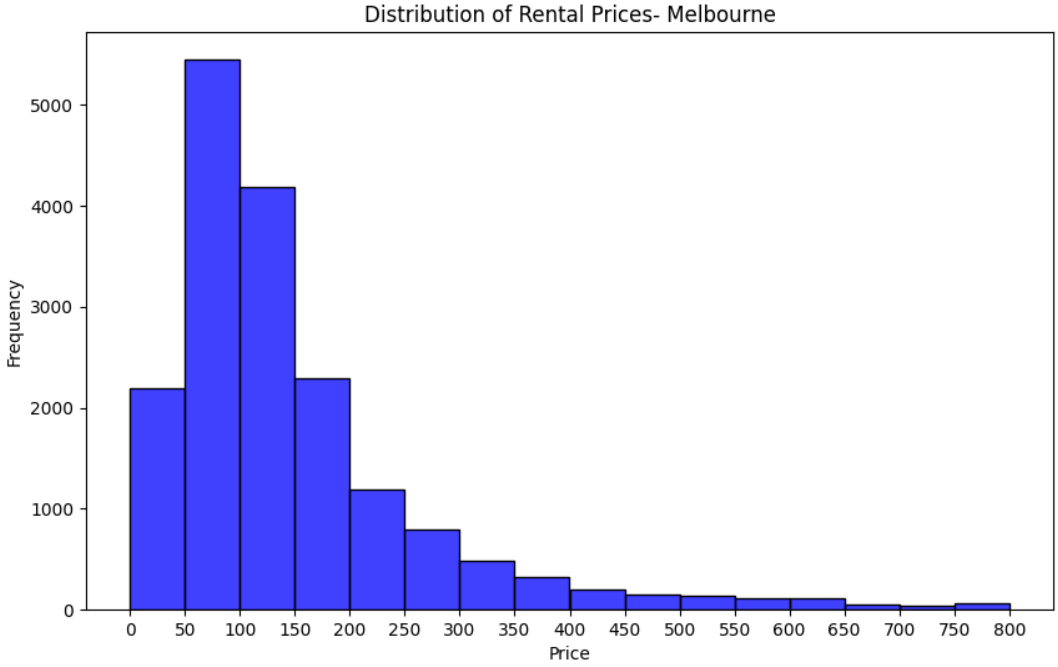
Answers to Airbnb's Intermediate Questions

- **Q1.** What is the distribution of prices across a city's neighborhoods? How does it change when you segment it further by room type?
- **Q2.** Create a map with a dot for each listing in a city and add a color scale based on price on the dots.
- **Q3**. How do listings that require a minimum stay of a week or longer differ from those that don't?

Melbourne's Airbnb Data Set

Answer1. Part-A (for Melbourne):



From the above histogram we can determine that the majority of the rental prices in Melbourne are in the lower range, there are a few rental prices in the higher range. This indicates that the distribution of rental price is right-skewed.

Answer-1. Part-B (for Melbourne):

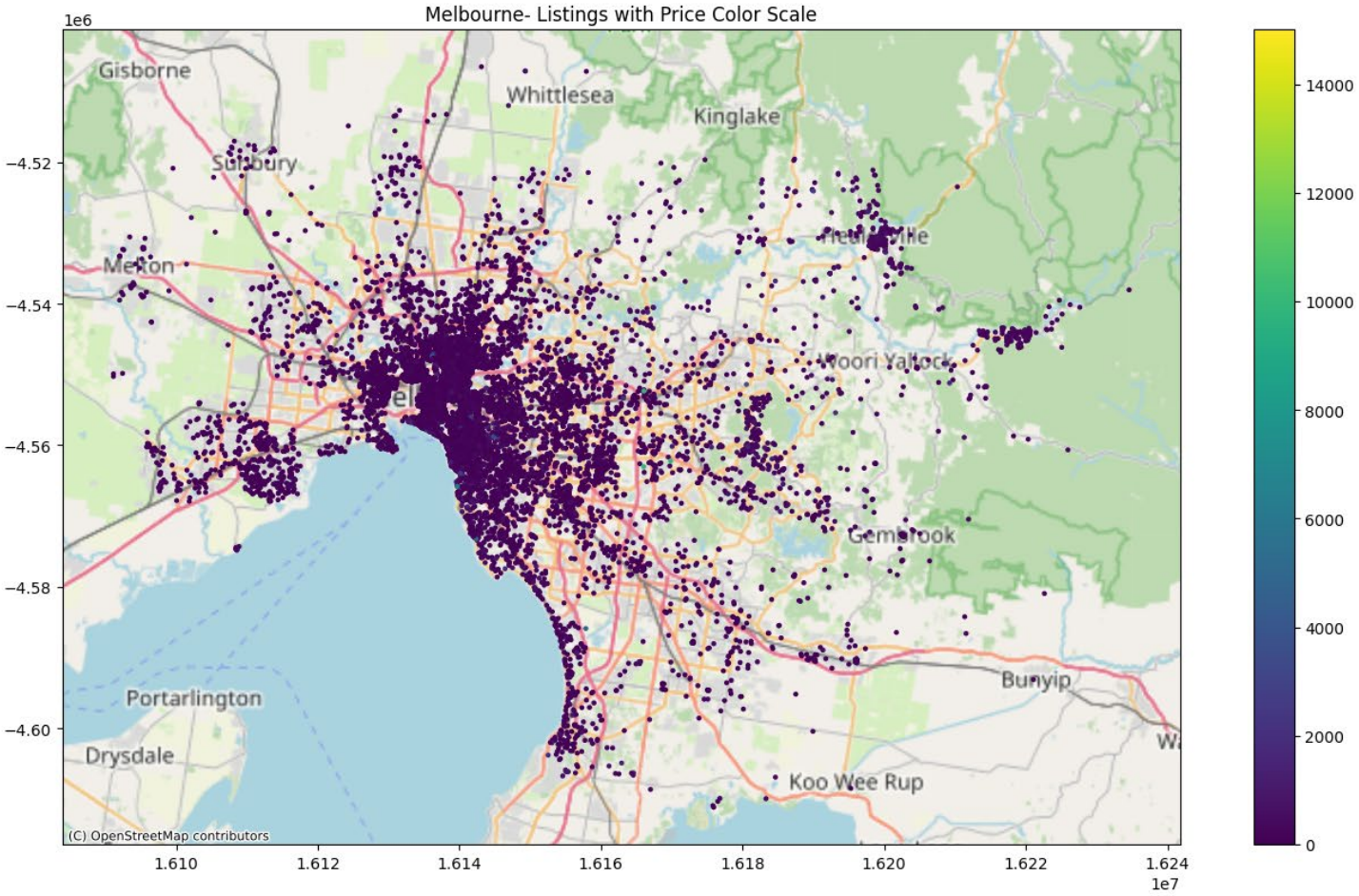
Segmenting distribution of rental price further by room type:

- Entire home/apt $145.0
- Hotel room $199.0
- Private room $60.0
- Shared room $33.0

The price for entire home/apt & hotel room costs more than a private room & a shared room.

Answer-2 (for Melbourne).

Map with a dot for each listing in a city having a color scale based on price:

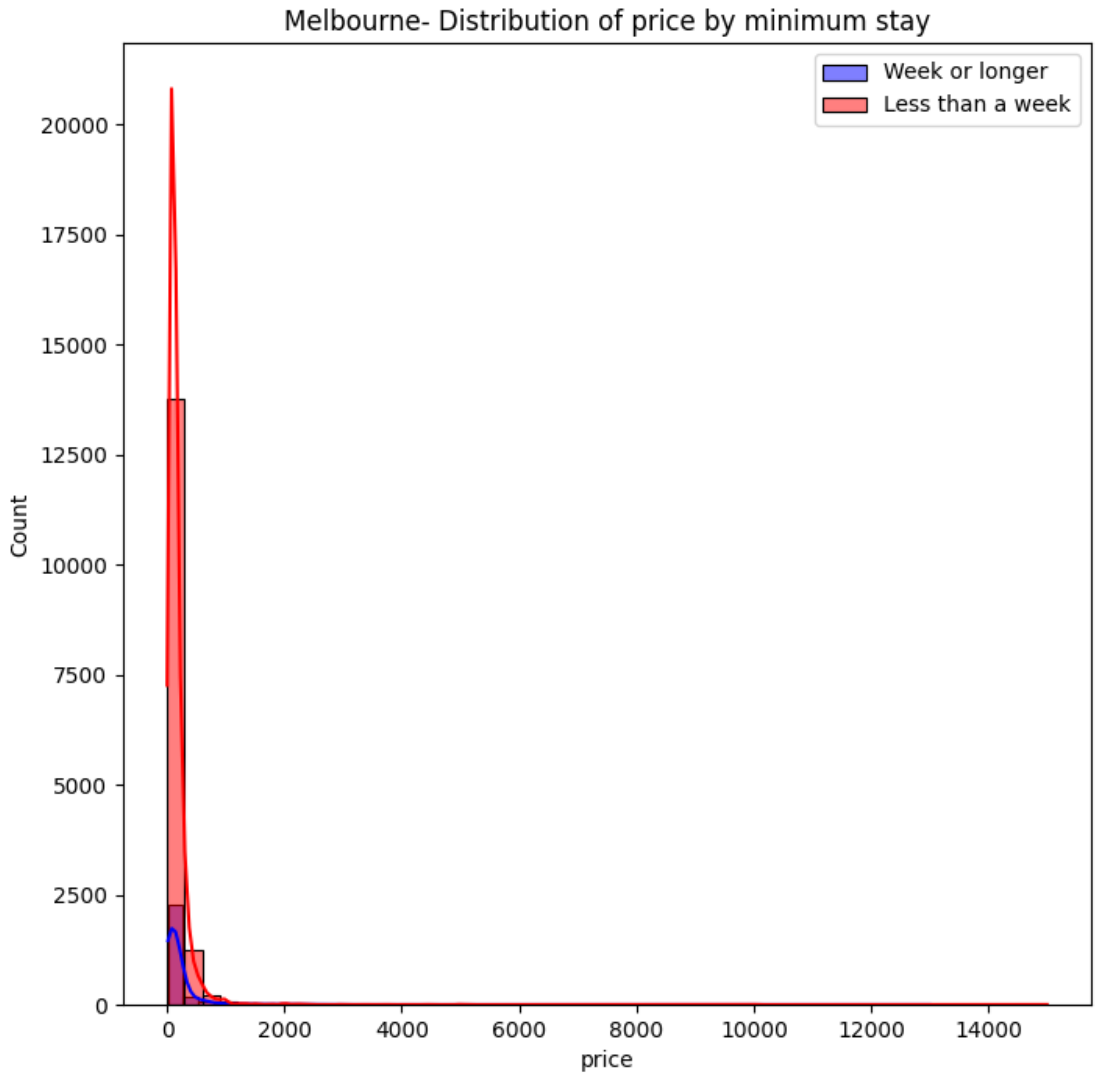


Answer-3 (for Melbourne).

Listings that require a minimum stay of a week or longer differ from those that don't:

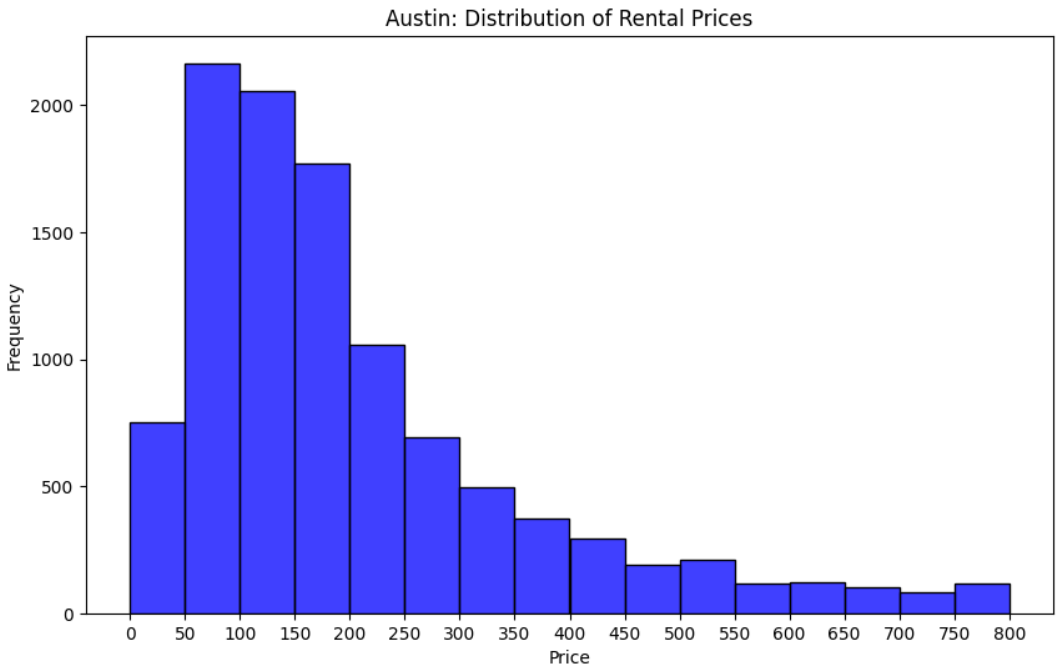
- Melbourne: Average price for listings with minimum stay of a week or longer: $203.16
- Melbourne: Average price for listings without minimum stay of a week or longer: $168.00

We can determine from Melbourne's dataset listings that requires a minimum stay of a week or longer would cost $203.16 while the listings that does not require a minimum stay would cost $168.00.



Austin's Airbnb Data Set

Answer-1. Part-A (for Austin):



From the above histogram we can also determine that the majority of the rental prices in Austin are in the lower range, there are a few rental prices in the higher range. This indicates that the distribution of rental price is right-skewed.

Answer-1. Part-B (for Austin):

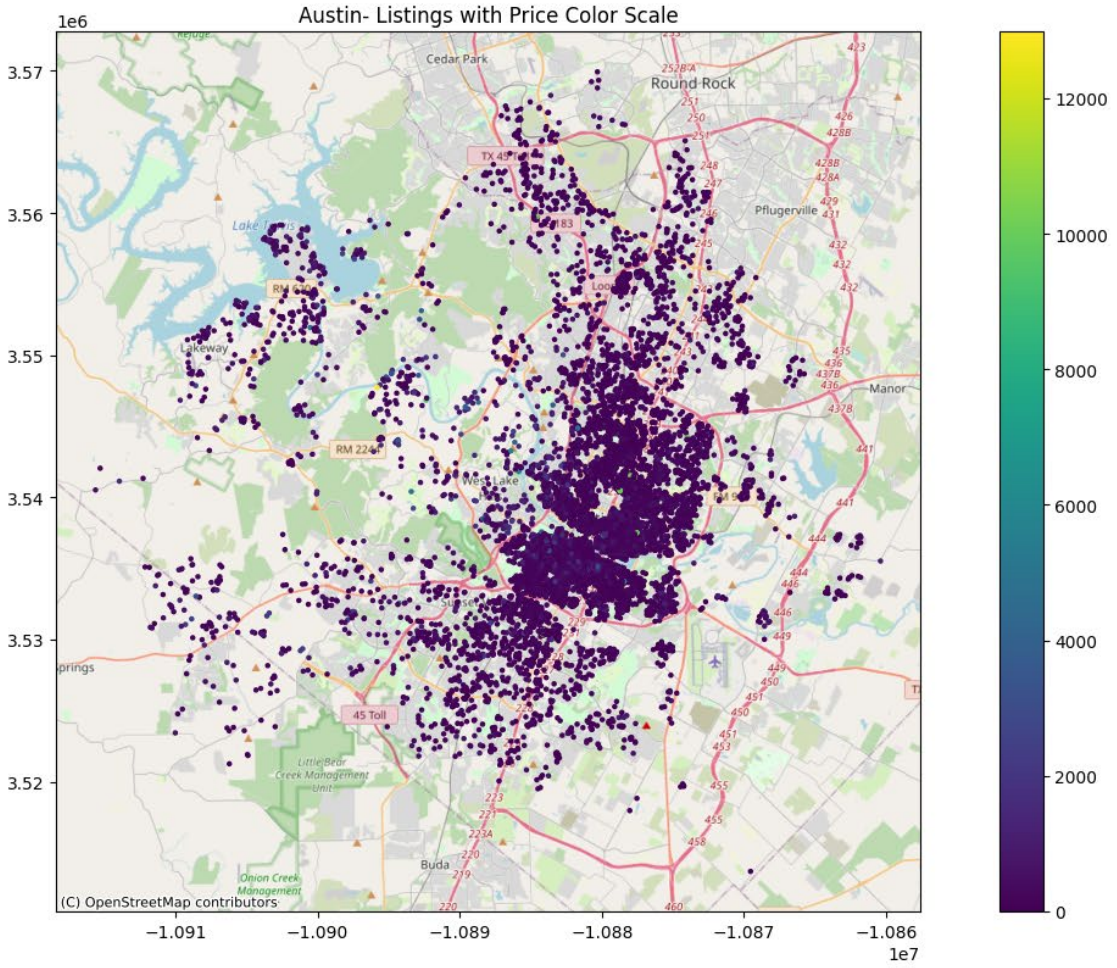
Segmenting distribution of rental price further by room type:

- Entire home/apt $188.0
- Hotel room $210.0
- Private room $70.0
- Shared room $25.0

Looking at the above data, booking a hotel room would cost more than a private or shared room. The price for an entire home/apt is also high compared to a private or shared room.

Answer-2. (for Austin):

Map with a dot for each listing in a city having a color scale based on price:

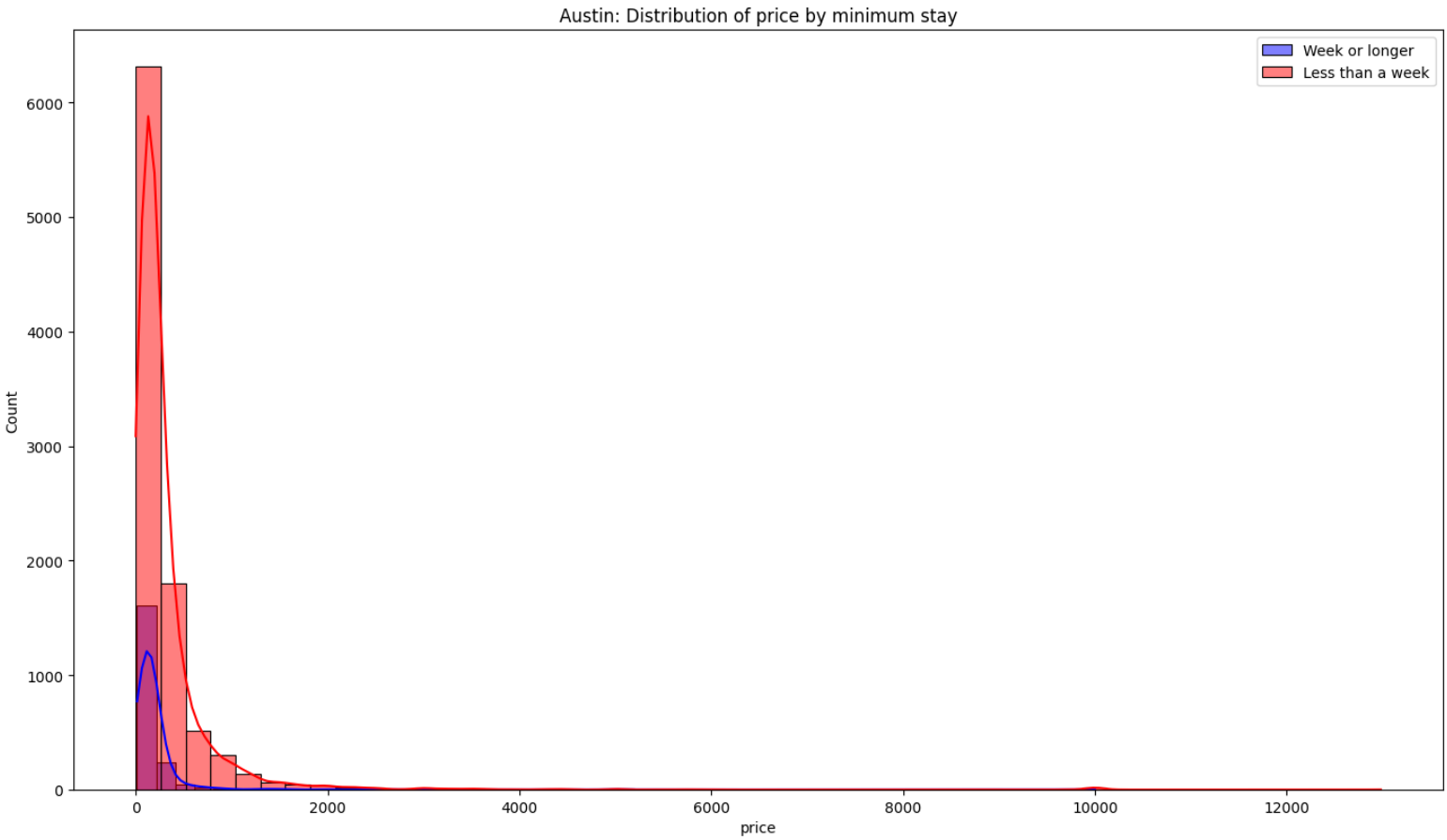


Answer-3 (for Austin).

Listings that require a minimum stay of a week or longer differ from those that don't:

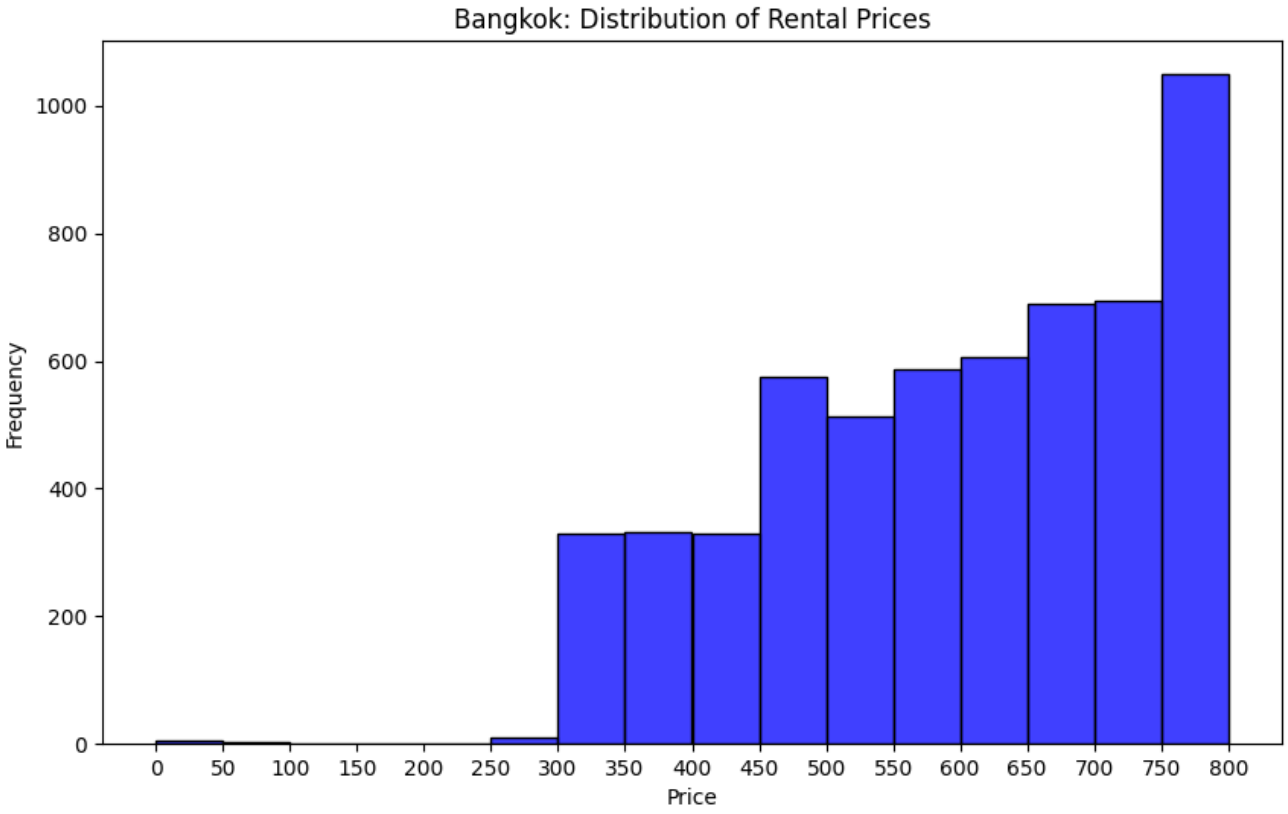
- Austin: Average price for listings with minimum stay of a week or longer: $192.95
- Austin: Average price for listings without minimum stay of a week or longer: $314.67

We can determine from Austin's dataset listings that requires a minimum stay of a week or longer would cost $192.95 while the listings that does not require a minimum stay would cost $314.67.


Austin: Distribution of price by minimum stay
Week or longer
Less than a week
Count
price
0
1000
2000
3000
4000
5000
6000
0
2000
4000
6000
8000
10000
12000

Bangkok's Airbnb Data Set

Answer1. Part-A (for Bangkok):



From the above histogram we can determine that the majority of the rental prices in Austin are in the mid-range, there are a few rental prices in the higher range. This indicates that the distribution of rental price is left-skewed.

Answer-1. Part-B (for Bangkok):

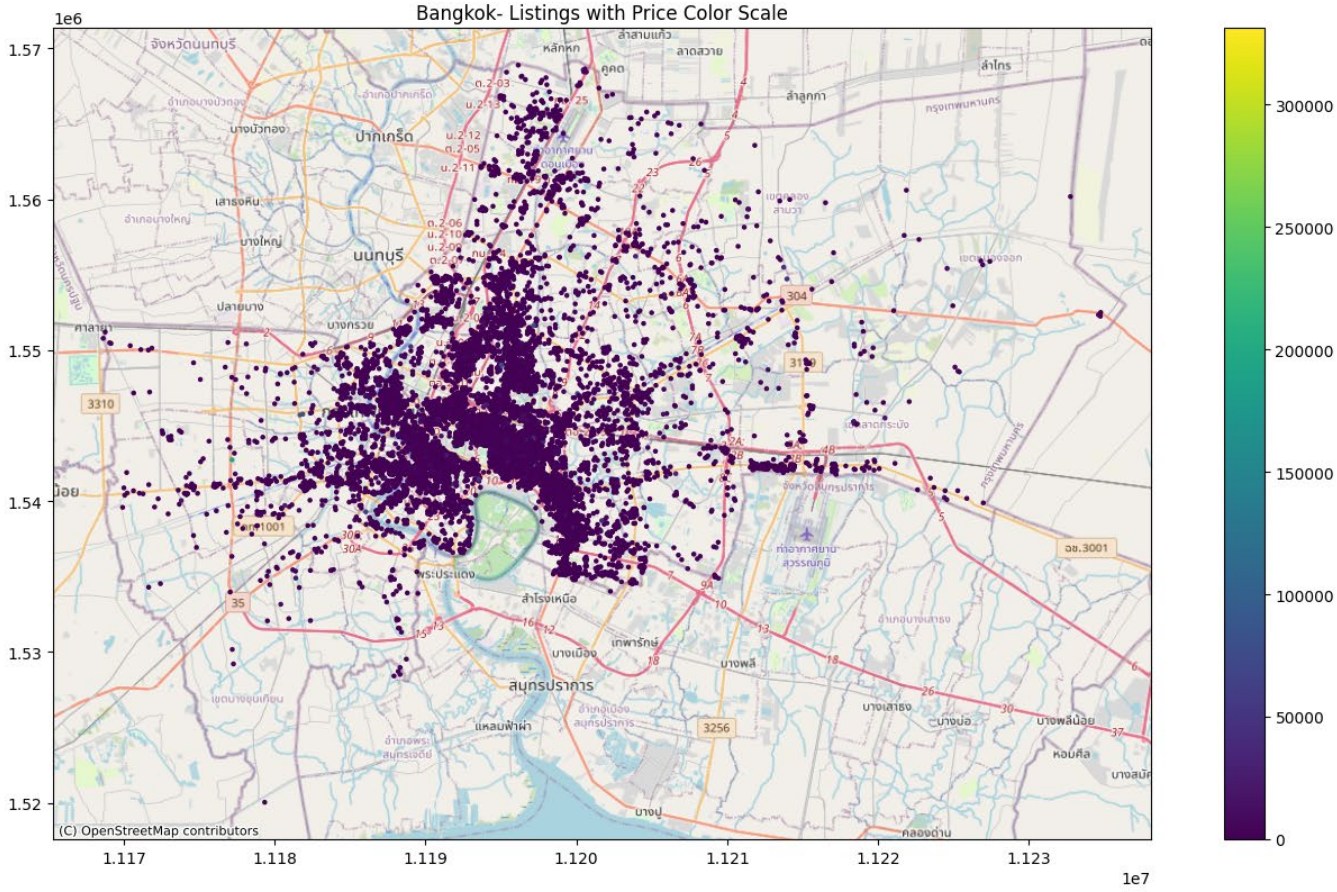
Segmenting distribution of rental price further by room type:

- Entire home/apt $1200.0
- Hotel room $1287.5
- Private room $1000.0
- Shared room $450.0

Looking at the above data, booking a hotel room, entire home/apt & a private room costs more compared to shared room.

Answer-2. (for Bangkok):

Map with a dot for each listing in a city having a color scale based on price:

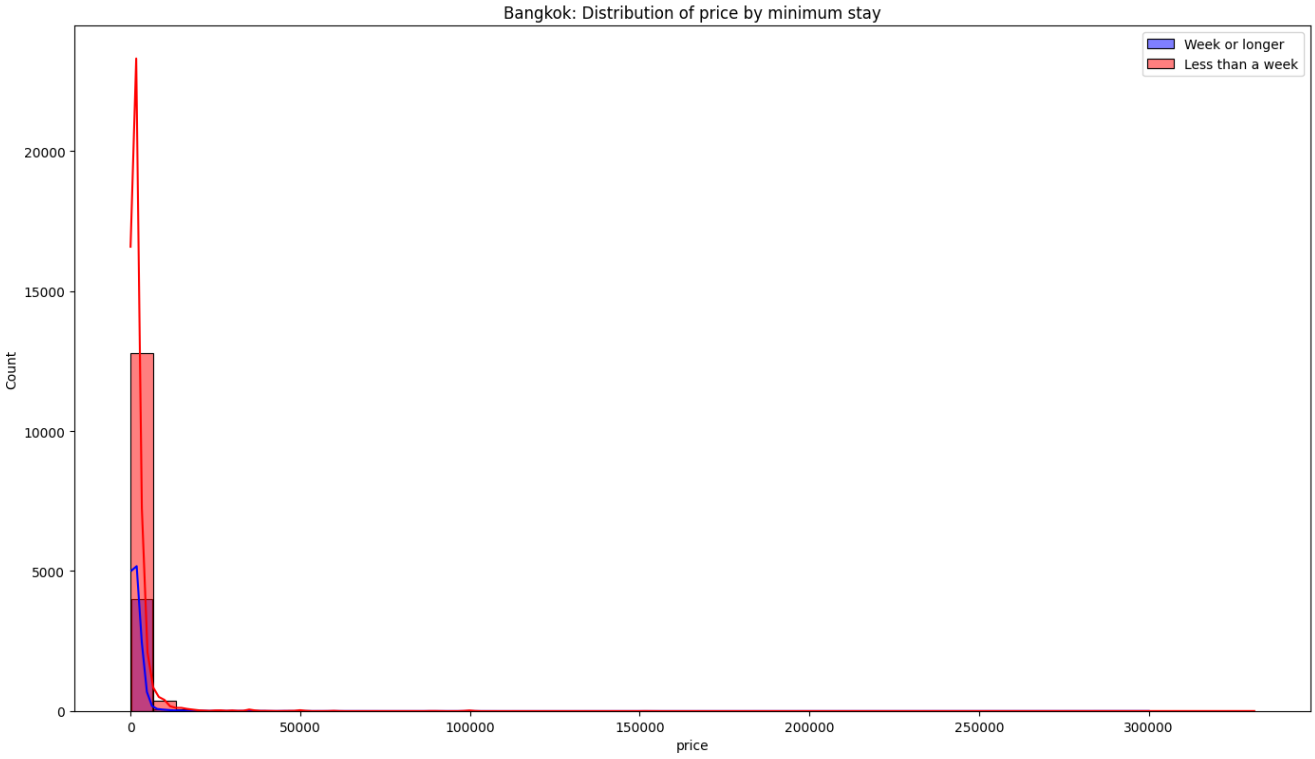


Answer-3 (for Bangkok).

Listings that require a minimum stay of a week or longer differ from those that don't:

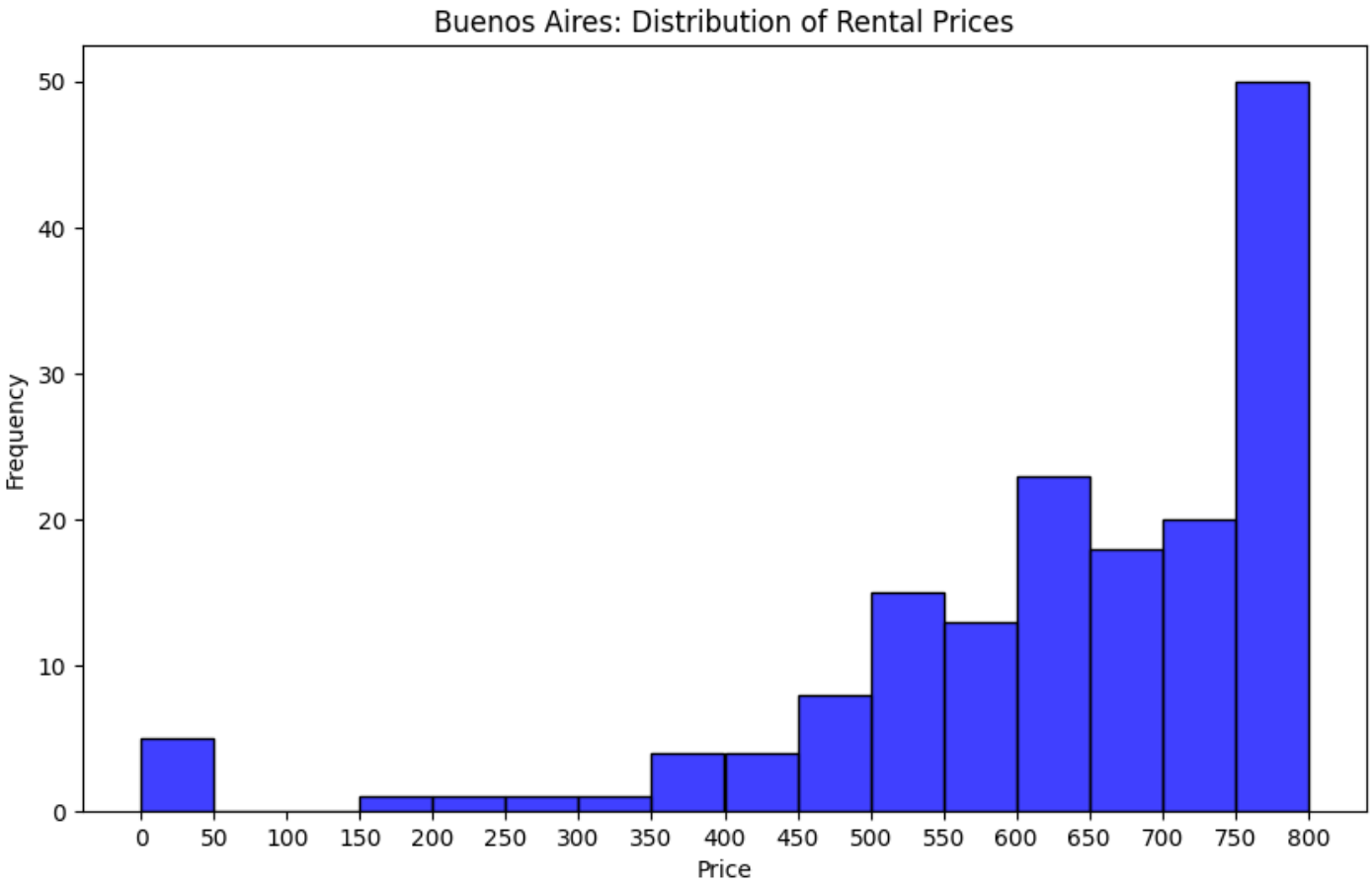
- Bangkok: Average price for listings with minimum stay of a week or longer: $1918.30
- Bangkok: Average price for listings without minimum stay of a week or longer: $2196.76

We can determine that listings that require minimum stay of a week or longer costs less as compared to those listings that do not.



Buenos's Air Airbnb Data Set

Answer1. Part-A (for Buenos's Air):



From the above histogram we can determine that the majority of the rental prices in Buenos Aires are in the lower range, there are a few rental prices in the higher range. This indicates that the distribution of rental price is left-skewed.

Answer-1. Part-B (for Buenos's Air):

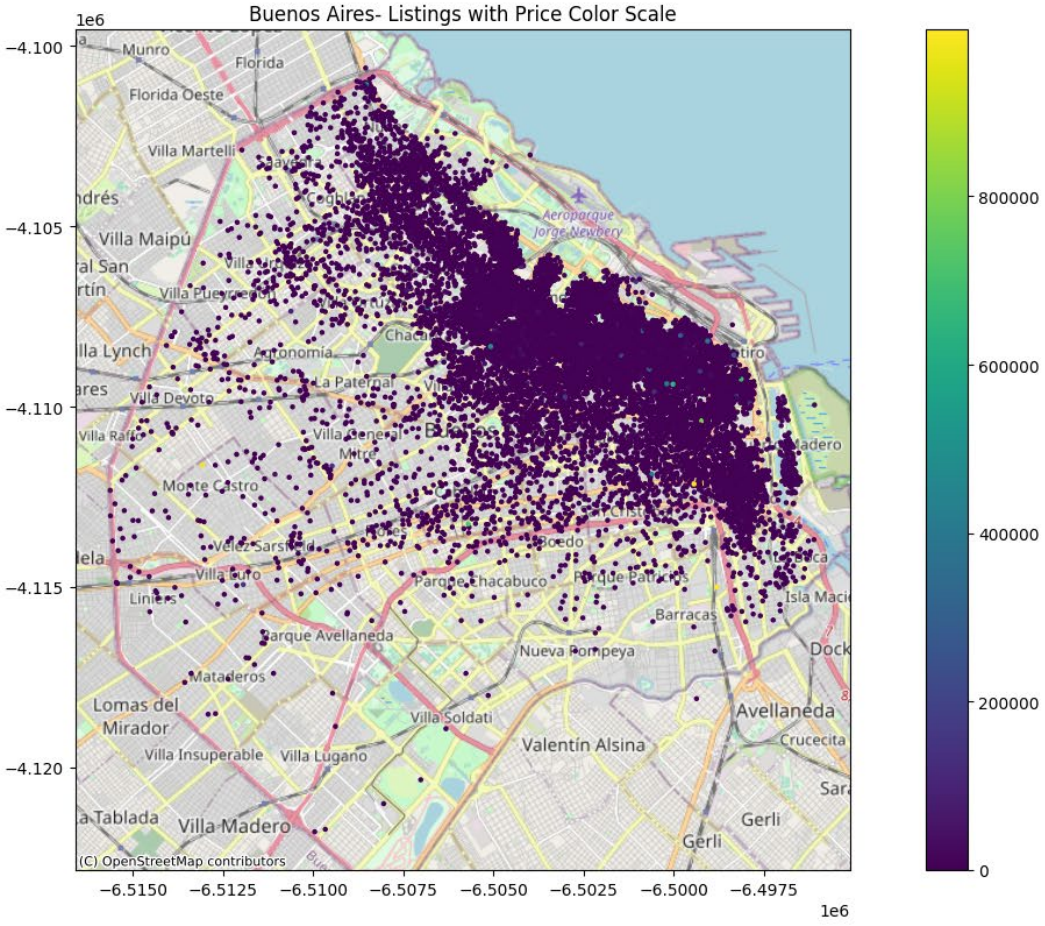
Segmenting distribution of rental price further by room type:

- Entire home/apt $3450.0
- Hotel room $3383.0
- Private room $1590.0
- Shared room $995.0

Looking at the above data, booking an entire home/apt, hotel room are costly as compared to private room or shared room.

Answer-2. (for Buenos's Air):

Map with a dot for each listing in a city having a color scale based on price:

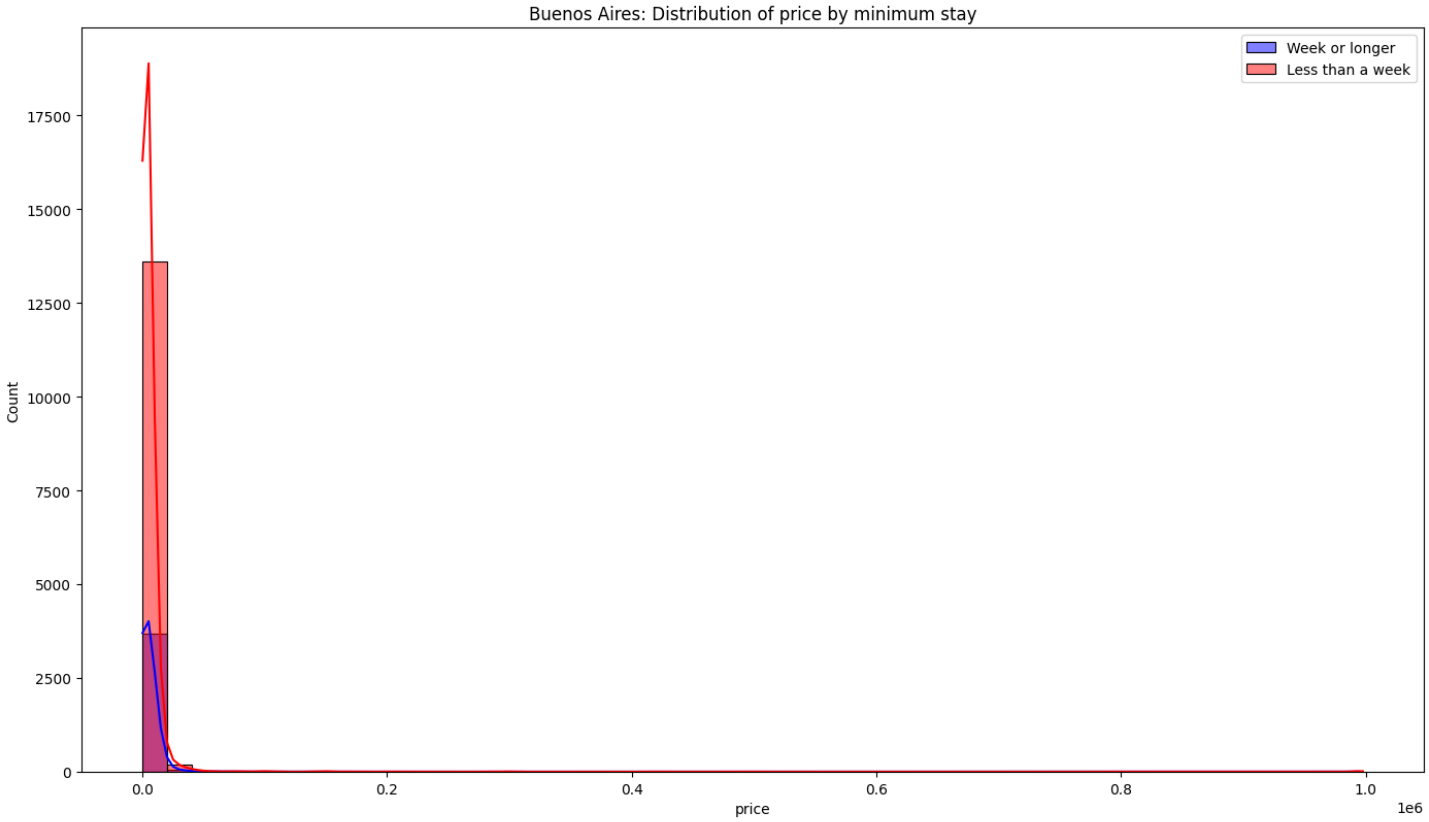


Answer-3 (for Buenos's Air).

Listings that require a minimum stay of a week or longer differ from those that don't:

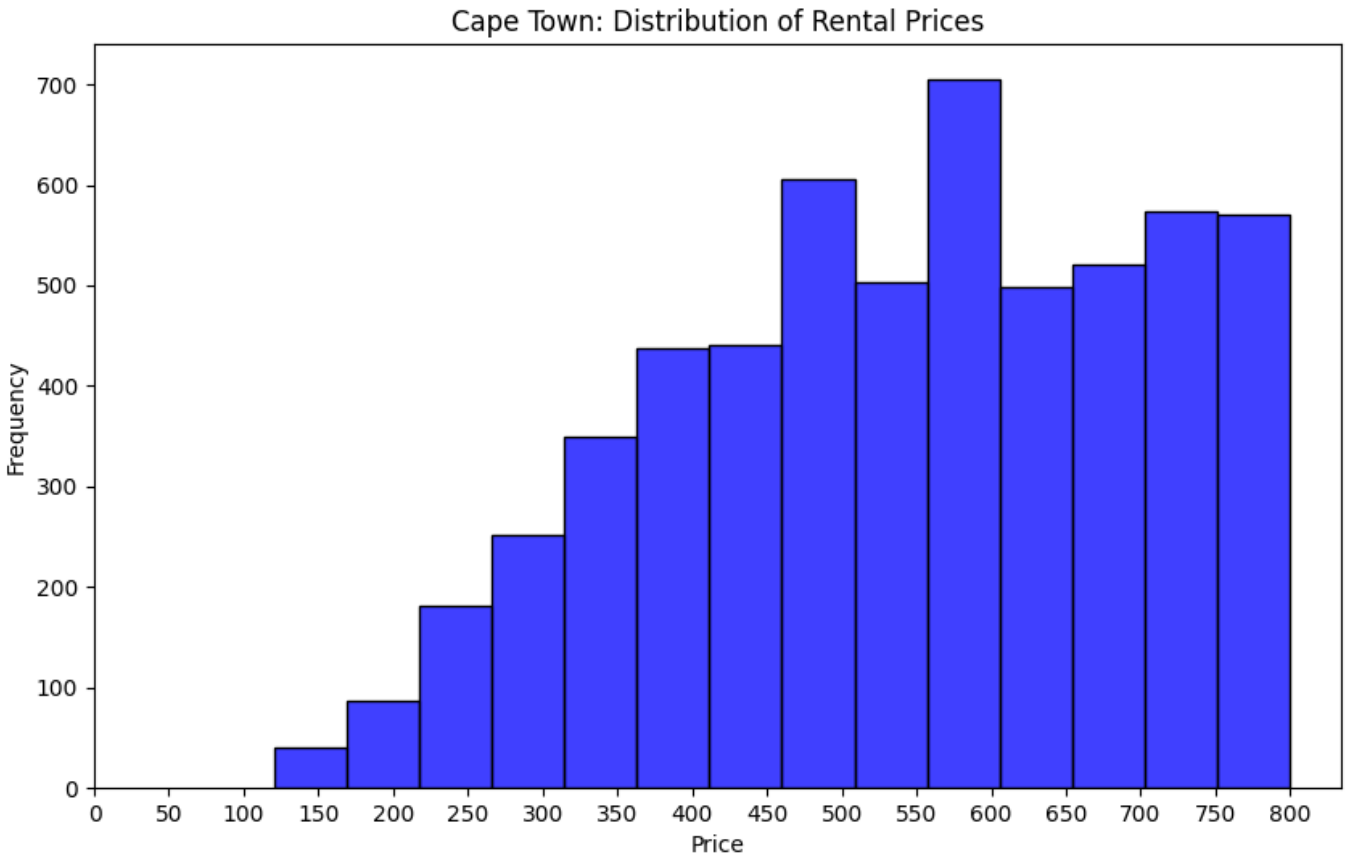
- Buenos Aires: Average price for listings with minimum stay of a week or longer: $6217.00
- Buenos Aires: Average price for listings without minimum stay of a week or longer: $5947.36

We can determine that listings that require minimum stay of a week or longer costs more as compared to those listings that do not.



Cape Town's Airbnb Data Set

Answer1. Part-A (for Cape Town):



From the above histogram we can determine that the majority of the rental prices in Cape Town are in the lower range, there are a few rental prices in the higher range. This indicates that the distribution of rental price is left-skewed.

Answer-1. Part-B (for Cape Town):

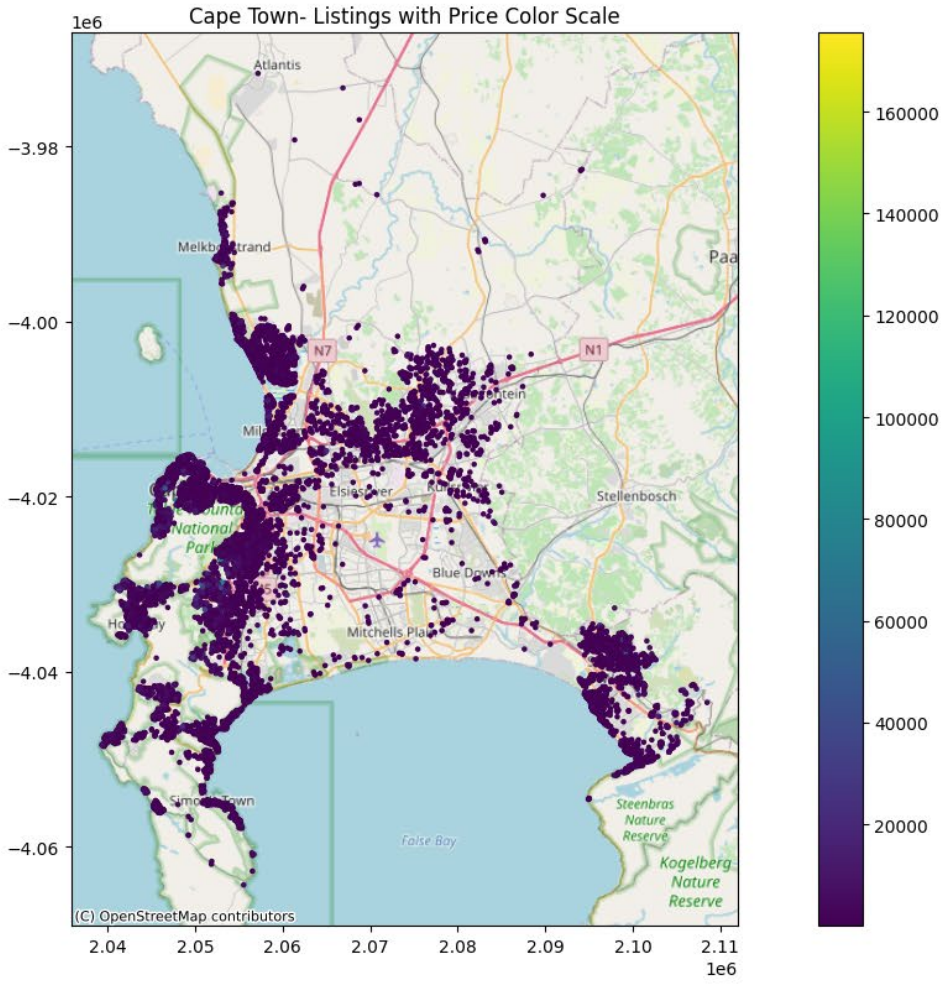
Segmenting distribution of rental price further by room type:

- Entire home/apt 1314.0
- Hotel room 1408.0
- Private room 661.0
- Shared room 291.5

Looking at the above data, booking a hotel room is more costly as well as an entire home/apt as compared to private room or shared room.

Answer-2 (for Cape Town).

Map with a dot for each listing in a city having a color scale based on price:

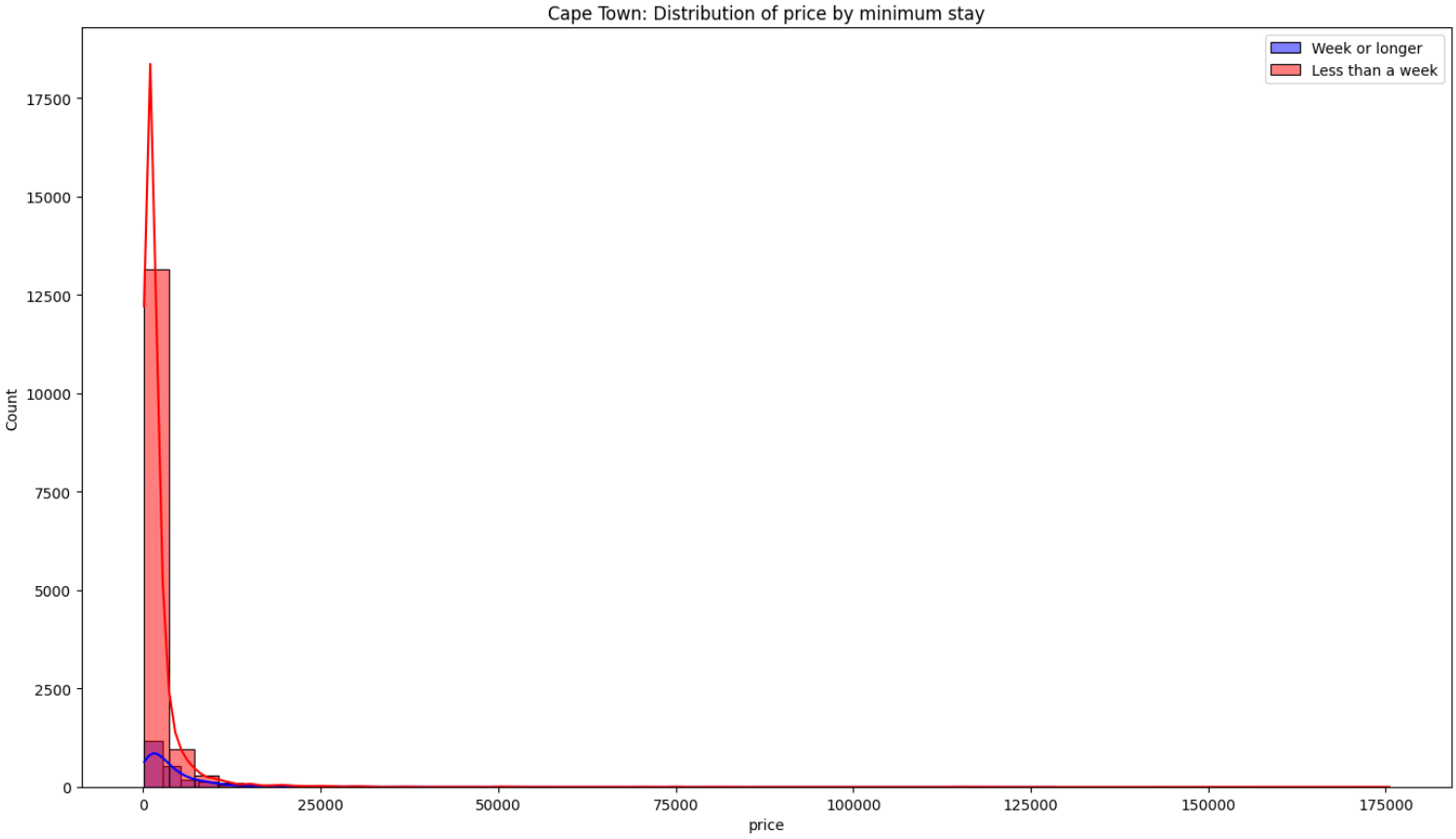


Answer-3 (for Cape Town).

Listings that require a minimum stay of a week or longer differ from those that don't:

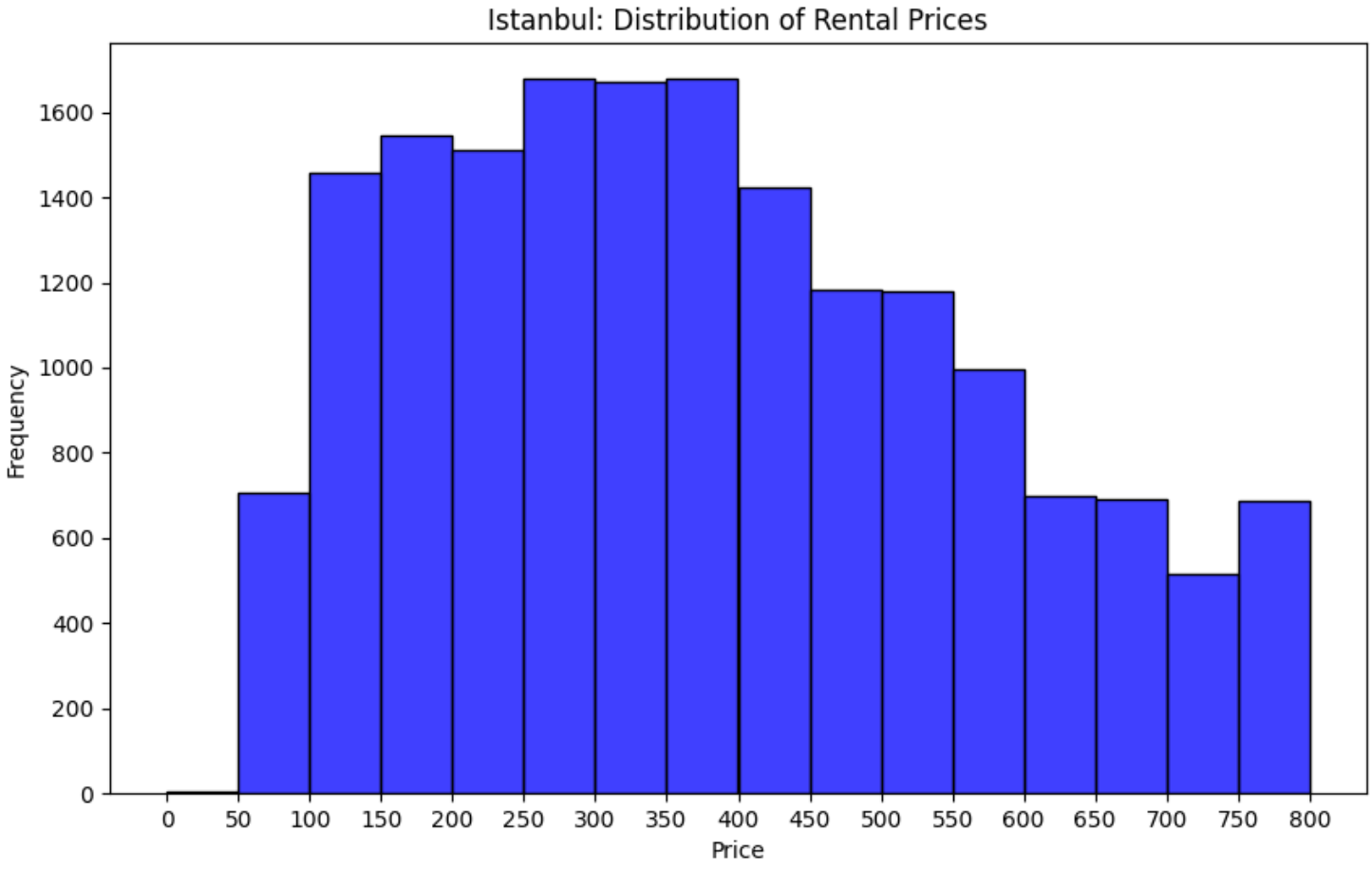
- Cape Town: Average price for listings with minimum stay of a week or longer: $4282.88
- Cape Town: Average price for listings without minimum stay of a week or longer: $2070.50

We can determine from Cape Town's dataset listings that requires a minimum stay of a week or longer would cost $4282.88 while the listings that does not require a minimum stay would cost $2070.50.



Istanbul's Airbnb Data Set

Answer1. Part-A (for Istanbul's):



From the above histogram we can determine that the majority of the rental prices in Istanbul are in the mid-range, there are a few rental prices in the lower range. This indicates that the distribution of rental price is right-skewed.

Answer-1. Part-B (for Istanbul):

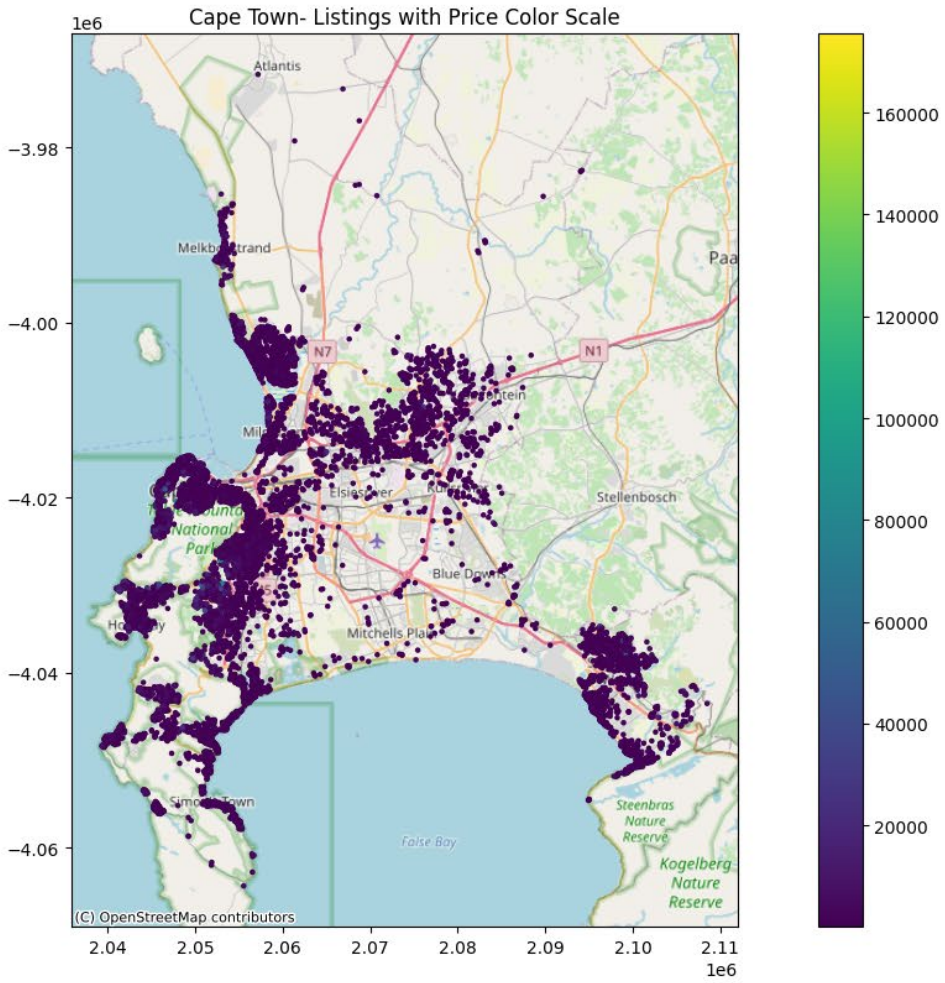
Segmenting distribution of rental price further by room type:

- Entire home/apt 552.0
- Hotel room 535.0
- Private room 278.0
- Shared room 150.0

Looking at the above data, booking an entire home/apt as well as a hotel room has a pretty fair price. The private room and shared room price is low.

Answer-2 (for Istanbul).

Map with a dot for each listing in a city having a color scale based on price:

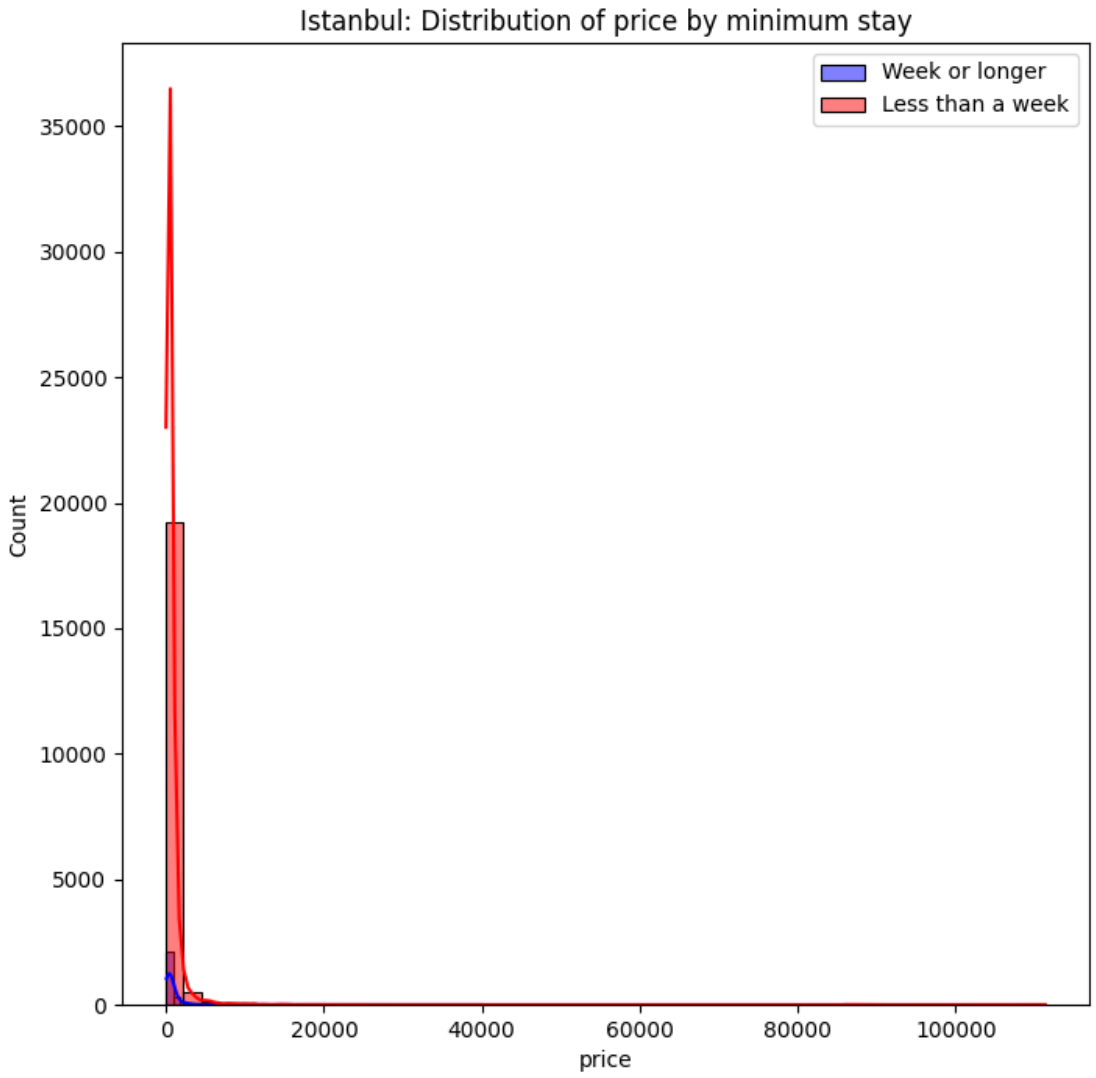


Answer-3 (for Istanbul).

Listings that require a minimum stay of a week or longer differ from those that don't:

- Istanbul: Average price for listings with minimum stay of a week or longer: $884.92
- Istanbul: Average price for listings without minimum stay of a week or longer: $730.72

We can determine from Istanbul's dataset, for listings that requires a minimum stay of a week or longer would cost $884.92 while the listings that does not require a minimum stay would cost $730.72.

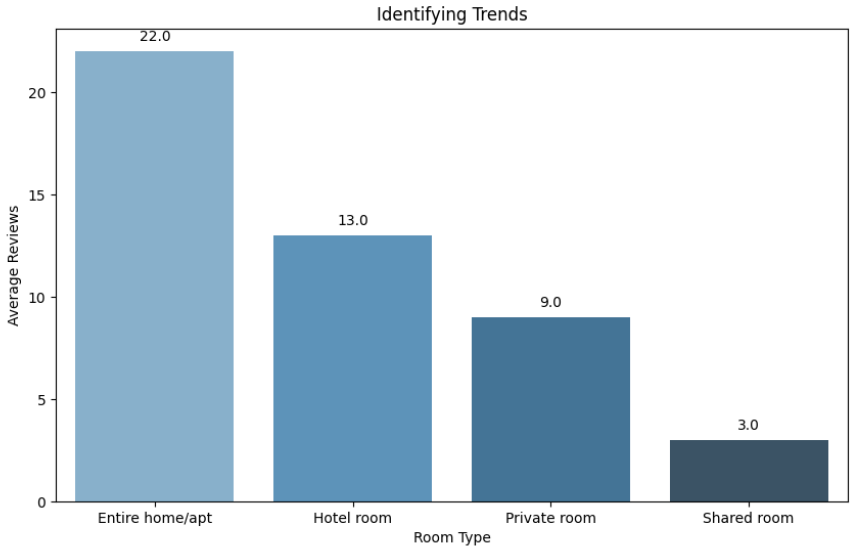


Question-4: An international real estate firm has hired you to research professional hosting on Airbnb. These are hosts that have multiple listings, make considerable income from their listings, and often manage teams to operate their listings. Examples include property managers and hospitality business owners.

Using the data from all six cities, you'll have to infer listings by professional hosts based on the distribution of calculated_host_listings_count. The lead consultant is interested in whether you can identify trends across listings operated by inferred professional hosts, as well as an estimation of the percentage of listings on Airbnb operated by professional hosts.

Answer:

By using the data from all six cities for listings by professional hosts, the entire data was combined in a single data frame, a criterion was set to infer professional hosts based on calculated_host_listings_count. The listings were filtered based on areas operated by professional hosts. Finally, the percentage of listings was calculated which gave an estimation of the percentage of listings on Airbnb operated by professional hosts, also we used the data from all six cities based on average reviews to identify trends across listings:



The above diagram shows that mostly people are interested in renting an entire home/apt. It might be due to more number of rooms, to accommodate more people.

Also, an estimation of the percentage of listings on Airbnb operated by professional hosts is:

- Listings operated by professional hosts: 24.34%

Report

Motivation:

According to Airbnb's website the company is operating an online marketplace for short- and long-term homestays and experiences. The company acts as a broker and charges a commission from each booking. The company does not own any of the real estate. Airbnb's name comes from AirBreadaNdBreakfast.

In this project we conducted a thorough analysis of dataset consisting of six cities with Airbnb rentals that are: Austin, Bangkok, Buenos Aires, Cape Town, Istanbul, and Melbourne. Each row represents a listing with details such as coordinates, neighborhood, host id, price per night, number of reviews, and so on. The goal of this project is to understand the data to uncover some interesting highlights.

The data for each city was analyzed one by one, creating visualizations and the relationship to better understand the data.

Analysis Steps:

The following analysis steps were used to uncover interesting highlights:

Step-1 (Using Required Libraries):

The following libraries from Python were used:

1. pandas
2. numpy
3. matplotlib.pyplot
4. seaborn
5. geopandas
6. contextily

Step-2 (Loading & Exploring the data):

In the following block of code we are reading a data set:

```
# Reading the CSV Dataset
data = pd.read_csv('data/listings_melbourne.csv')
```

We can also gather some additional information from the data set for some calculations. We have defined a variable in below code by the name rental_price, using the column 'price' from the data set we have assigned that column to the rental_price

```
rental_price = data.loc[:, 'price']


max_rent = np.max(rental_price) # highest rental price
print('Melbourne: The max rental price is: $',
round(max_rent, 2))

min_rent = np.min(rental_price) # min rental price
print('Melbourne: The min rental price is: $',
round(min_rent, 2))


mean_rent = np.mean(rental_price) # on avg, rental
price amount
print('Melbourne: The avg rental price is: $',
round(mean_rent, 2))
```

The above code has the following result:

- Melbourne: The max rental price is: $ 15000
- Melbourne: The min rental price is: $ 0
- Melbourne: The avg rental price is: $ 173.14

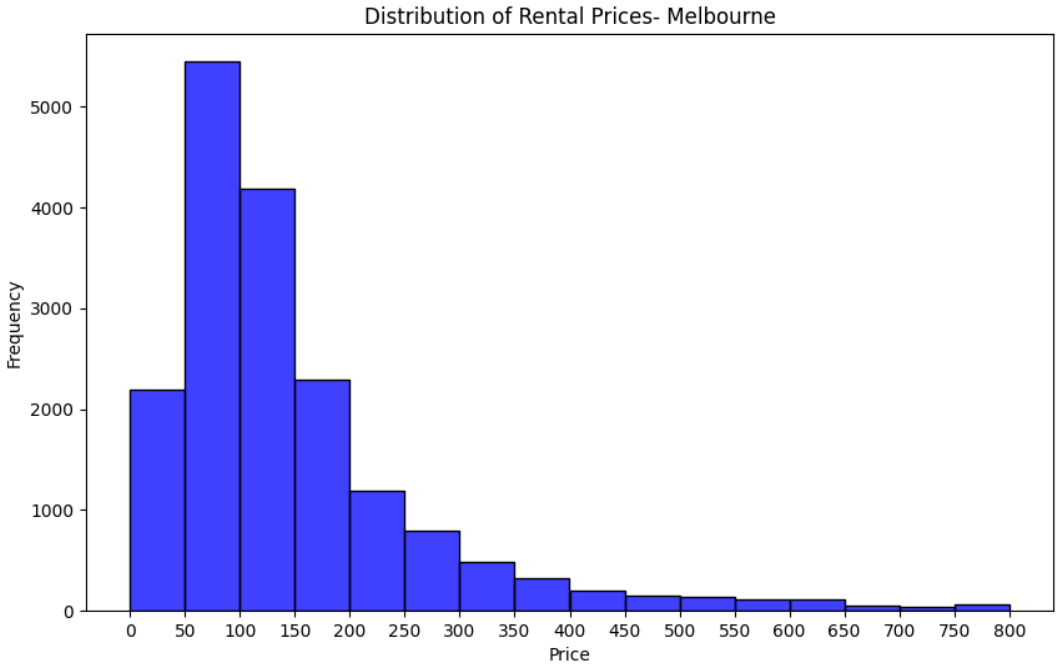
Maximum Value ($15,000): This is the highest rental price listed in Melbourne City. The value $15,000 is an extreme value and does not represent the reality of most rentals.

Minimum Value ($0): This value indicates that there are listings for accommodations that are free. This could be a data entry error or a specific promotion.

Mean ($173.14): This value indicates that, on average, the rental prices in Melbourne City are around $173.14.

Step-3 (Distribution of Rental Price):

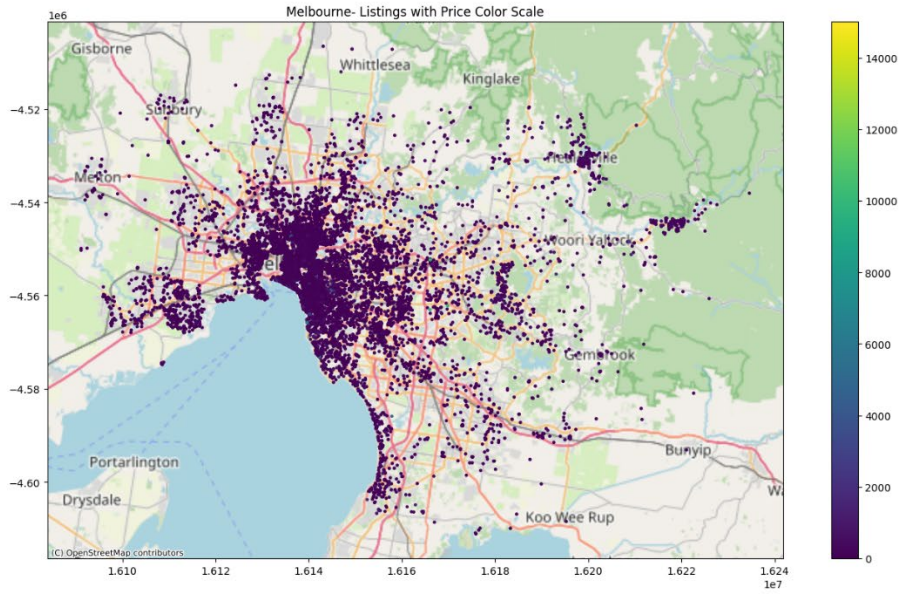
To have a visual representation of the distribution of prices across a city's neighborhoods, python's library plotly will be used.



The distribution show's as right skewed as we have more the majority of the rental prices in Melbourne are in the lower range.

Step-4 (Map with a dot for each listing in a city and a color scale):

A map would give us a good visual representation of the location. The properties are spread across the region & each dot on the map represents a property.



Step-5 (Rooms listed that requires min stay from those that don't):

Now to show the listings that require a minimum stay of a week or longer differ from those that don't. We are analyzing the price distribution for each category. We have the following data:

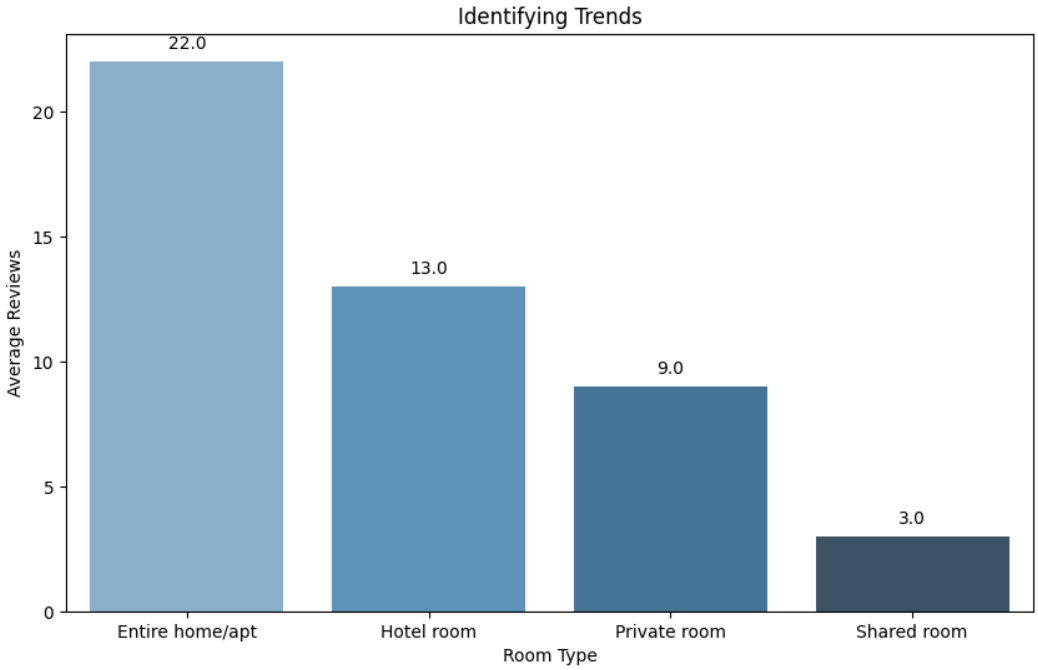
- Average price for listings with minimum stay of a week or longer: $203.16
- Average price for listings without minimum stay of a week or longer: $168.00

Step-6 (Identifying trends across listings):

In this step we have combined data for all cities into a single data-frame. A threshold has been defined & used to filter the listings. A percentage is calculated once that listing is filtered using the threshold which gives us an estimation of the percentage of listings on Airbnb operated by professional hosts which is:

- Listings operated by professional hosts: 24.34%

To identify trends across listings operated by inferred professional hosts, the data for all cities has been used & grouped by room type to calculate average number of reviews.



From the bar plot, we can see that the entire home/apt have the highest average number of reviews, followed by hotel room, private room & shared room. It shows that entire home/apt has the most number of reviews on average which could be due to the factor that it provides more space, has more rooms & could accommodate more people.

Findings:

We conducted a thorough analysis of the Airbnb dataset for 6 cities to uncover some interesting findings. We were able to see the distribution of prices across a city's neighborhood. An interactive histogram was generated which gave as a view if the distribution of price is right-skewed or left-skewed, also to determine the majority of rental price. The data for each city was further segmented by room type which gave us info such as the cost for entire home/apt, hotel room, private room & shared room. For each city, a map with a dot for each listing in a city with a color scale based on price on the dots was created. We also uncovered some useful insights to determine the price for listings that require a minimum stay of a week or longer, also for listings that do not require a minimum stay. Lastly, to identify trends across listings from six cities, looks like most people were interested in entire home/apt from Airbnb which could be due to the size, more number of rooms, to accommodate more people. Also to mention that an estimation of the percentage of listings on Airbnb operated by professional hosts were: 24.34%

Conclusion:

The analysis conducted provides a valuable insight into Airbnb's listings from six cities. We were able to process the data for some valuable information which could be used to determine the price of rent across six different cities. The analysis provides an overview to renters for the different price they could expect.