CSE 421: Introduction to Algorithms
Assignment #4
January 30, 2002
Due: Wednesday, February 6

Reading Assignment: Kleinberg and Tardos, chapter 4.

Problems

1. Let $G = (V, E)$ be a connected, undirected, weighted graph, where $c(e)$ is the cost on edge e for any edge $e \in E$. Let s be a particular node in V. For any T which is a spanning tree of G rooted at s, we define the *total path length of* T, denoted $P(T)$, to be

   $$P(T) = \sum_{v \in V} d_T(s, v),$$

   where $d_T(s, v)$ is the sum of the costs along the path between s and v in the tree T. Give an algorithm for finding a spanning tree T of G rooted at s that minimizes $P(T)$.

2. Kleinberg and Tardos, page 92, problem 10.

3. Kleinberg and Tardos, page 92, problem 11.

4. **Extra Credit:** Kleinberg and Tardos, page 94, problem 15.

5. **Extra Credit:** Feedback on Sections 3.3-3.4 and 4.1 in book. Please submit this by email to both Erik and Anna.

For all problems on this homework, prove that your algorithm is correct, and analyse the worst-case complexity of your algorithm.