1. Solve the following problem in two ways, first **by hand**, and second by writing **Python code using revised simplex** method.

$$\text{Min } -3x_1 + 8x_2$$
$$s.t. \;\; 4x_1 + 2x_2 \leq 12$$
$$2x_1 + 3x_2 \leq 6$$
$$all\ x_i \geq 0$$

2. Solve the following problem in two ways, first by writing **Python code using revised simplex** method, and second by **writing python code using Gurobi**.

Maximize:

$$3x_1 + 2x_2 - x_3 - 2x_4 + x_5 + 2x_6 - x_7 + 3x_8 + 4x_9 - 3x_{10}$$

Constraints:

$$2x_1 + x_2 + 3x_3 + x_4 + 2x_5 + x_6 + 4x_7 + x_8 - 2x_9 + 3x_{10} \leq 80$$
$$x_1 - 4x_2 + x_3 + 2x_4 + 3x_5 + x_6 - x_7 + 4x_8 + x_9 + 2x_{10} \leq 50$$
$$3x_1 + 2x_2 - 2x_3 - x_4 + x_5 + 3x_6 + 2x_7 + x_8 + x_9 + x_{10} \leq 40$$
$$2x_1 + 3x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + 3x_9 + 2x_{10} \leq 90$$
$$x_1 + x_2 + x_3 + x_4 + x_5 + x_6 + x_7 + x_8 + x_9 + x_{10} \leq 50$$