CS 70 Discrete Mathematics and Probability Theory Summer 2016 Dinh, Psomas, and Ye Discussion 2A

1. Fun Counting Edges

Prove the following claims: In any graph, the number of vertices of odd degree is even.

2. Color the graph

Suppose that the degrees of the vertices in a graph are all at most d. Prove, using the well-ordering principle, that one can color the vertices of the graph using at most d + 1 colors so that no two adjacent vertices end up having the same color.

3. Introduction to Trees

Recall that a tree is a connected graph with no cycles, (and so no self-loops, and no multi-edges). Show that any tree with at least 2 nodes must have a node of degree 1.

4. Graph Gardening

Prove that if graph G is a tree with e edges and n nodes, then e = n - 1. Use induction on n.