Homework 1  
Computer Science 511  
Fall 2008  
Due in class on Friday, September 5

Reading Assignment
Kleinberg and Tardos, Chapter 7.

Problem Set
In this and all subsequent assignments, unless otherwise stated, all problems are from the Kleinberg and Tardos text (K & T).

1. (10 points) Show that if we add any number of incoming arcs, with any capacities, to the source node, the maximum flow value remains unchanged. Similarly, show that if we add any number of outgoing arcs, with any capacities, to the sink node, the maximum flow value remains unchanged.

2. (10 points) Exercise 11, page 420 of K & T.

3. (10 points) Exercise 12, page 420 of K & T.

4. (10 points) Exercise 13, pages 420–421 of K & T.

5. (10 points) Suppose someone presents you with a solution to a maximum-flow problem on some network. Give a linear time algorithm to determine whether the solution does indeed give a maximum flow.

Note. We reserve the right to grade only a subset of the problems assigned. Which problems will be graded will be decided after the submission deadline.