STOR 415, Fall 2019
Solutions to Homework Assignment No. 8

1. (a) Let the variable x_{ij} denote the amount to ship from warehouse i to customer j. Let s_i be the supply at the ith warehouse, d_j be the demand of the jth customer, and c_{ij} be the unit shipping cost from warehouse i to customer j. Add a dummy warehouse with supply $s_4 = 40$ (the difference between the total demand and total supply), and set the unit shipping cost from the dummy warehouse to customers 1, 2 and 3 as $\$70, \$75$ and $\$65$, respectively. The mathematical formulation is:

$$\begin{aligned}
&\min \sum_{i=1}^{4}\sum_{j=1}^{3} c_{ij}x_{ij},\\
&\text{s.t.} \sum_{j=1}^{4} x_{ij} = s_i, \quad i = 1,2,3,4\\
&\sum_{i=1}^{4} x_{ij} = d_j, \quad j = 1,23,\\
&x_{ij} \geq 0, \quad i = 1,...,4, j = 1,2,3.
\end{aligned}$$

1. (b) See company.ipynb in the share folder on the server. The optimal solution is

	To		
From	Customer 1	Customer 2	Customer 3
Warehouse 1	10	0	20
Warehouse 2	30	0	0
Warehouse 3	0	10	20
Dummy	0	40	0

The optimal value is $4950.

2. See height.ipynb in the share folder on the server.