Due at the start of class Wednesday, November 30, 2011.

**Problem 1.** Assume that $G = (V, E)$ is a weighted graph where each edge has nonnegative integer weight. Let $c$ be the maximum weight of any edge in the graph. Show how to modify Dijkstra’s algorithm to solve the single source shortest paths problem in time $O(m + nc)$ (where $n$ is the number of vertices and $m$ is the number of edges).

**Problem 2.** The Rectangle Packing Problem (RPP) is given a set of $n$ small rectangles of sizes $a_i \times b_i$ (where $1 \leq i \leq n$) and a large $A \times B$ rectangle, can the large rectangle be packed with a subset of the small rectangles so that there is no empty space?

Assume all values are integers. Show that RPP is in NP.