Module 02 – Transportation Modeling

Exploratory Data Analysis

		Location 5	Location 6	Location 7	Location 8	Location 9	Location 10
		Macaron Market	Molten Mocha Marsh	Peppermint Parlor	Rainbow Sprinkle Summit	Starburst Starlit Skies	Sugarplum Springs
Location 1	Butter Pecan Bluff	$ 0.09	$ 0.17	$ 0.18	$ 0.09	$ 0.06	$ 0.19
Location 2	Chocolate River Rapids	$ 0.10	$ 0.08	$ 0.09	$ 0.05	$ 0.10	$ 0.15
Location 3	Funfetti Fields	$ 0.10	$ 0.06	$ 0.16	$ 0.08	$ 0.05	$ 0.08
Location 4	Gooey Ganache Grotto	$ 0.09	$ 0.10	$ 0.07	$ 0.07	$ 0.12	$ 0.16

Model Formulation

MIN:

.09X_15+.17X_16+.18X_17+.09X_18+.06X_19+.19X_110+
.1X_25+.08X_26+.09X_27+.05X_28+.1X_29+.15X_210+
.1X_35+.06X_36+.16X_37+.08X_38+.05X_39+.08X_310+
.09X_45+.1X_46+.07X_47+.07X_48+.12X_49+.16X_410

X_15+X_16+X_17+X_18+X_19+X+110 = 135
X_25+X_26+X_27+X_28+X_29+X+210 = 177
X_35+X_36+X_37+X_38+X_39+X+310 = 175
X_45+X_46+X_47+X_48+X_49+X+410 = 108

X_15+X_25+X_35+X_45 <= 117
X_16+X_26+X_36+X_46 <= 106
X_17+X_27+X_37+X_47 <= 105
X_18+X_28+X_38+X_48 <= 112
X_19+X_29+X_39+X_49 <= 108
X_110+X_210+X_310+X_410 <= 104

Model Optimized for Profit

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	Macaron Market	Molten Mocha Marsh	Peppermint Parlor	Rainbow Sprinkle Summit	Starburst Starlit Skies	Sugarplum Springs	Amount	Capacity
Butter Pecan Bluff	57	0	0	0	78	0	135	135
Chocolate River Rapids	0	65	0	112	0	0	177	177
Funfetti Fields	0	41	0	0	30	104	175	175
Gooey Ganache Grotto	3	0	105	0	0	0	108	108
Sum	**60**	**106**	**105**	**112**	**108**	**104**		
Demand	**117**	**106**	**105**	**112**	**108**	**104**		
				Total	**40.50999779**			

My model is showing that an optimal solution will cost $40.50

Model with Stipulation

*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, the solution is not feasible, as the capacity and demand cannot be maxed out.

	Macaron Market	Molten Mocha Marsh	Peppermint Parlor	Rainbow Sprinkle Summit	Starburst Starlit Skies	Sugarplum Springs	Amount	Capacity
Butter Pecan Bluff	0	0	34	101	0	0	135	135
Chocolate River Rapids	0	106	71	0	0	0	177	177
Funfetti Fields	117	0	0	0	0	58	175	175
Gooey Ganache Grotto	0	0	0	0	62	46	108	108
Sum	**117**	**106**	**105**	**101**	**62**	**104**		
Demand	**117**	**106**	**105**	**112**	**108**	**104**		
				Total	**61.13636141**			