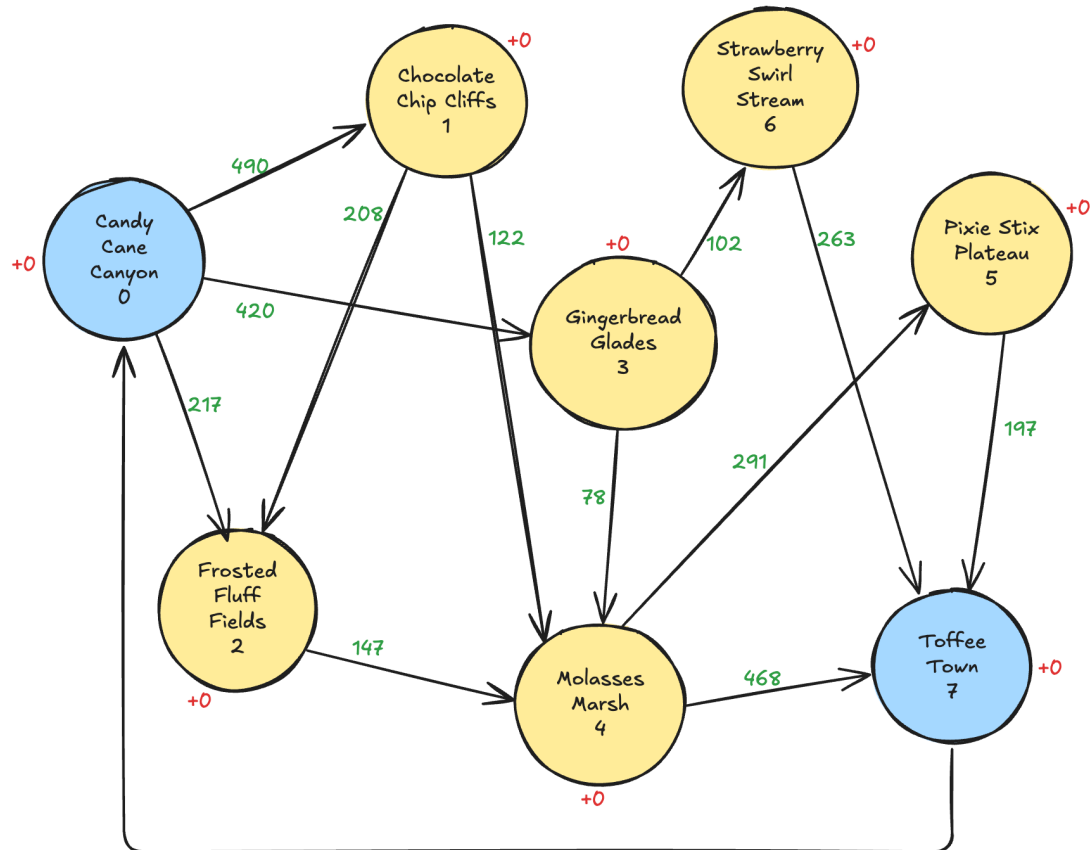


Module 07 – Maximal Flow

Exploratory Data Analysis

Make a visual graph of your data like what we saw for the sample problem



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.

Model Optimized for Maximal Flow

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

nmmm

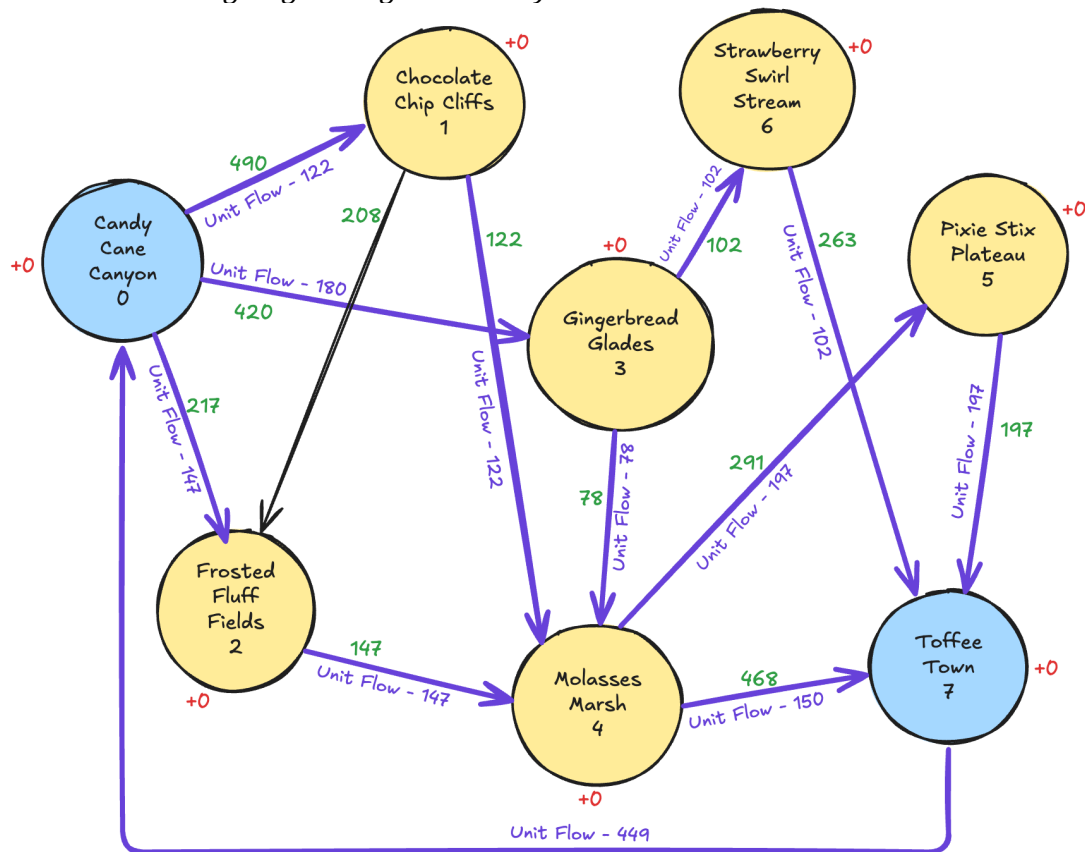
Maximum Flow -->

449

Units of Flow	From	To	Upper Bound
122	0 Candy Cane Canyon	1 Chocolate Chip Cliffs	490
147	0 Candy Cane Canyon	2 Frosted Fluff Fields	217
180	0 Candy Cane Canyon	3 Gingerbread Glades	420
0	1 Chocolate Chip Cliffs	2 Frosted Fluff Fields	208
122	1 Chocolate Chip Cliffs	4 Molasses Marsh	122
147	2 Frosted Fluff Fields	4 Molasses Marsh	147
78	3 Gingerbread Glades	4 Molasses Marsh	78
102	3 Gingerbread Glades	6 Strawberry Swirl Stream	102
150	4 Molasses Marsh	7 Toffee Town	468
197	4 Molasses Marsh	5 Pixie Stix Plateau	291
197	5 Pixie Stix Plateau	7 Toffee Town	197
102	6 Strawberry Swirl Stream	7 Toffee Town	263
449	7 Toffee Town	0 Candy Cane Canyon	9999

Nodes	Inflow	Outflow	Net Flow	Supply / Demand
0 Candy Cane Canyon	449	449	0	0
1 Chocolate Chip Cliffs	122	122	0	0
2 Frosted Fluff Fields	147	147	0	0
3 Gingerbread Glades	180	180	0	0
4 Molasses Marsh	347	347	0	0
5 Pixie Stix Plateau	197	197	0	0
6 Strawberry Swirl Stream	102	102	0	0
7 Toffee Town	449	449	0	0

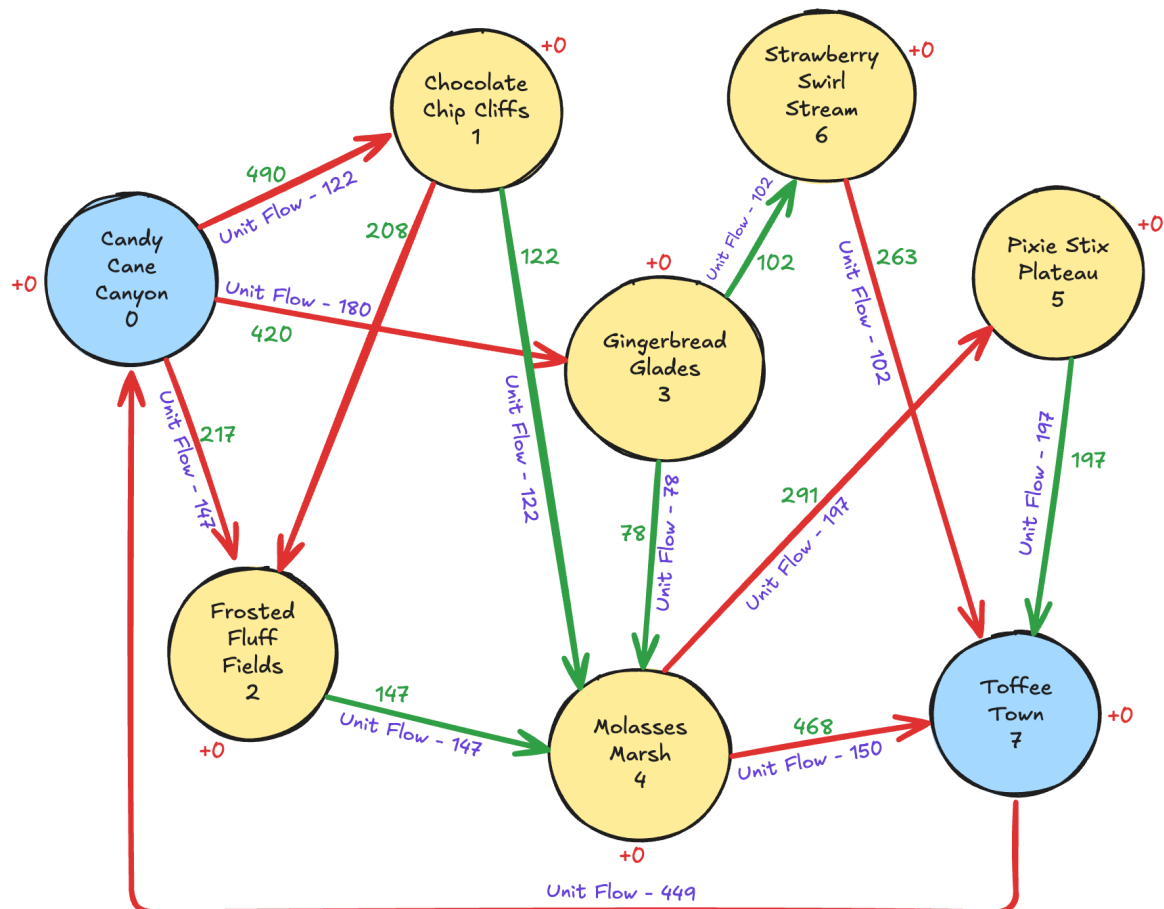
- Some of the bottlenecks in my model are the paths through Chocolate Chip Cliffs, Frosted Fluff Fields and Gingerbread Glades linking up to Molasses Marsh. Now the Path through Chocolate Chip Cliffs to Molasses Marsh has a bottle neck of 122 units, the one from Frosted Fluff Fields is 147 units and the path from Gingerbread Glades is 78 units. Overall, my model is recommending that the maximum possible flow is 449 units and without increasing the capacity of one or more links than no improvements can be made to further maximize the flow.
- 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.

- Model Stipulation Alterations: Identify the Bottlenecks
 - o Using a copy of the network, show how many units reach each edge
 - o Identify the nodes that are underutilized and those that are at capacity with different colors you can also color the edges **RED** for underutilized and **GREEN** for at capacity)
 - An edge is underutilized they aren't at capacity
 - An edge at capacity when it has edges that are at capacity (especially if they are all at capacity)



- o Write a brief statement on what would help increase the optimal solution
 - In my opinion we could increase the capacity from Chocolate Chip Cliffs to Molasses Marsh which would boost the flow from path 1. As well as increasing the capacity by adding, let's say 70 units from Frosted Fluff Fields to Molasses Marsh as were currently at 147 units but it could handle about 217 units. Lastly, we could increase flow From Gingerbread Glades because its only using 180 of 420 units available so we could redirect some units through either Molasses Marsh path or Strawberry Swirl Stream path to have better utilization.