ISE 5123 **Software Tools-Dec Support**
Spring 2020

Quiz 2
March 12, 2020

The Medequip Company produces precision medical diagnostic equipment at two factories. Three medical centers have placed orders for this month's production output. The table below shows what the cost would be fro shipping each unit from each factory to each of these customers. Also shown are the number of units that will be produced at each factory and the number of units ordered by each customer.

From/To	**Unit shipping cost**			**Output**
	Customer 1	**Customer 2**	**Customer 3**	
Factory 1	\$600	\$800	\$700	400 units
Factory 2	\$400	\$900	\$600	500 units
Order size	300 units	200 units	400 units	

A decision now needs to be made about the shipping plan for how many units to ship from each factory to each customer. The mathematical formulation is given below. Solve this model using Python and Gurobi, and print the optimal solutions and objective function.

Let x_{ij} be the number of units shipped from factory $i = 1, 2$ to customer $j = 1, 2, 3$.

$$\begin{aligned}
\text{minimize} \quad & C = 600x_{11} + 800x_{12} + 700x_{13} + 400x_{21} + 900x_{22} + 600x_{23} \\
\text{subject to} \quad & x_{11} + x_{12} + x_{13} = 400 \\
& x_{21} + x_{22} + x_{23} = 500 \\
& x_{11} + x_{21} = 300 \\
& x_{12} + x_{22} = 200 \\
& x_{13} + x_{23} = 400 \\
\text{and} \quad & x_{ij} \geq 0,\ i = 1, 2 \text{ and } j = 1, 2, 3
\end{aligned}$$