Food Delivery at GW's 23 Commercement

Task:

- ☐ Xinyi & Danyu TSP & TSP precedence Modeling — Tue
- ☐ Chao Report (The details of first two Presentation) — Tue

Presentation:

1) the supply chain problem and its motivation;
2) the analytical models proposed and relevant data collected;
3) the application of the proposed models and preliminary findings.

Report:

The report should include the main results and details to demonstrate the solution approach. The report should be typewritten in Word or PDF, 1.5 line spacing, front size 12, Normal margins (1-inch at top, bottom, left, and right), and within 15 pages.

The model we may use in 2 scenarios:

1. From Canteen to Demand
    a. Logistic Planning — (Travelling Salesman Problem & TSP with precedence constraints)
    b. Vehicle Routing Problem
2. Locate Pick-up Station (Alternative)
    a. Facility location problem
        i. Set covering problem: how many stations should we locate?
        ii. P-median problem: If we locate P facilities, minimize the shipping cost
    b. Clustering

The frame of the project is to meet the requirements of different food delivery
First of all, to get the basic input data

1. gain the map of the campus and mark the schools we needed in the map(<=13) https://www.gwu.edu/schools-colleges

2. gain the time or distance from the source to the node, from the nodeA to the nodeB ……, from the node P to the source, finishing the loop

Then, meet the conditions we assume:

1. The basic: The food delivery starts from the source (maybe: The thurston Hall), will end at the same source(source only 1)
2. Changing the source node (Shenkman Hall)
3. comparing the basic options
4. TSP with precedence constraints (like in Shenkman, change the direction)
5. Vehicle Routing Problem(Generally, there are 2^11 conditions. Accurately, it depends on the conditions in the middle line, node 4,node 8, node 12, 2^3 conditions. More accurately, for example, we take the condition of node 8, to identify which source node it belongs to)(Two more tests needed) — Xinyi
6. Facility location problem — Danyu
    a. Set covering problem: data needed: whether they could be covered…(to get the min facilities)
    b. (different from the last one)P-median problem: Known P, minimize the **shipping cost**. data needed: distance+demand…..(to get the min cost)
7. Clustering…..choosing the best fittable model…that is K-median
   To minimize the whole distance L1 norm needed — Haoyang