Homework #3

1. Use the two-phase method to find the solution of the following LP problem:

$$\begin{array}{rllcl} \text{maximize } z = 3x_1 + x_2, & & & & \\ & x_1 & +x_2 & \leq & 1 \\ \text{subject to} & -2x_1 & +x_2 & \geq & 1 \\ & 3x_1 & +2x_2 & \geq & 4 \\ \text{and} & x_1, x_2 \geq 0. & & & \end{array}$$

   Add x_0 to every element of the basis when performing the first phase of the two-phase method. Choose entering and leaving variables by taking the variable with the smallest subscript amoung all viable candidates; this is often called the "smallest subscript rule" or "Bland's rule." Hint: you should find that the LP is infeasible after roughly three pivots.

2. Same problem as problem (1) for the LP:

$$\begin{array}{rlcl} \text{maximize } z = 3x_1, & & & \\ & x_1 & \leq & 7 \\ \text{subject to} & x_1 & \geq & 1 \\ & x_1 & \geq & 4 \\ \text{and} & x_1 \geq 0. & & \end{array}$$

   (Same stipulations about adding x_0 and about the pivoting rule.) After you have solved this correctly ($x_1 = 7$, $z = 21$), go back to the first pivot of the first phase, where x_0 enters the basis, and make an incorrect choice of leaving variable; what is wrong with the resulting dictionary?