

CSCI 246 — Discrete Structures

Homework #6

Assigned: November 13, 2013; Due: December 6, 2013

Please complete all problems, showing all of your work. Partial credit can only be given if your answers are justified. Recall that this assignment should be completed individually—no group work is permitted. If you have questions about the assignment, including needing clarification on what the questions are asking, please contact the teaching assistant or instructor. Each question is worth 10 points, for a total of 100 points.

Chapter 10 Questions

1. 10.11-9: Show (i.e., prove) that every tree is bipartite.
2. 10.11-23: Show that a graph is connected if and only if it has a spanning tree.

Chapter 11 Questions

1. 11.7-3: Show that if every face of a planar graph has four edges, then $|E(G)| = 2|V(G)| - 4$.
2. 11.10-3: Prove that there is no graph with six vertices, ten edges, and all vertices of the same degree.

Chapter 12 Questions

1. 12.10-5: Do any trees have Euler traversals? Explain.
2. 12.10-13: Consider two different graphs G and H , each of which has an Euler circuit. Construct a graph F by adding an edge connecting some vertex g of G to some vertex h of H . Is there anything notable about F ? Explain.

Chapter 13 Questions

1. 13.8-11: Give an algorithm for properly edge-coloring $K_{m,n}$ with the least possible number of colors.
2. 13.8-14: If a graph G is isomorphic to another graph H , then is it possible that $\chi'(G) \neq \chi'(H)$? Explain.
3. 13.8-18: Suppose G has a Hamiltonian circuit \mathcal{H} . How many colors are required to vertex-color \mathcal{H} ?
4. (5 pts. Extra Credit) 13.8-25: For any connected G , what is the relationship between $\chi(G)$ and $\chi'(G)$? Explain.