Module 02 – Transportation Modeling

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:

- *The locations involved in the analysis (id -> name) and specify if they are a source or a destination*
- *A table of the average cost between source and destination (for the sake of this assignment, we are dealing with sugar-miles similar to the bushel-mile example from the textbook)*

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:
The B14:G17 range is the decision variable being changed by the solver.
Solver is finding the optimal units to send for each location, considering demand and capacity.

Objective Function:
Sumproduct of the 'cost per' data from table 1, and the decision variable section of table 2.
Giving solver an objective function to minimize transportation costs.

Constraints:
Non-negativity constraint of the decision variable, table 2, B14:G17 range
Received = Demand *(meaning that solver should find a solution where all demand is met)*
Total Shipped = Capacity *(meaning that solver should find a solution where capacity is met for each source)*

Model Optimized for Profit
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	B	C	D	E	F	G	H	I
4	**Row Labels**	**D4364665**	**D48b24ce**	**D60bded9**	**D7c2a294**	**D98c2300**	**Da7cec12**	**Grand Total**	
5	S1723453	0.080000086	0.160000015	0.149999978	0.139999988	0.12000003	0.119999938	0.129205028	
6	S58c7391	0.050000074	0.049999975	0.069999928	0.119999945	0.170000004	0.099999932	0.092088865	
7	Sd937cea	0.130000021	0.089999979	0.090000044	0.099999966	0.089999979	0.049999984	0.092435894	
8	Sff2d315	0.110000009	0.139999958	0.060000042	0.129999992	0.09000002	0.14000001	0.111866033	
9	**Grand Total**	**0.092281929**	**0.10865852**	**0.094649678**	**0.123987316**	**0.116158947**	**0.10195309**	**0.106515983**	
10									
11	NOT FEASIBLE....								
12									
13	**Row Labels**	Praline Park	Snickerdoodle	White Chocola	Rock Candy Ric	Molten Mocha	Pudding Peaks	Total shipped	Capacity
14	Chewy Cherry Chews Channel	0	0	87	68	0	0	155	155
15	Frosted Fluff Fields	0	101	29	0	0	0	130	130
16	Dulce de Leche Dunes	112	0	0	0	0	50	162	162
17	Coconut Macaroon Moor	0	0	0	0	89	60	149	149
18	Received	112	101	116	68	89	110		
19	Demand	112	101	116	117	107	110		
20									
21									
22	Objective -->	63.11999651							

This model is a transshipment problem, using the source and destination information, including units shipped, total cost, as well as cost per unit shipped, given capacity for sources and demand that must be met for destinations. For this workshop, there are no distances provided, just the costs associated with the distance traveled. We had to work to create table 1 (above) to set up our success for the solver section, where we take the costs associated with each connection between source and destination, so that we can compute shipment costs. This total shipment cost is ultimately what is being minimized to recommend a shipment solution that will reduce costs for this candy company.

Model with Stipulation

*Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution. What happens if you add an additional constraint to the model such that all demand **MUST** be met. Is the solution still feasible? If not, please explain why.*

No, Solver cannot find a feasible solution because the demand for both Rock Candy Ridge and Molten Mocha Marsh are not met.