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Homework 9

Method

To determine the optimal path of the traveling salesman problem I took on the “brute force” mentality and generated a permutation matrix of all possible city combinations. Since the salesman needed to return to the starting city I added a sixth “stop” which is that path’s starting city. There are 120 possible paths. Using the provided distance table I was able to determine the total driving distance of each path, then find the path with the minimum cost.

Results

The optimal sequence of cities the salesman should follow is shown below:

Buffalo, Albany, Boston, New York, Providence, Buffalo

This path was calculated using the distance table, along with the assumption that the salesman must always return to the starting city. The cost of this sequence is **1064 miles**.

Discussion

The “brute force” method I used to determine the minimum path was acceptable in this case since the number of nodes was not high. Since the number of possible paths would increase factorially as the number of cities increases, a larger number of nodes would have forced me to use a more efficient method of calculating the path with the minimum cost. Dijkstra’s algorithm would have been another way to calculate the minimum cost path, but since the number of cities was low enough I could get away with taking the “brute force” approach.