ESSENTIAL COMPONENTS  
OFFICE REALIGNMENT PROJECT

Problem

Ram Wireless seeks to realign store assignments for Staunton, Richmond, Warrenton, and Tappahannock regional offices to minimize travel costs, which include both mileage and employee salary expenses. Each store must be assigned to a regional office in a way that reduces unnecessary travel time, allowing employees more time for store-related work. Additionally, each regional office’s available hours for each task area must be respected. This phase extends the analysis by explicitly incorporating constraints related to area-specific availability of hours and examining how the assignment aligns geographically to ensure practical implementation.

Data

be the set of regional offices  
 be the set of stores  
 be the areas   
 = state mileage rate, which is $0.585 per mile  
 the salary being paid to the employees while driving (26 per hour )  
the distance in miles from store to regional office   
 time required in hours to travel from a store to a regional office   
 hours required annually by each store in area   
 employee hours available annually in regional office in each area   
number of annual round trips required by store in area   
 the cost of assigning employees from each store to a regional office , which includes mileage cost and salary cost ,

Objective in Words

Decide the assignment of stores to regional office ( i.e, which regional office each store must be assigned to )

So that the total cost ( mileage cost + salary cost ) is minimized

Subject to the following constraints:

1. Each store must be assigned to only one regional office
2. The hours required by stores assigned to a regional office for each area must not exceed the hours available in that office for that area.

Decision Variables

Let be the binary decision variable where,

Algebraic Formulation

Minimize

Subject to the constraints:

AssignEachStoreOnce:

HoursConstraint:

Implementation

An implementation of the above problem using AMPL and Python is as follows:

Results