Graph Coloring (Vertex Coloring)

Vertex coloring is an assignment of colors, to the vertices of a graph such that no two adjacent vertices share the same color.

Chromatic Number

The minimum number of colors required to color the vertices of a graph such that no two vertices share the same color is called the chromatic number of the graph.

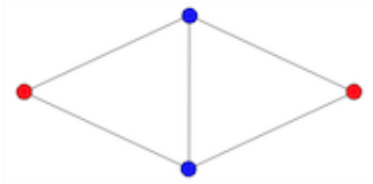


Figure : Vertex coloring in not possible with just 2 colors

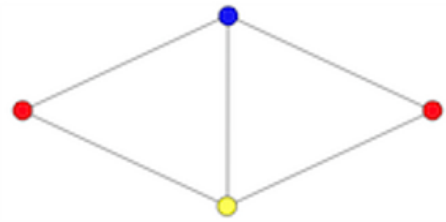


Figure : Minimum 3 colors are required for Vertex coloring, so Chromatic number of the graph is 3

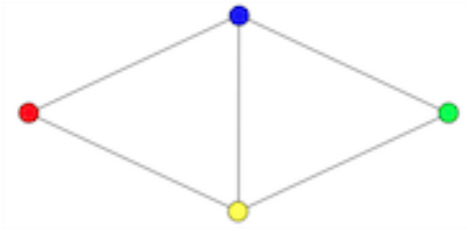
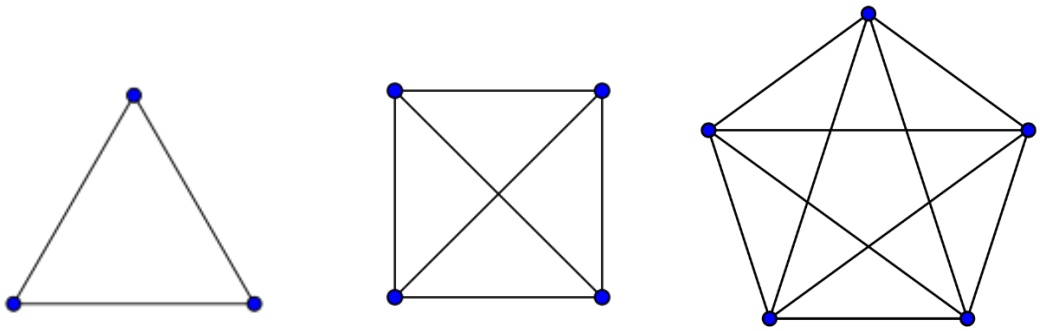


Figure : Vertex coloring with 4 colors

Complete Graph

A graph in which each vertex is connected to every other vertex is called a complete graph.

A complete graph of n vertices is denoted by K_n.



K_3 K_4 K_5

Note : **Since we will have to use a different color for each vertex of a Complete Graph. The Chromatic number of a Complete Graph K_n is n**

- List the possible solution (or all possible solutions) of vertex coloring a graph with m colors
- Can we color the graph G with m colors – Yes/No
- Minimum how many colors are required for vertex coloring graph G – Chromatic Number