Lower Bounds
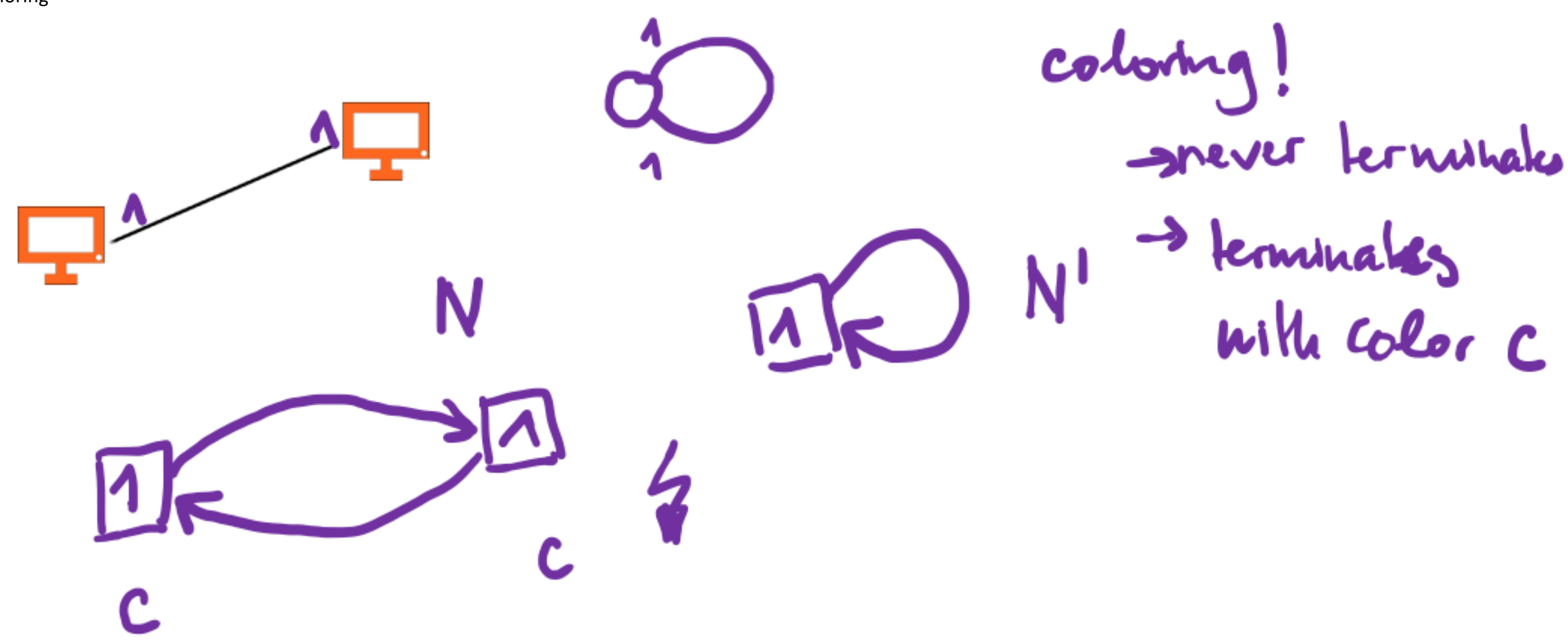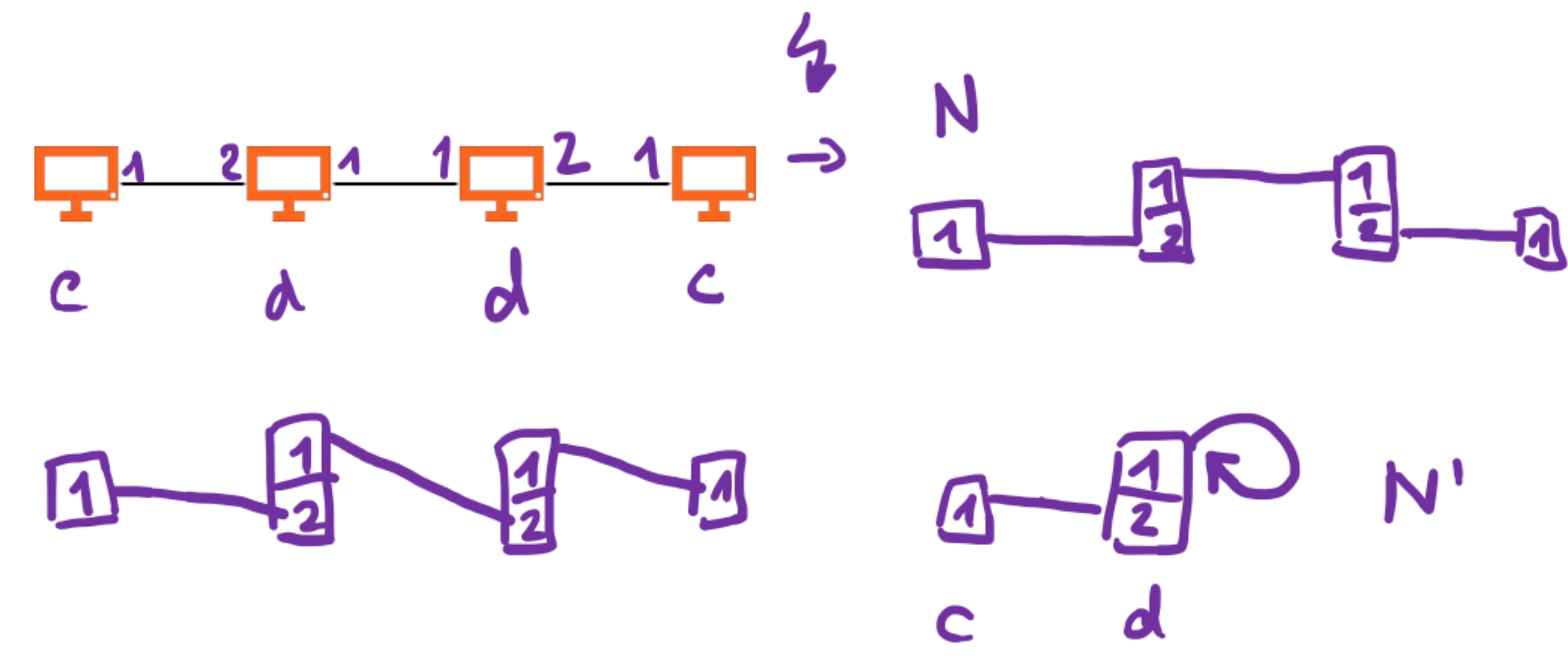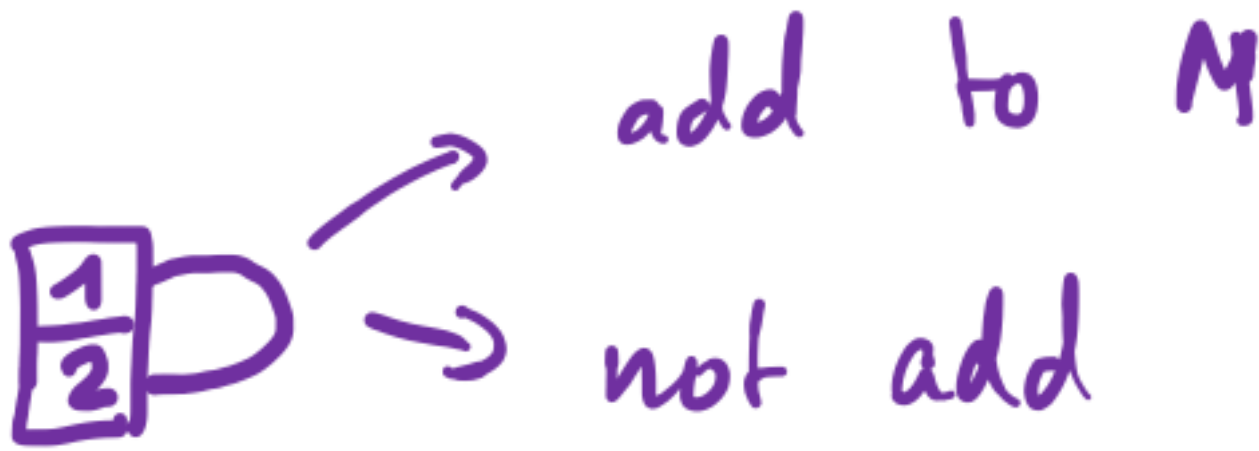
Monday, 23. October 2023
14:54

Vertex coloring

N

N'

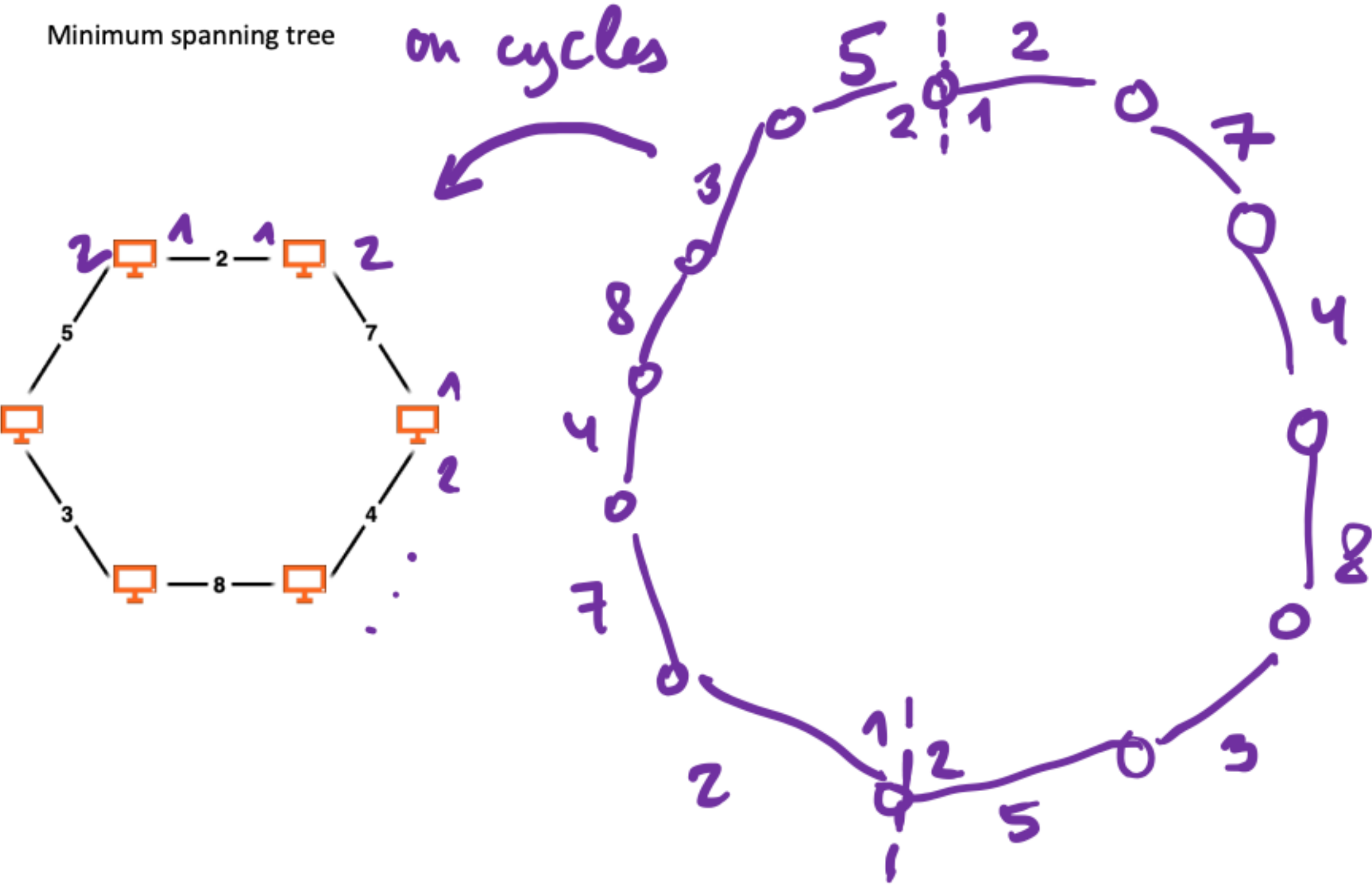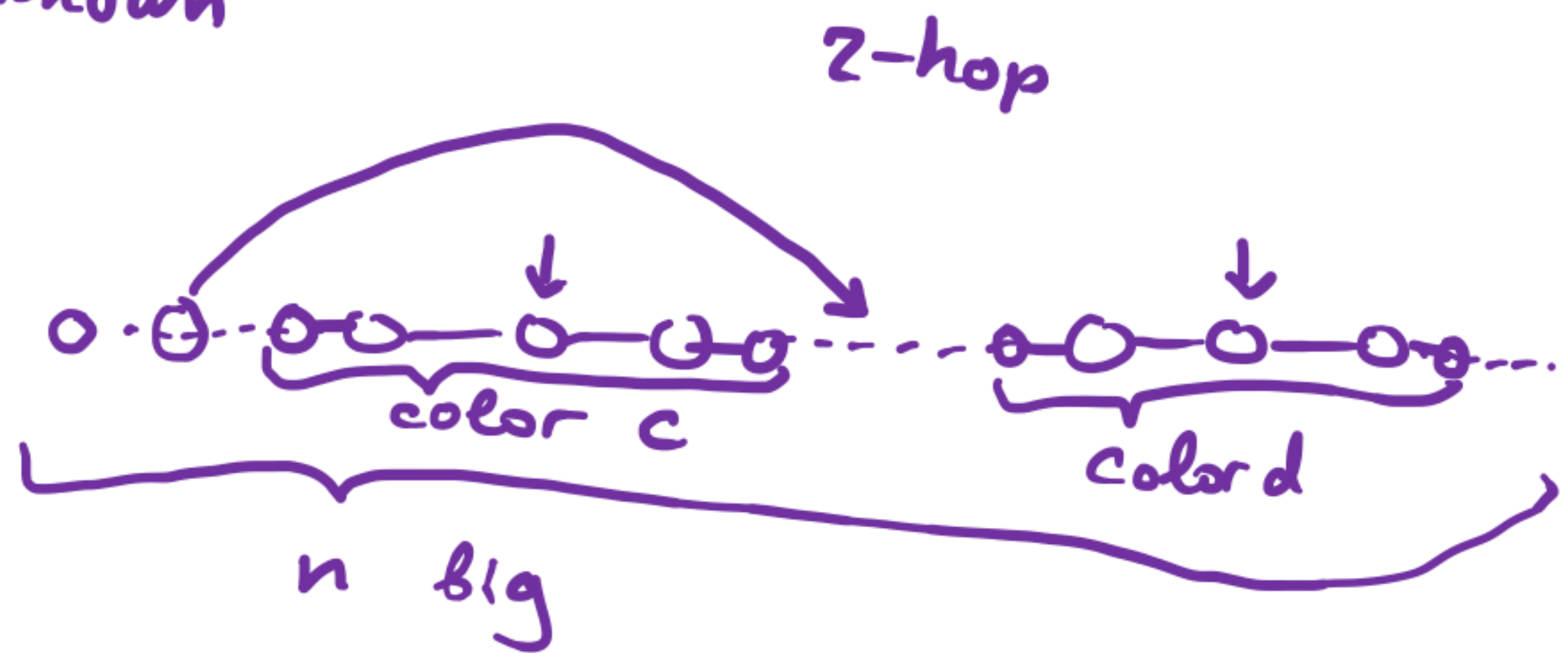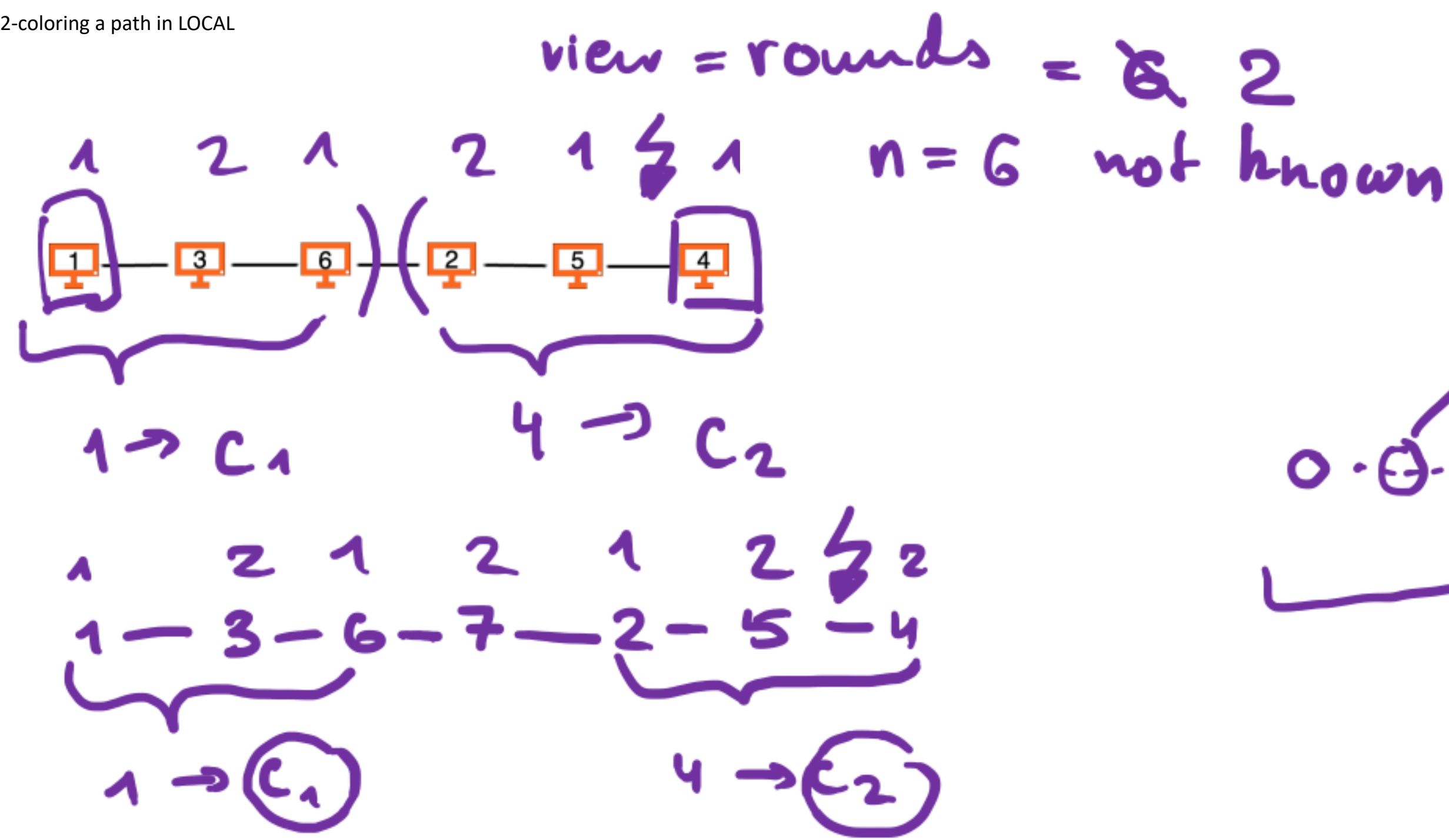coloring!
→ never terminates
→ terminates
  with color c

Vertex coloring

N

N'

Problems on Cycles

add to M
not add
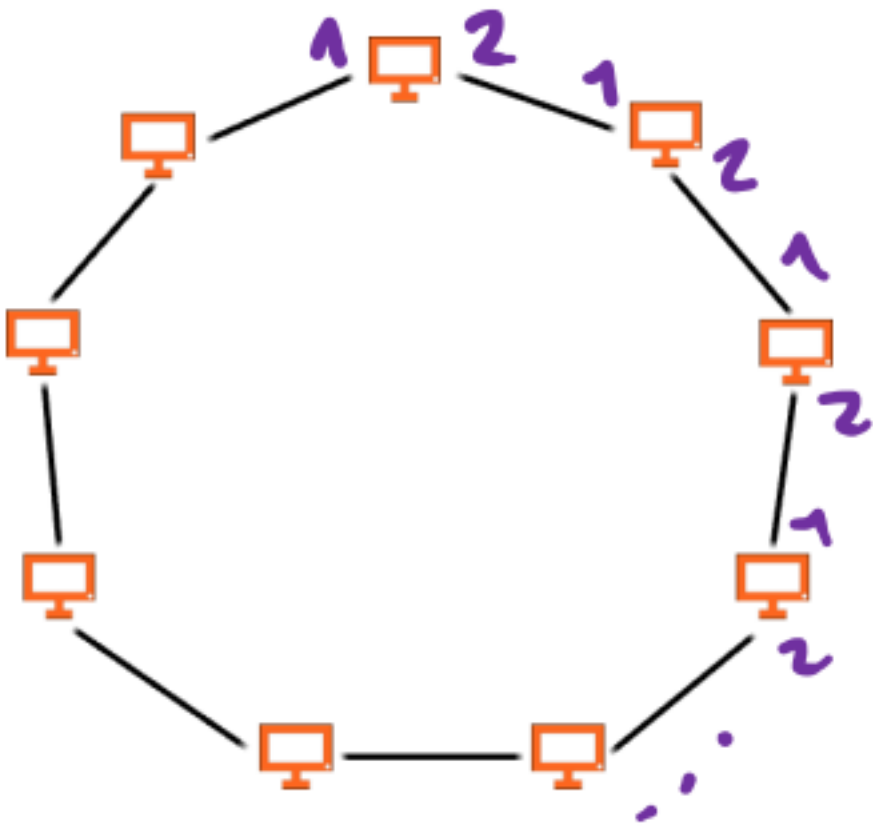
non-empty

Matching?

Edge coloring?

Minimum spanning tree   on cycles

2-coloring a path in LOCAL

view = rounds = 8 2

$n = 6$ not known

$$\overset{1}{[1]} \overset{2}{-} \overset{\wedge}{[3]} \overset{2}{-} \overset{1}{[6]} \Big) \Big(\overset{2}{[2]} \overset{1}{-} \overset{\nless}{[5]} \overset{\wedge}{-} \overset{1}{[4]} \Big)$$

$1 \to C_1$ $4 \to C_2$

$$\overset{\wedge}{1} - \overset{2}{3} \overset{1}{-} 6 \overset{2}{-} 7 \overset{1}{-} \overset{2}{2} \overset{\nless}{-} 5 \overset{2}{-} 4$$

$1 \to \boxed{C_1}$ $4 \to \boxed{C_2}$

2-hop

color c

color d

n big

Neighborhood graph of a 4-cycle

$N_1(g)$

$\cdots \to \boxed{123} \to \boxed{234} \to \boxed{341} \to \boxed{412} \to \cdots$

$\cdots \to 132 \to 324 \to 241 \to 413 \to \cdots$

$\cdots \to 124 \to 243 \to 431 \to 312 \to \cdots$ $\chi(N_1(g)) = 2$

$\cdots \to 142 \to 423 \to 231 \to 314 \to \cdots$

$\cdots \to 134 \to 342 \to 421 \to 243 \to \cdots$

$\cdots \to 143 \to 432 \to 321 \to 214 \to \cdots$

$N_0(g)$

$\chi(N_0(g)) = 4$

$N_2(g)$

$\cdots \to 12341 \to 23412 \to 34123 \to 41234 \to \cdots$

$\cdots \to 13241 \to 32413 \to 24132 \to 41324 \to \cdots$

$\cdots \to 12431 \to 24312 \to 43124 \to 31243 \to \cdots$

$\cdots \to 14231 \to 42314 \to 23142 \to 31423 \to \cdots$

$\cdots \to 13421 \to 34213 \to 42134 \to 21342 \to \cdots$

$\cdots \to 14321 \to 43214 \to 32143 \to 21432 \to \cdots$

$\chi(N_2(g)) = 2$