

Due at the start of class Thursday, October 13, 2011.

Problem 1. Do Exercise 3 on pages 189-190 of Kleinberg and Tardos. But use “our favorite method” for the proof.

Problem 2.

- (a) Show that Prim’s algorithm is correct using “our favorite method”.
- (b) Show that Prim’s algorithm is correct using mathematical induction.

Warning: The two solutions should look very similar to each other.

Problem 3. Suppose we are given a graph G (connected, undirected) with costs on the edges (all costs > 0). Now we construct a new graph G' , which is the same as G , except for the costs. The cost of an edge e is defined to be $1/c_e$ where c_e is the cost of e in G .

1. Is the Minimum cost spanning tree in G , the Maximum cost spanning tree in G' ? Prove or disprove.
2. Suppose that P is the shortest path from s to v in G . Is P the longest simple path from s to v in G' ? Prove, or disprove.

Problem 4. Do Exercise 16 on pages 196-197 of Kleinberg and Tardos.