PSG Alumni hosted Hackathon 2024 (for 21xx students)

Problem statement

Steve has worked as Chef in many star hotels in multiple continents. Steve aspires to set up a chain of restaurants in his hometown Coimbatore. Steve figures starting with a cloud kitchen might be the first logical step. Steve after talking to his friends has identified three areas as potential places to start his business - RS Puram, Saibaba Colony and Peelamedu. Steve has hired a consultant to help narrow down to location and also type of food / restaurant business to start. Steve is very excited to start a Pastry based Restaurant.

Level 0

Consultant has mapped Saibaba colony into 20 neighborhoods and also suggested location for first Restaurant / cloud kitchen. Steve wants to start from the restaurant and cover all neighborhoods and return to the restaurant using the shortest possible path avoiding already visited neighborhoods. So we want to write a program that can recommend the path Steve needs to traverse to generate outfile.

Level 1a

Steve after walking thru the location is confident about prospects of pastry business in Saibaba colony and has finalized the location of Pastry cloud kitchen. Steve is very risk averse so Steve advertised pre-order for Pastry to be delivered as evening snack. Steve has hired one delivery person and has a scooter with a modified carrier. Based on the day's orders he wants to communicate the delivery slots to his customers. Since the scooter carrier has finite capacity and customers may order cupcakes, birthday cake, bread etc We are tasked with writing a program that will allow Steve to enter all orders for the day and we create different slots. We want to make sure we can fill the scooter carrier to max possible capacity and also conserve petrol by making each drop slot cover a minimum distance. Goal is reduce number trips and total distance traveled

Level 1b (Optimizing Levels)

Steve initially gets only a few orders per day after lots of advertising and giving samples in grocery shops in the area. Business has started to expand but has reached a saturation point in these areas. So Steve is considering expanding to the adjacent Sivananda colony using the same person and scooter we need to now recommend possible routes and slots for this bigger area Steve wants to operate.

Level 2a

Steve now has lots of customers and now some customers are starting to get evening snacks after children return from school, so the customers are unhappy and Steve is slowly losing them. Steve promises to fix this situation and with profits made so far buys more scooters and delivery persons. Steve is worried if this will work, so we need to modify the program to help Steve with figuring out delivery slots with multiple scooters now.

Level 2b (Optimizing Levels)

Steve with multiple delivery scooters is able to satisfy his customer and has gained back all the customers he lost earlier. Steve is concerned his sales have stopped expanding, so Steve is considering expanding to adjacent Gandipuram. We need to now recommend possible routes and slots for this bigger area that Steve wants to operate.

Level 3

Steve started with a very small bakery with all the additional area he needs to serve Steve is often having to turn down orders from some customers. Also in the expanded areas now Steve is also seeing his petrol expenses increase. So after analyzing his order data and rental cost, he has started Cloud Pastry Services in multiple locations. We need to now recommend possible routes and slots for this bigger area Steve wants to operate.

Data points:

Given the distance between each neighborhood,number of restaurants, distance between restaurant and neighborhood, the number of vehicles, and the capacity of each vehicle. Different input files are given and the sample out format is given for reference