Task: Geospatial Analysis

- Visualize the locations of restaurants on a map using latitude and longitude information.
- Analyze the distribution of restaurants across different cities or countries.Determine if there is any correlation between the restaurant's location and its rating.

In [21]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns

rdata_df=pd.read_csv('Dataset.csv')
rdata_df
```

Out[21]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality
0	6317637	Le Petit Souffle	162	Makati City	Third Floor, Century City Mall, Kalayaan Avenu...	Century City Mall, Poblacion, Makati City
1	6304287	Izakaya Kikufuji	162	Makati City	Little Tokyo, 2277 Chino Roces Avenue, Legaspi...	Little Tokyo, Legaspi Village, Makati City
2	6300002	Heat - Edsa Shangri-La	162	Mandaluyong City	Edsa Shangri-La, 1 Garden Way, Ortigas, Mandal...	Edsa Shangri-La, Ortigas, Mandaluyong City
3	6318506	Ooma	162	Mandaluyong City	Third Floor, Mega Fashion Hall, SM Megamall, O...	SM Megamall, Ortigas, Mandaluyong City
4	6314302	Sambo Kojin	162	Mandaluyong City	Third Floor, Mega Atrium, SM Megamall, Ortigas...	SM Megamall, Ortigas, Mandaluyong City
...	...	...	...	...	...	...
9546	5915730	Naml\ Gurme	208	��stanbul	Kemanke�� Karamustafa Pa��a Mahallesi, Rlhtlm ...	Karak�_y
9547	5908749	Ceviz A��acl	208	��stanbul	Ko��uyolu Mahallesi, Muhittin ��st�_nda�� Cadd...	Ko��uyolu
9548	5915807	Huqqa	208	��stanbul	Kuru�_e��me Mahallesi, Muallim Naci Caddesi, N...	Kuru�_e��me
9549	5916112	A���k Kahve	208	��stanbul	Kuru�_e��me Mahallesi, Muallim Naci Caddesi, N...	Kuru�_e��me
9550	5927402	Walter's Coffee Roastery	208	��stanbul	Cafea��a Mahallesi, Bademaltl Sokak, No 21/B, ...	Moda

9551 rows × 21 columns

In [22]:
```
import os
os.getcwd()
```

Out[22]:
```
'C:\\Users\\bhanuprasad\\Desktop\\cognify intenship'
```

here the map will shows the locations based on the latitude and longitude

In [23]:
```
import folium
# Drop rows with missing values in 'Latitude' or 'Longitude' columns
data_cleaned = rdata_df.dropna(subset=['Latitude', 'Longitude'])

# Create a map centered on the average latitude and longitude of the restaurants
map_center = [data_cleaned['Latitude'].mean(), data_cleaned['Longitude'].mean()]
restaurant_map = folium.Map(location=map_center, zoom_start=10)

# Add markers for each restaurant's location
for _, row in data_cleaned.iterrows():
    folium.Marker(
        location=[row['Latitude'], row['Longitude']],
        popup=row['Restaurant Name'],
    ).add_to(restaurant_map)

# Save the map to an HTML file to view
map_file_path =r'C:\\Users\\bhanuprasad\\Desktop\\cognify intenship\\restaurant_
restaurant_map.save(map_file_path)
map_file_path
```

Out[23]:
```
'C:\\\\Users\\\\bhanuprasad\\\\Desktop\\\\cognify intenship\\\\restaurant_map1.
html'
```

In [25]:
```
rdata_df
```

Out[25]:

	Restaurant ID	Restaurant Name	Country Code	City	Address	Locality
0	6317637	Le Petit Souffle	162	Makati City	Third Floor, Century City Mall, Kalayaan Avenu...	Century City Mall, Poblacion, Makati City
1	6304287	Izakaya Kikufuji	162	Makati City	Little Tokyo, 2277 Chino Roces Avenue, Legaspi...	Little Tokyo, Legaspi Village, Makati City
2	6300002	Heat - Edsa Shangri-La	162	Mandaluyong City	Edsa Shangri-La, 1 Garden Way, Ortigas, Mandal...	Edsa Shangri-La, Ortigas, Mandaluyong City
3	6318506	Ooma	162	Mandaluyong City	Third Floor, Mega Fashion Hall, SM Megamall, O...	SM Megamall, Ortigas, Mandaluyong City
4	6314302	Sambo Kojin	162	Mandaluyong City	Third Floor, Mega Atrium, SM Megamall, Ortigas...	SM Megamall, Ortigas, Mandaluyong City
...	...	...	...	...	...	...
9546	5915730	Naml\ Gurme	208	��stanbul	Kemanke�� Karamustafa Pa��a Mahallesi, Rlhtlm ...	Karak�_y
9547	5908749	Ceviz A��acl	208	��stanbul	Ko��uyolu Mahallesi, Muhittin ��st�_nda�� Cadd...	Ko��uyolu
9548	5915807	Huqqa	208	��stanbul	Kuru�_e��me Mahallesi, Muallim Naci Caddesi, N...	Kuru�_e��me
9549	5916112	A���k Kahve	208	��stanbul	Kuru�_e��me Mahallesi, Muallim Naci Caddesi, N...	Kuru�_e��me
9550	5927402	Walter's Coffee Roastery	208	��stanbul	Cafea��a Mahallesi, Bademaltl Sokak, No 21/B, ...	Moda

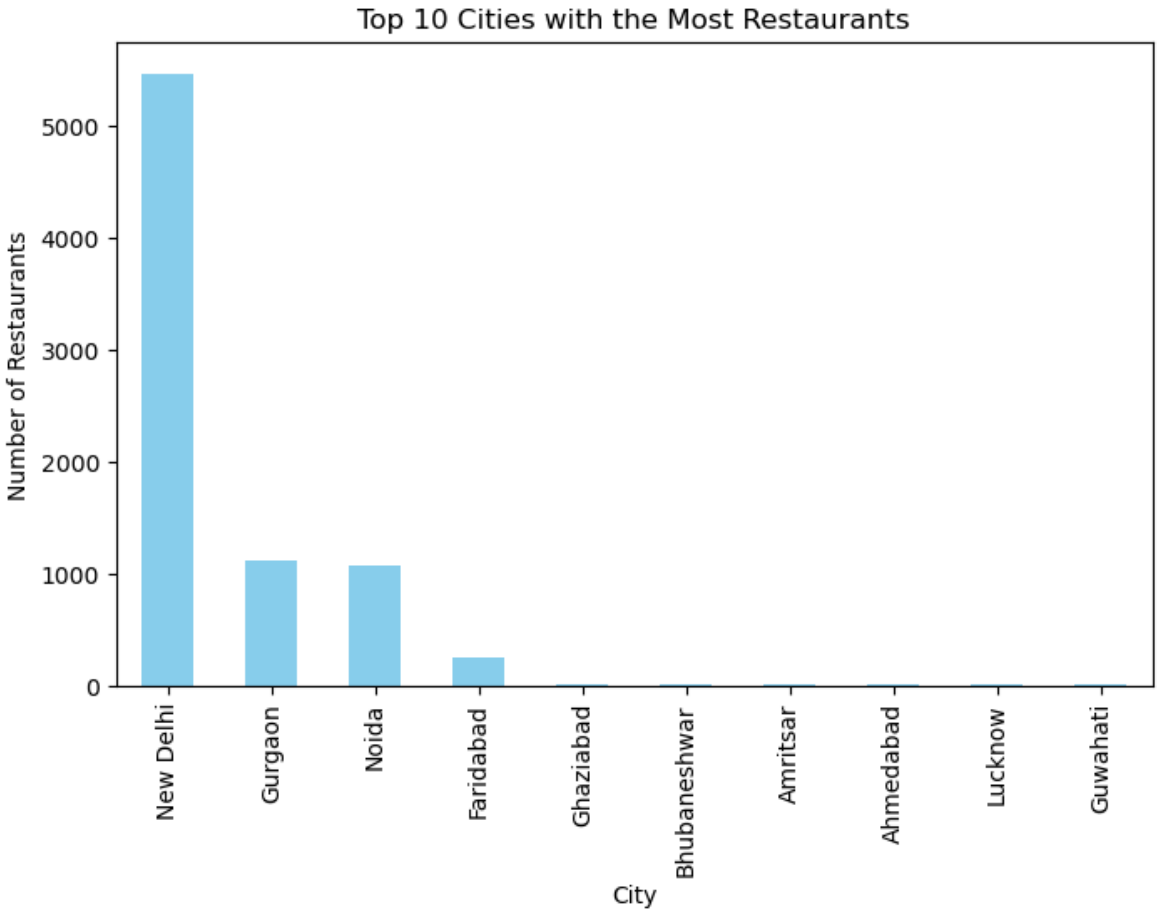
9551 rows × 21 columns

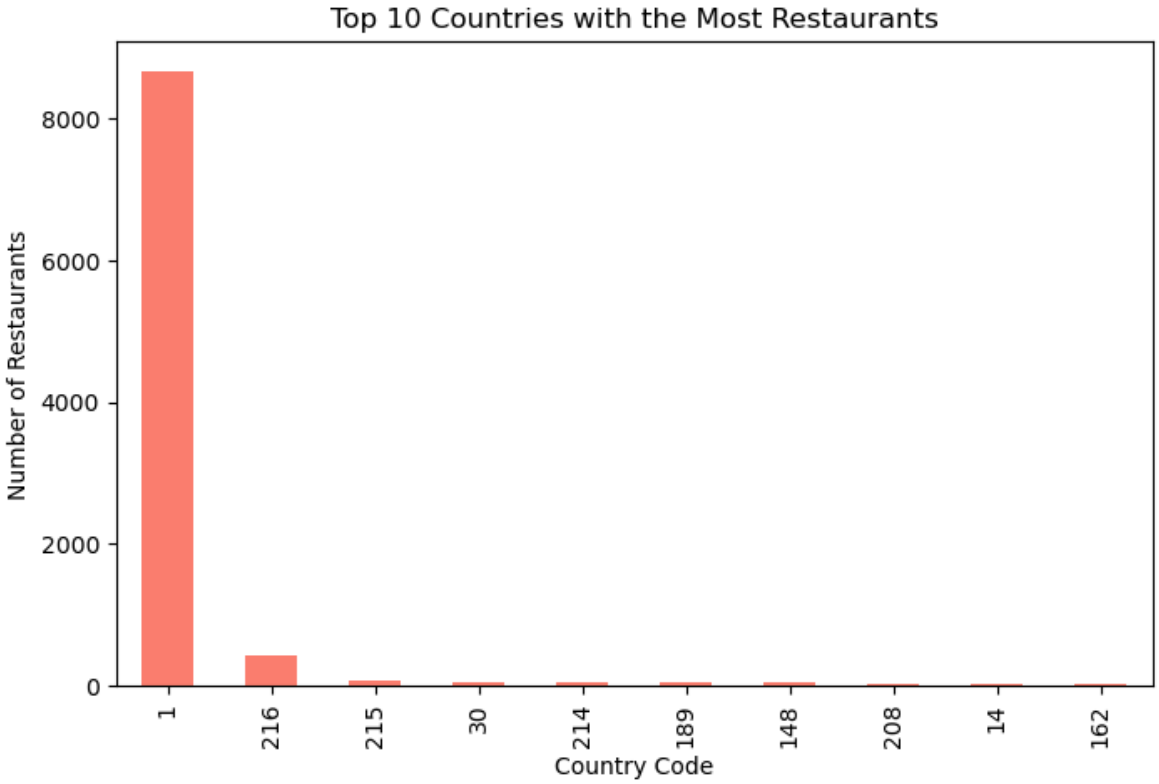
In [27]:
```
city=rdata_df['City'].value_counts()
country=rdata_df['Country Code'].value_counts()
city,country
```

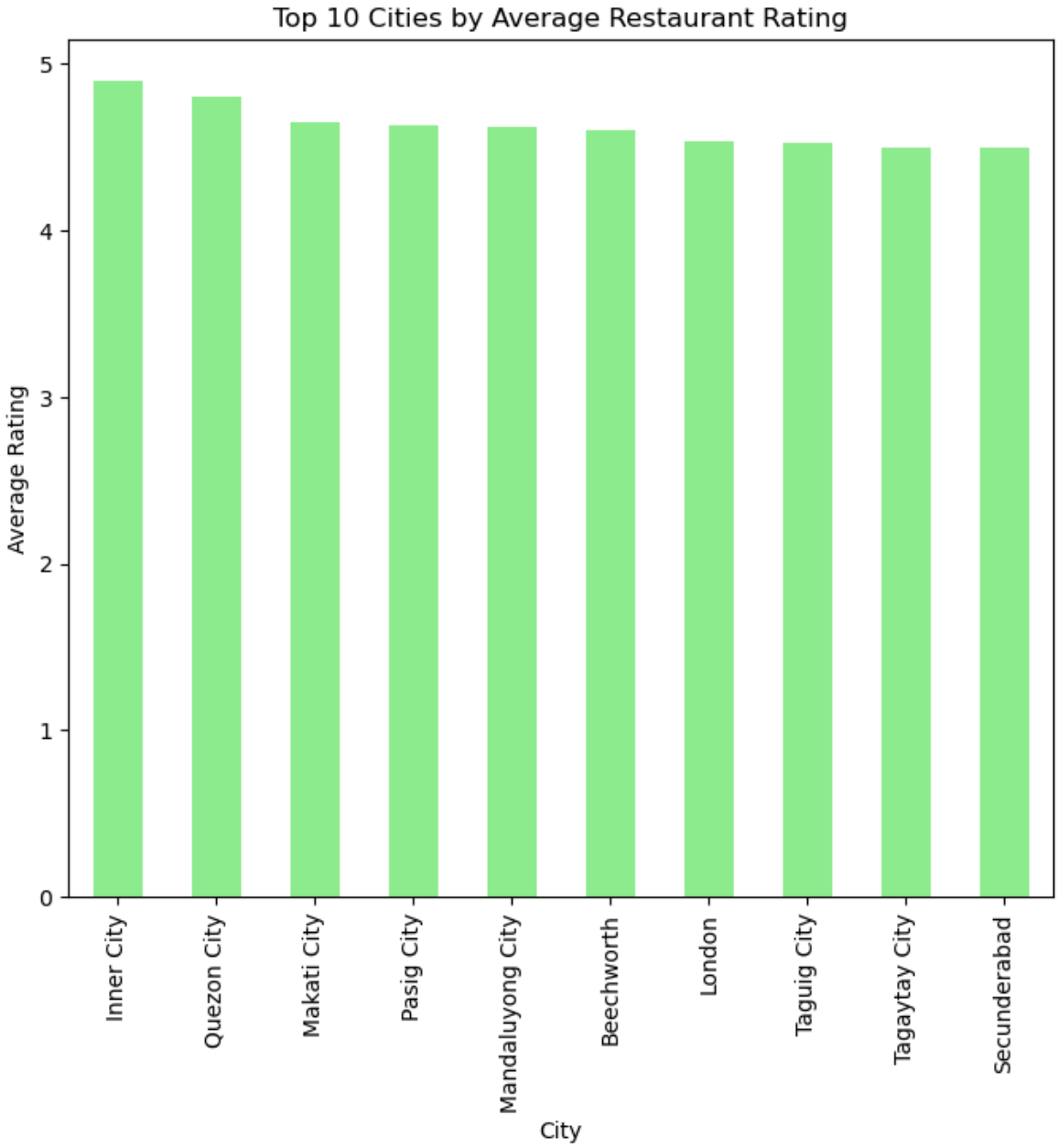
Out[27]:
```
(City
 New Delhi           5473
 Gurgaon             1118
 Noida               1080
 Faridabad            251
 Ghaziabad             25
                      ...
 Panchkula              1
 Mc Millan              1
 Mayfield               1
 Macedon                1
 Vineland Station       1
 Name: count, Length: 141, dtype: int64,
 Country Code
 1      8652
 216     434
 215      80
 30       60
 214      60
 189      60
 148      40
 208      34
 14       24
 162      22
 94       21
 184      20
 166      20
 191      20
 37        4
 Name: count, dtype: int64)
```

In [31]:
```
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt

#city_distribution = rdata_df['City'].value_counts()
#country_distribution = rdata_df['Country Code'].value_counts()

# Plot the top 10 cities with the most restaurants
plt.figure(figsize=(8, 5))
city.head(10).plot(kind='bar', color='skyblue')
plt.title('Top 10 Cities with the Most Restaurants')
plt.xlabel('City')
plt.ylabel('Number of Restaurants')
plt.show()

plt.figure(figsize=(8, 5)) # Plot the top 10 countries with the most restaurants
country.head(10).plot(kind='bar', color='salmon')
plt.title('Top 10 Countries with the Most Restaurants')
plt.xlabel('Country Code')
plt.ylabel('Number of Restaurants')
plt.show()

# 2. Average Rating by City
```

```
avg_rating_by_city = rdata_df.groupby('City')['Aggregate rating'].mean().sort_va

# Plot top 10 cities by average rating
plt.figure(figsize=(8, 7))
avg_rating_by_city.head(10).plot(kind='bar', color='lightgreen')
plt.title('Top 10 Cities by Average Restaurant Rating')
plt.xlabel('City')
plt.ylabel('Average Rating')
plt.show()

# 3. Correlation Check (if needed, can calculate using city-level numeric data)
# Check the relationship between the number of restaurants in a city and the ave
city_rating_correlation = pd.DataFrame({
    'Restaurant Count': city_distribution,
    'Average Rating': avg_rating_by_city
}).dropna()

correlation = city_rating_correlation.corr().loc['Restaurant Count', 'Average Ra
print("Correlation between the number of restaurants in a city and average ratin
```




Top 10 Countries with the Most Restaurants
Number of Restaurants
0
2000
4000
6000
8000
1
216
215
30
214
189
148
208
14
162
Country Code




```
Correlation between the number of restaurants in a city and average rating: -0.32
862750510298927
```

In [ ]: