BIA 650 A Homework#7 W&A Chapter 6, Problem 28

# Management Overview

Problem Statement:

The objective is to minimize the distance covered by service representatives to the reach customers in all the cities. Also, only three of the seven potential hubs must be chosen as service centres.

Data:

* + The **inputs** are identified as Distance between cities and the number of trips made to each city.
  + The **decision variables** are
    1. A binary variable which tells us whether a city should be a service centre or not.
    2. Another binary variable which assigns service centre to each city
  + **Constraints** are as follows
    1. Number of service centres should equal 3
    2. Number of Cities serviced by each service centre cannot be greater than 11.
  + Total Distance travelled is the **Output**

Model Approach:

* + Separate the data into inputs, decision variables, constraints and output and enter them on the spreadsheet. Inputs, Decision Variables, Constraints and objective cell to be minimized are added in Solver and it is run. We select the simplex method because this is a linear problem.

Sensitivity Analysis: (Total miles travelled Vs Number of service centres)

Using Solver Table’s one-way data table, we observe the sensitivity of Required number of service centres to total distance travelled. It is intuitive that the distance travelled should decrease as the number of service centres increase. It is also interesting to note from the graph that the rate at which the total distance covered decreases, also keeps decreasing.

A screenshot of a social media post

Description automatically generated

Solution: Houston is assigned as service centre to Dallas, Los Angeles, Miami and Phoenix; Buffalo to Boston, New York and Pittsburgh; Kansas City to Chicago, Denver, San Francisco and Seattle. The told distance covered by the service representatives annually is 10683 (in thousands of miles).