Data Scientist Role Play: Profiling and Analyzing the Yelp Dataset Coursera Worksheet

This is a 2-part assignment. In the first part, you are asked a series of questions that will help you profile and understand the data just like a data scientist would. For this first part of the assignment, you will be assessed both on the correctness of your findings, as well as the code you used to arrive at your answer. You will be graded on how easy your code is to read, so remember to use proper formatting and comments where necessary. In the second part of the assignment, you are asked to come up with your own inferences and analysis of the data for a particular research question you want to answer. You will be required to prepare the dataset for the analysis you choose to do. As with the first part, you will be graded, in part, on how easy your code is to read, so use proper formatting and comments to illustrate and communicate your intent as required. For both parts of this assignment, use this "worksheet." It provides all the questions you are being asked, and your job will be to transfer your answe rs and SQL coding where indicated into this worksheet so that your peers can review your work. You should be able to use any Text Editor (Windows Notepad, Apple TextEdit, Notepad ++, Sublime Text, etc.) to copy and paste your answers. If you are going to use Word or some other page layout application, just be careful to make sure your answers and code are lined appropriately.

In this case, you may want to save as a PDF to ensure your formatting remains intact for you reviewer.

Part 1: Yelp Dataset Profiling and Understanding

1. Profile the data by finding the total number of records for each of the tables below:

i. Attribute table = 10000

ii. Business table = 10000

iii. Category table = 10000

iv. Checkin table = 10000

v. elite_years table = 10000

vi. friend table = 10000

vii. hours table = 10000

viii. photo table = 10000

ix. review table = 10000

x. tip table = 10000 10000

xi. user table = 10000

- select count(*) from Attribute
- select count(*) from Business
- select count(*) from Category
- select count(*) from Checkin
- select count(*) from elite_years
- select count(*) from friend
- select count(*) from hours
- select count(*) from photo
- select count(*) from review
- select count(*) from tip
- select count(*) from user

2. Find the total distinct records by either the foreign key or primary key for each table. If two foreign keys are listed in the table, please specify which foreign key.

i. Business = id: 10000

ii. Hours = business_id: 1562

iii. Category = business_id: 2643

iv. Attribute = business_id: 1115

v. Review = id:10000, business_id: 8090, user_id: 9581

vi. Checkin = business_id: 493

vii. Photo = id: 10000, business_id: 6493

viii. Tip = user_id: 537, business_id: 3979

ix. User = id: 10000

x. Friend = user_id: 11

xi. Elite_years = user_id: 2780

Note: Primary Keys are denoted in the ER-Diagram with a yellow key icon.

3. Are there any columns with null values in the Users table? Indicate "yes," or "no."

Answer: no

```
+-------------+
| count(null) |
+-------------+
|           0 |
+-------------+
```

SQL code used to arrive at answer: select count(null) from user

4. For each table and column listed below, display the smallest (minimum), largest (maximum), and average (mean) value for

the following fields:

i. Table: Review, Column: Stars

min:1 max:5 avg:3.7082

- select min(stars) from review
- select max(stars) from review
- select avg(stars) from review

ii. Table: Business, Column: Stars

min:1 max:5 avg: 3.6549

- select min(stars) from Business
- select max(stars) from Business
- select avg(stars) from Business

iii. Table: Tip, Column: Likes

min:0 max:2 avg: 0.0144

- select min(Likes) from Tip
- select max(Likes) from Tip
- select avg(Likes) from Tip

iv. Table: Checkin, Column: Count

min:1 max: 53 avg: 1.9414

- select min(Count) from Checkin
- select max(Count) from Checkin
- select avg(Count) from Checkin

v. Table: User, Column: Review_count

min: 0 max: 2000 avg: 24.2995

- select min(Review_count) from User
- select max(Review_count) from User
- select avg(Review_count) from User

5. List the cities with the most reviews in descending order:

SQL code used to arrive at answer:

SELECT city, SUM(review_count) AS reviews FROM business GROUP BY city ORDER BY reviews DESC

Copy and Paste the Result Below:

```
+-----------------+---------+
| city            | reviews |
+-----------------+---------+
| Las Vegas       |   82854 |
| Phoenix         |   34503 |
| Toronto         |   24113 |
| Scottsdale      |   20614 |
| Charlotte       |   12523 |
| Henderson       |   10871 |
| Tempe           |   10504 |
| Pittsburgh      |    9798 |
| Montréal        |    9448 |
| Chandler        |    8112 |
| Mesa            |    6875 |
| Gilbert         |    6380 |
| Cleveland       |    5593 |
| Madison         |    5265 |
| Glendale        |    4406 |
| Mississauga     |    3814 |
| Edinburgh       |    2792 |
| Peoria          |    2624 |
| North Las Vegas |    2438 |
| Markham         |    2352 |
| Champaign       |    2029 |
| Stuttgart       |    1849 |
| Surprise        |    1520 |
| Lakewood        |    1465 |
| Goodyear        |    1155 |
+-----------------+---------+
(Output limit exceeded, 25 of 362 total rows shown)
```

6. Find the distribution of star ratings to the business in the following cities:

i. Avon

SQL code used to arrive at answer:

SELECT stars, SUM(review_count) FROM business where city ='Avon' GROUP BY stars

Copy and Paste the Resulting Table Below (2 columns – star rating and count):

```
+-------+-------------------+
| stars | SUM(review count) |
+-------+-------------------+
|   1.5 |                10 |
|   2.5 |                 6 |
|   3.5 |                88 |
|   4.0 |                21 |
|   4.5 |                31 |
|   5.0 |                 3 |
+-------+-------------------+
```

ii. Beachwood

SQL code used to arrive at answer:

SELECT stars, SUM(review_count) FROM business where city ='Beachwood' GROUP BY stars

Copy and Paste the Resulting Table Below (2 columns – star rating and count):

```
+-------+-------------------+
| stars | SUM(review count) |
+-------+-------------------+
|   2.0 |                 8 |
|   2.5 |                 3 |
|   3.0 |                11 |
|   3.5 |                 6 |
|   4.0 |                69 |
|   4.5 |                17 |
|   5.0 |                23 |
+-------+-------------------+
```

7. Find the top 3 users based on their total number of reviews:

SQL code used to arrive at answer:

SELECT id,name,review_count FROM user ORDER BY review_count DESC LIMIT 3

Copy and Paste the Result Below:

```
+------------------------+--------+--------------+
| id                     | name   | review count |
+------------------------+--------+--------------+
| -G7Zkl1wIWBBmD0KRy sCw | Gerald |         2000 |
| -3s52C4zL DHRK0ULG6qtg | Sara   |         1629 |
| -8lbUNlXVSoXqaRRiHiSNq | Yuri   |         1339 |
+------------------------+--------+--------------+
```

8. Does posing more reviews correlate with more fans?

- SELECT name,review_count,fans,yelping_since FROM user ORDER BY fans DESC LIMIT 20

```
+-----------+--------------+------+---------------------+
| name      | review count | fans | yelping since       |
+-----------+--------------+------+---------------------+
| Amy       |          609 |  503 | 2007-07-19 00:00:00 |
| Mimi      |          968 |  497 | 2011-03-30 00:00:00 |
| Harald    |         1153 |  311 | 2012-11-27 00:00:00 |
| Gerald    |         2000 |  253 | 2012-12-16 00:00:00 |
| Christine |          930 |  173 | 2009-07-08 00:00:00 |
| Lisa      |          813 |  159 | 2009-10-05 00:00:00 |
| Cat       |          377 |  133 | 2009-02-05 00:00:00 |
| William   |         1215 |  126 | 2015-02-19 00:00:00 |
| Fran      |          862 |  124 | 2012-04-05 00:00:00 |
| Lissa     |          834 |  120 | 2007-08-14 00:00:00 |
| Mark      |          861 |  115 | 2009-05-31 00:00:00 |
| Tiffany   |          408 |  111 | 2008-10-28 00:00:00 |
| bernice   |          255 |  105 | 2007-08-29 00:00:00 |
| Roanna    |         1039 |  104 | 2006-03-28 00:00:00 |
| Angela    |          694 |  101 | 2010-10-01 00:00:00 |
| .Hon      |         1246 |  101 | 2006-07-19 00:00:00 |
| Ben       |          307 |   96 | 2007-03-10 00:00:00 |
| Linda     |          584 |   89 | 2005-08-07 00:00:00 |
| Christina |          842 |   85 | 2012-10-08 00:00:00 |
| Jessica   |          220 |   84 | 2009-01-12 00:00:00 |
+-----------+--------------+------+---------------------+
```

Please explain your findings and interpretation of the results:

- Not only review_count correlate fans, but also yelping_since correlate fans

9. Are there more reviews with the word "love" or with the word "hate" in them?

Answer: Love

SQL code used to arrive at answer:

- SELECT COUNT(*) FROM review WHERE text LIKE "%love%" 1780
- SELECT COUNT(*) FROM review WHERE text LIKE "%hate%" 232

10. Find the top 10 users with the most fans:

SQL code used to arrive at answer:

- SELECT id,name,fans FROM user ORDER BY fans DESC LIMIT 10

Copy and Paste the Result Below:

```
+------------------------+-----------+------+
| id                     | name      | fans |
+------------------------+-----------+------+
| -9I98YbNQnLdAmcYfb324Q | Amy       |  503 |
| -8EnCioUmDygAbsYZmTeRQ | Mimi      |  497 |
| --2vR0DIsmQ6WfcSzKWigw | Harald    |  311 |
| -G7Zkl1wIWBBmD0KRy sCw | Gerald    |  253 |
| -0IiMAZI2SsQ7VmyzJjokQ | Christine |  173 |
| -g3XIcCb2b-BD0QBCcq2Sw | Lisa      |  159 |
| -9bbDysuiWeo2VShFJJtcw | Cat       |  133 |
| -FZBTkAZEXoP7CYvRV2ZwQ | William   |  126 |
| -9da1xk7zgnnfO1uTVYGkA | Fran      |  124 |
| -lh59ko3dxChBSZ9U7LfUw | Lissa     |  120 |
+------------------------+-----------+------+
```

11. Is there a strong relationship (or correlation) between having a high number of fans and being listed as "useful" or "funny?" Out of the top 10 users with the highest number of fans, what percent are also listed as "useful" or "funny"?

Key:

0% - 25% - Low relationship

26% - 75% - Medium relationship

76% - 100% - Strong relationship

SQL code used to arrive at answer:

- SELECT name,fans,useful,funny,review_count FROM user ORDER BY useful DESC

Copy and Paste the Result Below:

```
+-----------+------+--------+--------+--------------+
| name      | fans | useful |  funny | review count |
+-----------+------+--------+--------+--------------+
| Harald    |  311 | 122921 | 122419 |         1153 |
| Gerald    |  253 |  17524 |   2324 |         2000 |
| Susie     |   24 |  14703 |   3823 |          272 |
| Fran      |  124 |   9851 |   7606 |          862 |
| William   |  126 |   9363 |   9361 |         1215 |
| .Hon      |  101 |   7850 |   5851 |         1246 |
| W         |    4 |   6974 |   6033 |          198 |
| Alan      |   44 |   5640 |   4567 |           80 |
| Christine |  173 |   4834 |   6646 |          930 |
| Mike      |   65 |   4656 |    301 |          346 |
+-----------+------+--------+--------+--------------+
```

Please explain your findings and interpretation of the results:

- Yes, Strong Relationship, the more useful the more fans

Part 2: Inferences and Analysis

1. Pick one city and category of your choice and group the businesses in that city or category by their overall star rating.

Compare the businesses with 2-3 stars to the businesses with 4-5 stars and answer the following questions. Include your code.

i. Do the two groups you chose to analyze have a different distribution of hours?

- The 4-5 star group seems to have shorter hours then the 2-3 star group.

ii. Do the two groups you chose to analyze have a different number of reviews?

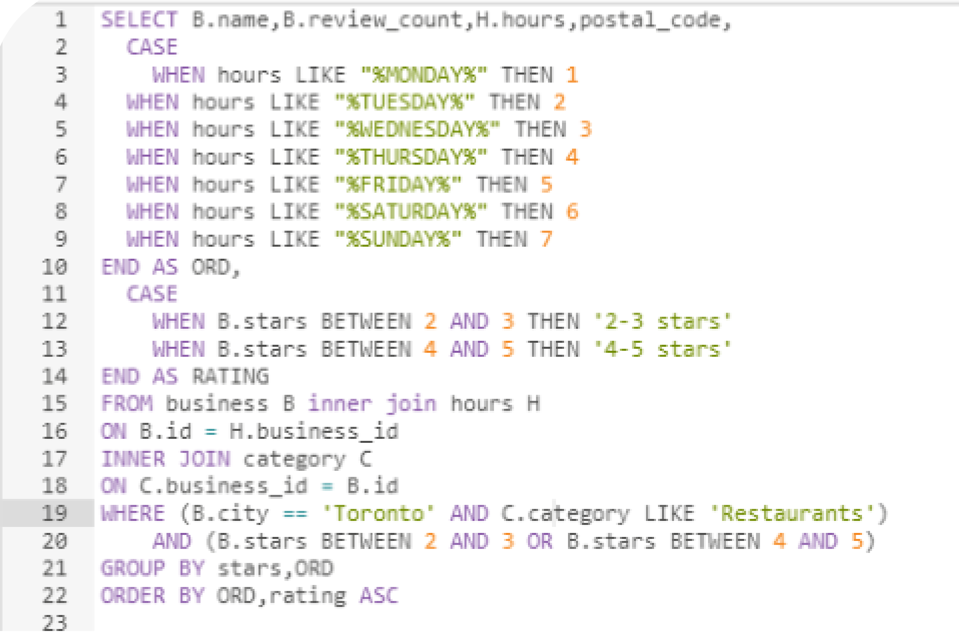
- Yes, The 4-5 star group has shorter working hours but review count is more than 2-3 star group

iii. Are you able to infer anything from the location data provided between these two groups? Explain**.**

- No, every business is in a different zip-code.

SQL code used for analysis:

```
| 99 Cent Sushi |            5 | Thursday|11:00-23:00  | M5B 2E5     |    4 | 2-3 stars
| Pizzaiolo     |           34 | Thursday|9:00-23:00   | M5H 1X6     |    4 | 2-3 stars
| Edulis        |           89 | Thursday|18:00-23:00  | M5V         |    4 | 4-5 stars
| Sushi Osaka   |            8 | Thursday|11:00-23:00  | M9A 1C2     |    4 | 4-5 stars
```



```sql
SELECT B.name,B.review_count,H.hours,postal_code,
  CASE
    WHEN hours LIKE "%MONDAY%" THEN 1
  WHEN hours LIKE "%TUESDAY%" THEN 2
  WHEN hours LIKE "%WEDNESDAY%" THEN 3
  WHEN hours LIKE "%THURSDAY%" THEN 4
  WHEN hours LIKE "%FRIDAY%" THEN 5
  WHEN hours LIKE "%SATURDAY%" THEN 6
  WHEN hours LIKE "%SUNDAY%" THEN 7
END AS ORD,
  CASE
    WHEN B.stars BETWEEN 2 AND 3 THEN '2-3 stars'
    WHEN B.stars BETWEEN 4 AND 5 THEN '4-5 stars'
END AS RATING
FROM business B inner join hours H
ON B.id = H.business_id
INNER JOIN category C
ON C.business_id = B.id
WHERE (B.city == 'Toronto' AND C.category LIKE 'Restaurants')
    AND (B.stars BETWEEN 2 AND 3 OR B.stars BETWEEN 4 AND 5)
GROUP BY stars,ORD
ORDER BY ORD,rating ASC
```

2. Group business based on the ones that are open and the ones that are closed. What differences can you find between the ones that are still open and the ones that are closed? List at least two differences and the SQL code you used to arrive at your answer.

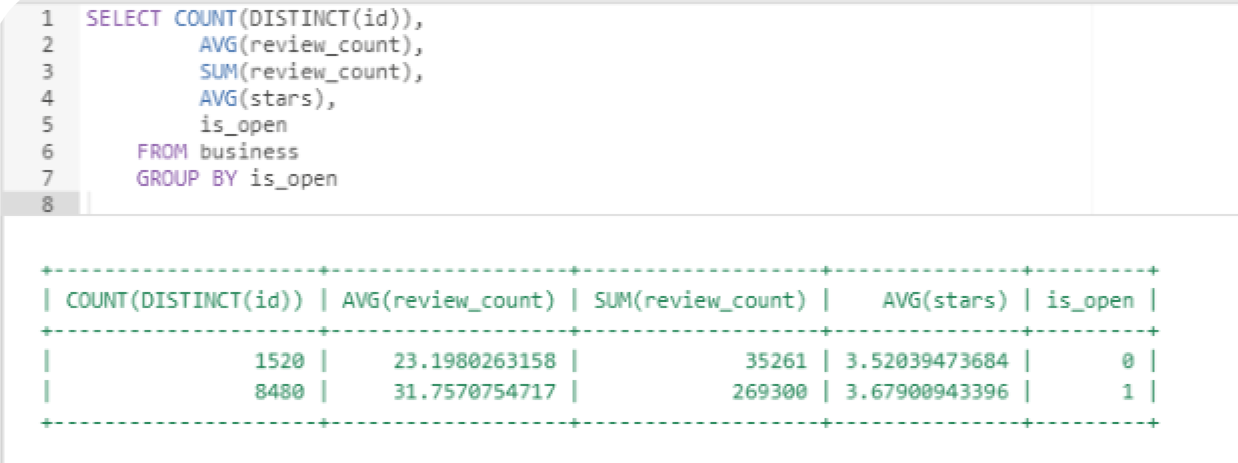
i. Difference 1:

- Open: AVG(review_count) = 31.757 Closed: AVG(review_count) = 23.198

ii. Difference 2:

- Open: AVG(stars) = 3.679 Closed: AVG(stars) = 3.520

SQL code used for analysis:



```sql
SELECT COUNT(DISTINCT(id)),
        AVG(review_count),
        SUM(review_count),
        AVG(stars),
        is_open
    FROM business
    GROUP BY is_open
```

```
+---------------------+-------------------+-------------------+----------------+---------+
| COUNT(DISTINCT(id)) | AVG(review_count) | SUM(review_count) |     AVG(stars) | is_open |
+---------------------+-------------------+-------------------+----------------+---------+
|                1520 |     23.1980263158 |             35261 | 3.52039473684 |       0 |
|                8480 |     31.7570754717 |            269300 | 3.67900943396 |       1 |
+---------------------+-------------------+-------------------+----------------+---------+
```

3. For this last part of your analysis, you are going to choose the type of analysis you want to conduct on the Yelp dataset and are going to prepare the data for analysis. Ideas for analysis include: Parsing out keywords and business attributes for sentiment analysis, clustering businesses to find commonalities or anomalies between them, predicting the overall star rating for a business, predicting the number of fans a user will have, and so on. These are just a few examples to get you started, so feel free to be creative and come up with your own problem you want to solve. Provide answers, in-line, to all of the following:

i. Indicate the type of analysis you chose to do:

Predicting whether a business will stay open or close. We wish not to explicitly examine the text of the reviews, but this would be an interesting analysis.

ii. Write 1-2 brief paragraphs on the type of data you will need for your analysis and why you chose that data:

To better help businesses understand the importance of different factors which will help their business stay open. Some data that may be important; number of reviews, star rating of business, hours open, and of course location. We will gather the latitude and longitude as well as city, state, postal_code, and address to make processing easier later on. Categories and attributes will be used to better distinguish between different types of businesses. `is_open` will determine which business is open and which business have closed (not hours) but permanently.

iii. Output of your finished dataset:

```
    +------------------------+-------------------------------+----------------------
------+----------------+-------+-------------+----------+-----------+---------------+---
----+---------------+-------------+-----------------+---------------+---------------
+-----------------+-------------+-------------------------------------------------------
----------------------------------------------------------------------------------------
---------------------------------------------------------------------+--------------------
----------------------------------------------------------------------------------------
----------------------------------------------------------------------------------------
```

```
--------------------------------------------------------------------------------
-------------------------------------------+---------+

| id                     | name                             | address
| city           | state | postal code | latitude | longitude | review count | stars |
monday hours | tuesday hours | wednesday hours | thursday_hours | friday_hours |
saturday hours | sunday_hours | categories
| attributes
| is open |
+------------------------+--------------------------------+--------------------------
--+---------------+-------+------------+----------+-----------+--------------+-------
+--------------+---------------+-----------------+----------------+--------------+----
------------+--------------+------------------------------------------------------
--------------------------------------------------------------------------------
--------------------------------------------------------------+------------------------
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
--------------------------------------------------------------------------------
-------------------------------------------+---------+
| -0DET7VdEQOJVJ v6klEuq | Flaming Kitchen                  | 3235 York Regional Road 7
| Markham        | ON    | L3R 3P9     |  43.8484 |  -79.3487 |           25 |   3.0 |
12:00-23:00  | 12:00-23:00   | 12:00-23:00     | 12:00-23:00    | 12:00-23:00  |
12:00-23:00    | 12:00-23:00  | Asian Fusion,Restaurants
|
RestaurantsTableService,GoodForMeal,Alcohol,Caters,HasTV,RestaurantsGoodForGroups,Nois
eLevel,WiFi,RestaurantsAttire,RestaurantsReservations,OutdoorSeating,RestaurantsPriceR
ange2,BikeParking,RestaurantsDelivery,Ambience,RestaurantsTakeOut,GoodForKids,Business
Parking                                                                    |       1 |
| -2HjuT4yjLZ3b5f abD87Q | Freeman's Car Stereo             | 4821 South Blvd
| Charlotte      | NC    | 28217       |  35.1727 |  -80.8755 |            8 |   3.5 |
9:00-19:00   | 9:00-19:00    | 9:00-19:00      | 9:00-19:00     | 9:00-19:00   | 9:00-
17:00     | None          | Electronics,Shopping,Automotive,Car Stereo Installation
|
BusinessAcceptsCreditCards,RestaurantsPriceRange2,BusinessParking,WheelchairAccessible
|       1 |
| -CdstAUdEvci8GeJG8owpQ | Motors & More                    | 2315 Highland Dr
| Las Vegas      | NV    | 89102       |  36.1465 |  -115.167 |            7 |   5.0 |
7:00-17:00   | 7:00-17:00    | 7:00-17:00      | 7:00-17:00     | 7:00-17:00   | 8:00-
12:00     | None          | Home Services,Solar Installation,Heating & Air
Conditioning/HVAC
| BusinessAcceptsCreditCards,BusinessAcceptsBitcoin,ByAppointmentOnly
|       1 |
| -K4gAv8 vjx8-2BxkVeRkA | Baby Cakes                       | 4145 Erie St
| Willoughby     | OH    | 44094       |  41.6399 |  -81.4064 |            5 |   3.5 |
None         | 11:00-17:00   | 11:00-17:00     | 11:00-20:00    | 11:00-17:00  |
10:00-17:00    | None         | Bakeries,Food
|
BusinessAcceptsCreditCards,RestaurantsTakeOut,WheelchairAccessible,RestaurantsDelivery
|       1 |
| -PtTGvWsckUL8tTutHr6Ew | Snip-its Rocky River             | 21609 Center Ridge Rd
| Rocky River    | OH    | 44116       |  41.4595 |  -81.8587 |           18 |   2.5 |
10:00-19:00  | 10:00-19:00   | 10:00-19:00     | 10:00-19:00    | 10:00-19:00  | 9:00-
17:30     | 10:00-16:00  | Beauty & Spas,Hair Salons
|
BusinessAcceptsCreditCards,RestaurantsPriceRange2,GoodForKids,BusinessParking,ByAppoin
tmentOnly
|       1 |
| -ayZoW iNDsunYXX 0x1YQ | Standard Restaurant Supply       | 2922 E McDowell Rd
| Phoenix        | AZ    | 85008       |  33.4664 |  -112.018 |           15 |   3.5 |
8:00-18:00   | 8:00-18:00    | 8:00-18:00      | 8:00-18:00     | 8:00-18:00   | 9:00-
17:00     | None          | Shopping,Wholesalers,Restaurant Supplies,Professional
Services,Wholesale Stores
|
BusinessAcceptsCreditCards,RestaurantsPriceRange2,BusinessParking,BikeParking,Wheelcha
irAccessible
|       1 |
| -d9qyfNhLMQwVVg raBKeg | What A Bagel                     | 973 Eglinton Avenue W
| York           | ON    | M6C 2C4     |  43.6999 |  -79.4295 |            8 |   3.0 |
6:00-15:30   | 6:00-15:30    | 6:00-15:30      | 6:00-15:30     | 6:00-15:30   | 6:00-
15:30     | None          | Restaurants,Bagels,Breakfast & Brunch,Food
| NoiseLevel,RestaurantsAttire,RestaurantsTableService,OutdoorSeating
|       1 |
| -hjbcaxaU9yYXY2iI-49sw | Pinnacle Fencing Solutions       |
| Phoenix        | AZ    | 85060       |  33.4805 |  -111.997 |           13 |   4.0 |
8:00-16:00   | 8:00-16:00    | 8:00-16:00      | 8:00-16:00     | 8:00-16:00   | None
| None         | Home Services,Contractors,Fences & Gates
| BusinessAcceptsCreditCards,ByAppointmentOnly
|       1 |
| -iu4FxdfxN4rU4Fu9BjiFw | Alterations Express              | 17240 Royalton Rd
| Strongsville   | OH    | 44136       |  41.3141 |  -81.8207 |            3 |   4.0 |
8:00-19:00   | 8:00-19:00    | 8:00-19:00      | 8:00-19:00     | 8:00-19:00   | 8:00-
18:00     | None          | Shopping,Bridal,Dry Cleaning & Laundry,Local
Services,Sewing & Alterations
|
BusinessParking,BusinessAcceptsCreditCards,RestaurantsPriceRange2,BusinessAcceptsBitco
in,BikeParking,ByAppointmentOnly,WheelchairAccessible
|       1 |
| -j4NsiRzSMrMk2N bGH SA | Extra Space Storage              | 2880 W Elliot Rd
| Chandler       | AZ    | 85224       |  33.3496 |  -111.892 |            5 |   4.0 |
8:00-17:30   | 8:00-17:30    | 8:00-17:30      | 8:00-17:30     | 8:00-17:30   | 8:00-
17:30     | 10:00-14:00  | Home Services,Self Storage,Movers,Shopping,Local
Services,Home Decor,Home & Garden
| BusinessAcceptsCreditCards
|       1 |
| -uiBBVWI6tMDm2JFbZFrOw | Gussied Up                       | 1090 Bathurst St
| Toronto        | ON    | M5R 1W5     |  43.6727 |  -79.4142 |            6 |   4.5 |
None         | 11:00-19:00   | 11:00-19:00     | 11:00-19:00    | 11:00-19:00  |
11:00-17:00    | 12:00-16:00  | Women's Clothing,Shopping,Fashion
| BusinessAcceptsCreditCards,RestaurantsPriceRange2,BusinessParking,BikeParking
|       1 |
| 0-aPEeNc2zVb5Gp-i7Ckqq | Buddy's Muffler & Exhaust        | 1509 Hickory Grove Rd
| Gastonia       | NC    | 28056       |  35.2772 |    -81.06 |            4 |   5.0 |
8:30-17:00   | 8:30-17:00    | 8:30-17:00      | 8:30-17:00     | 8:30-17:00   | 9:00-
15:00     | None          | Automotive,Auto Repair
| BusinessAcceptsCreditCards
|       1 |
| 01xXe2m z048W5gcBFpoJA | Five Guys                        | 2641 N 44th St, Ste 100
| Phoenix        | AZ    | 85008       |   33.478 |  -111.986 |           63 |   3.5 |
10:00-22:00  | 10:00-22:00   | 10:00-22:00     | 10:00-22:00    | 10:00-22:00  |
10:00-22:00    | 10:00-22:00  | American (New),Burgers,Fast Food,Restaurants
|
RestaurantsTableService,GoodForMeal,Alcohol,Caters,HasTV,RestaurantsGoodForGroups,Nois
eLevel,WiFi,RestaurantsAttire,RestaurantsReservations,OutdoorSeating,BusinessAcceptsCr
```

```
editCards,RestaurantsPriceRange2,BikeParking,RestaurantsDelivery,Ambience,RestaurantsT
akeOut,GoodForKids,DriveThru,BusinessParking                          |       1 |
| 06I2r8S3tHP LwGnnkk6Uw | All Storage - Anthem           | 2620 W Horizon Ridge Pkwy
| Henderson      | NV     | 89052        |  36.0021 |  -115.102 |            3 |   3.5 |
9:00-16:30    | 9:00-16:30     | 9:00-16:30      | 9:00-16:30     | 9:00-16:30    | 9:00-
16:30     | None          | Truck Rental,Local Services,Self Storage,Parking,Automotive
| BusinessAcceptsCreditCards,BusinessAcceptsBitcoin
|       1 |
| 07h3mGtTovPJE660nX6E-A | Mood                           | 1 Greenside Place
| Edinburgh      | EDH    | EH1 3AA      |   55.957 |  -3.18502 |           11 |   2.0 |
None          | None          | None            | 22:30-3:00     | 22:00-3:00    |
22:00-3:00     | 22:30-3:00    | Dance Clubs,Nightlife
|
Alcohol,OutdoorSeating,BusinessAcceptsCreditCards,RestaurantsPriceRange2,AgesAllowed,M
usic,Smoking,RestaurantsGoodForGroups,WheelchairAccessible
|       0 |
| 0AJF-USLN6K5T4caooDdjw | Starbucks                      | 4605 E Chandler Blvd, Ste
A | Phoenix       | AZ     | 85048        |  33.3044 |  -111.984 |           52 |   3.0
| 5:00-20:00    | 5:00-20:00     | 5:00-20:00      | 5:00-20:30     | 5:00-20:00    |
5:00-20:00     | 5:00-20:00    | Coffee & Tea,Food
|
BusinessParking,Caters,WiFi,OutdoorSeating,BusinessAcceptsCreditCards,RestaurantsPrice
Range2,BikeParking,RestaurantsTakeOut
|       1 |
| 0B3W6KxkD3o4W4l6cq735w | Big Smoke Burger               | 260 Yonge Street
| Toronto        | ON     | M4B 2L9      |  43.6546 |  -79.3805 |           47 |   3.0 |
10:30-21:00   | 10:30-21:00    | 10:30-21:00     | 10:30-21:00    | 10:30-21:00   |
10:30-21:00    | 11:00-19:00   | Poutineries,Burgers,Restaurants
|
RestaurantsTableService,GoodForMeal,Alcohol,Caters,HasTV,RestaurantsGoodForGroups,Nois
eLevel,WiFi,RestaurantsAttire,RestaurantsReservations,OutdoorSeating,BusinessAcceptsCr
editCards,RestaurantsPriceRange2,WheelchairAccessible,BikeParking,RestaurantsDelivery,
Ambience,RestaurantsTakeOut,GoodForKids,DriveThru,BusinessParking |       1 |
| 0IySwcfqwJjpHPsYwjpAkg | Subway                         | 2904 Yorkmont Rd
| Charlotte      | NC     | 28208        |  35.1903 |  -80.9288 |            7 |   3.5 |
6:00-22:00    | 6:00-22:00     | 6:00-22:00      | 6:00-22:00     | 6:00-22:00    |
10:00-21:00    | None          | Fast Food,Restaurants,Sandwiches
| Ambience,RestaurantsPriceRange2,GoodForKids
|       1 |
| 0K2rKvqdBmiOAUTebcUohQ | Red Rock Canyon Visitor Center | 1000 Scenic Loop Dr
| Las Vegas      | NV     | 89161        |  36.1357 |  -115.428 |           32 |   4.5 |
8:00-16:30    | 8:00-16:30     | 8:00-16:30      | 8:00-16:30     | 8:00-16:30    | 8:00-
16:30     | 8:00-16:30    | Education,Visitor Centers,Professional Services,Special
Education,Local Services,Community Service/Non-Profit,Hotels & Travel,Travel
Services,Gift Shops,Shopping,Parks,Hiking,Flowers & Gifts,Active Life |
BusinessAcceptsCreditCards,GoodForKids
|       1 |
| 0Ni7Stqt4RFWDGjOYRi2Bw | Scent From Above Company       | 2501 W Behrend Dr, Ste 67
| Scottsdale     | AZ     | 85027        |  33.6656 |  -112.111 |           14 |   4.5 |
6:00-16:00    | 6:00-16:00     | 6:00-16:00      | 6:00-16:00     | 6:00-16:00    | None
| None          | Home Cleaning,Local Services,Professional Services,Carpet
Cleaning,Home Services,Office Cleaning,Window Washing
| BusinessAcceptsCreditCards,ByAppointmentOnly
|       1 |
| 0WBMEfqXQnEOAIkV-uCW6w | The Charlotte Room             | 19 Charlotte Street
| Toronto        | ON     | M5V 2H5      |  43.6466 |  -79.3938 |           10 |   3.5 |
15:00-1:00    | 15:00-1:00     | 15:00-1:00      | 15:00-1:00     | 15:00-2:00    |
18:00-2:00     | None          | Event Planning & Services,Bars,Nightlife,Lounges,Pool
Halls,Venues & Event Spaces
|
BusinessParking,HasTV,CoatCheck,NoiseLevel,OutdoorSeating,BusinessAcceptsCreditCards,R
estaurantsPriceRange2,Music,WheelchairAccessible,Smoking,Ambience,BestNights,Restauran
tsGoodForGroups,HappyHour,GoodForDancing,Alcohol
|       0 |
| 0Y3lHyqRHfWOBuQlS1bM0g | PC Savants                     | 11966 W Candelaria Ct
| Sun City       | AZ     | 85373        |  33.6901 |  -112.319 |           11 |   5.0 |
10:00-19:00   | 10:00-19:00    | 10:00-19:00     | 10:00-19:00    | 10:00-19:00   |
11:00-18:00    | 11:00-18:00   | IT Services & Computer Repair,Electronics Repair,Local
Services,Mobile Phone Repair
| BusinessAcceptsCreditCards,BusinessAcceptsBitcoin
|       1 |
| 0aKsGxx7XP2TMs fn 9xVw | Sweet Ruby Jane Confections    | 8975 S Eastern Ave, Ste 3-
B | Las Vegas     | NV     | 89123        |   36.015 |  -115.118 |           30 |   4.0
| 10:00-19:00   | 10:00-19:00    | 10:00-19:00     | 10:00-19:00    | 10:00-19:00   |
10:00-19:00    | None          | Food,Chocolatiers & Shops,Bakeries,Specialty
Food,Desserts
|
BusinessAcceptsCreditCards,RestaurantsPriceRange2,BusinessParking,WheelchairAccessible
|       0 |
| 0cxO1Lx2Pi7u6ftWX3Wksg | Oinky's Pork Chop Heaven       | 22483 Emery Rd
| North Randall | OH     | 44128        |  41.4352 |  -81.5214 |            3 |   3.0 |
6:00-23:00    | 6:00-23:00     | 6:00-23:00      | 6:00-23:00     | 6:00-23:00    | 6:00-
23:00     | 6:00-23:00    | Soul Food,Restaurants
|
RestaurantsAttire,RestaurantsGoodForGroups,GoodForKids,RestaurantsReservations,Restaur
antsTakeOut
|       1 |
| 0e-j5VcEn54EZT-FKCUZdw | Sushi Osaka                    | 5084 Dundas Street W
| Toronto        | ON     | M9A 1C2      |  43.6452 |  -79.5324 |            8 |   4.5 |
11:00-23:00   | 11:00-23:00    | 11:00-23:00     | 11:00-23:00    | 11:00-23:00   |
11:00-23:00    | 14:00-23:00   | Sushi Bars,Restaurants,Japanese,Korean
| RestaurantsTakeOut,WiFi,RestaurantsGoodForGroups,RestaurantsReservations
|       1 |
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(Output limit exceeded, 25 of 70 total rows shown)
```
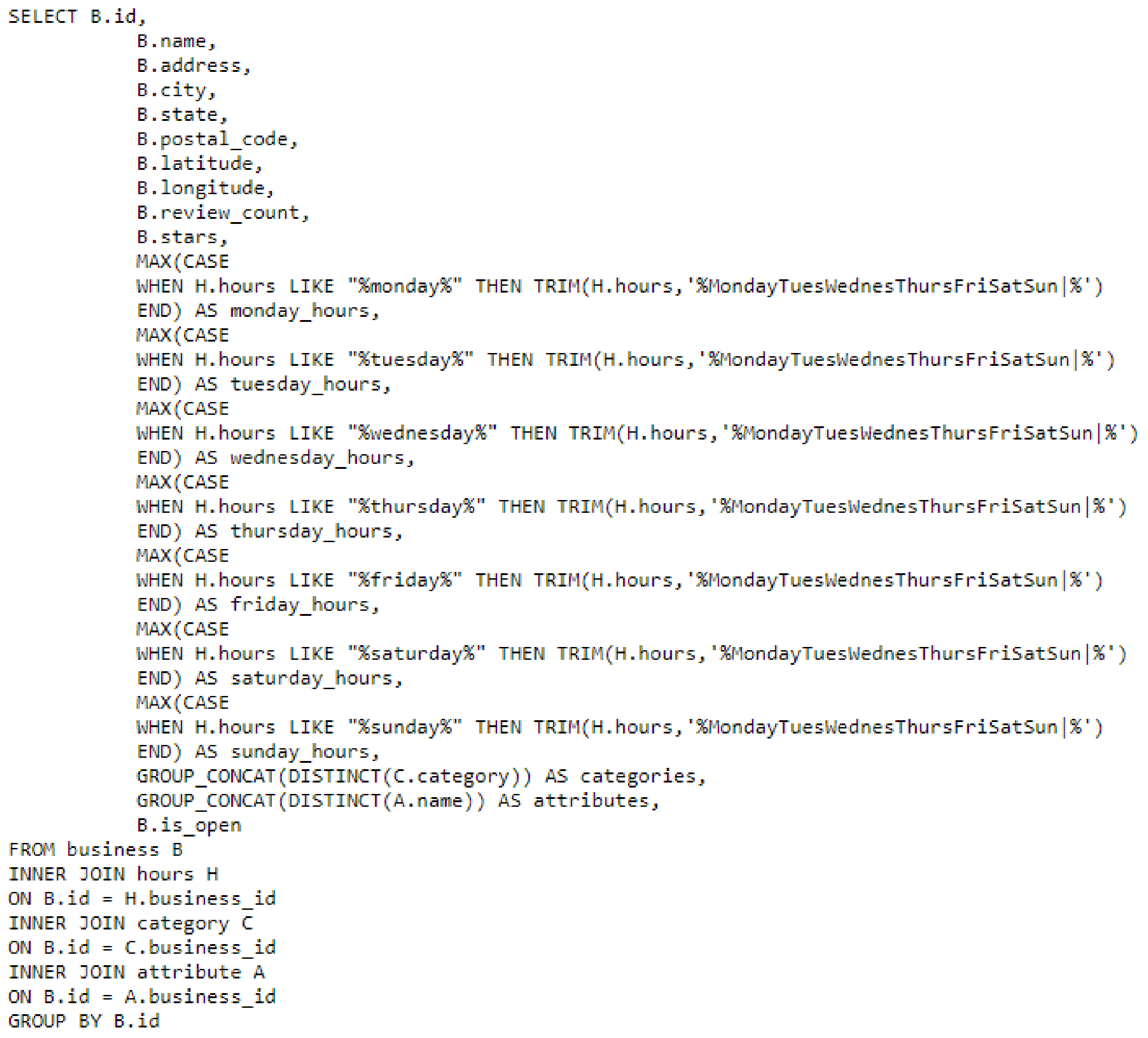

iv. Provide the SQL code you used to create your final dataset:



```sql
SELECT B.id,
           B.name,
           B.address,
           B.city,
           B.state,
           B.postal_code,
           B.latitude,
           B.longitude,
           B.review_count,
           B.stars,
           MAX(CASE
           WHEN H.hours LIKE "%monday%" THEN TRIM(H.hours,'%MondayTuesWednesThursFriSatSun|%')
           END) AS monday_hours,
           MAX(CASE
           WHEN H.hours LIKE "%tuesday%" THEN TRIM(H.hours,'%MondayTuesWednesThursFriSatSun|%')
           END) AS tuesday_hours,
           MAX(CASE
           WHEN H.hours LIKE "%wednesday%" THEN TRIM(H.hours,'%MondayTuesWednesThursFriSatSun|%')
           END) AS wednesday_hours,
           MAX(CASE
           WHEN H.hours LIKE "%thursday%" THEN TRIM(H.hours,'%MondayTuesWednesThursFriSatSun|%')
           END) AS thursday_hours,
           MAX(CASE
           WHEN H.hours LIKE "%friday%" THEN TRIM(H.hours,'%MondayTuesWednesThursFriSatSun|%')
           END) AS friday_hours,
           MAX(CASE
           WHEN H.hours LIKE "%saturday%" THEN TRIM(H.hours,'%MondayTuesWednesThursFriSatSun|%')
           END) AS saturday_hours,
           MAX(CASE
           WHEN H.hours LIKE "%sunday%" THEN TRIM(H.hours,'%MondayTuesWednesThursFriSatSun|%')
           END) AS sunday_hours,
           GROUP_CONCAT(DISTINCT(C.category)) AS categories,
           GROUP_CONCAT(DISTINCT(A.name)) AS attributes,
           B.is_open
FROM business B
INNER JOIN hours H
ON B.id = H.business_id
INNER JOIN category C
ON B.id = C.business_id
INNER JOIN attribute A
ON B.id = A.business_id
GROUP BY B.id
```