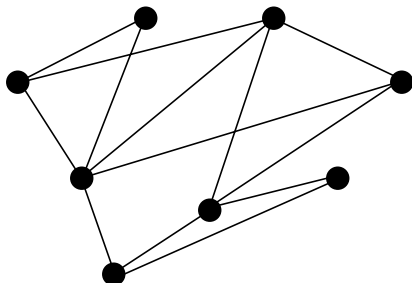


Homework 6

Math 145, Spring 2019

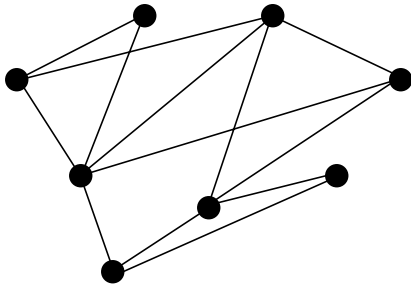
Every solution must contain an explanation written in words supporting your numerical solution to receive credit.

1. Find a Hamiltonian cycle (a cycle which includes all the vertices exactly once) in the following graph:

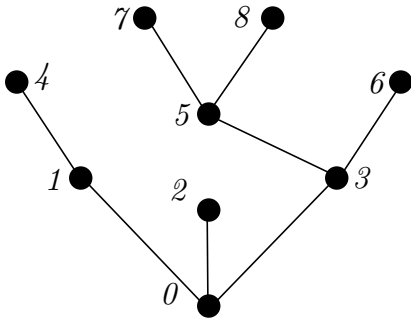


2. Given an example of a graph that has a Hamiltonian cycle (a cycle which uses each vertex of the graph exactly once), but has *no* closed Eulerian walk.
3. Give an example of a graph which has a Hamiltonian cycle where the Hamiltonian cycle is also a closed Eulerian walk.
4. Prove that if G is a tree, and v_i and v_j are vertices of G , then there is a *unique* linear subgraph connecting v_i to v_j . (i.e. prove that there cannot be two different linear subgraphs connecting v_i and v_j)
5. Suppose G is a connected graph. Let G' be the graph obtained from G by adding a single edge (no new vertices). Prove that G' contains a cycle.
6. Write down all possible trees with at most 5 vertices using the construction procedure from Wednesday's lecture/section 8.2 of the textbook.
7. Let T be a tree with vertices of degree only 3 or 1. If T has 10 vertices of degree 3, how many vertices of degree 1 are in T ?

8. Find a spanning tree for the following graph:



9. Give the Prüfer code for the following tree (show your work).



10. Give the Prüfer code for the following tree (show your work).

