

COEN 280 - Database Systems

Winter 2022

Homework Assignment 3

Due: Friday, Mar 8 @11:59pm

Demo: TBD

In your course project you would develop a data analysis application for Yelp.com's business review data. The emphasis would be on the database infrastructure of the application.

In 2013, Yelp.com has announced the "Yelp Dataset Challenge" and invited students to use this data in an innovative way and break ground in research. In this project you would query this dataset to extract useful information for local businesses and individual users.

The Yelp data is available in JSON format. The original Yelp dataset includes 42,153 businesses, 252,898 users, and 1,125,458 reviews from Phoenix (AZ), Las Vegas (NV), Madison (WI) in United States and Waterloo (ON) and Edinburgh (ON) in Canada. (http://www.yelp.com/dataset_challenge/). In your project you will use a smaller and simplified dataset. This simplified dataset includes only **20,544** businesses, the reviews that are written for those businesses only, and the users that wrote those reviews.

The Yelp JSON files that you will use in this project are available on Camino.

(Note: Please make sure to use the dataset available on Camin, not the one from the Yelp.com website)

See Appendix-A for an overview of the Yelp Academic Dataset.

Overview & Requirements:

You would develop a target application which runs queries on the Yelp data and extracts useful information. The primary users for this application will be potential customers seeking for businesses and users that match their search criteria. Your application will have a user interface that provides the user the available business categories (main, sub-categories), the attributes associated with each business category along with business review and yelp user information associated with each business category. Using this application the user will search for the businesses from various business categories that have the properties (attributes) the user is looking for.

Faceted search has become a popular technique in commercial search applications, particularly for online retailers and libraries. It is a technique for accessing information organized according to a faceted classification system, allowing users to explore a collection of information by applying multiple **filters**. Faceted search is the dynamic clustering of items or search results into categories that let users drill into search results (or even skip searching entirely) by any value in any field. Users can then "drill down" by applying specific constraints to the search results. Look at https://react.rocks/tag/Faceted_Search for some examples.

In this application, the user can filter the search results using available business attributes (i.e. facets) such as category, sub-category, attributes, reviews, stars and votes. Each time the user clicks on a facet value; the set of results is reduced to only the items that have that value. Additional clicks continue to narrow down the search—the previous facet values are remembered and applied again.

You will be designing your application a standalone Java application.

Example screenshots of a possible application are available in Appendix-B. In evaluating your work, instructor's primary focus will be primarily on how you design your database and how efficiently you can search the database and pull out the information. However, your GUI should provide the basic functionality for easy browsing of the business categories and attributes (as illustrated in Appendix-B). Creativity is encouraged!

Project Details:

1. Part 0

Install Oracle Database 11gR2 or later. Consult the instructions provided on Camino under Assignment 3. You will be installing a docker container with an Oracle Database install on this environment that you will be using for your assignment.

I. Part 1

- Download the Yelp dataset from Camino. Look at each JSON file and understand what information the JSON objects provide. Pay attention to the data items in JSON objects that you will need for your application (For example, categories, attributes,...etc.)
- You may have to modify your database design from Homework 2 to model the database for the described application scenario on page-1. Your database schema doesn't necessarily need to include all the data items provided in the JSON files. Your schema should be precise but yet complete. It should be designed in such a way that all queries/data retrievals on/from the database run efficiently and effectively.
- Produce DDL SQL statements for creating the corresponding tables in a relational DBMS. Note the constraints, including key constraints, referential integrity constraints, not NULL constraints, etc. needed for the relational schema to capture and enforce the semantics of your ER design.
- Populate your database with the Yelp data. Generate INSERT statements for your tables and run those to insert data into your DB.
- After you populated your database, created indexes on frequently accessed columns of its tables using CREATE INDEX statement. This will help speed up query execution times. You have some flexibility about which indexes to choose.

II. Part 2

Implement the application for searching local businesses as explained in section "Overview & Requirements". In this milestone you would:

- Write the SQL queries to search your database.
- Establish connectivity with the DBMS.
- Embed/execute queries in/from the code. Retrieve query results and parse the returned results to generate the output that will be displayed on the GUI.
- **Business Search:** Implement a GUI where the user can search for movies that match the criteria given.
 - Browse through main categories for the businesses (See Appendix C); select the business attributes that user wants to search for;
note: The list of the main categories is given in Appendix-C. All other categories that appear in the business objects are sub-categories. Such a distinction is made for easier browsing of the business categories.
 - The usage flow of the GUI is as follows:
 - 1) Once the application is loaded, main categories are loaded from the backend database. Note that, selection of business main categories (single or multiple) is required. *For instance, assume that use selects **Restaurants** as the main category.*
 - 2) The subcategories matching the main category selection will be listed under subcategories column. Since user selected *Restaurants* in previous step, only sub-categories values that its main category is *Restaurants* should appear in the sub-categories panel. Note how faceted search work here. After step 1, the set of results is reduced to only the businesses that belong to *Restaurants* category. The user can select desired sub-categories values. This attribute is optional in building the query. User might not select a sub-category at all. *Assume that use selects **Mediterranean** as the sub-category value.*
 - 3) Attribute column is the next selection. Similar to No 2, the set of results is reduced to only the subcategories **AND** main category selection. The user can select desired attribute values (single or multiple selections). This attribute is optional in building the query. User might not select a attribute values at all. Since user selected *Restaurants*, and *Mediterranean* in previous steps, only attribute values that appeared in business with main-category = *Restaurants* **AND** sub-

category = *Mediterranean*, should appear in the attribute selection panel. Assume that user selects *Outdoor Sitting* as the desired attribute.

- 4) Review column is the next selection. You can specify review duration (from/to) and enter the star and vote values into the text box. The attributes under the Review column are also optional.
 - 5) City textfield is the next selection. You can enter any city name in the city textfield and all businesses with specified categories, subcategories and attributes located in that city can be selected. Note that city textfield is independent of category, subcategory, and attribute selection mentioned above, which means that if you do not pick any category, subcategory and attributes, then all businesses located in that city will be selected. Note that city textfield can have no text.
- The application should be able to search for the businesses that have either all the specified values (AND condition) or that have any of the values specified (OR condition). For example:
 - if user selected AND condition, and selected *Restaurants* and *Cafes* as main categories, sub-categories of businesses that have *Restaurants AND Cafes* as main categories, should be listed in the next panel.
 - If user selected OR condition, and selected *Restaurants* and *Cafes* as main categories, sub-categories of businesses that have *Restaurants OR Cafes* as main categories, should be listed in the next panel.

Note that the relation between facets (or business characteristics) is always **AND**. However, the relation between values of one facet can be set to be OR or AND.

Example:

Consider the below example on the AND/OR selection. Assume the following example:

BusinessID	Category	Sub-category
1	restaurant	Mediterranean
2	restaurant	Mexican
3	restaurant	Mediterranean

Suppose User selects Restaurant as main category and both Mediterranean and Mexican as sub-category. Also user selects AND from the "Search for" drop down menu. This means that attributes of businesses that are (Restaurant, Mediterranean) AND (Restaurant, Mexican) should appear in the attribute column.

Look for the **conjunction** of attributes between business 1, 2, 3 that follow the above rule.

Per above example the following attributes should show in the attribute panel since they are common between all three businesses: (remember that user selected AND from the "Search for" drop down menu)

Ambience_Good_True
Price_Range_1_False

Suppose User selects Restaurant as main category and both Mediterranean and Mexican as sub-category.

Also user selects OR from the "Search for" drop down menu.

This means that attributes of business that are (Restaurant, Mediterranean) OR (Restaurant, Mexican) should appear in the attribute column. So, you have to look for **disjunction** of attributes between business 1, 2, 3 that follow the above rule.

Per above example, what shows in attribute panel is:

Music_Loud_True
Ambience_Good_True
Parking_Street_False
Price_Range_1_False
Music_Loud_False

- Select a certain business in the search results and list the following for that business(s):

Business, City, State, Stars

- select a certain business in the search results and list all the reviews for that business. (*note: The review list should also include the names of the users who provided those reviews*)

- **User Search:** Implement a GUI where the user can perform a search for users that match the criteria given
 - The usage flow of the GUI is as follows:
 - 1) User can specify user search using attributes such as member_since, review_count, number of friends, average stars and number of friends.
 - 2) Clicking on “Execute User Query” will show user matches, yelping_since and average_stars
 - 3) select a certain user in the search results and list all the reviews given by that user.
 - 4) Users can be selected based on vote_funny, vote_cool and vote_useful.
 - 5) Review count, number of friends, average stars, vote_funny, vote_cool and vote_useful should have 5 different comparators, which are >, >=, =, <=, <, followed by the edit text indicating a number.

Note: The user can do either a Business search or User search (not both) at any given time through the GUI.

Note: All data displayed on the GUI should be kept in the database and should be retrieved from it when needed. You are not allowed to create internal data structures to store data.

Required .sql files:

You are required to create two .sql files:

1. createdb.sql: This file should create all required tables. In addition, it should include constraints, indexes, and any other DDL statements you might need for your application.
2. dropdb.sql: This file should drop all tables and the other objects once created by your createdb.sql file.

Required Java Programs:

You are required to implement two Java programs:

1. populate.java: This program should get the names of the input files as command line parameters and populate them into your database. It should be executed as:
“> java populate yelp_business.json yelp_review.json yelp_checkin.json yelp_user.json”.
Note that every time you run this program, it should remove the previous data in your tables; otherwise the tables will have redundant data.
2. hw3.java: This program should provide a GUI, similar to figure 1, to query your database.

References:

1. Yelp Dataset Challenge, http://www.yelp.com/dataset_challenge/
2. Samples for users of the Yelp Academic Database, <https://github.com/Yelp/dataset-examples>

Appendix-A

Yelp's Academic Dataset

Yelp has made available a dataset which contains user reviews for 42,153 businesses in Phoenix (AZ), Las Vegas (NV), Madison (WI) in United States and Waterloo (ON) and Edinburgh (ON) in Canada. The purpose was to provide a real-world data set to promote research in various areas of research. The dataset includes 5 types of data objects: *business*, *review*, *user*, *tip*, and *check-in*. Every object contains a 'type' field, which tells whether it is a *business*, a *user*, or a *review*. *Business* objects contain basic information about local businesses. *Review* objects contain the details of the reviews by users for the businesses. *Review*'s *user_id* associates the reviews with the *user* objects. Similarly, *review*'s *business_id* associates each review with the *businesses*.

The fields of objects are given below:

Business Objects

Business objects contain basic information about local businesses.

```
{
  'business_id': (encrypted business id),
  'full_address': (localized address),
  'hours': (the days of the week when business is open; the opening and closing times on those days)
  'open': True / False (corresponds to closed, not business hours),
  'categories': (categories associated with the business)
  'city': (city),
  'state': (state),
  'latitude': latitude,
  'longitude': longitude,
  'review_count': review count,
  'name': (business name),
  'neighborhoods': [(hood names)],
  'stars': (star rating, rounded to half-stars),
  'attributes': (business properties),
  'type': 'business'
}
```

Review Objects

Review objects contain the review text, the star rating, and information on votes Yelp users have cast on the review. Use *user_id* to associate this review with others by the same user. Use *business_id* to associate this review with others of the same business.

```
{
  'votes': {
    'useful': (count of useful votes),
    'funny': (count of funny votes),
    'cool': (count of cool votes)
  }
  'user_id': (the identifier of the authoring user),
  'review_id': (the identifier of the reviewed business),
  'stars': (star rating, integer 1-5),
  'date': (date, formatted like '2011-04-19'),
  'text': (review text),
  'type': 'review',
  'business_id': (the identifier of the reviewed business)
}
```

User Objects

User objects contain aggregate information about a single user across all of Yelp (including businesses and reviews not in this dataset).

```
{
  'yelping_since': (the date when user account was created)
  'votes': {
    'useful': (count of useful votes across all reviews),
    'funny': (count of funny votes across all reviews),
    'cool': (count of cool votes across all reviews)
  }
}
```

```

    }
    'review_count': (review count),
    'name': (first name, last initial, like 'Matt J.'),
    'user_id': (unique user identifier),
    'friends': (friends of the user),
    'fans': (number fans of the user),
    'average_stars': (floating point average, like 4.31),
    'type': 'user',
    'compliments': (comments from other users),
    'elite': ()
}

```

Checkin

```

{
  'type': 'checkin'
  'business_id': (encrypted business id),
  'checkin_info': {
    '0-0': {number of checkins from 00:00 to 01:00 on all Sundays},
    '1-0': {number of checkins from 01:00 to 02:00 on all Sundays},
    ...
    '14-4': {number of checkins from 14:00 to 15:00 on all Thursdays},
    ...
    '23-6': {number of checkins from 23:00 to 0:00 on all Saturdays}
  }
} # if there was no checkin for a hour-day block it will not be in the list

```

Tip

```

{
  'user_id': (encrypted user id),
  'text': {},
  'business_id': (encrypted business id),
  'likes': {},
  'date': {},
  'type': 'tip'
}

```

Usage of this dataset is governed by the Academic Dataset Terms of Use.

Appendix-B

☐ Active Life
 ☐ Arts & Entertainment
 ☐ Adult Education
 ☐ African
 ☐ Accepts Credit Cards_false
 ☐ Accepts Credit Cards_true

☐ Automotive
 ☐ Beauty & Spas
 ☐ Bars
 ☐ Beer, Wine & Spirits
 ☐ Ambience_casual_true
 ☐ Ambience_classy_false

☒ Cafes
 ☐ Car Rental
 ☐ Butcher
 ☐ Chicken Wings
 ☐ Ambience_hipster_true
 ☐ Ambience_intimate_false

☐ Convenience Stores
 ☐ Dentists
 ☐ Cuban
 ☐ Electronics
 ☐ Chinese
 ☐ Ambience_trendy_false

☐ Department Stores
 ☐ Doctors
 ☐ Food Stands
 ☐ Food Trucks
 ☐ Caters_false
 ☐ Caters_true

☐ Drugstores
 ☐ Education
 ☐ Halal
 ☐ Ethiopian
 ☐ Good For_brunch_false
 ☐ Good For_Groups_true

☐ Event Planning & Services
 ☐ Flowers & Gifts
 ☐ Internet Cafes
 ☐ Hawaiian
 ☐ Good For_dinner_true
 ☐ Good For_late_night_false

☒ Food
 ☐ Grocery
 ☐ Local Flavor
 ☐ Local Services
 ☐ Good For_kids_true
 ☐ Has TV_false

☐ Hardware Stores
 ☐ Health & Medical
 ☐ Nutritionists
 ☐ Irish
 ☐ Noise Level_quiet
 ☐ Outdoor Seating_false

☐ Home & Garden
 ☐ Home Services
 ☐ Real Estate
 ☐ Russian
 ☐ Parking_lot_false
 ☐ Parking_lot_true

☐ Hospitals
 ☐ Hotels & Travel
 ☐ Specialty Schools
 ☐ Sports Bars
 ☐ Parking_valet_false
 ☐ Parking_validated_false

☐ Medical Centers
 ☐ Nightlife
 ☐ Tires
 ☐ Tobacco Shops
 ☐ Take-out_true
 ☐ Takes Reservations_false

☐ Nurseries & Gardening
 ☐ Restaurants
 ☐ Waiter Service_true
 ☐ Wheelchair Accessible_false

☐ Shopping
 ☐ Transportation

OR

City

Member Since

Review Count

Number of Friends

Average Stars

vote funny

vote useful

vote cool

AND

Full Address	City	Review Cou.	Business N.	Longitude	Latitude	State Name	Stars	Whether Op.
Summerlin, Las Vegas	Las Vegas	19	Roamin Do...	-115.26597	36.1988542	NV	4.0	true
The Strip, Las Vegas	Las Vegas	16	Lulu's On T...	-115.17112	36.126561	NV	4.5	true
Las Vegas, Las Vegas	Las Vegas	35	Sausagefe...	-115.136389	36.175	NV	3.5	false

Figure 1- Yelp Application Main UI (Business Search)

☐ Active Life
 ☐ Arts & Entertainment
 ☐ Automotive
 ☐ Beauty & Spas
 ☐ Adult Education
 ☐ African
 ☐ Accepts Credit Cards_false
 ☐ Accepts Credit Cards_true

☐ Cafes
 ☐ Car Rental
 ☐ Butcher
 ☐ Chicken Wings
 ☐ Ambience_casual_true
 ☐ Ambience_classy_false

☐ Convenience Stores
 ☐ Dentists
 ☐ Cuban
 ☐ Electronics
 ☐ Chinese
 ☐ Ambience_hipster_true
 ☐ Ambience_intimate_false

☐ Department Stores
 ☐ Doctors
 ☐ Food Stands
 ☐ Food Trucks
 ☐ Caters_false
 ☐ Caters_true

☐ Drugstores
 ☐ Education
 ☐ Halal
 ☐ Ethiopian
 ☐ Good For_brunch_false
 ☐ Good For_Groups_true

☐ Event Planning & Services
 ☐ Flowers & Gifts
 ☐ Internet Cafes
 ☐ Hawaiian
 ☐ Good For_dinner_true
 ☐ Good For_late_night_false

☒ Food
 ☐ Grocery
 ☐ Local Flavor
 ☐ Local Services
 ☐ Good For_kids_true
 ☐ Has TV_false

☐ Hardware Stores
 ☐ Health & Medical
 ☐ Nutritionists
 ☐ Irish
 ☐ Noise Level_quiet
 ☐ Outdoor Seating_false

☐ Home & Garden
 ☐ Home Services
 ☐ Real Estate
 ☐ Russian
 ☐ Parking_lot_false
 ☐ Parking_lot_true

☐ Hospitals
 ☐ Hotels & Travel
 ☐ Specialty Schools
 ☐ Sports Bars
 ☐ Parking_valet_false
 ☐ Parking_validated_false

☐ Medical Centers
 ☐ Nightlife
 ☐ Tires
 ☐ Tobacco Shops
 ☐ Take-out_true
 ☐ Takes Reservations_false

☐ Nurseries & Gardening
 ☐ Restaurants
 ☐ Waiter Service_true
 ☐ Wheelchair Accessible_false

☐ Shopping
 ☐ Transportation

AND

City

Member Since

Review Count

Number of Friends

Average Stars

vote funny

vote useful

vote cool

AND

User Name	Date created	Review Count	Number of friends	average stars	total votes
Danielle	2012-03-01	22	22	3.95	70
Nader	2009-07-01	202	252	4.2	1949
Jim	2013-07-01	33	17	3.94	63
Brett	2010-01-01	18	15	4.89	39
Alison	2011-08-01	7	11	4.43	5
Laura	2011-06-01	8	4	4.38	11
Jeannie	2009-04-01	257	36	3.72	389
Frank	2011-07-01	10	3	4.1	5
James	2010-12-01	15	3	4.4	27
danielle	2011-02-01	36	4	3.92	99
Jennifer	2013-09-01	4	8	5.0	6
Kathy	2011-09-01	159	12	3.77	382
Jenni	2013-09-01	63	3	3.49	59
Ulysses	2013-03-01	2	14	3.5	2
Kate	2008-06-01	70	13	3.96	152
Tim	2013-09-01	22	9	4.06	11
Pat	2009-12-01	88	12	4.02	126
Zoe	2011-01-01	2	19	4.5	2
Bryan	2010-03-01	404	288	4.11	3934
Paris	2011-02-01	5	8	4.2	9
Silvia	2009-08-01	18	26	3.5	75
Tyler	2009-06-01	12	8	3.38	20
Cobra Commander	2012-03-01	43	37	3.98	84
Jennifer	2012-04-01	5	9	4.8	3
Kay	2013-05-01	36	3	3.69	129
Leanne	2012-11-01	61	8	4.11	86
Anastasia	2008-07-01	162	58	4.46	1744
Kevin	2011-06-01	4	5	3.0	3
Celine	2011-12-01	11	4	2.91	18
Stephanie	2010-01-01	19	26	3.68	36
Scott	2009-10-01	10	4	3.18	19
Eddie	2010-11-01	4	3	3.5	4

Figure 2- Yelp Application Main UI (User Search)

Appendix-C

Main Business Categories

1. Active Life
2. Arts & Entertainment
3. Automotive
4. Car Rental
5. Cafes
6. Beauty & Spas
7. Convenience Stores
8. Dentists
9. Doctors
10. Drugstores
11. Department Stores
12. Education
13. Event Planning & Services
14. Flowers & Gifts
15. Food
16. Health & Medical
17. Home Services
18. Home & Garden
19. Hospitals
20. Hotels & Travel
21. Hardware Stores
22. Grocery
23. Medical Centers
24. Nurseries & Gardening
25. Nightlife
26. Restaurants
27. Shopping
28. Transportation

Appendix-D (Sample query output)

Test case 1:

Main Categories: Automotive, Car Rental

Search For Attribute: AND

Output:

B_NAME	CITY	STATE	STARS
1 A-1 Van Rental & Leasing	Phoenix	AZ	5
2 Big Two Toyota-Scion Of Chandler	Chandler	AZ	4
3 Dollar Rent A Car	Las Vegas	NV	1.5
4 Escape Eagles	Las Vegas	NV	4.5
5 JAM Scooters	Las Vegas	NV	5
6 Smart Motors Toyota Scion	Madison	WI	4.5
7 Thrifty Car Rental	Glendale	AZ	2.5
8 Thrifty Car Rental	Las Vegas	NV	1.5

Test case 2:

Main categories: Hospitals, Health & Medical

Subcategories: Diagnostic Imaging, Diagnostic Services

Search For Attribute: OR

Output:

Full Address	City	Review Count	Business Name	Longitude	Latitude	State N...	Stars	Whet...
9090 W Post R...	Las Vegas	5	High Risk Pregnancy Center	-115.29...	36.074...	NV	5.0	false
16641 N 40th ...	Phoenix	4	Valley Radiologists Ltd	-111.99...	33.638...	AZ	5.0	false
7751 W Flami...	Las Vegas	5	Labcorp	-115.25...	36.114...	NV	1.5	false
708 N. Rainbo...	Las Vegas	3	Any Lab Test Now Las Vegas	-115.24...	36.180...	NV	3.5	false
3501 N. Scotts...	Scottsdale	12	Scottsdale Medical Imaging L...	-111.92...	33.488...	AZ	3.0	false
6591 W Thund...	Glendale	3	Insight Imaging - Thunderbird...	-112.20...	33.610...	AZ	2.5	false
4501 E Thoma...	Phoenix	3	Any Lab Test Now Phoenix	-111.98...	33.479...	AZ	4.5	false
2767 N Tenay...	Las Vegas	18	Steinberg Diagnostic Medical ...	-115.24...	36.210...	NV	2.5	false
5125 N 16th St...	Phoenix	12	Baby's First Ultrasound	-112.04...	33.511...	AZ	3.0	false
8551 W Lake ...	Las Vegas	9	Pueblo Medical Imaging	-115.28...	36.198...	NV	3.5	false
9070 W Post R...	Las Vegas	8	Steinberg Diagnostic Medical ...	-115.29...	36.074...	NV	3.5	false
6502 Grand Te...	Madison	3	Storkvision	-89.492...	43.059...	WI	2.5	false
2850 Siena He...	Las Vegas	9	Steinberg Diagnostic Medical ...	-115.11...	36.004...	NV	3.0	false
2080 W South...	Apache Jun...	3	Sonora Quest Laboratories	-111.56...	33.393...	AZ	1.5	false
6037 S Fort Ap...	Las Vegas	28	Baby's First Image 3D/4D Ultr...	-115.29...	36.079...	NV	4.5	false
2811 W Horizo...	Henderson	5	Desert Radiologists	-115.11...	35.998...	NV	4.0	false
3483 S Mercy ...	Gilbert	6	Sonora Quest Laboratories	-111.74...	33.286...	AZ	3.0	true
565 Marks StSt...	Henderson	15	Miracle In Progress 3D/4D Ult...	-115.03...	36.062...	NV	4.0	false
2611 Horizon ...	Henderson	6	West Valley Imaging - Hender...	-115.10...	36.001...	NV	3.5	false
2051 N Rainb...	Las Vegas	5	The Vaccine Center and Trav...	-115.24...	36.198...	NV	4.0	false
880 Seven Hill...	Henderson	4	Wellhealth Womens Specialty...	-115.12...	35.995...	NV	4.0	false
5040 N 15th Av...	Phoenix	7	Insight Imaging - Camelback	-112.08...	33.492...	AZ	2.5	false
16515 S 40th ...	Phoenix	3	Sonora Quest Laboratories	-111.99...	33.297...	AZ	4.5	false
2000 E Southe...	Tempe	10	Sonora Quest Laboratories	-111.90...	33.393...	AZ	2.0	false
500 E Windmil...	Las Vegas	8	The Vaccine Center and Trav...	-115.15...	36.042...	NV	3.5	false
7901 W Tropic...	Las Vegas	3	Quest Diagnostics	-115.26...	36.270...	NV	2.5	false
11209 N Tatu...	Phoenix	4	Sonora Quest Laboratories	-111.97...	33.587...	AZ	4.0	false
1409 E Lake M...	North Las V...	4	North Vista Hospital	-115.12...	36.195...	NV	3.0	false
2950 S Maryla...	Las Vegas	6	Steinberg Diagnostic Medical ...	-115.13...	36.136...	NV	3.5	false
9465 E Ironwo...	Scottsdale	3	Labcorp	-111.87...	33.577...	AZ	4.5	false
6707 N 19th Av...	Phoenix	4	Sonora Quest Laboratories	-112.09...	33.535...	AZ	3.0	false
4220 S Grand ...	Las Vegas	21	Miracle In Progress 3D4D Ultr...	-115.30...	36.112...	NV	3.5	false

2680 S Val Vist...	Gilbert	3	Simonmed	-111.75...	33.302...	AZ	1.5	false
2020 Palomin...	Las Vegas	6	Desert Radiologists	-115.17...	36.162...	NV	2.5	false
2501 E Southe...	Tempe	4	LabCorp	-111.88...	33.392...	AZ	3.0	false
2625 Box Cany...	Las Vegas	11	Katz Joel, MD	-115.24...	36.207...	NV	3.5	false
16222 N 59th ...	Glendale	4	Sun Radiology	-112.18...	33.632...	AZ	2.0	false
9201 E Mounta...	Scottsdale	9	Simonmed Imaging	-111.88...	33.574...	AZ	3.0	false
6320 W Union ...	Glendale	3	Sonora Quest Laboratories	-112.19...	33.655...	AZ	1.5	false
3145 E Warm ...	Las Vegas	8	Sneak Peek Video-Ultrasound	-115.10...	36.056...	NV	4.5	false
3440 W Cheye...	North Las V...	4	Labcorp	-115.18...	36.217...	NV	3.5	false
5410 W Thund...	Glendale	3	Simonmed	-112.17...	33.611...	AZ	1.5	false
4 Sunset Way...	Henderson	7	Steinberg Diagnostic Medical ...	-115.06...	36.071...	NV	2.0	false
5850 Polaris A...	Las Vegas	18	Concentra Medical Centers	-115.18...	36.083...	NV	2.0	false
5495 S Rainbo...	Las Vegas	6	Nevada Imaging Centers	-115.24...	36.089...	NV	2.5	false
515 W Buckey...	Phoenix	3	Labcorp	-112.08...	33.437...	AZ	3.0	false
5447 S Rainbo...	Las Vegas	3	My Baby Bump Imaging	-115.24...	36.089...	NV	5.0	true
9700 N 91st St...	Scottsdale	5	Sonora Quest Laboratories	-111.88...	33.573...	AZ	3.0	true
1760 E Pecos ...	Gilbert	4	Marquis Diagnostic Imaging	-111.75...	33.296...	AZ	4.0	false
1300 N 12th St...	Phoenix	6	Sonora Quest Laboratories	-112.05...	33.463...	AZ	3.0	false
8551 W Lake ...	Las Vegas	10	Labcorp	-115.28...	36.198...	NV	3.0	false
3025 S Rainbo...	Las Vegas	12	West Valley Imaging	-115.24...	36.134...	NV	4.0	false
6925 N Duran...	Las Vegas	4	Steinberg Diagnostic Medical ...	-115.28...	36.288...	NV	2.0	false
3921 E Baseli...	Gilbert	4	Labcorp	-111.74...	33.378...	AZ	2.5	false
6400 S Easter...	Las Vegas	5	Psychemedics Corporation	-115.11...	36.073...	NV	4.5	false
2865 Siena He...	Henderson	3	LabCorp	-115.11...	36.003...	NV	3.5	false
740 Dorrell Ln...	North Las V...	8	3D Baby Kisses	-115.13...	36.287...	NV	5.0	false
3811 E Bell Rd...	Phoenix	3	Sonora Quest Laboratories	-111.99...	33.639...	AZ	5.0	false

Test case 3:

Main Categories: **Food, Restaurants**
 Sub Categories: **Bakeries and Donuts**
 Attributes: **Take-out_true , Takes Reservations_false**
 Search For Attribute: **AND**
 Review From: **2014-01-15**
 Review To: **2014-06-11**
 Review Stars > **0**
 Review Votes >= **0**
 Output:

B_NAME	CITY	STATE	STARS
1 Fractured Prune Chandler	AZ		4

Test case 4:

Member since: 2014-01-01
 Review Count > 5
 Number of Friends > 30
 Average number of stars > 4.8
 vote funny > 0
 vote useful > 0
 vote cool > 0
 Search for attribute: **AND**
 Output:

User Name	Date created	Review Count	Number of friends	average stars	total votes
Gregory	2014-02-01	7	72	5.0	14