Due at the start of class Fri, Apr 29, 2011.

**Problem 1.** Write *between* 300 and 400 words on a cool application of graphs. You may go online and look for material, but you should cite your sources.

**Problem 2.** Run the shortest path algorithm on the following graph (Figure 1). Show all the steps, as well as all the $d$ values of all nodes. Please start at root $r$.

![Figure 1: A graph with 7 nodes and 10 edges](image)

**Problem 3.** Write a function in ruby that takes an array $A$ of integers and separately prints the sum of the positive numbers, and the sum of the negative numbers. For example, if the array contains $[3, -2, 4, -1, 6, -1, 0, 3]$ the function prints $16$ and $-4$.

**Problem 4.** Write a short description on the Jacquard Loom. Why do you think this is an interesting thing?