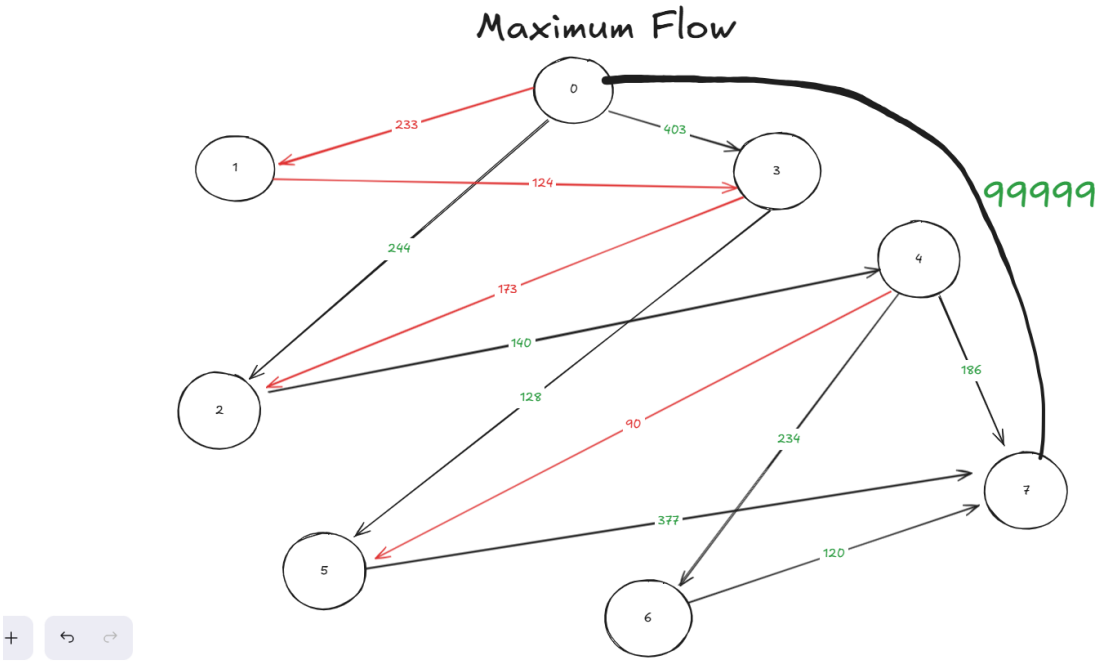
Module 07 – Maximal Flow

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/Word



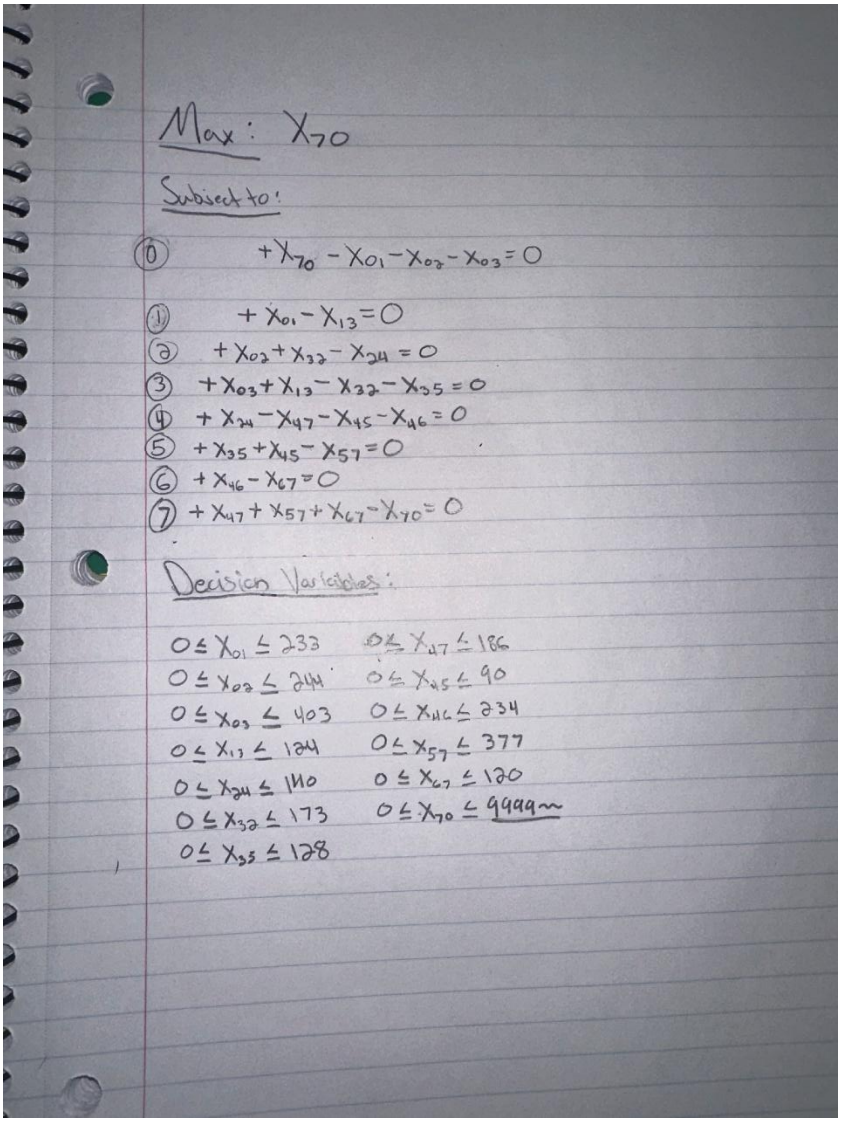
Model Formulation

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.

Maximal Flow -> 268

Units of Flow	Links From		Links To		Upper Bound
0	0	Coconut Cream Cove	1	Crispy Rice Reef	233
140	0	Coconut Cream Cove	2	Fudge Falls	244
128	0	Coconut Cream Cove	3	Hazelnut Haven	403
0	1	Crispy Rice Reef	3	Hazelnut Haven	124
140	2	Fudge Falls	4	Mochi Metropolis	140
0	3	Hazelnut Haven	2	Fudge Falls	173
128	3	Hazelnut Haven	5	Peppermint Peninsula	128
20	4	Mochi Metropolis	7	Rainbow Ribbon Roads	186
0	4	Mochi Metropolis	5	Peppermint Peninsula	90
120	4	Mochi Metropolis	6	Pudding Peaks	234
128	5	Peppermint Peninsula	7	Rainbow Ribbon Roads	377
120	6	Pudding Peaks	7	Rainbow Ribbon Roads	120
268	7	Rainbow Ribbon Roads	0	Coconut Cream Cove	99999

	Nodes	Inflow	Outflow	Net Flow	Supply / Demand
0	Coconut Cream Cove	268	268	0	**0**
1	Crispy Rice Reef	0	0	0	**0**
2	Fudge Falls	140	140	0	**0**
3	Hazelnut Haven	128	128	0	**0**
4	Mochi Metropolis	140	140	0	**0**
5	Peppermint Peninsula	128	128	0	**0**
6	Pudding Peaks	120	120	0	**0**
7	Rainbow Ribbon Roads	268	268	0	**0**



Model Optimized for Maximal Flow

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

Model with Stipulation

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

- Using a copy of the network, show how many units pass through each edge
- Identify the edges that are underutilized and those that are at capacity with different colors (you can also color the nodes **RED** for underutilized and **GREEN** for at capacity)`
  - An edges is underutilized if edges go to it that aren't at capacity
  - An edges is at capacity when it has edges that are at capacity (especially if they are all at capacity)
- Write a brief statement on what would help increase the optimal solution