

## LP Assignment 2

DUE DATE: Wednesday, September 16, 2009, by 4:30pm in my office mail slot.

Please carefully read the presentation rules reproduced for your convenience on the back of this sheet. **Any paper submitted which is sloppy or uses two sides of a page will be returned immediately with no credit.**

Provide neat and careful solutions to the following five problems.

1. Using Bland's Rule, find the optimal dictionary for the following problem. In this problem only, give the current basis and the current basic feasible solution after each pivot.

$$\begin{array}{ll} \text{maximize} & 3x_1 + 2x_2 + 4x_3 \\ \text{subject to} & -2x_1 + 3x_2 + x_3 \leq 40 \\ & \quad - x_2 + 4x_3 \leq 100 \\ & - x_1 + x_2 + 2x_3 \geq -36 \\ & x_1, x_2, x_3 \geq 0 \end{array}$$

2. Apply the two-phase simplex method with Bland's Rule to optimize the following problem.

$$\begin{array}{ll} \text{maximize} & x_1 \\ \text{subject to} & x_1 - x_2 + 2x_3 \leq 50 \\ & x_1 + 2x_2 - x_3 \geq 60 \\ & 2x_1 \quad + 3x_3 \geq 100 \\ & x_1, x_2, x_3 \geq 0 \end{array}$$

3. Apply the two-phase simplex method with Bland's Rule to optimize the following problem.

$$\begin{array}{ll} \text{maximize} & 2x_1 \quad + 5x_3 \\ \text{subject to} & x_1 + 2x_2 \geq 40 \\ & \quad x_2 + 2x_3 \geq 20 \\ & x_1 + 3x_2 + 2x_3 \leq 50 \\ & x_1, x_2, x_3 \geq 0 \end{array}$$

4. Apply the two-phase simplex method with Bland's Rule to optimize the following problem.

$$\begin{array}{ll} \text{maximize} & x_1 + x_2 \\ \text{subject to} & x_1 \leq 10 \\ & x_2 \leq 8 \\ & x_1 + x_2 \geq 10 \\ & x_1, x_2 \geq 0 \end{array}$$

5. Apply the Perturbation/Lexicographic Method to optimize the following problem.

$$\begin{array}{ll} \text{maximize} & x_1 + x_2 + x_3 \\ \text{subject to} & x_1 \leq 10 \\ & 2x_1 + x_2 + x_3 \leq 20 \\ & x_1 + x_2 \leq 10 \\ & x_1, x_2, x_3 \geq 0 \end{array}$$

#### BASIC RULES FOR LP ASSIGNMENTS

- I) Each student must compose his/her assignments independently. However, rough work may be done in groups;
- II) Write legibly and use only one side of each sheet of paper; **Any paper submitted which is sloppy or uses two sides of a page will be returned immediately with no credit.**
- III) Show your work. Explain your answers using FULL SENTENCES;
- IV) No late assignments will be accepted for credit.