Assignment 3

Due Wednesday, Oct. 11

No Lindo on this assignment! Solve by hand.

4.12.3, 4.12.6, 4.14.2

For 4.12.3 and 4.12.6, use our version of the two-phase method, **not** the big-M method which we are not covering. Note that I always change $\geq$ constraints to $\leq$ constraints. Also, to minimize z I maximize $-z$.

E.1. Solve the following, using our two-phase method:

$$\begin{array}{lrcl}
\text{maximize} & z = -7x_1 + 4x_2 + 10x_3 + 12x_4 & & \\
\text{subject to} & x_1 - 3x_2 - x_4 & \leq & -2 \\
& x_2 + 2x_3 + 2x_4 & = & 3 \\
& x_1 - x_2 - x_4 & = & -1 \\
& x_1, x_2, x_3, x_4 \geq 0 & &
\end{array}$$

E.2. Solve

$$\begin{array}{lrcl}
\text{maximize} & z = 4x_1 - 2x_2 + 3x_3 & & \\
\text{subject to} & 2x_1 + x_2 + x_3 & \leq & 1 \\
& x_1 - x_2 + x_3 & \leq & 0 \\
& x_1, x_2 \geq 0,\ x_3 \text{ URS} & &
\end{array}$$

E.3. What size of Klee-Minty problem could be done in one year by a computer that performs one thousand pivots per second (using the most-negative-entry rule)? One million pivots per second? Approximately how long would you expect these computers to take for a typical linear programming problem of the same size as the Klee-Minty problem that takes them a year?