COMP566   **Discrete Optimization I**

Homework 2   Due: Thursday, October 4 , 2007

1. P. 69, Ex 5.3 (a) (b). Yes, the answers are in the back, but we would like to see the details on how they are obtained using Thm. 5.3

2. Read the handout for the Sep 27 lecture on solving systems of inequalities. Show how to adapt the method described there to find a solution to a system of the type $Ax = b, x \geq 0$, or show that the system is infeasible. What is the certificate of infeasibility? Express this in a way similar to Theorem 2 in the handout. In arguing that your method is correct, you may use results in the handout. Illustrate your method on the following system:

$$x_1 - x_2 - x_3 + x_4 = 2$$

$$x_1 + 2x_2 + 3x_3 - x_4 = 5$$

$$2x_1 - x_2 - x_3 + x_4 = -1$$

$$x_1, x_2, x_3, x_4 \geq 0$$

3. Write down the primal and dual LPs for problem 1.6, p. 10. Solve both problems directly using CPLEX. Give an interpretation of the dual problem and solution. Also check and interpret the complementary slackness conditions as given in Thm 5.2 for the primal and dual solutions that you found.