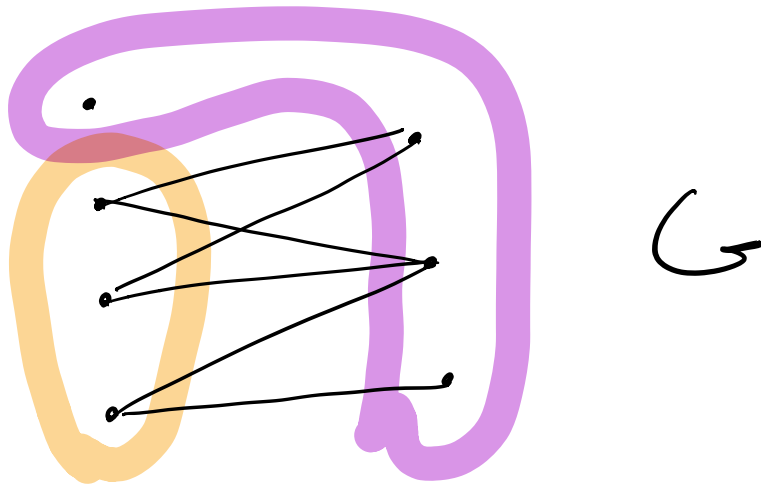
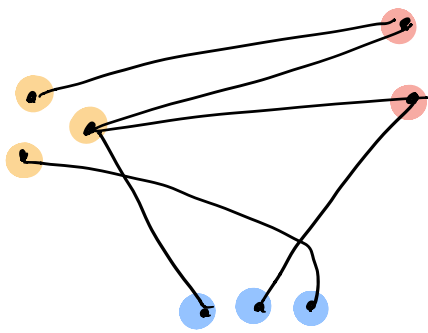


Def G is bipartite if we can find $P_1, P_2 \subset V(G)$
s.t. $P_1 \cup P_2 = V(G)$ $P_1 \cap P_2 = \emptyset$
if $v, w \in P_i$, $i=1,2$ then v & w are not adjacent.



Def We say G is k -partite, if we can find $P_1, P_2, \dots, P_k \subset V(G)$ s.t. $\bigcup_{i=1}^k P_i = V(G)$ & $P_i \cap P_j = \emptyset$ all $i \neq j$. such that $v, w \in P_i$ then v, w are not adjacent.



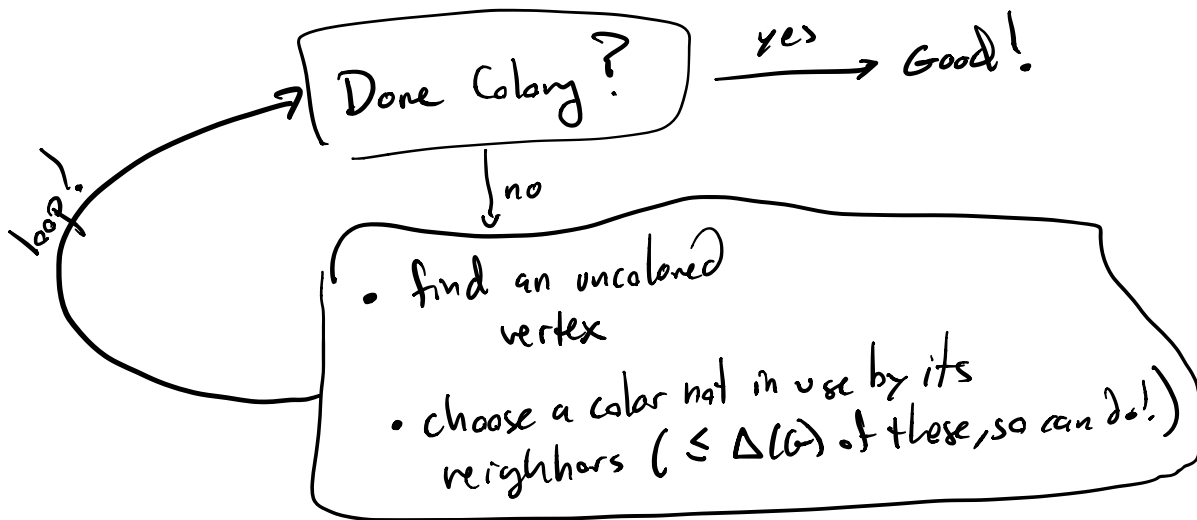
3-partite.

Observation

G is k -colorable $\Leftrightarrow G$ is k -partite.

How to color a graph?

Naive Algorithm: (Conclusion, can use at most $\Delta(G) + 1$ colors)



Smarter Algorithm

