Module 09 – Fixed Charge Problem

Exploratory Data Analysis

*In this section, you should perform some data analysis on the data provided to you. Please format your findings in a visually pleasing way and please be sure to include these cuts:*

* *Make a visual graph of your data on a map (coordinates should be within US borders)*
  + <https://mymaps.google.com/>
  + Find a map with latitude/longitude and place them approximately
  + Any alternative that gives the same effect

A map of the united states

AI-generated content may be incorrect.

Model Formulation

*Write the formulation of the model into here prior to implementing it in your Excel model. Be explicit with the definition of the decision variables, objective function, and constraints.*

Decision Variables:

Xi = The Amount of Products Sent from the Warehouses to the Distribution Centers

Objective Function:

MIN 1485X1+2092X2+2187X3+1421X4

Constraints:

Binary:

All Yi must be binary

Linking Constraints:

X1<=M1 Y1

X2<=M2 Y2

X3<= M3 Y3

X4<= M4 Y4

Non-Negativity:

Xi>=0i i= 1,2,3,4

Model Optimized for Min Costs to Supply DCs

*Implement your formulation into Excel and be sure to make it neat. This section should include:*

* *A screenshot of your optimized final model (formatted nicely, of course)*
* *A text explanation of what your model is recommending*

*A screenshot of a computer

AI-generated content may be incorrect.*

*A screenshot of a computer

AI-generated content may be incorrect.*

My model is recommending that to minimize costs, Fish and Murr Candy should open the warehouses Cotton Candy Clouds and Jolly Rancher Range, in order to minimize the total cost.

Model with Stipulation

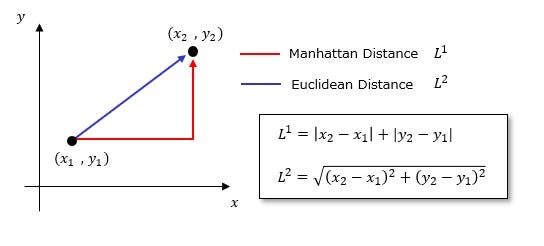
*Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution.*

*Please perform 2 out of the 3 scenarios below with a short text description on what changed:*

1. *Instead of only being able to open 2 warehouses, what happens to our objective function when we only can open 1 warehouse?*

The total cost nearly doubles. Our company fulfills through just having the Crispy Rice Reef open.

1. *Right now, we have $1 per unit shipped over the distance between the warehouse and the DC. What happens to our objective function when we increase this to $30? Does your DC assignment change at all?*
2. *For distance between each location, we used Manhattan distance but what happens to our model if we use Euclidean distance instead? Did the change impact the model at all? Do you feel this is a better distance metric to use in this scenario?*



Using Euclidean distance decreases the total cost. I feel that this metric is a better distance metric to use in this scenario because it measures I think it more accurately depicts the distance between the warehouses and distribution centers.