

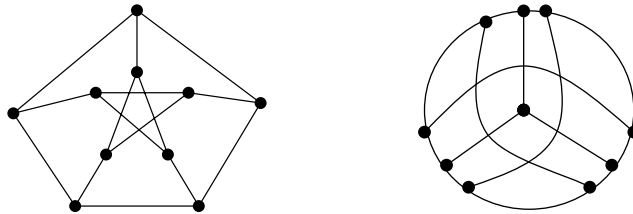
CSE 2500: Problem Set Eight

Instructor: Aggelos Kiayias

Due: Nov. 6

Exercise 1

Part (a). Find an isomorphism of the following graphs:



Part (b). Show that both the graphs are isomorphic to the following graph: the Vertex set is $\binom{\{1, 2, 3, 4, 5\}}{2}$ (unordered pairs of numbers), and two vertices $\{i, j\}$ and $\{k, \ell\}$ ($i, j, k, \ell \in \{1, 2, 3, 4, 5\}$) form an edge if and only if $\{i, j\} \cap \{k, \ell\} = \emptyset$.

Part (c). Do these graphs have an Euler cycle (use the upper left drawing for reference). Add the smallest number of edges possible to this graph to derive a graph that has an Euler cycle and find that cycle.

Exercise 2

For a graph G , let $L(G)$ we define the so-called *line graph* of G , as follows $L(G) = (E, \{\{e, e'\} : e, e' \in E(G), e \cup e' \neq \emptyset\})$. Prove or disprove the following statements:

- For any graph G , G is connected implies that $L(G)$ is connected.
- For any graph G , $L(G)$ is connected implies that G is connected.