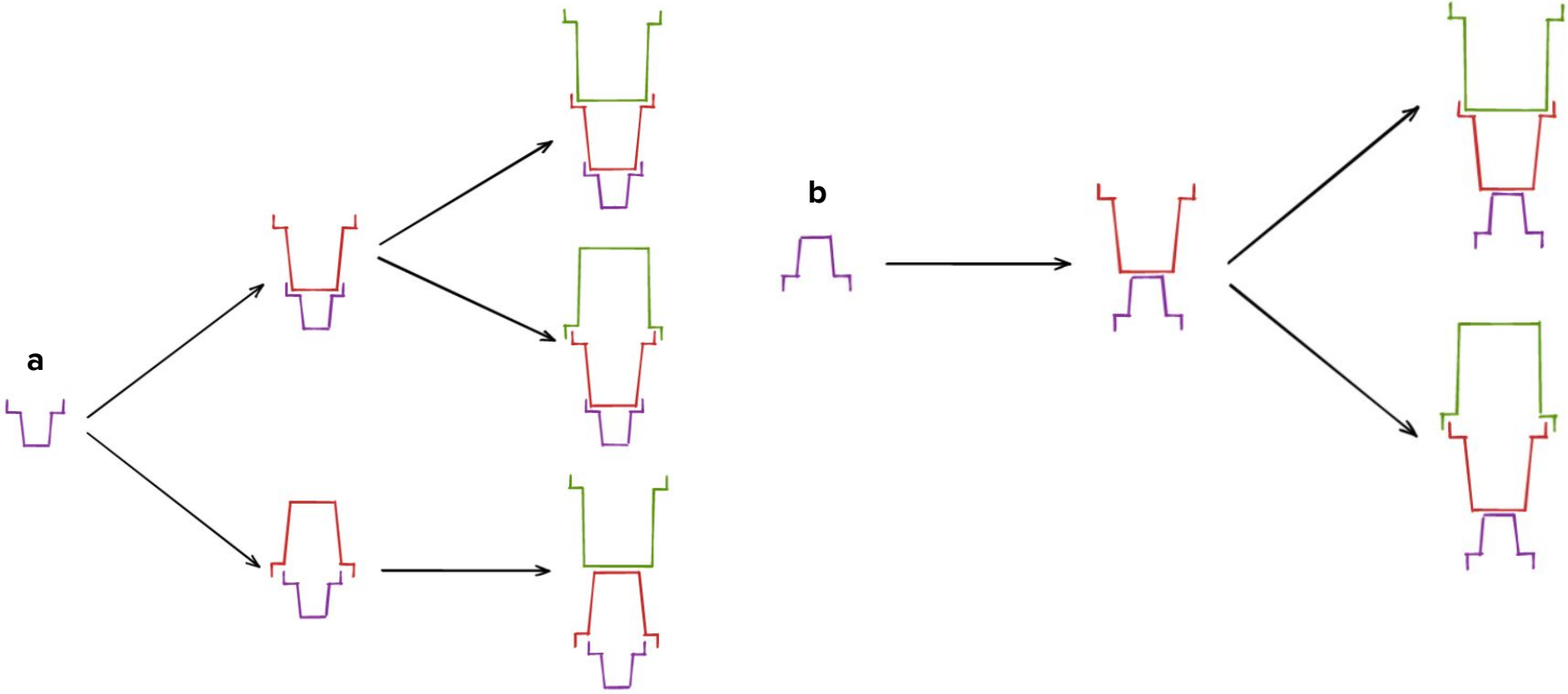
2, 6, 10, 16, 26, 42, 68, 110, ...

1, **3, 5, 8, 13, 21, 34, 55, ...**

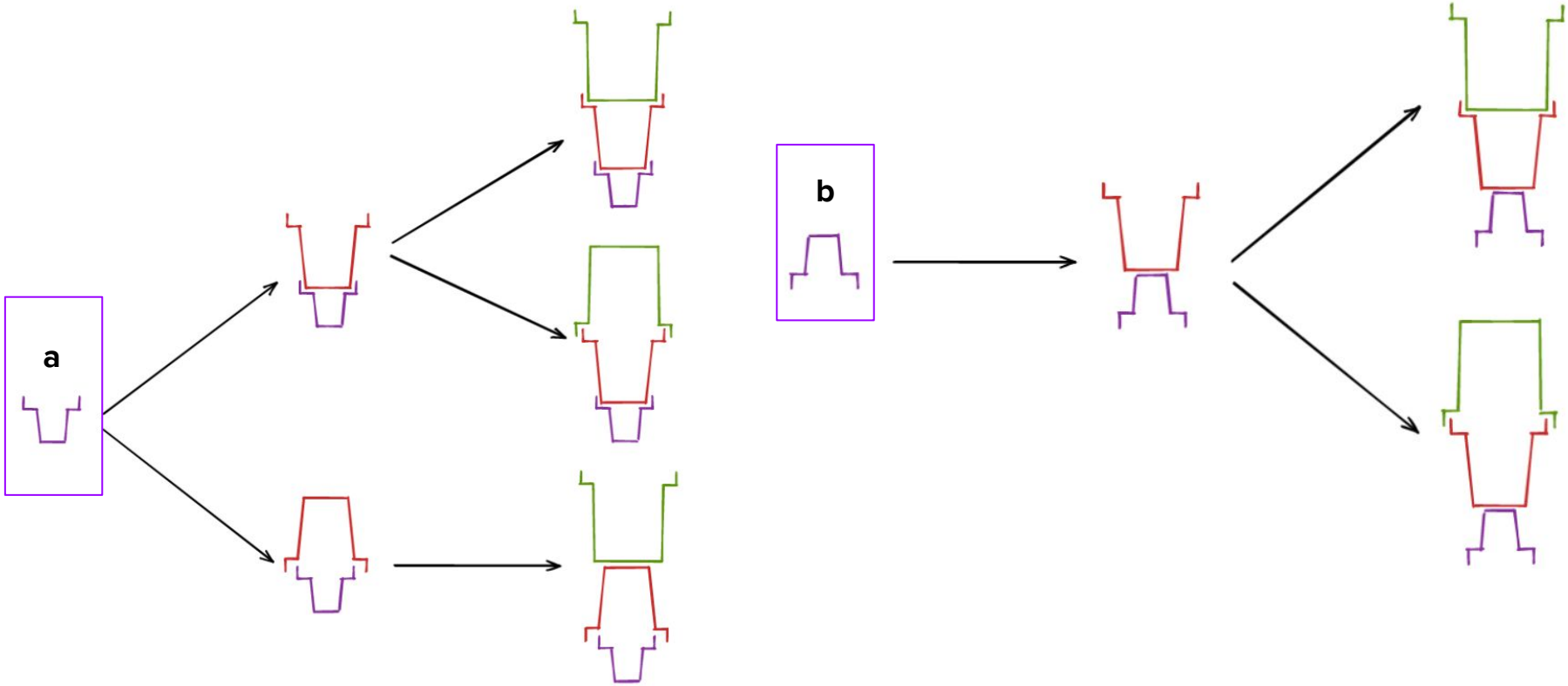
**Every** ~~ideal~~ golden tower is one of

How can we **add** the next cup?



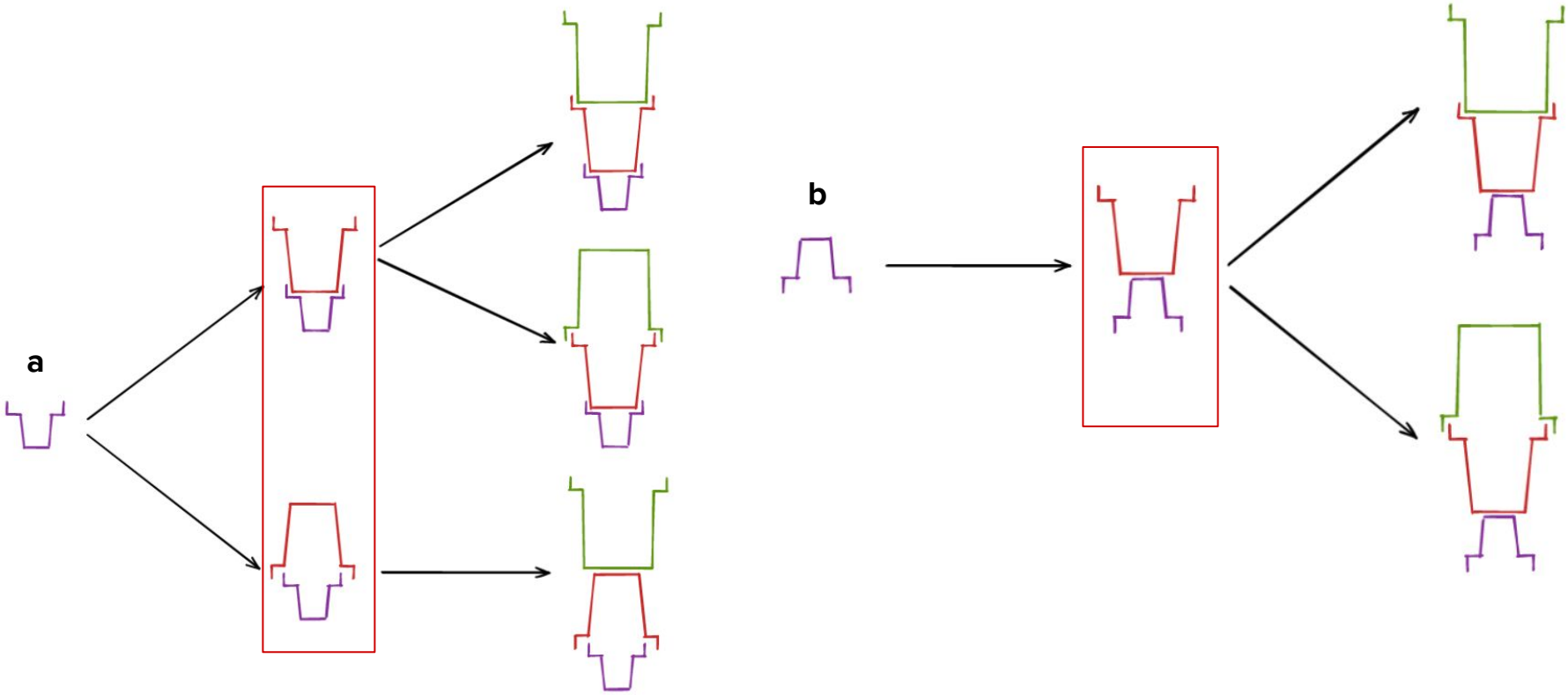

a
b

**n:** a + b



**n:** a + b

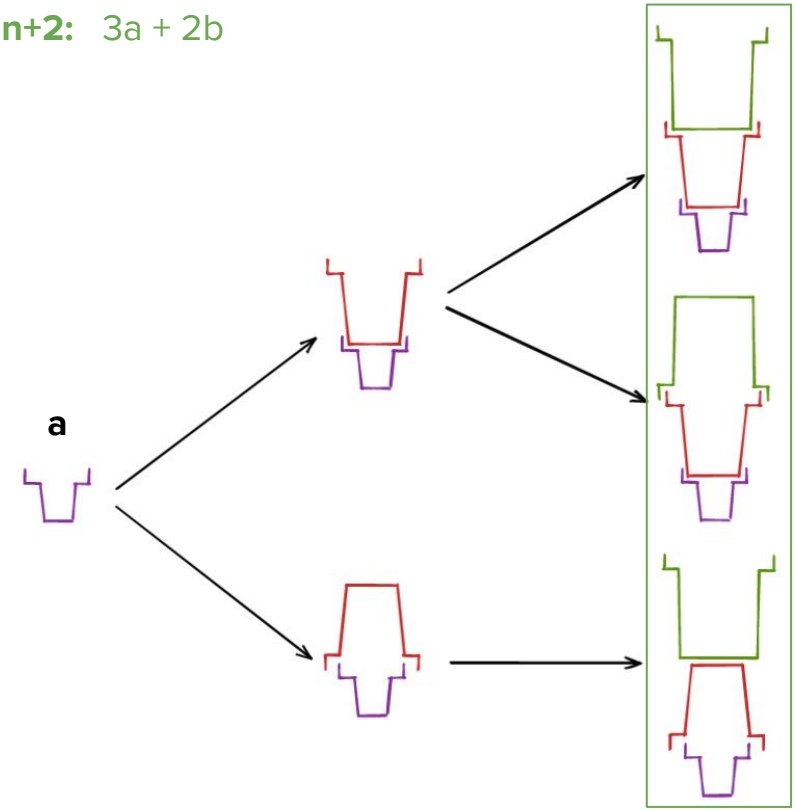
**n+1:** 2a + b

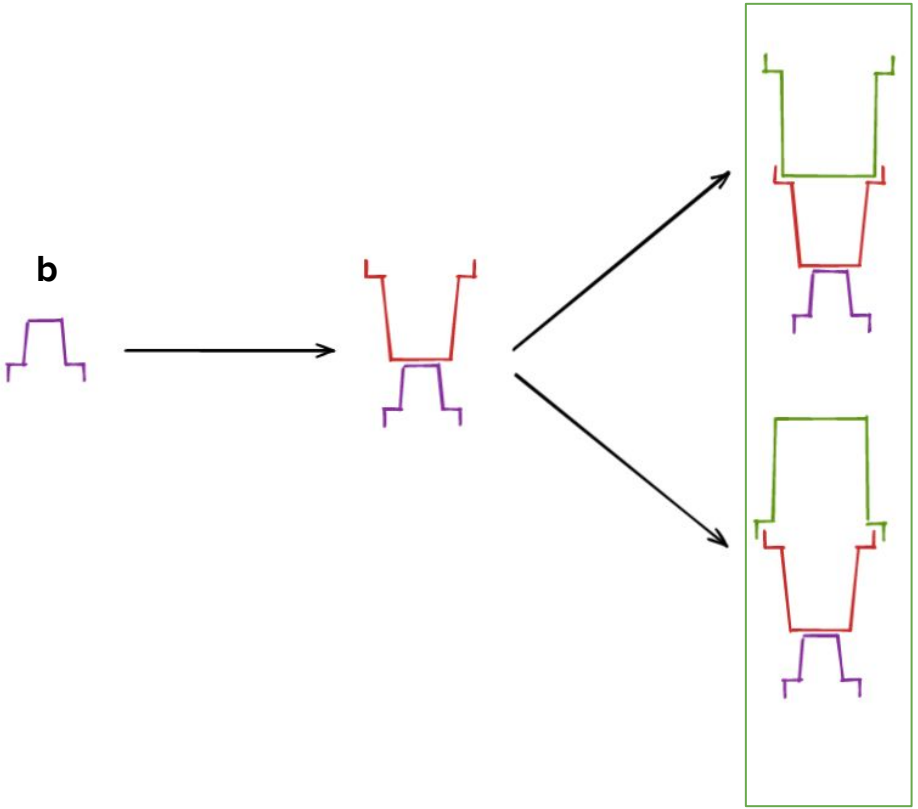


**n:** a + b

**n+1:** 2a + b

**n+2:** 3a + 2b



# Other questions & links

- How many **towers** are there (no nesting, but relax the locked condition)?
- Can we define the notion of a **distance** between stacks? Is it a proper distance metric? What happens to the maximum distance between stacks as n increases?
- What if we allow gaps, or duplicates?

- https://github.com/alyssaburlton/stacking-cups