CS2110 Assignment 5

The Problem

The design team at AppsUnlimited has come up with the concept for a new app to help users find restaurants when they traveling.

The prototype UI is given shown above. Basically the user enters two pieces of data, namely

1. How far they are willing to travel (e.g. 1.5 km), and
2. How much they are willing to spend, (e.g. $20).

The user can then do three types of search, namely

- **All:** Display all restaurants that match the user's criteria.
- **Best:** Display those restaurants that match the user's criteria and for which there is no other restaurants that are both cheaper and closer.
- **Ranked** – Displays the same restaurants as Best button but the restaurants are ordered by rank. The rank of a restaurant is the count of number of restaurants that match the constraints and are both farther and more expensive.

The Data

This application is to be based on a Restaurants file which contains the following information for each restaurant:

- o   Name,
- o   Street address
- o   Average meal price, and
- o   lat/long co-ordinates

The Architecture

You can assume a 3 tiered architecture in which

- The presentation layer runs on the phone
- The business logic and data access layers run on the server
- The data source consists of the file described about which will be read and processed by the data access layer each time the server is initialized.
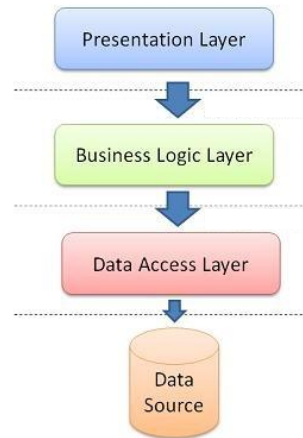
Your Task

- You may work in groups of size 1, 2 or 3. Only a single member of each group should submit the assignment but be sure to list all group members' names and Banner IDs!
- You may assume that
  - the application that is running in the presentation layer of the user's phone has access to the user's current lat and long coordinates at all times
  - the server running the business logic layer has access to a geospatial library that can compute the distance between points represented by lat/long co-ordinates
  - you may assume that the data source is a CSV file where each line consists of
    - Name (String), Street address (String) , average meal price in cents (int) , lat co-ordinate (float), long co-ordinate (float)

Tasks for groups of size one:

1) Design a set of ADTs and algorithms to support the "Yum" application.
2) For each operation or algorithm supported by one of your ADTs, describe what it does using pictures, words and examples. Be sure to say where in the tiered architecture each component should run and why. You will also need to describe any communications between layers and components.
3) For each ADT describe a simple brute-force implementation, give pseudo code, and analysis.
4) For each ADT describe a better/more-efficient implementation, give pseudo code, and analysis.
5) Write up your results in a well-organized report.

Tasks for groups of size two: Do the design work described above, plus

1. Implement and test you're the proposed ADT and algorithms
2. Do an experimental analysis of its performance (to be included in your report).
3. In addition to submitting your report your group should be ready to give a demo of the running software.

Tasks for groups of size three: Do the design and implementation work described above, plus

1. Create a working application complete with UI.
2. In addition to submitting your report your group should be ready to give a demo of the running software.