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

A whiteboard with a diagram

AI-generated content may be incorrect.

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.*

*MAX: X70*

*Subject to:*

*X70-X01-X02-X03 = 0*

*X01-X12-X16=0*

*X12-X25-X26=0*

*X03-X35=0*

*X64-X47=0*

*X25-X57=0*

*X16-X63-X64-X67=0*

*Decision Variables:*

*0<=X01<= 121*

*0<=X02<= 228*

*0<=X03<= 498*

*0<=X12<= 125*

*0<=X16<= 199*

*0<=X25<= 60*

*0<=X26<= 113*

*0<=X35<= 278*

*0<=X47<= 204*

*0<=X57<= 130*

*0<=X67<= 260*

*0<=X63<= 244*

*0<=X64<= 187*

*0<=X70<= 99999*

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)*

A screenshot of a data

AI-generated content may be incorrect.

Model with Stipulation

* *Using a copy of the network, show how many units reach each node.*
* *Identify the nodes that are underutilized and those that are at capacity with different colors.*
* *Write a brief statement on what would help increase the optimal solution.*

*To increase the optimal solution, the best option would be to utilize the underutilized nodes as they have more capacity. This would not only increase maximal flow, but ensure that each node can carry a large capacity.*

*(The units at each node are in the circle)*

***A diagram of a network

AI-generated content may be incorrect.***