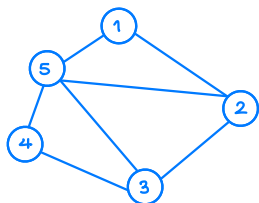


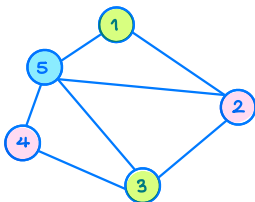
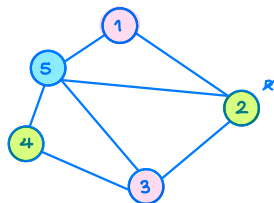
Graph Coloring



Given the graph, color
 $m=3$
 $\{R, G, B\}$

"We have to color the vertices of a graph such that no two neighboring vertices (adjacent vertices) must have the same color"

Let's try :



→ More than one solution possible
We want all possible solutions

1 2 3 4 5
 R G R G B

Type of questions

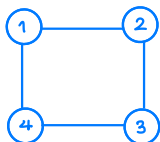
Given graph, some colors, can graph be colored using those color or not?

mColoring decision problem

Given graph, how many colors (minimum) required for coloring the graph

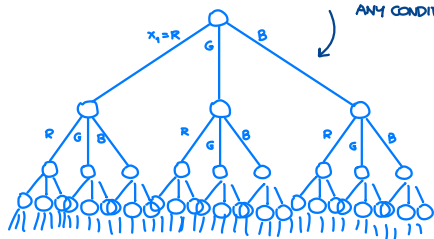
mColoring optimization problem

Apply backtracking.



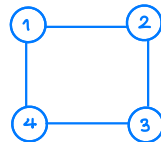
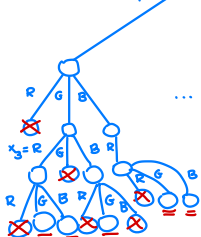
$m=3$
 $\{R, G, B\}$

IF WE DON'T APPLY ANY CONDITIONS



$$1 + 3 + 3 \cdot 3 + 3 \cdot 3 \cdot 3 + 3 \cdot 3 \cdot 3 \cdot 3 = \frac{3^{4+1} - 1}{3 - 1} = C^{n+1}$$

$x_1=R$



1. R, G, R, G
2. R, G, R, B
3. R, G, B, G
4. R, B, R, G
5. R, B, R, B
- ...