CS 146 - Sect 4

HW #1 **Due Jan 31st, 2008**

Please turn in HW at the beginning of class.

For all homeworks, when asked for "example", give the name and short description of what it is and how it is used. When asked for "algorithm", give a short description and complete pseudo code. When asked to "show", give a short description along with your detailed work. In all cases, show all work and assumptions.

1. Give an **example** of an algorithm in:
   a. biology
   b. electrical engineering
   c. economics/business

2. Show the **algorithm** to find the max of a set of numbers in:
   1. What is the worse case?
   2. What is the best case?

3. Show the **algorithm** to find the min of a set of numbers in:
   1. What is the worse case?
   2. What is the best case?

4. Assume that you have n >1 coins. One of the coins is heavier than the others, all else the same. You have a scale and you are only allowed to put at most one coin on each side.
   1. How many weighings do you need to find the heavy coin.
      1. **Show** that your answer is the best case (lower bound).
   2. Now, assume that you can put any number of coins on each side. How many weighings do you need to find the heavy coin? Show the upper and lower bounds and work.