

Bipartite Graphs: A simple graph G is called bipartite if its vertex set V can be partitioned into two disjoint sets V_1 and V_2 such that every edge in the graph connects a vertex in V_1 and a vertex in V_2 and no edge in G connects either two vertices in V_1 or two vertices in V_2 . When this condition holds, we call pair (V_1, V_2) a bipartition of the vertex set V of G .

A simple graph is bipartite if and only if it is possible to assign one of two different colors to each vertex of the graph so that no two adjacent vertices are assigned the same color.

Isomorphism: Two graphs which contain the same number of vertices connected in the same way are said to be isomorphic.

Isomorphic graphs must have the same number of vertices, and must have the same number of edges. In addition the degrees of the vertices in isomorphic graphs must be the same. If any of these quantities differ then the graphs are not isomorphic.

However, even when these quantities are the same it does not necessarily mean that two graphs are isomorphic.