BIA 650 A Homework#5 W&A Chapter 5, Problem 30

# Management Overview

Problem Statement:

The Objective is to minimize the Total Distance given that Maude can travel along each node in either direction.

Data Sources:

* + The **inputs** are identified as the distances between different nodes.
  + The key **decision variable** is the Flow for each node. A flow of 0 represents that Maude does not pass through the node and a flow of one represents that Maude passes through the node.
  + **Constraints** are identified as
    - Flow balance for every node except 1 and 10 has to be 0.
    - The flow balance for node 1 must be 1(can’t flow into node because that’s the starting point)
    - The flow balance for node 10 must be -1(Can’t flow out of node 10 because that’s the end point)
  + **Output** is the total distance covered.

Model Approach:

* + Separate the data into inputs, decision variables, constraints and output.
  + Extra cells are added to account for the additional flows allowed. The range definitions are modified to account for the new cells added.

Observation:

* Running Solver, it was observed that the Total Distance covered or the route did not change even after Maude was allowed to travel in either direction through the different nodes.

Solution:

* The optimal solution is for Maude to travel from Node 1 to Node 4 covering 56 miles and then from Node 4 to Node 6 covering 45 miles and from Node 6 to Node 10 covering 97 miles, totalling 198 miles.