COMP 312
Assignment 4
Due at 9 a.m., Thursday, March 31 2011
All problems are of equal value.

Reading

Cormen, Leiserson, Rivest and Stein, Chapters 16 (not responsible for material in 16.4 or 16.5 but worth reading) and 23.

Practice

CLRS, 16.1...5, 16.2-1...5, 16.2-7, 16-2, 16-4, 16-5, 23.1-1...7, 23.1-10, 23.2-1, 23.2-2, 23.2-8, 23-1, 23-2, 23-3.

To Be Handed In

1. CLRS, 16.2-6
2. CLRS, 16-1
3. The n cities, $c_1, c_2, \ldots, c_n$, along a straight (i.e., no curves or turns of any kind) highway are to be covered by a series of cell towers to be placed along the highway. A cell tower covers all cities that are within R miles of it in any direction. Let d_i be the distance (in miles) between c_i and c_{i+1} for $i = 1, \ldots, n-1$. Give an efficient algorithm for placing the minimum number of towers that cover all of the cities. Show your algorithm is correct and analyze its running time. What happens if the highway isn't straight? Does your algorithm still work? If so, prove it. If not, give a counterexample.
4. CLRS, 23-4
5. Give an algorithm for finding the maximum weight spanning tree of a graph, i.e., the spanning tree of maximum total weight. Argue that it is correct and analyze its running time.