CSE412 Database Management
Assignment 2: Relational algebra and SQL

Consider a database of Yelp used in the previous assignment. This time we will use three tables from it (1) User, (2) Business, and (3) Review. For the ease of understanding, each relation (i.e., table) described below.

Users: The Users relation has the following columns (attributes): (1) UserID is a unique identifier for each user (primary key, integer type) (2) name (varchar) (3) yelping_since (timestamp).

UserID	Name	Yelping since
1	Alice	**2011-01-01**
2	Bob	**2011-01-02**
…	…	…

Businesses (assume they are restaurants): A business has a unique id, name, categories. A business has one or more categories (string).

BusinessID	Name	Categories
1	Taco bell	Tacos|Mexican
2	Pita jungle	Mediterranean|American
…	…	…

Reviews:

The Reviews relation consists of the following attributes: (1) UserID: the ID of a user that exists in the users relation. (2) BusinessId: the ID of a business that exists in the Businesses relation (3) Review: a numerical value between 1 and 5 that the user assigned to the business. Note that a user may review a business only once.

UserID	BusinessID	Review
1	2	1.5
2	1	4.0
…	…	…

Problem 1 (2.5 Points): Write the <u>appropriate relational algebra</u> that maps to the following functionality:

a) Find all users whose name is Bob
b) Find all business categorized as "Mexican"
c) Find the UserID of all users that reviewed Taco bell.
d) Find the UserID of all users that rated Mexican restaurants
e) Find all users who joined Yelp in 2018 and rated the Pita Jungle restaurant.
f) Find two *different* relational algebra ways to: Find all restaurants rated by users that joined Yelp in either Year 2016 or 2018.
g) Find users who have rated every single business except Chinese restaurants

Problem 2 (2.5 Points): Write the appropriate <u>SQL</u> that maps to the following functionality

a) For (parts (e), (f), and (g)) in Problem 1, find the suitable SQL query that perform the same functionality
b) Write a SQL query that performs the following
    a. Find all users who joined Yelp between year 2016 and 2018
    b. Find UserID's of users who have rate Mexican or Chinese restaurants.
    c. Find two different ways to write a SQL query that: Retrieves IDs of all BurgerKing rated by users who joined Yelp in 2018.
    d. Find taco restaurants whose average review is greater than 4.0.

Submission Guidelines:

- It is highly recommended to test the sql queries on your side before submitting.
- No need to submit the CREATE TABLE statements for this assignment. Please stick to SQL statements as per requirements.
- Late submission is not allowed.
- Your assignment should be typed not handwritten. The symbols used in relational algebra must be typed as well with the help of any software of your choice.
- Submit a single PDF document that includes your report to Blackboard. Name your PDF as follows: "cse412-assignment2 -MYASUDigitalID".

Deadline:

11:59 PM, March 25 2021