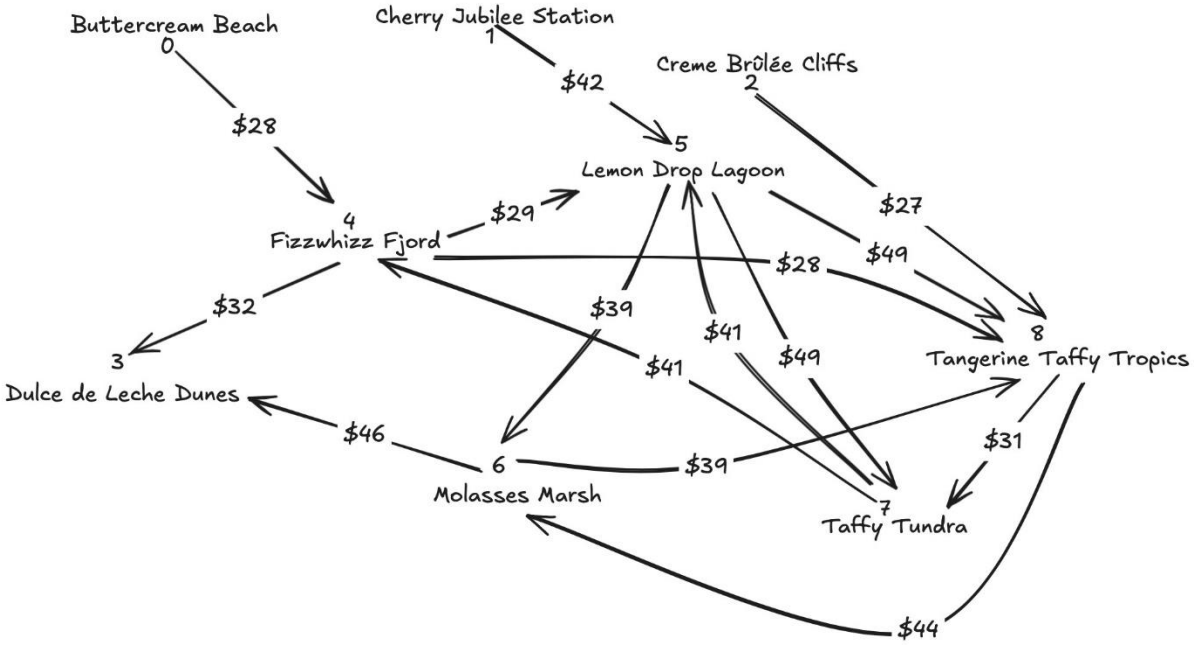
Module 06 – Transshipment Problem

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:

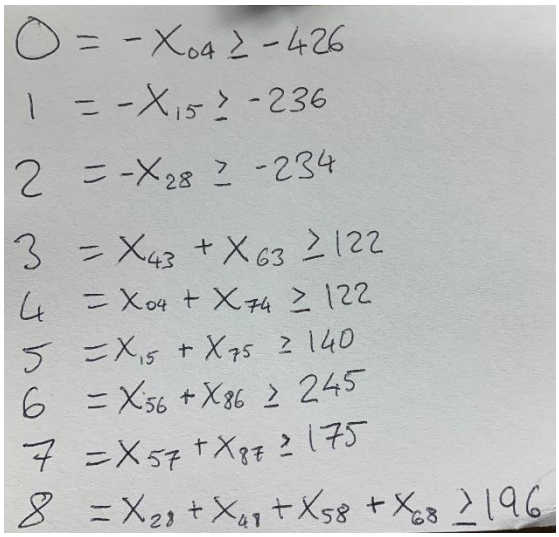
- *Make a visual graph of your data like what we saw for the sample problem*
  - https://excalidraw.com
  - https://mermaid.live
  - https://dreampuf.github.io/GraphvizOnline
  - Powerpoint



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.
Hint: This one differs a bit from the sample problem in terms of Balance-of-Flow

MIN=
28X04+42X15+27X28+32X43+29X45+28X48+39X56+49X57+49X58+46X63+39X68 +41X74+41X75+44X86+31X87



Total Transportation Cost ->	$ 48,127.00

Ship		From		To	Unit Cost
426	0	Buttercream Beach	4	Fizzwhiz Fjord	$ 28
236	1	Cherry Jubilee Junction	5	Lemon Drop Lagoon	$ 42
234	2	Creme Brulee Cliffs	8	Tangerine Taffy Tropics	$ 27
122	4	Fizzwhiz Fjord	3	Dulce de Leche Dunes	$ 32
45	4	Fizzwhiz Fjord	5	Lemon Drop Lagoon	$ 29
137	4	Fizzwhiz Fjord	8	Tangerine Taffy Tropics	$ 28
141	5	Lemon Drop Lagoon	6	Molasses Marsh	$ 39
0	5	Lemon Drop Lagoon	7	Taffy Tundra	$ 49
0	5	Lemon Drop Lagoon	8	Tangerine Taffy Tropics	$ 49
0	6	Molasses Marsh	3	Dulce de Leche Dunes	$ 46
0	6	Molasses Marsh	8	Tangerine Taffy Tropics	$ 39
0	7	Taffy Tundra	4	Fizzwhiz Fjord	$ 41
0	7	Taffy Tundra	5	Lemon Drop Lagoon	$ 41
0	8	Tangerine Taffy Tropics	6	Molasses Marsh	$ 44
175	8	Tangerine Taffy Tropics	7	Taffy Tundra	$ 31

	Nodes	Inflow	Outflow	Net Flow	Supply/Demand
0	Buttercream Beach	0	426	-426	-426
1	Cherry Jubilee Junction	0	236	-236	-236
2	Creme Brulee Cliffs	0	234	-234	-234
3	Dulce de Leche Dunes	122	0	122	122
4	Fizzwhiz Fjord	426	304	122	122
5	Lemon Drop Lagoon	281	141	140	140
6	Molasses Marsh	141	0	141	245
7	Taffy Tundra	175	0	175	175
8	Tangerine Taffy Tropics	371	175	196	196

Model Optimized for Minimal Transportation Cost

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*
- *Update your graph from the EDA section to bold/color the links being used (and show how much is going through that link)*

The model uses the most efficient routes to meet all supply and demand requirements at the lowest total cost. It optimizes the flow to minimize expenses while ensuring each node's supply and demand constraints are balanced.

Model with Stipulation

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

Follow these steps to complete this section:

1. *Describe the necessity of the Balance-of-Flow for this problem type*
2. *What happens when you change your model to make Total Supply > Total Demand (i.e. add 115 units to one of the sources)*
3. *What happens when you rerun your model?*
4. *What do you need to change to make your model work again?*
5. *Make the changes and report on your findings.*
    a. *PS there is a small chance that the source you added 115 to may make your model infeasible. If so, add the 115 units to a different source.*