Homeomorphic Graph

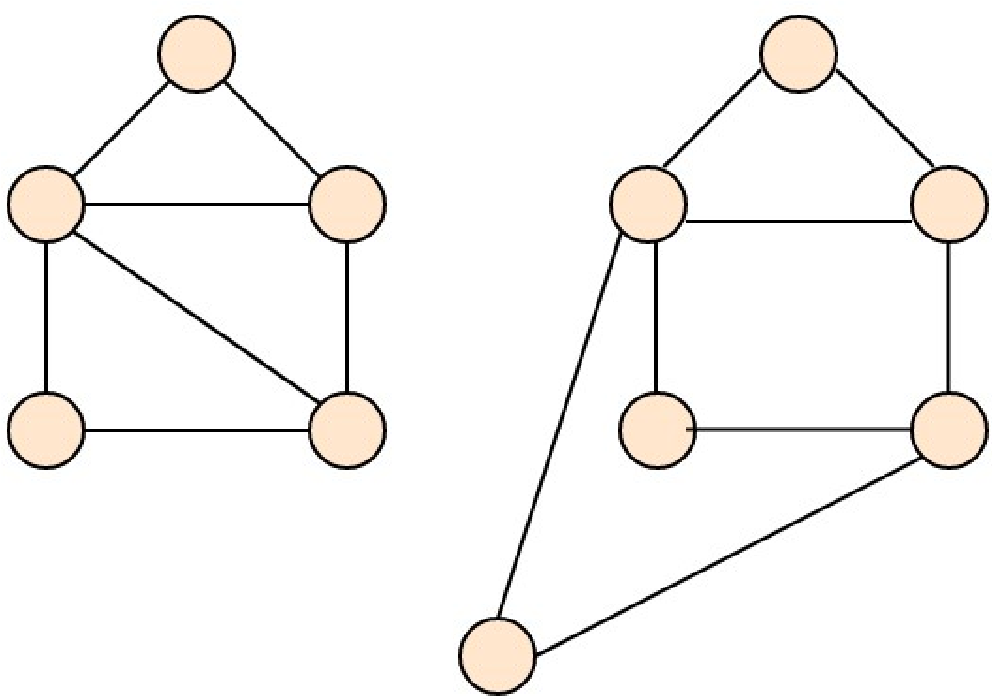
A graph homomorphism F from a graph G = (V, E) to a graph G' = (V', E') is written as:
f : G –> G'. It is a mapping f: V –> V' from the vertex set of G to the vertex set of G' such that {u, v} ∈ E ⇒ {f(u), f(v) ∈ E'.

In simple words, If another graph G* can be formed by dividing the edge of G with additional vertices, or if a Graph G* can be obtained by introducing vertices of degree 2 in any edge of a Graph G, then the graph G* is complete. Both the graphs G and G* are known as Homeomorphic graphs.

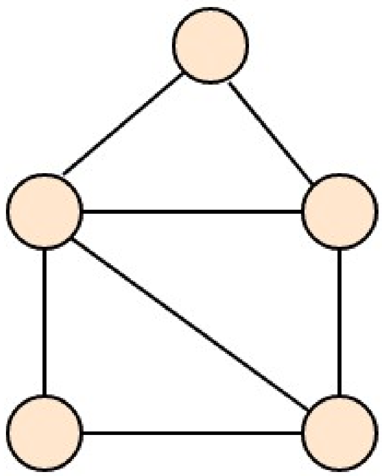
Properties of Homeomorphic Graph

- Homomorphism always retains a graph's edges and connectedness.
- If a homomorphism is a bijective mapping, then it is an isomorphism.
- The compositions of homomorphisms are also homomorphisms.
- Finding out if there is any homomorphic graph of another graph is an NP-complete problem.

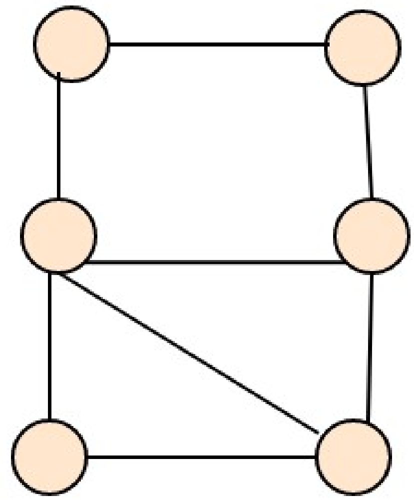
Example



G G'



H



H’

As we can see in both examples, G' can be derived from G,' and H' can be derived from H by introducing a vertex of degree 2.