

Team 5: Angel Santana, Shivani Negi, Kynndal Teel, Liam Kennedy
Keith Sparling
MSBX 5405
17 December 2021

Team Database Project - Airbnb Exploratory Analysis

Table of Contents

Project Scenario - Part A	1
Project Scenario - Part B	2
Project Scenario - Part C	3
Airbnb Database ER Diagram Model	4
Business Questions	4
Angel Santana Select Statements & Results	4
Kynndal Teel Select Statements & Results	9
Liam Kennedy Select Statements & Results	12
Shivani Negi Select Statements & Results	15
Data Visualizations	18
Angel Santana Data Visualizations using Tableau	18
Kynndal Teel Data Visualizations using Tableau	21
Liam Kennedy Data Visualizations using Tableau	24
Shivani Negi Data Visualizations using Tableau	28

Project Scenario - Part A

A property investor has hired our team to do some exploratory analysis on Airbnb properties in Denver, CO. The client wants to see a breakdown by neighborhood of the following: the number of listings, property types, amenities offered, average listing price, nearby points of interest, listing availability, and seasonality of bookings. In addition, the client wants us to compare metrics such as listing availability and average listing price for each neighborhood; this will help the client determine the most profitable neighborhoods to operate in.

Airbnb collects data on their hosts, property listings, booking calendar, and reviews. This data is publicly available and according to the Inside Airbnb website where we sourced our datasets from, their data has been “analyzed, cleansed and aggregated where appropriate to

facilitate public discussion” (Inside Airbnb). Our analysis focuses on a set of 3,920 listings located in the city of Denver, CO.

While much can be gleaned from Inside Airbnb’s website regarding the short term rental market in Denver, our project caters specifically to the client’s needs. We have built a relational database which satisfies the client’s need to better understand the competitive landscape here in Denver, Colorado.

Project Scenario - Part B

Our points of interest are sourced from denvergov.org’s website. The full points of interest catalog includes 135 different locations. We had to manually assign a neighborhood value for each point of interest by looking up the address in Google Maps. We have chosen to simplify this component of the project slightly by choosing a random set of 80 points of interest from the original dataset.

The amenities table is another area we had to simplify the scope of the project slightly. The Inside Airbnb listing dataset stores the amenities for each property as an array of strings (e.g. [“carbon monoxide alarm”, “kitchen”, “private entrance”, “WiFi”...etc]). We have chosen a few of these amenities and each one can be found as a separate field in the amenities table. The datatype for these fields is a boolean string such that if the associated property provides the amenity, the field value is True. Otherwise, the field value is False.

Using Python, the three raw files were transformed into tables that could be readily inserted into the database. The original data was not relational and, more often than not, lacked indexing that could be used as primary keys. In these instances, a key had to be generated by isolating the distinct values and assigning them a sequential index. In other cases, the tables were easy to format because the values were already associated with a value that could be used as a

primary key; such was the case for hosts and properties for which there already existed a unique identifier. Aside from building relational tables, significant cleaning was performed. The raw data included a number of columns that were irrelevant to building the database at hand such as urls for images and metadata on the data scraping.

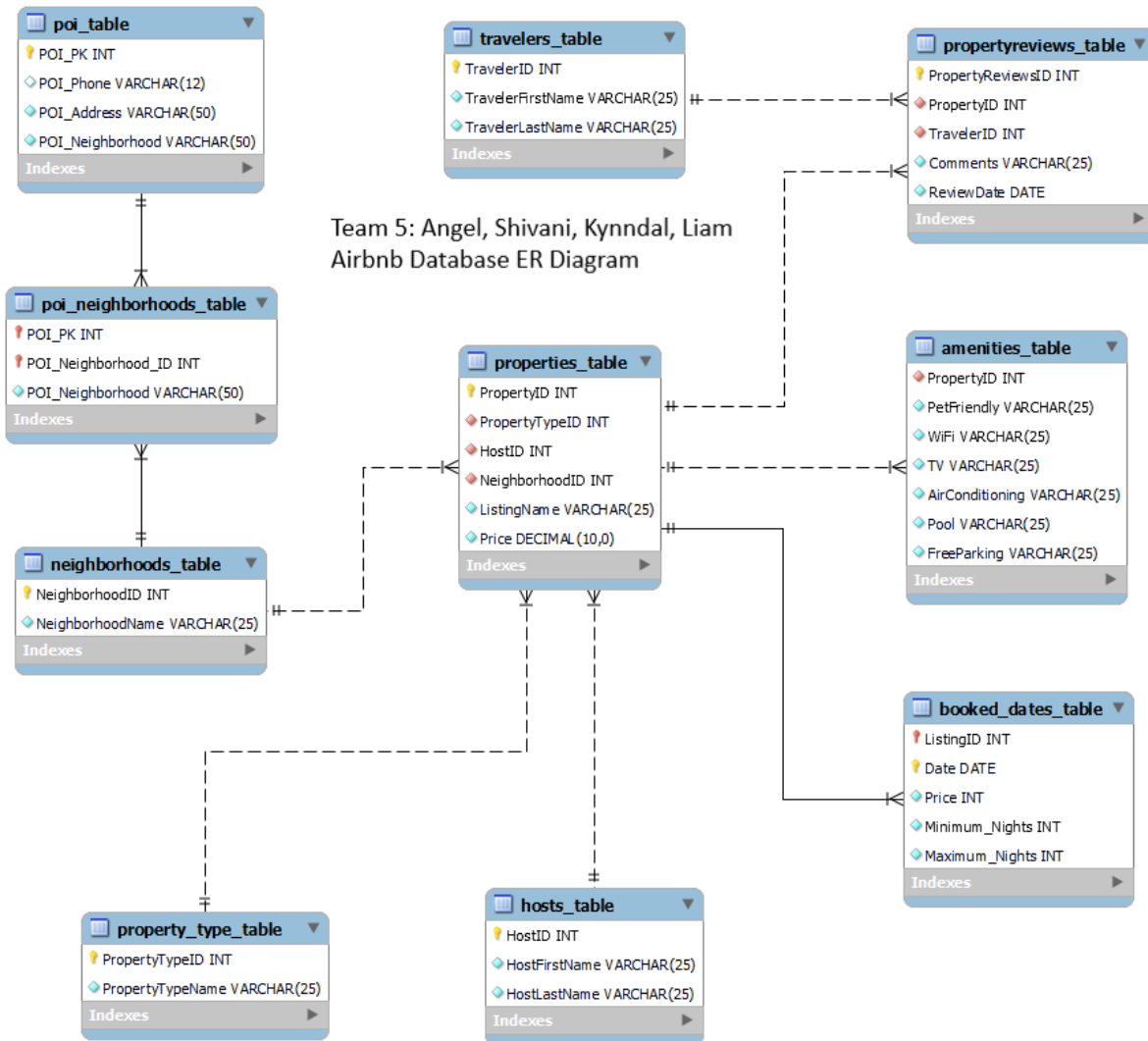
Project Scenario - Part C

Our database was heavily dependent on the idea of Exploratory Data Analysis. Our approach to normalizing our database was to first explore the original [datasets](#) and conduct some preliminary [analysis](#) using Python. After exploring the data, we were able to create sample tables to start designing our database. We used a combination of Python and SQL scripts to create 10 .csv flat files which corresponded to the 10 tables in our databases.

We had to manipulate the original datasets and create new data sources that only contained the information we needed. This involved deleting unnecessary features that weren't going to be used. For example, we derived multiple tables from the original listings (such as properties, neighborhoods, amenities, hosts...etc). Additionally, we created a primary key for each table that would allow the records to be referenced more easily. We repeated this process for our other tables to keep a consistent normalization for our database, this process involved first and second normalization.

Our third normalization included going back to our database and reviewing features/tables that are not used for that specific table. For this process, we will go back when we are done doing our exploratory analysis to review whether or not we need such a feature in that table.

Airbnb Database ER Diagram Model



Business Questions








Angel Santana Select Statements & Results

- Business Question 1:** A potential investor would like to know the host names that start with the letter A because he wants to see if his name would stand out.

a. This business question was used because it was good to see if there was a pattern in names, common names, etc.

b. Results:

```
SELECT
  HostFirstName AS 'Host First Name', HostLastName AS 'Host Last Name'
FROM
  hosts_table
WHERE
  HostFirstName LIKE 'A%'
```

Input To Search Data        Cost: 5ms < > Total N

	Host First Name	Host Last Name
	Filter	Filter
<input type="checkbox"/>	1	Alexandra Jones
<input type="checkbox"/>	2	Alexandra Godfrey
<input type="checkbox"/>	3	Andy Hightower
<input type="checkbox"/>	4	Amine Oneill
<input type="checkbox"/>	5	Audrey Hanley
<input type="checkbox"/>	6	Anastacia Ramos
<input type="checkbox"/>	7	Adrienne Medina
<input type="checkbox"/>	8	Andrea Brunner
<input type="checkbox"/>	9	Ashlae Uribe
<input type="checkbox"/>	10	Andrea White
<input type="checkbox"/>	11	Alexandra Baker
<input type="checkbox"/>	12	Albina Langston
<input type="checkbox"/>	13	Annabelle + Christian Drake
<input type="checkbox"/>	14	Andrea Snyder
<input type="checkbox"/>	15	Araceli Vasquez
<input type="checkbox"/>	16	Anne McIntosh
<input type="checkbox"/>	17	Anu Fischer
<input type="checkbox"/>	18	Andrea Easley
<input type="checkbox"/>	19	Annette Ramirez
<input type="checkbox"/>	20	Amy Knight

2. **Business Question 2:** *A potential investor would like to know the host last names that begin with the letter E due to his phobia of names with E.*








a. This is an interesting question because it's rare to see people that have a fear of last names that start with E. But of course, we have to make sure the client has the right data.

b. Results:

```

SELECT
  HostLastName AS 'Host Last Name', HostFirstName AS 'Host First Name'
FROM
  hosts_table
WHERE
  HostLastName LIKE 'E%'

```

Input To Search Data        Cost: 2ms < 1 > Total 55

<input type="checkbox"/>	Q	Host Last Name	Host First Name
<input type="checkbox"/>		Filter	Filter
<input type="checkbox"/>	1	Eller	Tom
<input type="checkbox"/>	2	Everett	Jim
<input type="checkbox"/>	3	Easley	Andrea
<input type="checkbox"/>	4	Eckert	Natalie
<input type="checkbox"/>	5	Evans	Cynthia
<input type="checkbox"/>	6	Edwards	Christina
<input type="checkbox"/>	7	Erickson	John
<input type="checkbox"/>	8	Eason	Dana
<input type="checkbox"/>	9	Epps	Aleksej
<input type="checkbox"/>	10	Ennis	Cam
<input type="checkbox"/>	11	Ellsworth	Nick
<input type="checkbox"/>	12	Elkins	Jeremy
<input type="checkbox"/>	13	Estes	Mike
<input type="checkbox"/>	14	Ellis	Al
<input type="checkbox"/>	15	Edmonds	Pierce
<input type="checkbox"/>	16	Ervin	Bryce
<input type="checkbox"/>	17	Eldridge	Christine & David
<input type="checkbox"/>	18	Ewing	Shelby
<input type="checkbox"/>	19	Ellison	Peter
<input type="checkbox"/>	20	Escamilla	Christiana & Ben

3. **Business Question 3:** *A potential investor would like to know many of each property there are to see what would be the best investment.*








a. This is an important question because as an investor, it would be good to see the best type of properties to invest in.

b. Results:

```

SELECT
    count(p1.PropertyTypeID) AS 'Number of Properties', p2.PropertyType AS 'Property
Type'
FROM
    properties_table p1
INNER JOIN
    property_type_table p2
ON
    p1.PropertyTypeID = p2.PropertyTypeID
GROUP BY
    p2.PropertyType
ORDER BY
    COUNT(p1.PropertyTypeID) DESC

```

Input To Search Data        Cost: 4ms < 1 > Total 42

<input checked="" type="checkbox"/>	Number of Properties	Property Type
	Filter	Filter
1	859	Entire residential home
2	637	Entire rental unit
3	470	Entire condominium (co
4	445	Entire guest suite
5	364	Private room in resident
6	337	Entire townhouse
7	186	Entire guesthouse
8	138	Entire serviced apartmen
9	88	Private room in townho
10	87	Entire loft
11	72	Entire bungalow
12	38	Room in boutique hotel
13	37	Private room in rental u
14	28	Private room in condom
15	18	Private room in guest su


4. **Business Question 4:** *A potential investor would like to know how many properties of airbnb are in each neighborhood and the average price.*
- This question is important because as an investor, it is only right to make sure there is enough data to support a future decision of where an investment should be made and whether or not it can be possibly profitable.
 - Results:

	Number of Properties	Neighborhood Name	Price
▶	313	Five Points	\$170.5591
	302	Highland	\$204.6391
	198	Union Station	\$179.9545
	144	CBD	\$173.6111
	136	Capitol Hill	\$121.2279
	133	Gateway - Green Valley Ra	\$91.4586
	128	West Colfax	\$176.4531
	122	Speer	\$137.5984
	122	Berkeley	\$145.7131
	112	West Highland	\$142.3304
	107	Sunnyside	\$146.5514
	93	City Park West	\$114.6129
	87	Baker	\$112.8391
	81	Sloan Lake	\$196.2346
	79	Cole	\$141.9367
	78	Whittier	\$151.0256
	78	Stapleton	\$121.5385
	74	Jefferson Park	\$169.4865

5. **Business Question 5:** *A potential investor would like to know the listing name and price of \$100 - \$300.*

- a. This question is important and in a way related to all questions as it further shows the name of the listing name and the price.

```
WITH best_prices AS
(
  SELECT * FROM properties_table
  WHERE Price BETWEEN 100 AND 300
) SELECT ListingName AS 'Listing Name', CONCAT('$', price) AS 'Price' FROM best_prices
ORDER BY price
```

Input To Search Data  Cost: 10ms < 1 > Total 1886

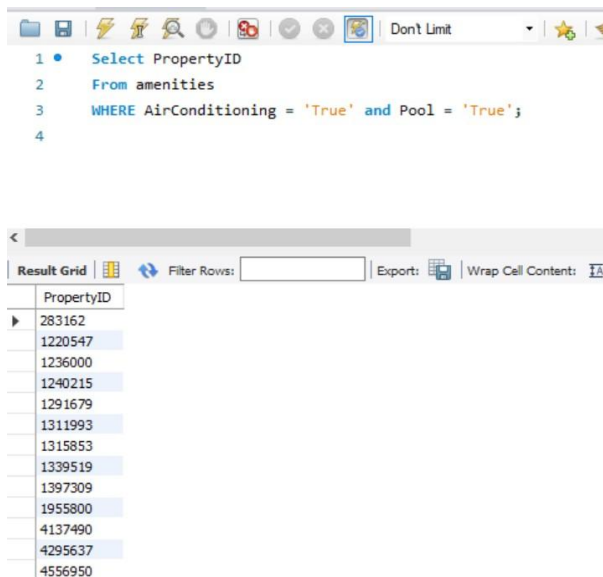
	Listing Name	Price decimal(10,1)
✓	Filter	Filter
1	Room w/attached private b	\$100
2	Historic Denver Rowhome	\$100
3	Entire House - Central to	\$100
4	Kitchen+Laundry+Backyard	\$100
5	Downtown Denver Apartment	\$100
6	(4) Beautiful 3BR Newly R	\$100
7	Luxury 1 Bedroom Apartmen	\$100
8	Explore Denver From Our W	\$100
9	Relaxing 2 bedroom reside	\$100
10	Entire Townhome w/ Patio	\$100
11	Remodeled Loft Downtown D	\$100
12	Tiny Home in the Heart of	\$100
13	Historic Denver Bungalow-	\$100
14	Cozy-Cool Highlands Cotta	\$100
15	Historic Retreat on Highl	\$100
16	Cozy apartment in a great	\$100
17	Private Entrance Guest Su	\$100
18	Condo in Five Points Just	\$100
19	Private - Art Inspired Ur	\$100

b. Results:

Kynndal Teel Select Statements & Results

6. **Business Question 6:** *A potential investor would like to know which properties have a pool and Air conditioning included*

- a. This is important as it allows the investor to see what comes along with the properties that they are investing in to weigh if it is worth investing
- b. Results:



```

1 • Select PropertyID
2 From amenities
3 WHERE AirConditioning = 'True' and Pool = 'True';
4

```

PropertyID
283162
1220547
1236000
1240215
1291679
1311993
1315853
1339519
1397309
1955800
4137490
4295637
4556950

7. **Business Question 7:** *A potential investor would like to know how many properties are pet friendly*

- a. This is important for the investor to know so they can target the right clients that need properties that allows pets
- b. Results:



```

6 • Select count(PropertyID) AS '# of petf riendly properties'
7 FROM amenities
8 WHERE PetFriendly = 'True';

```

of petf riendly properties
9

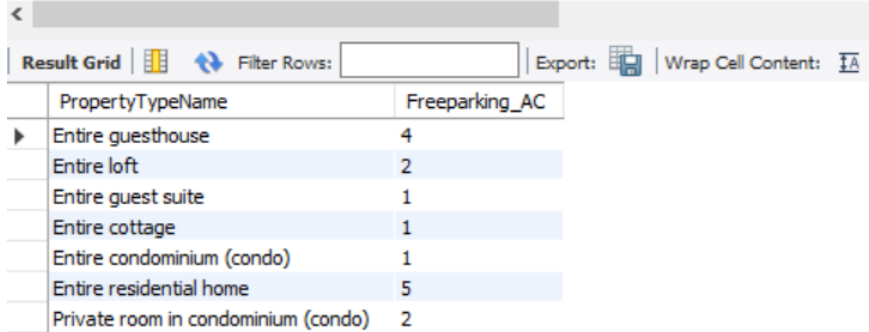
8. **Business Question 8:** *An investor is interested to see how many of each property types have free parking and Air Conditioning included*

- a. This is an important question as it allows the investor to analyze which property types come with free parking and Air conditioning units
- b. Results

```

10  Select t.PropertyTypeNames, count(*) as Freeparking_AC
11  From propertytypes as t
12  join properties as p on t.PropertyTypeID = p.PropertyTypeID
13  join amenities as a on p.PropertyID = a.PropertyID
14  where a.AirConditioning = 'True' and a.FreeParking = 'True'
15  Group by t.PropertyTypeNames;
16

```



The screenshot shows a database query result grid. The grid has two columns: 'PropertyName' and 'Freeparking_AC'. The data is as follows:

PropertyName	Freeparking_AC
Entire guesthouse	4
Entire loft	2
Entire guest suite	1
Entire cottage	1
Entire condominium (condo)	1
Entire residential home	5
Private room in condominium (condo)	2

9. **Business Question 9:** *A potential investor would like to know the average nightly price for each property type*

- a. This is important because it allows the investor to see which property type can bring in the most money on their investment
- b. Results:

```

17 • Select t.propertyTypeName, round(avg(p.price),2) as 'nightly price'
18 from propertytypes as t
19 inner join properties as p
20 on t.PropertyTypeID = p.PropertyTypeID
21 Group by t.PropertyTypeID;

```

propertyTypeName	nightly price
Entire guest suite	117.88
Entire cottage	110.00
Entire condominium (condo)	106.71
Entire residential home	411.05
Private room in condominium (condo)	99.75
Entire rental unit	119.77
Entire townhouse	260.00
Private room in townhouse	103.00
Entire serviced apartment	200.41

10. **Business Question 10** *A potential investor would like a list of property names distinguished by their nightly rate. They consider places over \$500/night to be expensive, over \$200 to be affordable, and under \$200 is cheap*

- This is important to know because it allows them to see which properties are bringing in the most money
- Results:

```

24 • Select ListingName,
25 CASE when price > 500 Then 'expensive'
26 When price > 200 Then 'affordable'
27 Else 'cheap' END
28 AS Nightly_Price
29 From properties;

```

ListingName	Nightly_Price
Live the high life in the heart of LoHi!	expensive
Rare LoHi home, 2000sf, 2 decks, sleep 10, wal...	affordable
Victorian 1-bedroom in the Heart of LoHi	cheap
Beautiful 4bed/4bath in an Amazing Location-LoHi	affordable
City Lights from a Rooftop Hot Tub in This Cust...	expensive
3 Bedroom LoHi Denver Home	cheap
Black Rhyno - Original LoHi Farmhouse	affordable

Liam Kennedy Select Statements & Results

11. **Business Question 11:** *The investor would like to know how many properties are listed on Airbnb in the Denver area*

- a. This will give the investor a good idea of the size of the market.
- b. Results:

```

3 • SELECT count(distinct PropertyID) as total
4   FROM Properties_Table;
5

```

Result Grid		Filter Rows:	Export:	Wr
	total			
▶	3920			

12. **Business Question 12:** *The investor would like to know how many hosts have properties listed on Airbnb in the Denver area*

- a. This, along with the previous query, will give the investor a good idea of what the market currently looks like.
- b. Results:

```

8 • SELECT count(distinct HostID) as total
9   FROM Hosts_Table;

```

Result Grid		Filter Rows:	Export:
	total		
▶	2555		

13. **Business Question 13:** *The investor would like to know what the distribution of properties held looks like, particularly at the upper end*

a. This will tell the investor how many people manage a large number of properties;
these will be the biggest players in the market.

b. Results:

```

13 • SELECT b.HostID, count(*) as count
14     FROM Properties_Table a
15         JOIN Hosts_Table b ON a.HostID = b.HostID
16     GROUP BY b.HostID
17     HAVING count > 1
18     ORDER BY count DESC;

```

HostID	count
359071917	103
107434423	60
261774896	47
263502162	46
401251189	40
24157036	37
360560535	26
2619306	24
34955862	21
121718072	20
107279139	20
48873476	19
219524979	19
30972487	18
390107054	17
406033071	17
219506731	16
70563805	15
359066913	15
9691307	14
6658113	13
55726275	13
151394248	12
196418785	10
193108199	10
383021621	10
419900657	10
348697199	9

14. **Business Question 14:** *The investor wants to know which neighborhoods have the most pools*

a. The investor is considering building a pool on the property, and this will let them
know which neighborhoods to build in if they want to stand out.

b. Results:

```

22 • SELECT a.NeighborhoodName, count(*) as pools
23 FROM Neighborhoods_Table a
24 JOIN Properties_Table b ON a.NeighborhoodID = b.NeighborhoodID
25 JOIN Amenities_Table c ON b.PropertyID = c.PropertyID
26 WHERE c.Pool = 'True'
27 GROUP BY a.NeighborhoodName
28 ORDER BY pools DESC;

```

NeighborhoodName	pools
Union Station	120
CBD	82
Highland	43
Five Points	31
Washington Virginia Vale	21
Civic Center	14
Stapleton	11
Lowry Field	11
University Park	10
Gateway - Green Valley Ra	9
Cherry Creek	7
Capitol Hill	7
Hampden South	7
West Colfax	5
Hale	5
Cheesman Park	5
North Capitol Hill	5
Windsor	4
Hampden	4
Speer	4
Congress Park	3
DIA	3
Indian Creek	3
Marston	3
Northeast Park Hill	3
Lincoln Park	2
University	2
Goldsmith	2

15. **Business Question 15:** *Investor would like to know the average number of reviews per property*

- a. Knowing the average number of reviews will give the investor a good target number to reach to be considered established and reputable.
- b. Results:

```

32 • SELECT avg(count) as avg_reviews FROM
33 ( SELECT PropertyID, count(*) as count
34 FROM PropertyReviews_Table
35 GROUP BY PropertyID ) a;

```

avg_reviews
68.8929

Shivani Negi Select Statements & Results

16. **Business Question 16:** *The investor is interested in which month (in Q1 2022) has the most bookings so far.*

- a. It is important for the investor to understand seasonality (i.e. cyclical variance in traveler demand throughout the year) in the Denver vacation rental market.
- b. Results: So far, March is the month with the most bookings in the first quarter of 2022.

	Month	Bookings
▶	3	49485
	2	47047
	1	45889

17. **Business Question 17:** *The investor is interested in the distribution of property type across all Denver neighborhoods.*

- a. This will help the investor understand demand and availability of property types based on neighborhood. For example, if a particular neighborhood is saturated with the “entire residential home” property type, then it may not make sense to invest in a residential home in that area as it may be difficult to compete with other properties.
- b. Results:

	NeighborhoodName	PropertyTypeName	PropertyCount
►	Athmar Park	Entire condominium (condo)	1
	Athmar Park	Entire guest suite	7
	Athmar Park	Entire guesthouse	1
	Athmar Park	Entire residential home	20
	Athmar Park	Private room in residenti	8
	Auraria	Entire condominium (condo)	1
	Auraria	Entire loft	1
	Baker	Entire bungalow	1
	Baker	Entire condominium (condo)	1
	Baker	Entire guest suite	7
	Baker	Entire guesthouse	2
	Baker	Entire rental unit	27
	Baker	Entire residential home	31
	Baker	Entire townhouse	9
	Baker	Entire vacation home	1
	Baker	Private room in guest sui	1
	Baker	Private room in residenti	4
	Baker	Private room in townhouse	3
	Barnum	Entire bungalow	1
	Barnum	Entire guest suite	3
	Barnum	Entire guesthouse	1
	Barnum	Entire rental unit	2
	Barnum	Entire residential home	8
	Barnum West	Entire cottage	1

18. **Business Question 18:** *An investor wants to know the 100 most reviewed properties and which neighborhoods are they located in.*

a. This will help the investor learn more about the popularity of and demand for Denver properties based on the neighborhood.

b. Results:

	PropertyID	ReviewCount	NeighborhoodName
►	1733052	1080	Cheesman Park
	665622	851	Highland
	14369542	754	Gateway - Green Valley Ra
	9731001	720	Gateway - Green Valley Ra
	7843605	643	Capitol Hill
	39405	624	Highland
	590	616	North Park Hill
	7912052	603	Hampden
	19671778	576	Montbello
	10237203	561	Congress Park
	7931953	556	Highland
	8941796	551	Sloan Lake
	15817834	522	Cory - Merrill
	12990793	501	Five Points
	21080559	488	Platt Park
	15831072	485	Whittier
	13447168	483	Skyland
	3479122	481	Five Points
	4227772	472	Five Points
	7592378	464	City Park West
	21796586	450	Gateway - Green Valley Ra
	9496966	449	City Park West
	2467260	447	City Park
	19893591	437	Sunnyside

19. **Business Question 19:** *An investor wants to know which neighborhoods have the most bookings in March 2022.*

- a. We learned from Business Question 16 that March is the month with the highest number of bookings in the first quarter of 2022. Now we need to understand how vacation rental demand in March is distributed by neighborhood.

b. Results:

	Bookings	NeighborhoodName
►	3833	Five Points
	2801	Highland
	2691	Union Station
	2053	Sunnyside
	1872	Capitol Hill
	1826	West Colfax
	1759	Speer
	1640	Berkeley
	1540	CBD
	1440	Gateway - Green Valley Ra
	1388	West Highland
	1309	Whittier
	1247	Cole
	1183	Sloan Lake
	1159	City Park West
	1092	Baker
	1040	Stapleton
	1023	Congress Park
	971	Washington Park West
	914	Jefferson Park
	888	Cheesman Park
	792	Northeast Park Hill
	767	Lincoln Park
	717	North Park Hill

20. **Business Question 20:** *The investor is interested in finding the host with the most properties and then seeing how their properties are distributed by neighborhoods.*

- a. By researching successful players in the Denver vacation rental market, we will gain an understanding of the competitive landscape.

b. Results:

	NeighborhoodName	NumProperties
►	Highland	40
	Washington Virginia Vale	17
	City Park	12
	Civic Center	12
	Lowry Field	10
	University Park	8
	Union Station	2
	Indian Creek	2

Data Visualizations

We used Tableau to create a variety of data visualizations in an effort to answer business questions for our client. We have used the following 8 types of charts/graphs: pie chart, scatter plot, highlight chart, treemap, heatmap, packed bubbles, circle view, and text table. We have also ensured that 14 of our 21 visualizations directly relate to 14 of the previously discussed business questions/select statements .

Angel Santana Data Visualizations using Tableau

Data Visualizations 1 and 2 (correspond to Business Questions 1 and 2)

These two visualizations are similar. I believe that this simplicity is good because you can see the first names that begin with A and notice if there are multiple names with that same pattern and be able to distinguish them based on last name. Host Last Names that being with E is also straightforward. These data visuals allow for a scrollable interaction.

Host First Names that start with A

Host First Name	Host Last Name
A.C.	Woodson
Aana	Molina
Aaron	Busch
	Graham
	Jernigan
	Machado
	Medeiros
Aaron And Amy	Leach
Abby	Hagen
Ahhv + Ren	Gaines

Host Last Names that begin with E

Host Last Name	Host First Name
Earl	Orit
Early	Tory
Easley	Andrea
Eason	Dana
Eastman	Jack (Manager)
Eaton	Hanna
Echols	Lauren
Eckert	Natalie
Eddy	Raquel
Edmonds	Pierce
Edmondson	Brad
Edwards	Christina
Egan	Jo
Elam	Leticia
Elder	Graham
Eldridge	Christine & David
Elias	Dania
Elkins	Jeremy
Eller	Tom

Data Visualization 3 (corresponds to Business Question 3)

This is a type of horizontal bars graph. I chose this type of visualization because the darker the color gets, the more of that type of property there are. Right off the bat you will be able to see where more of the count is located.

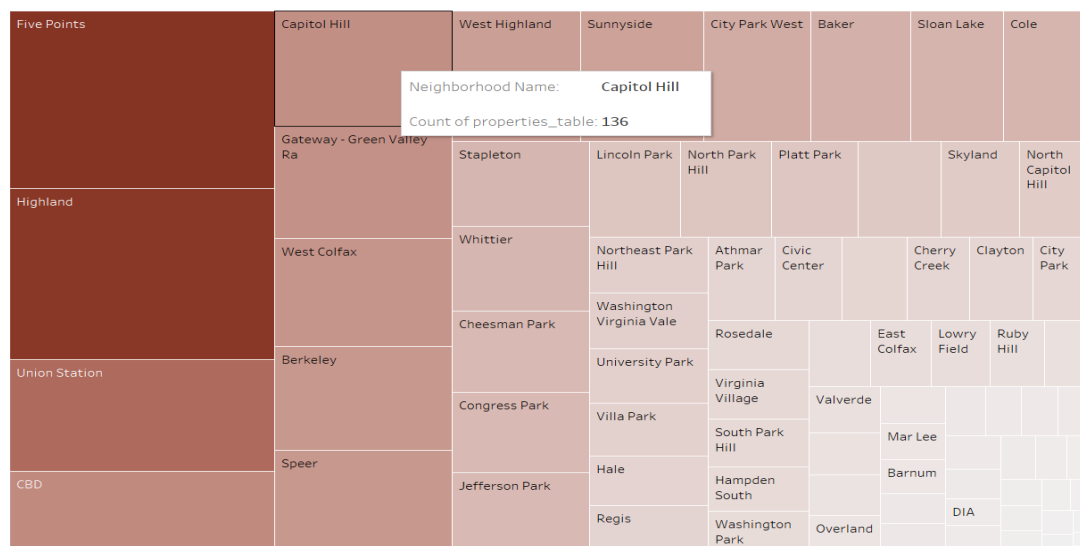
Count of Property Type

Property Type Name	
Camper/RV	4
Campsite	2
Castle	1
Entire bungalow	72
Entire condominium (condo)	470
Entire cottage	12
Entire guest suite	445
Entire guesthouse	186
Entire loft	87
Entire rental unit	637
Entire residential home	859
Entire serviced apartment	138
Entire townhouse	337
Entire vacation home	1
Entire villa	2
Farm stay	1
Lighthouse	1
Private room	1
Private room in bed and b	15
Private room in bungalow	17

Data Visualization 4 (corresponds to Business Question 4)

is tree maps visualization. I like this type of interactive visualization because it is appealing to the investor to see where more of the properties are located. Being able to hover over a neighborhood name you can get the number of properties.

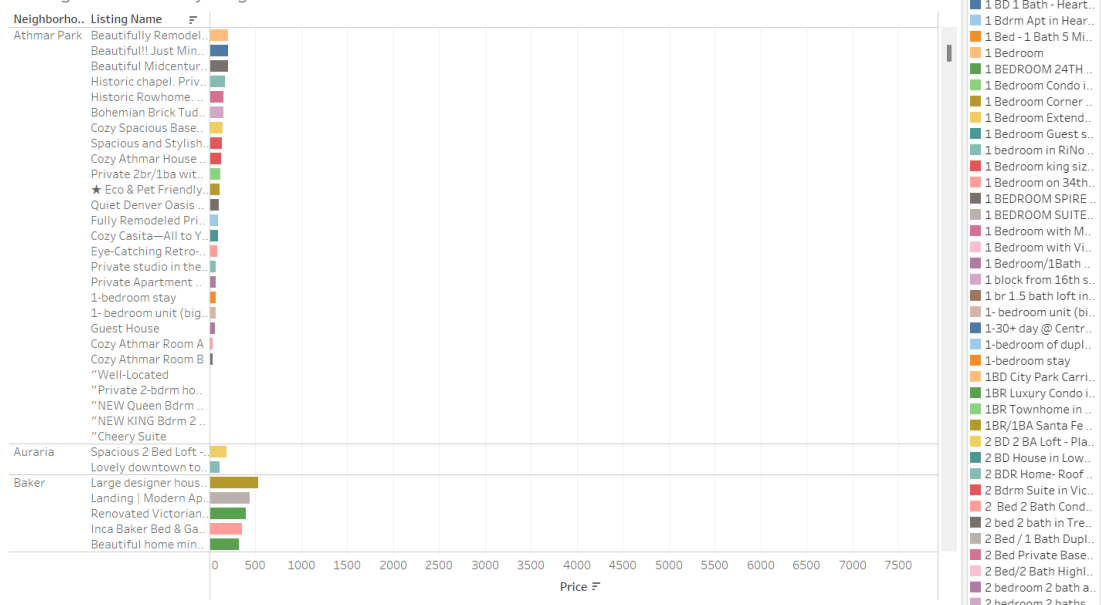
Number of Properties/Neighborhood



Data Visualization 5 (corresponds to Business Question 5)

is a colorful horizontal bar graph that visualizes all the different types of Listing Names along with what neighborhood it's located in and the price.

Listing Name Price by neighborhood



Kyndal Teel Data Visualizations using Tableau

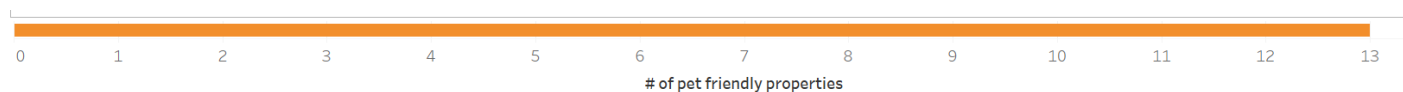
Data Visualization 6 (corresponds to Business Question 6)

I used a text table to list all the property ID that meet the criteria. I also put a column to verify that it does have a pool and a blue square to represent air conditioning. This allows for the investor to scan the list of potential properties.

PropertyID ..	Pool	
283162	True	■
1220547	True	■
1236000	True	■
1240215	True	■
1291679	True	■
1311993	True	■
1315853	True	■
1339519	True	■
1397309	True	■
1955800	True	■
4137490	True	■
4556950	True	■
4556956	True	■
5508840	True	■
5691532	True	■
5691878	True	■
5706497	True	■
6357426	True	■
8274383	True	■
8790444	True	■
8869376	True	■
9548317	True	■
9604653	True	■
11904176	True	■
11984589	True	■
12681403	True	■
13016382	True	■
13436850	True	■
13545464	True	■
13686460	True	■
13686918	True	■

Data Visualization 7 (corresponds to Business Questions 7)

I used a horizontal bar graph that represents the total number of pet friendly properties. This is a simple visualization that gets the point across easily.



Data Visualization 8 (corresponds to Business Question 8)

I used a treemap so that the real estate investor can easily tell which property types has the most options that include the amenities they desire.



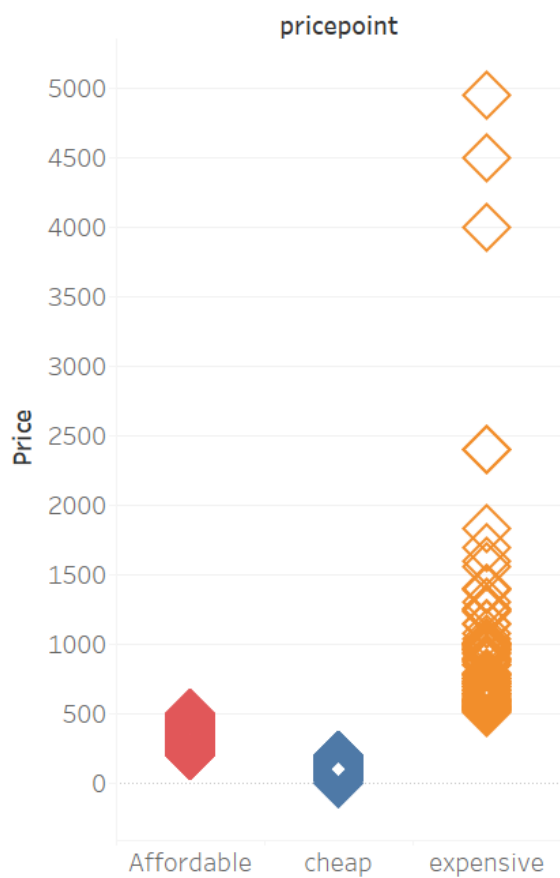
Data Visualization 9 (corresponds to Business Question 9)

I used a highlight table to highlight the values based on their averages so it is easy to see which ones bring in a high amount vs a low amount of money

Property Type N..	
Camper/RV	80.8
Campsite	19.5
Castle	521.0
Entire bungalow	188.0
Entire condominium..	156.2
Entire cottage	117.3
Entire guest suite	125.9
Entire guesthou..	121.8
Entire loft	179.0
Entire rental unit	134.0
Entire residentia..	254.2
Entire serviced a..	210.8
Entire townhouse	263.7
Entire vacation h..	112.0
Entire villa	240.5
Farm stay	118.0
Lighthouse	899.0
Private room	80.0
Private room in ..	158.6
Private room in ..	67.4
Private room in c..	169.0
Private room in c..	73.9
Private room in ..	84.6
Private room in ..	46.3

Data Visualization 10 (corresponds to Business Question 10)

I used a circle view for an easy to understand visualization, where you can simply scroll over the desired price point to find the price you want to pay.

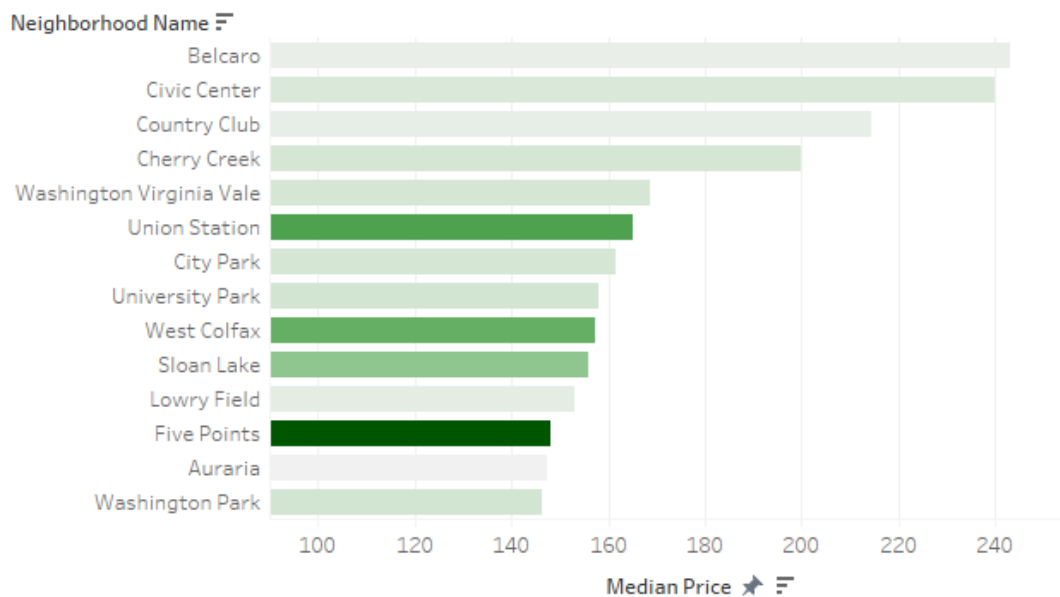


Liam Kennedy Data Visualizations using Tableau

Data Visualization 11

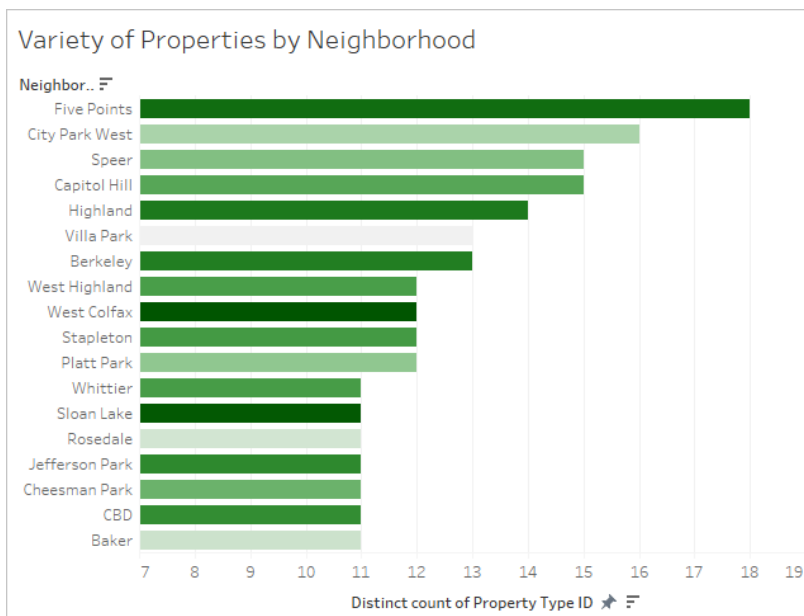
This is a horizontal bar graph depicting the median price of a listing by its neighborhood. The color is added to reflect the total properties in the area.

Median Price by Neighborhood



Data Visualization 12

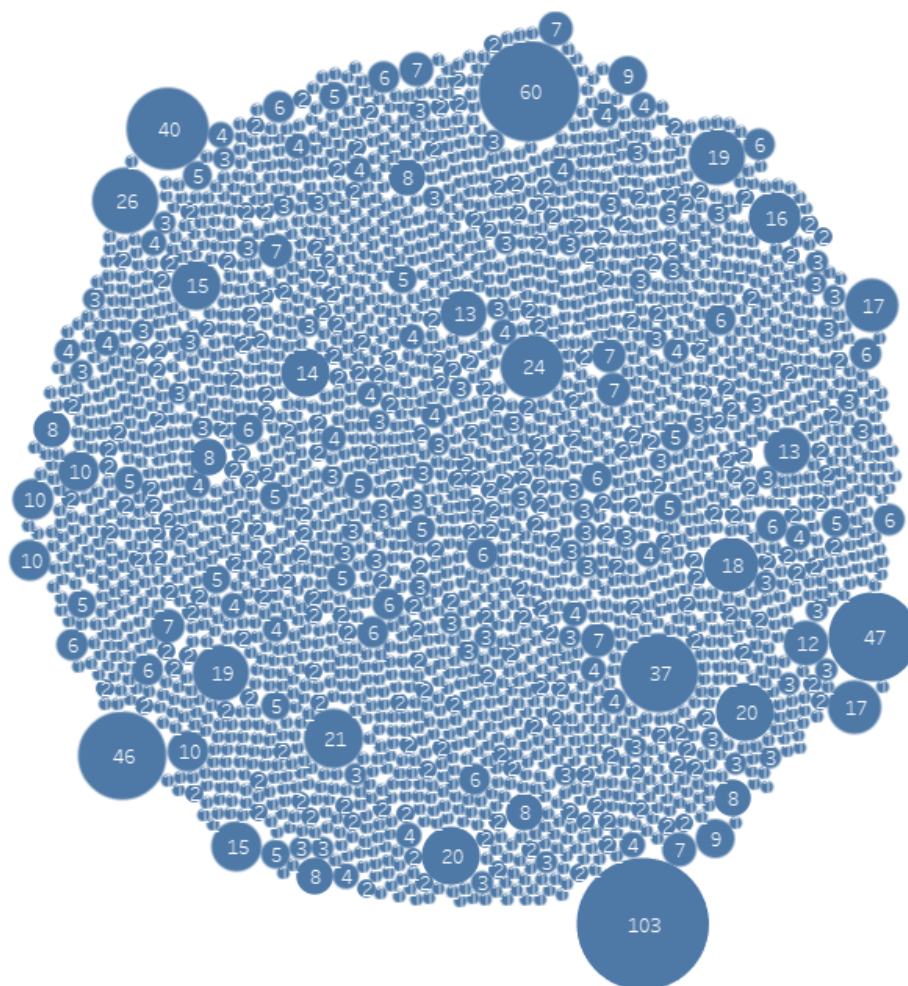
This chart depicts the variety of properties in each neighborhood. It is adjusted by price with color to give the investor an idea of which neighborhoods are expensive.



Data Visualization 13 (corresponds to Business Question 13)

This depicts the distribution of properties owned by hosts with a bubble graph. This nicely summarizes what the market looks like for hosts in Denver.

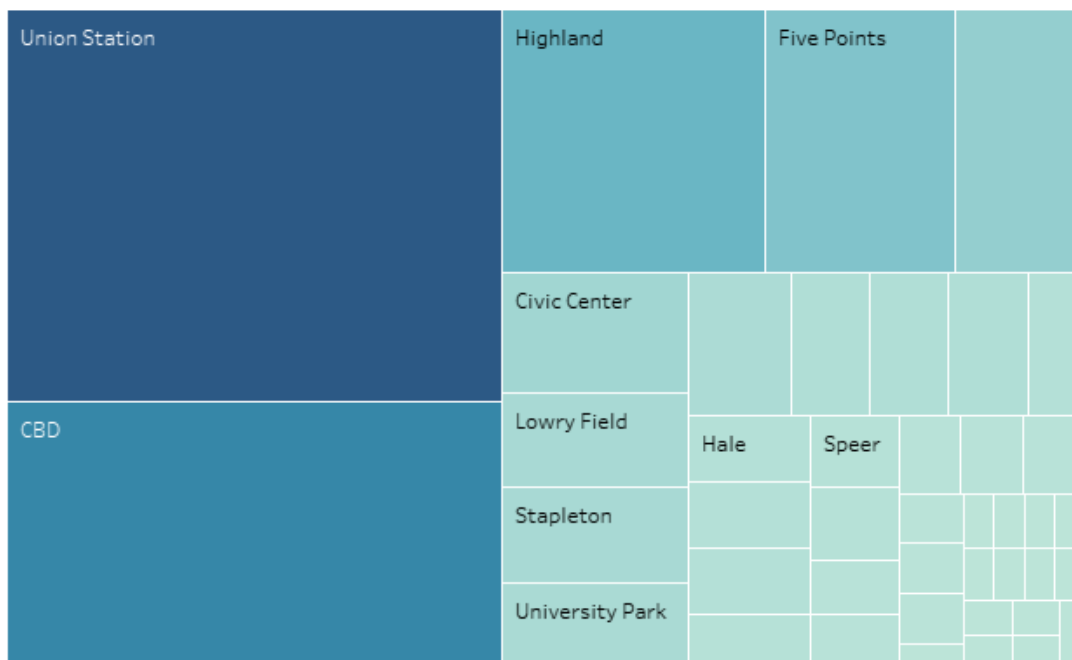
Distribution of Properties Owned



Data Visualization 14 (corresponds to Business Question 14)

This depicts the number of pools in each neighborhood and will give the investor a good idea of which neighborhoods are already saturated with them.

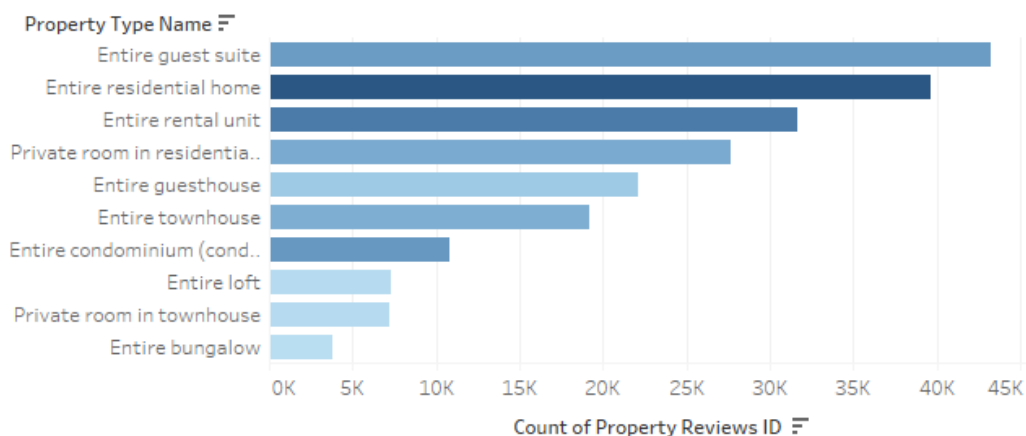
Pools by Neighborhood



Data Visualization 15

This chart examines the number of reviews by property type. The investor may be interested in which kinds of properties lend themselves to travelers who like to leave reviews. The color is correlated with the total count of the property type which will help the reviewer distinguish between high counts that are solely due to high volume of that property type.

Reviews per Property

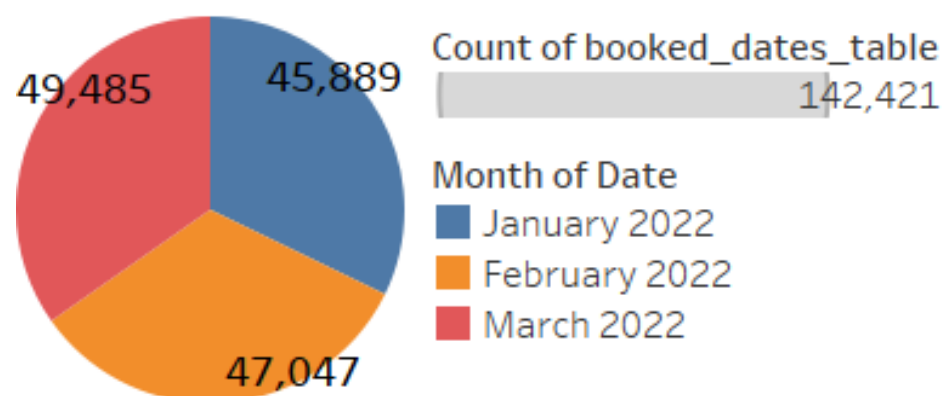


Shivani Negi Data Visualizations using Tableau

Data Visualization 16 (corresponds to Business Question 16)

This pie chart breaks booked dates in Q1 2022 into 3 months. So far, March 2022 is the month with the most bookings in the first quarter of next year. However, February and January closely follow. The lack of bookings in January could be due to recent cancellations because of change in plans or covid concerns.

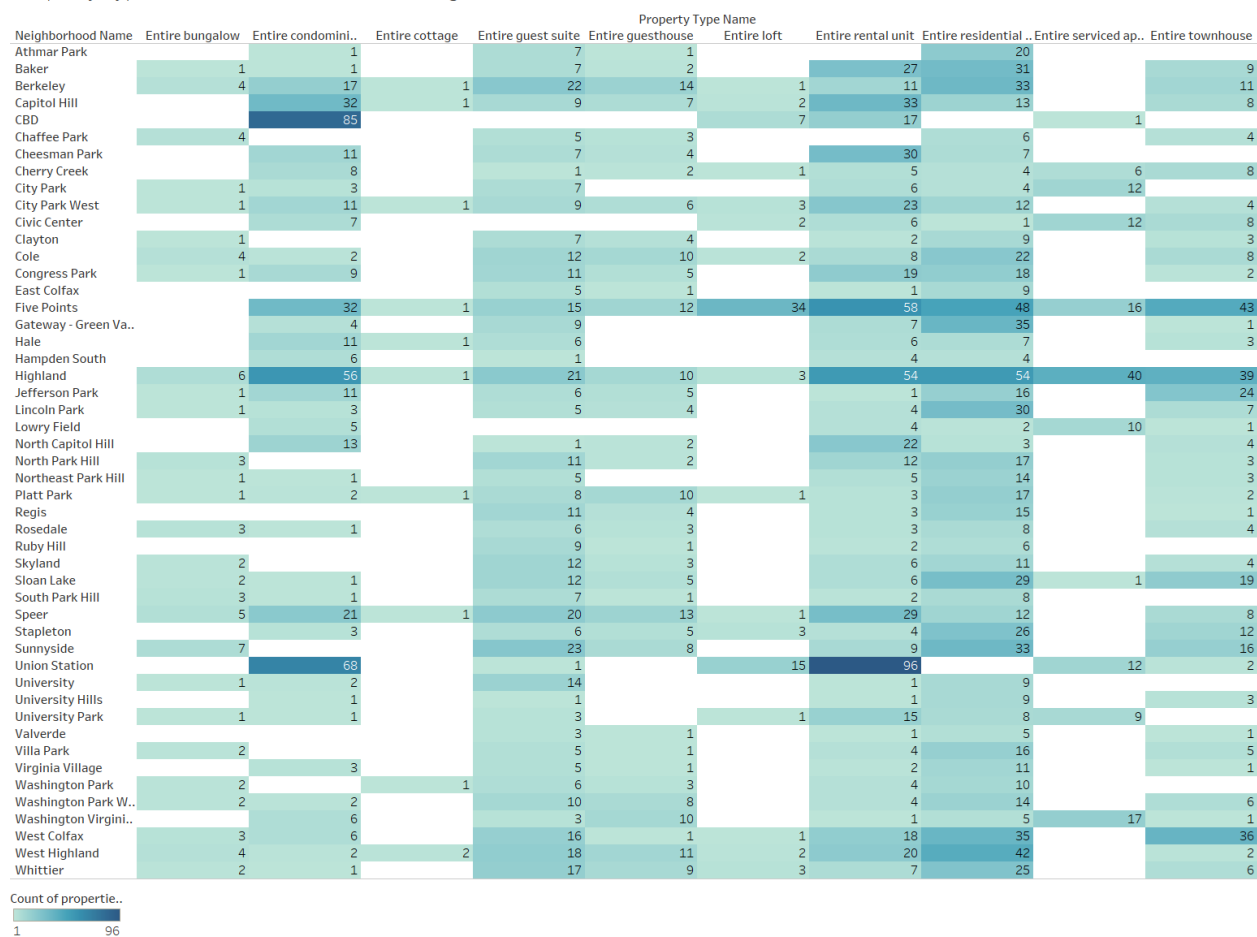
Denver Q1 2022 Airbnb Bookings by Month



Data Visualization 17 (corresponds to Business Question 17)

This horizontal bars chart explores the distribution of property types across Denver neighborhoods. I have removed property types that only allow you to book a room (instead of the whole residence) or only provide a camper/tiny home because the client isn't interested in such properties.

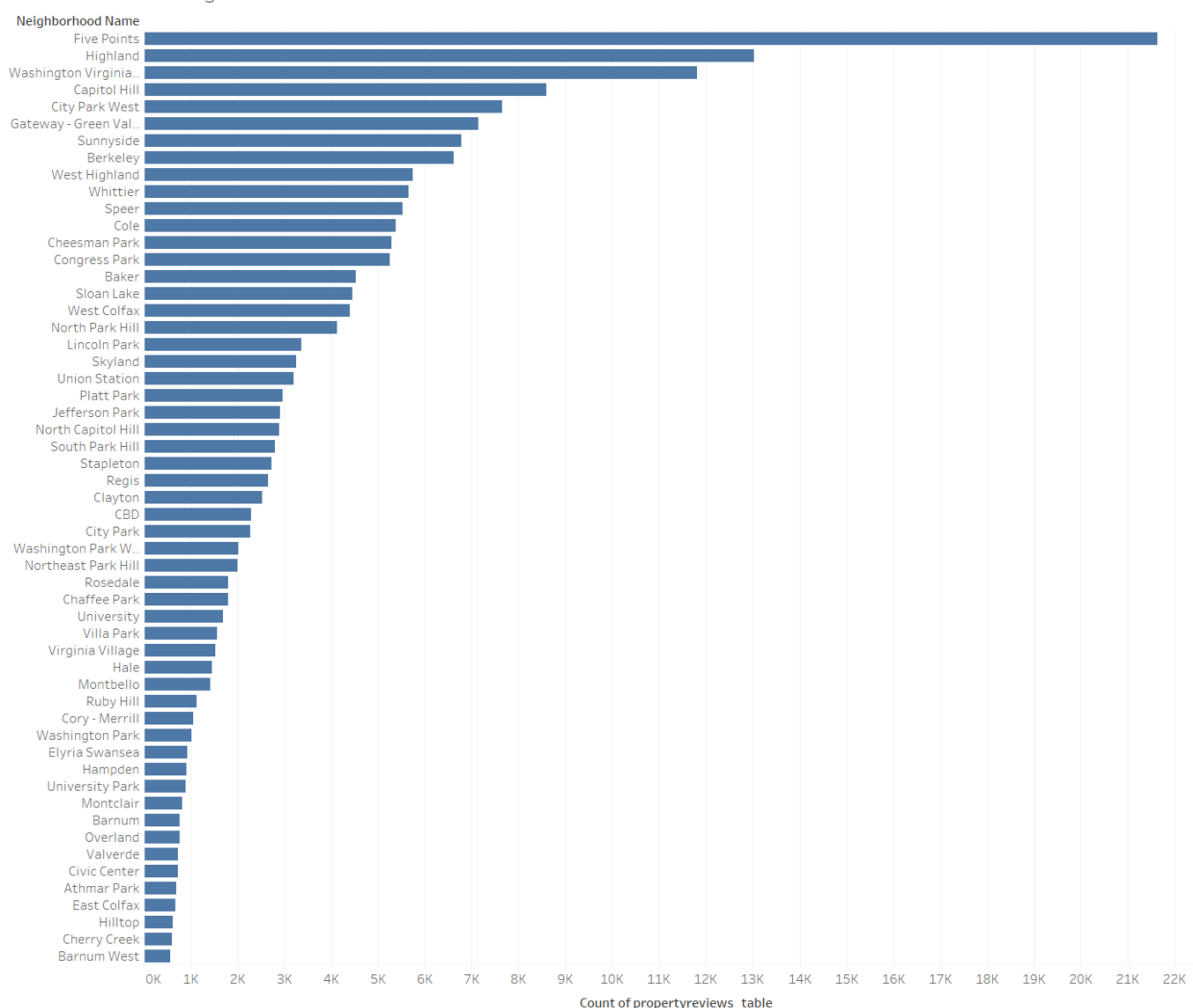
Property Type Distribution Across Denver Neighborhoods



Data Visualization 18

The following bar chart explores review count based on neighborhood. I have removed neighborhoods with less than 500 reviews in total. Based on the data, Five Points, Highland, and Washington Virginia Vale are the most reviewed neighborhoods in Denver.

Most Reviewed Neighborhoods

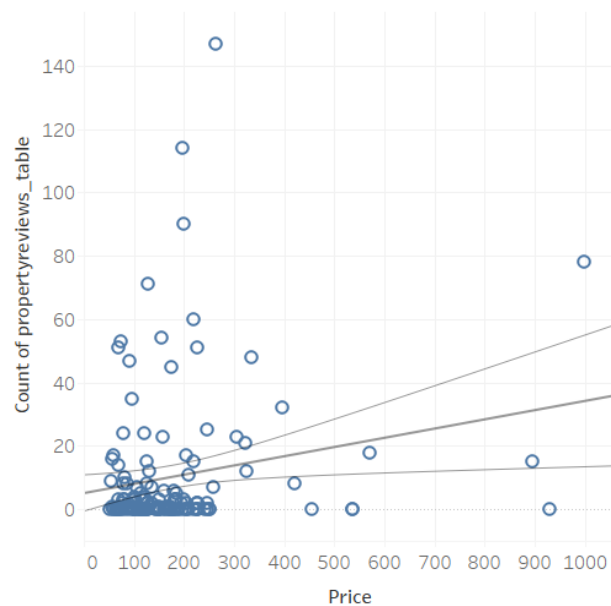


Data Visualizations 19 and 20

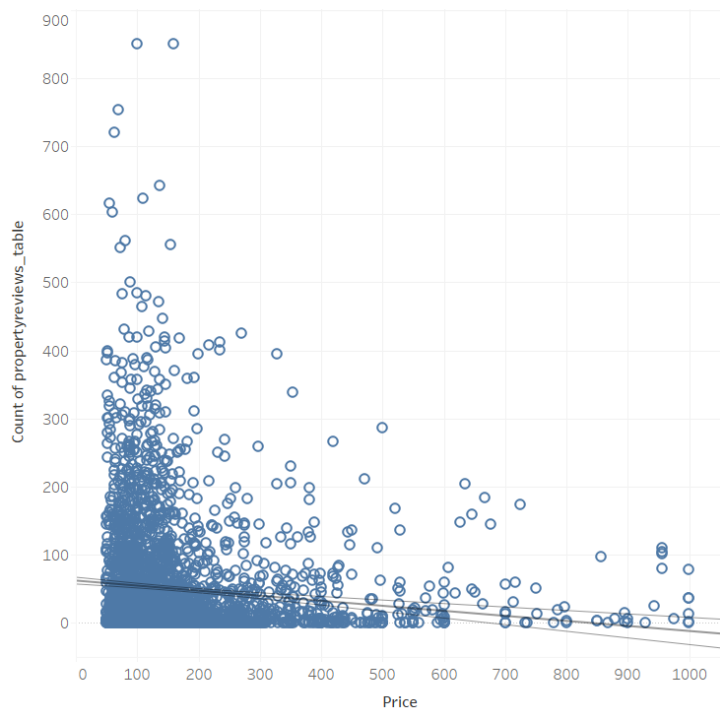
The client wants to know how amenities affect the nightly price travelers are willing to pay. In addition, they want to see if amenities affect the traveler's willingness to leave a review. I created two scatter plots that attempt to answer these questions. In general, price and review count are negatively correlated. Based on our data, travelers are not likely to leave reviews for expensive properties. This could be due to the fact that there is a smaller marker for expensive properties. However, when the host offers many amenities, travelers leave more reviews compared to travelers staying at less upscale properties. It should be noted that the confidence

interval range increases towards the higher prices because our sample size is low at the higher price points.

Nightly Price vs Review Count of Properties in Denver with All Amenities (Except Pet Friendly)



Nightly Price vs Review Count of Properties in Denver



Data Visualization 21

The following heatmap analyzes the average nightly listing price and the count of nearby points of interest for neighborhoods in Denver. I have excluded neighborhoods with 0 nearby points of interest from the visualization. Based on the data, the Central Business District (CBD) seems to have the best combination of nearby attractions and moderate nightly prices.

POIs and Avg Cost Comparison Across Denver Neighborhoods

