Due Thursday, Oct 18. (See calendar for final version due date.)

From the textbook, chapter 3:

3.57

Note that Appendix B of the textbook has hints for some problems.

Also do the following problems:

1. You have n coins, a scale (it only tells which side is heavier) plus an extra standard coin. (So, you actually have $n+1$ coins.) One of the coins has the wrong weight. (It is either too heavy or too light) How many weighings do you need to determine which coin is different and whether it is too heavy or too light? [Hint: A counting argument shows that the minimum number of weighings should be the smallest integer k so that

$$2n \leq 3^k$$

Try to find an algorithm which will give you the answer in that many weighings.] Prove your answer using induction. [Prove that your algorithm will work using strong induction.]

2. Determine which integers can be written as a nonnegative linear combination of the numbers 2 and 5. These are all integers n so that $n = 2a + 5b$ where a, b are nonnegative integers. The first case is $n = 0$.