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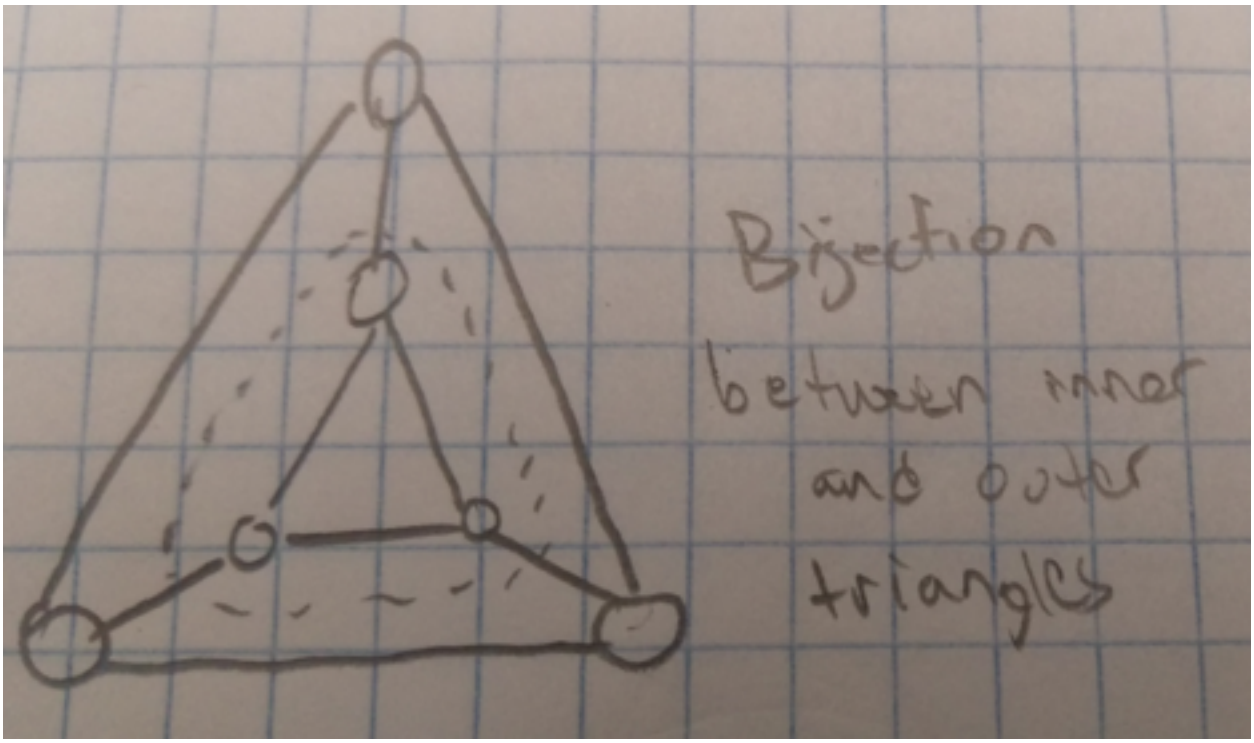
CSC 226 Assignment 4 Written

1. The bijection is F(V) -> F(V') where V and V' are vertex sets of self dual graphs. Below is an example of a bijection in a self-dual graph.



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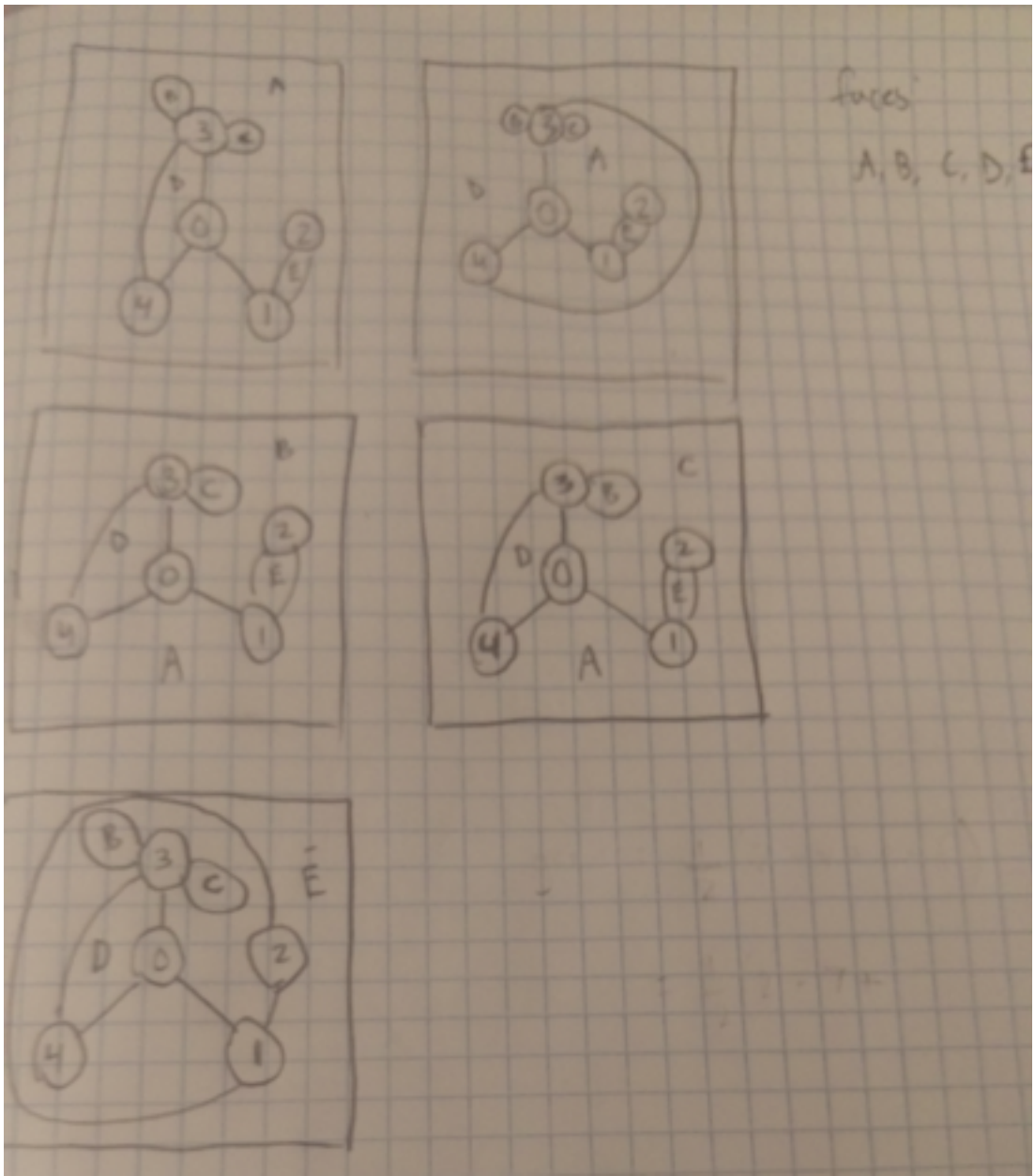

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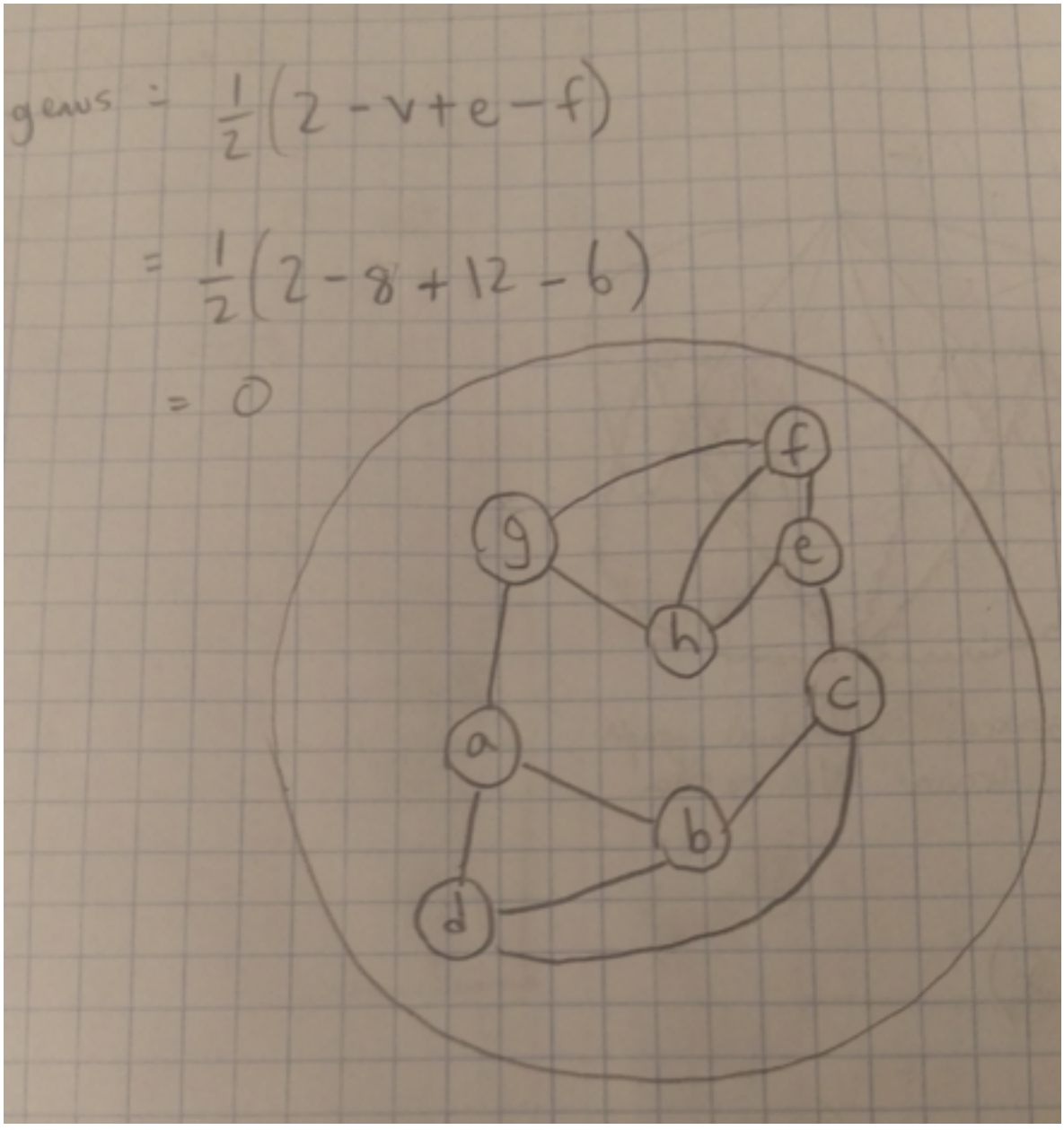
2. There are 5 embeddings.

3. It is embedded on a sphere (genus = 0)



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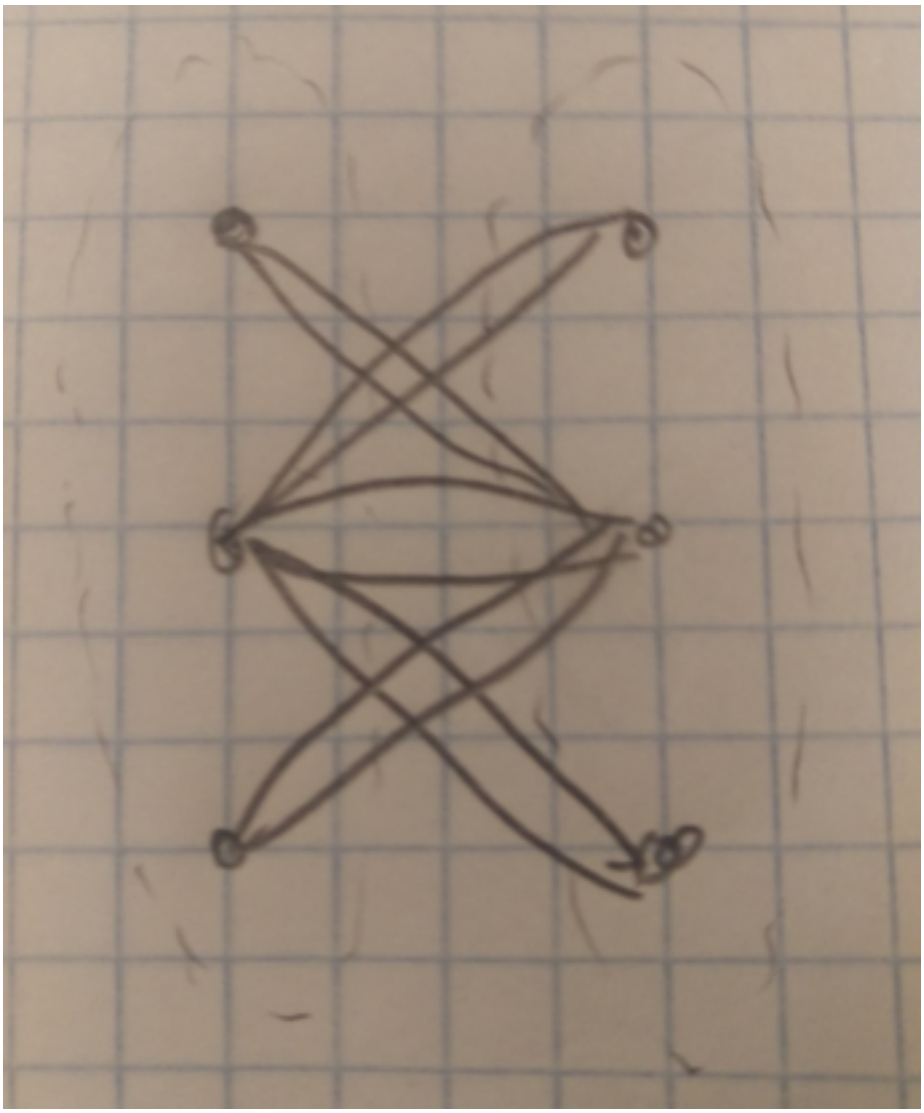

4. Biconnected: a connected graph that is not broken into disconnected pieces by deleting any single vertex.
   In this example, there are at least two edges connecting each vertex, so if any are removed, the graph will remain connected.

   Bipartite: a graph whose vertices can be divided into two disjoint sets U and V such that every edge connects a vertex in U to one in V.

In this example, the graph can be separated down the centre into sets U and V.

Non-Hamiltonian: a graph that does not contain a Hamiltonian cycle (a cycle where each vertex is visited exactly once).
In this example, there is no way to complete a Hamiltonian cycle because the structure of the graph would force a vertex to be visited twice.

5. If there is a negative cycle on the path from s to v and pathTo(v) is called, then there is no cheapest path since going around the cycle would further decrease the weight of the path. Thus one could indefinitely take the negative cycle to infinitely reduce the weight of the path. If this were to happen, the algorithm can detect the negative cycle and report it to the user.