SMU | LYLE
SCHOOL OF ENGINEERING

CSE 3353 ALGORITHMS: LAB 3

Overview: Using both naive brute force and dynamic programming (DP) techniques, solve the traveling sales man problem (TSP) (find a Hamiltonian circuit) for a given list of nodes and positions (graph).

Due: November 6, 2018 @ 4pm.

Code Requirements:

- Always use Node 1 as your start/finish point of TSP
- Read node list in from a text file which uses same format as the positions.txt file from Lab 2
    - NodeID x, y, z → 1,1.23,3.45,4.112 → int,float,float,float
    - You can derive your own list of nodes and positions
    - Code will be tested against a private list of nodes/positions. Code will only be tested up to the number of nodes identified in writeup as total nodes able to analyze.
- Return optimal (shortest) path for given list of nodes
- Start with a list of 4 nodes and increase to the maximum number that is feasible with your computer for both naïve and DP algorithms
- Design your code to be reusable for new algorithms, incorporating the file loader and output system into a single interface. Utilize patterns (or modified patterns) to make informed decisions on how to architect your project. How your code was designed will hold a substantial weight on overall project grade.

Report Requirements:

- Plot timing with excel for each algorithm in a single graph. X axis should be number of nodes in graph, Y axis should be total timing.
    - Also provide a table to summarize data in graph
- Provide a summary of results obtained and be sure to explain time complexity for each algorithm
    - Provide a graph that shows a comparison of timing captured on code execution vs the asymptotic timing determined for given algorithm
- Explain and document your design decision. Should include write up that explains architecture decisions and how you designed for functionality and extensibility as well as a UML diagram.
- Explain/derive subproblems and how the dynamic programming portion was developed

Submit inside of your class git repo.