LP ①

SET-UP the following LP problems. Do not solve.

Example 1: Secretaries vs. Clerks: (a min C problem)

The Handy Company has determined that a secretary can type 8 pages and file 20 reports per hour, and a clerk can type 4 pages and file 40 reports per hour. After extensive research the company has determined that each hour it needs 320 pages typed and 2600 reports filed. If secretaries are paid \$11 per hour and clerks are paid \$5 per hour, how many secretaries and clerks should the Handy Company hire to meet its needs at a minimum cost?

Set-up:

(objective fn.) $\min\ C = 11x_1 + 5x_2$

(pages typed/hr. constraint) $8x_1 + 4x_2 \geq 320$

(reports filed/hr. constraint) $20x_1 + 40x_2 \geq 2600$

(non-negativity constraint) $x_1, x_2 \geq 0$

(variable dictionary) $x_1 = \#$ secretaries to be hired

$x_2 = \#$ clerks to be hired

Example 2: Fred's Hats: (a max P problem)

Fred's Hats produces two types of cowboy hats. Each type 1 hat takes Fred 15 minutes to make while each type 2 hat takes him only 10 minutes. Each type 1 hat uses 1/2 square yard of material and each type 2 hat uses 3/4 square yard of material. Each work day consists of 7 hours. There are 125 square yards of material on hand each work day. If the profit on each type 1 hat is \$9 and the profit on each type 2 hat is \$7, how many hats of each type should Fred make each day in order to maximize his daily profit?

Set-up:

$$\max P = 9x_1 + 7x_2$$

$$15x_1 + 10x_2 \leq 420$$

$$\frac{x_1}{2} + \frac{3x_2}{4} \leq 125$$

$$x_1,\ x_2 \geq 0$$

$x_1 = \#$ of type 1 hats to be made each day

$x_2 = \#$ of type 2 hats to be made each day