Due at the start of class Tuesday, October 25, 2011.

Problem 1. Do Exercise 2 on page 246 of Kleinberg and Tardos.

Problem 2. Do Exercise 3 on pages 246-7 of Kleinberg and Tardos.

Problem 3. Assume we measure the distance between points in the plane using *Manhattan Distance*, where the distance between points (x_1, y_1) and (x_2, y_2) is $|x_1 - x_2| + |y_1 - y_2|$. Modify the closest-pair of points algorithm for this alternative method of measuring distance.

Problem 4. Show that you can multiply matrices in $O(n^{\lg 7})$ time even if n is not a power of 2.

Problem 5. Consider the following greedy algorithm for solving the chained matrix multiplication problem: Look for the two contiguous matrices that can be multiplied the fastest and multiply them. Continue like this until finished.

(More formally, let the dimensions for matrices $A_1, ..., A_n$, be given by the sequence $< p_0, p_1, \ldots, p_n >$. Look for the two contiguous matrices A_i and A_{i+1} whose multiplication minimizes the product $p_{i-1}p_ip_{i+1}$. Substitute p_{i-1}, p_{i+1} for p_{i-1}, p_i, p_{i+1} in p. Continue like this until p consists of only two values.)

Show that this greedy algorithm does not necessarily find the optimal way to multiply a chain of matrices.