

620-261 Introduction to Operations Research

TUTORIAL 4 Week beginning Monday April 7 2008

1. For the linear programming problem below

(a) Sketch the feasible region bounded by the constraints and label all corner points.

(b) Solve the LP problem using the Simplex method. At each stage you should identify the basic feasible solution on your graph.

$$\max \quad z = 7x_1 + 8x_2$$

$$\begin{aligned} \text{subj to} \quad & 2x_1 + x_2 \leq 25 \\ & 3x_1 + 4x_2 \leq 40 \\ & 5x_1 + 2x_2 \leq 50 \\ & x_1 \geq 0, x_2 \geq 0. \end{aligned}$$

2. Using the Simplex method, find all optimal solutions (if they exist) of the following linear programming problems:

(a)

$$\max \quad z = x_1 + 2x_2$$

$$\begin{aligned} \text{subj to} \quad & x_1 - x_2 \leq 1 \\ & -2x_1 + x_2 \leq 4 \\ & x_1 \geq 0, x_2 \geq 0. \end{aligned}$$

(b)

$$\max \quad z = 4x_1 + 8x_2$$

$$\begin{aligned} \text{subj to} \quad & 2x_1 + 4x_2 \leq 200 \\ & 6x_1 + x_2 \leq 100 \\ & x_1 \geq 0, x_2 \geq 0. \end{aligned}$$