Q1. Claim: \( \zeta = (1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7) \) is a graph isomorphism from \( G \) to \( H \). Verify or invalidate this claim. (Hint: Consider the complements of \( G \) and \( H \).)

Q2. Worst case, how long will it take you to verify the claim? How many conditions would you have to check? How many conditions did you check?

Q3. If the claim in Q1 is invalid, does this mean that \( G \) and \( H \) are not isomorphic?

Q4. Are \( G \) and \( H \) isomorphic? Justify your answer.
Q5. Write down a random ordering of the vertices \{v_1, v_2, \ldots, v_{12}\}.

Q6. Greedily color the graph using the ordering you chose in question Q5.

Q7. How many colors did you use in Q6? Is this $\chi(G)$?

Q8. Given an ordering of the vertices of an arbitrary graph $H$, how fast is it to color $H$ greedily? Write your answer in big-O notation in terms of the number of vertices $|V(H)|$ and / or the number of edges $|E(H)|$.

EC. Graph Isomorphism is in NP. Prove or disprove it is NP-complete.