Problem 1: All the exercises of chapter 1 of the book (page 9-12).

Problem 2: All the exercises of chapter 2 of the book (page 26).


Problem 4 (Due 2/4/05, Posted 1/28/05): Solve the problem (without computers)

\[
\begin{align*}
\text{maximize} & \quad 2x_1 - 3x_2 \\
\text{subject to} & \quad -2x_1 + x_2 \leq 2 \\
& \quad x_1 - 2x_2 \leq 3 \\
& \quad x_1 + 2x_2 \leq 11 \\
& \quad x_1, x_2 \geq 0
\end{align*}
\]

Problem 5 (Due 2/4/05, Posted 1/28/05): Solve the problem (without computers)

\[
\begin{align*}
\text{maximize} & \quad 2x_1 - 3x_2 + x_3 \\
\text{subject to} & \quad 3x_1 + 6x_2 + x_3 \leq 6 \\
& \quad 4x_1 + 2x_2 + x_3 \leq 4 \\
& \quad x_1 - x_2 + x_3 \leq 3 \\
& \quad x_1, x_2, x_3 \geq 0
\end{align*}
\]

Problem 6 (Due 2/4/05, Posted 1/28/05): Solve the problem (without computers)

\[
\begin{align*}
\text{maximize} & \quad 5x_1 + 3x_2 \\
\text{subject to} & \quad -4x_1 - 5x_2 \leq -10 \\
& \quad 5x_1 + 2x_2 \leq 10 \\
& \quad 3x_1 + 8x_2 \leq 12 \\
& \quad x_1, x_2 \geq 0
\end{align*}
\]

Problem 7 (Due 2/11/05, Posted 2/4/05): Write computer codes and solve the problems 4, 5 and 6 with a computer.

Problem 8 (Due 2/11/05, Posted 2/4/05): Problem 1.8 of the book (page 11). In addition to formulating the problem, solve it.

Problem 9 (Due 2/18/05, Posted 2/7/05): Problem 5.5 of the book (page 69).

Problem 10: Problems 5.1, 5.2, 5.3, 5.4, 5.6 and 5.7 of the book (pages 69-70).

Problem 11 (Due 2/25/05, Posted 2/16/05): Problems 17.1, 17.3 and 17.8 of the book (pages 269-270).
Problem 12 (Due 3/18/05, Posted 3/11/05): Write a program to compute the LU factorization of matrices, a program to solve lower triangular systems and a program to solve upper triangular systems. Use those programs to find the LU factorization of

\[
A = \begin{bmatrix}
2 & 1 & 1 \\
2 & 2 & 1 \\
0 & 1 & -1 \\
\end{bmatrix}
\]

and solve the linear system

\[Ax = b \text{ with } b = \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}\]  

Problem 13 (Due 3/18/05, Posted 3/11/05): Write a program to compute the LU factorization of matrices with partial pivoting. Use this program to find the factorization of

\[
A = \begin{bmatrix}
0 & 1 & 1 \\
2 & 2 & 1 \\
0 & 1 & -1 \\
\end{bmatrix}
\]

and solve the linear system

\[Ax = b \text{ with } b = \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}\]  

Problem 14 (Due 4/22/05, Posted 4/14/05): Write an algorithm (as we do in class) to update the depth of the nodes in the network simplex method. Be very explicit on what is the input and the output of the algorithm.

Problem 15 (Due 4/22/05, Posted 4/14/05): Problem 19.3 of the book (page 318).

Problem 16 (Due 4/22/05, Posted 4/14/05): Problem 19.4 of the book (page 318).

Problem 17 (Due 4/22/05, Posted 4/14/05): Problem 19.6 of the book (page 318).

Problem 18 (Due 4/22/05, Posted 4/14/05): Problem 19.7 of the book (page 318).

Problem 19 (Due 4/22/05, Posted 4/14/05): Problem 19.10 of the book (page 318).