

NYC_311_Data_Analysis

September 5, 2023

```
[1]: # Importing necessary libraries
```

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```
[2]: # Loading and Understanding the Dataset
```

```
# Loading the dataset
```

```
data = pd.read_csv(r'E:\Data Science with Python\
↳Simplilearn\311_Service_Requests_from_2010_to_Present.csv')
data
```

C:\Users\Shams\AppData\Local\Temp\ipykernel_76276\1729508188.py:4: DtypeWarning: Columns (48,49) have mixed types. Specify dtype option on import or set low_memory=False.

```
data = pd.read_csv(r'E:\Data Science with Python
Simplilearn\311_Service_Requests_from_2010_to_Present.csv')
```

```
[2]:
```

	Unique Key	Created Date		Closed Date		Agency \
0	32310363	12/31/2015	11:59:45 PM	01/01/2016	12:55:15 AM	NYPD
1	32309934	12/31/2015	11:59:44 PM	01/01/2016	01:26:57 AM	NYPD
2	32309159	12/31/2015	11:59:29 PM	01/01/2016	04:51:03 AM	NYPD
3	32305098	12/31/2015	11:57:46 PM	01/01/2016	07:43:13 AM	NYPD
4	32306529	12/31/2015	11:56:58 PM	01/01/2016	03:24:42 AM	NYPD
...
364553	29609918	01/01/2015	12:04:44 AM	01/01/2015	10:22:31 AM	NYPD
364554	29608392	01/01/2015	12:04:28 AM	01/01/2015	02:25:02 AM	NYPD
364555	29607589	01/01/2015	12:01:30 AM	01/01/2015	12:20:33 AM	NYPD
364556	29610889	01/01/2015	12:01:29 AM	01/01/2015	02:42:22 AM	NYPD
364557	29611816	01/01/2015	12:00:50 AM	01/01/2015	02:47:50 AM	NYPD

	Agency Name	Complaint Type \
0	New York City Police Department	Noise - Street/Sidewalk
1	New York City Police Department	Blocked Driveway
2	New York City Police Department	Blocked Driveway
3	New York City Police Department	Illegal Parking
4	New York City Police Department	Illegal Parking

...
364553	New York City Police Department	Illegal Parking
364554	New York City Police Department	Noise - Vehicle
364555	New York City Police Department	Noise - Street/Sidewalk
364556	New York City Police Department	Blocked Driveway
364557	New York City Police Department	Blocked Driveway

	Descriptor	Location Type	Incident Zip \
0	Loud Music/Party	Street/Sidewalk	10034.0
1	No Access	Street/Sidewalk	11105.0
2	No Access	Street/Sidewalk	10458.0
3	Commercial Overnight Parking	Street/Sidewalk	10461.0
4	Blocked Sidewalk	Street/Sidewalk	11373.0
...
364553	Blocked Hydrant	Street/Sidewalk	11421.0
364554	Car/Truck Horn	Street/Sidewalk	10468.0
364555	Loud Music/Party	Street/Sidewalk	10031.0
364556	No Access	Street/Sidewalk	10466.0
364557	No Access	Street/Sidewalk	11420.0

	Incident Address	...	Bridge Highway Name \
0	71 VERMILYEA AVENUE	...	NaN
1	27-07 23 AVENUE	...	NaN
2	2897 VALENTINE AVENUE	...	NaN
3	2940 BAISLEY AVENUE	...	NaN
4	87-14 57 ROAD	...	NaN
...
364553	84-25 85 ROAD	...	NaN
364554	2555 SEDGWICK AVENUE	...	NaN
364555	508 WEST 139 STREET	...	NaN
364556	931 EAST 226 STREET	...	NaN
364557	123-19 135 STREET	...	NaN

	Bridge Highway Direction	Road Ramp	Bridge Highway Segment \
0	NaN	NaN	NaN
1	NaN	NaN	NaN
2	NaN	NaN	NaN
3	NaN	NaN	NaN
4	NaN	NaN	NaN
...
364553	NaN	NaN	NaN
364554	NaN	NaN	NaN
364555	NaN	NaN	NaN
364556	NaN	NaN	NaN
364557	NaN	NaN	NaN

Garage Lot Name	Ferry Direction	Ferry Terminal Name	Latitude \
-----------------	-----------------	---------------------	------------

0	NaN	NaN	NaN	40.865682
1	NaN	NaN	NaN	40.775945
2	NaN	NaN	NaN	40.870325
3	NaN	NaN	NaN	40.835994
4	NaN	NaN	NaN	40.733060
...
364553	NaN	NaN	NaN	40.695145
364554	NaN	NaN	NaN	40.867830
364555	NaN	NaN	NaN	40.821647
364556	NaN	NaN	NaN	40.886361
364557	NaN	NaN	NaN	40.674212

	Longitude	Location
0	-73.923501	(40.86568153633767, -73.92350095571744)
1	-73.915094	(40.775945312321085, -73.91509393898605)
2	-73.888525	(40.870324522111424, -73.88852464418646)
3	-73.828379	(40.83599404683083, -73.82837939584206)
4	-73.874170	(40.733059618956815, -73.87416975810375)
...
364553	-73.860949	(40.69514470265117, -73.86094888534394)
364554	-73.907178	(40.86782963689454, -73.90717786644662)
364555	-73.950873	(40.821646626438095, -73.95087342885292)
364556	-73.853290	(40.88636077906953, -73.85329048666742)
364557	-73.803585	(40.674211762243935, -73.80358548685278)

[364558 rows x 53 columns]

```
[3]: # Identifying the shape and general info of the dataset
```

```
print("Dataset Shape:", data.shape)
```

Dataset Shape: (364558, 53)

```
[4]: data.columns.values
```

```
[4]: array(['Unique Key', 'Created Date', 'Closed Date', 'Agency',
        'Agency Name', 'Complaint Type', 'Descriptor', 'Location Type',
        'Incident Zip', 'Incident Address', 'Street Name',
        'Cross Street 1', 'Cross Street 2', 'Intersection Street 1',
        'Intersection Street 2', 'Address Type', 'City', 'Landmark',
        'Facility Type', 'Status', 'Due Date', 'Resolution Description',
        'Resolution Action Updated Date', 'Community Board', 'Borough',
        'X Coordinate (State Plane)', 'Y Coordinate (State Plane)',
        'Park Facility Name', 'Park Borough', 'School Name',
        'School Number', 'School Region', 'School Code',
        'School Phone Number', 'School Address', 'School City',
        'School State', 'School Zip', 'School Not Found',
        'School or Citywide Complaint', 'Vehicle Type',
```

```
'Taxi Company Borough', 'Taxi Pick Up Location',
'Bridge Highway Name', 'Bridge Highway Direction', 'Road Ramp',
'Bridge Highway Segment', 'Garage Lot Name', 'Ferry Direction',
'Ferry Terminal Name', 'Latitude', 'Longitude', 'Location'],
dtype=object)
```

```
[5]: data.info
```

```
[5]: <bound method DataFrame.info of          Unique Key          Created Date
Closed Date Agency \
0          32310363  12/31/2015 11:59:45 PM  01/01/2016 12:55:15 AM  NYPD
1          32309934  12/31/2015 11:59:44 PM  01/01/2016 01:26:57 AM  NYPD
2          32309159  12/31/2015 11:59:29 PM  01/01/2016 04:51:03 AM  NYPD
3          32305098  12/31/2015 11:57:46 PM  01/01/2016 07:43:13 AM  NYPD
4          32306529  12/31/2015 11:56:58 PM  01/01/2016 03:24:42 AM  NYPD
...          ...          ...          ...          ...
364553      29609918  01/01/2015 12:04:44 AM  01/01/2015 10:22:31 AM  NYPD
364554      29608392  01/01/2015 12:04:28 AM  01/01/2015 02:25:02 AM  NYPD
364555      29607589  01/01/2015 12:01:30 AM  01/01/2015 12:20:33 AM  NYPD
364556      29610889  01/01/2015 12:01:29 AM  01/01/2015 02:42:22 AM  NYPD
364557      29611816  01/01/2015 12:00:50 AM  01/01/2015 02:47:50 AM  NYPD
```

```
          Agency Name          Complaint Type \
0  New York City Police Department  Noise - Street/Sidewalk
1  New York City Police Department    Blocked Driveway
2  New York City Police Department    Blocked Driveway
3  New York City Police Department    Illegal Parking
4  New York City Police Department    Illegal Parking
...          ...          ...
364553  New York City Police Department    Illegal Parking
364554  New York City Police Department    Noise - Vehicle
364555  New York City Police Department  Noise - Street/Sidewalk
364556  New York City Police Department    Blocked Driveway
364557  New York City Police Department    Blocked Driveway
```

```
          Descriptor  Location Type  Incident Zip \
0      Loud Music/Party  Street/Sidewalk    10034.0
1           No Access  Street/Sidewalk    11105.0
2           No Access  Street/Sidewalk    10458.0
3  Commercial Overnight Parking  Street/Sidewalk    10461.0
4      Blocked Sidewalk  Street/Sidewalk    11373.0
...          ...          ...          ...
364553      Blocked Hydrant  Street/Sidewalk    11421.0
364554      Car/Truck Horn  Street/Sidewalk    10468.0
364555      Loud Music/Party  Street/Sidewalk    10031.0
364556           No Access  Street/Sidewalk    10466.0
364557           No Access  Street/Sidewalk    11420.0
```

	Incident Address	...	Bridge Highway Name	\
0	71 VERMILYEA AVENUE	...		NaN
1	27-07 23 AVENUE	...		NaN
2	2897 VALENTINE AVENUE	...		NaN
3	2940 BAISLEY AVENUE	...		NaN
4	87-14 57 ROAD	...		NaN
...	
364553	84-25 85 ROAD	...		NaN
364554	2555 SEDGWICK AVENUE	...		NaN
364555	508 WEST 139 STREET	...		NaN
364556	931 EAST 226 STREET	...		NaN
364557	123-19 135 STREET	...		NaN

	Bridge Highway Direction	Road Ramp	Bridge Highway Segment	\
0	NaN	NaN		NaN
1	NaN	NaN		NaN
2	NaN	NaN		NaN
3	NaN	NaN		NaN
4	NaN	NaN		NaN
...	
364553	NaN	NaN		NaN
364554	NaN	NaN		NaN
364555	NaN	NaN		NaN
364556	NaN	NaN		NaN
364557	NaN	NaN		NaN

	Garage Lot Name	Ferry Direction	Ferry Terminal Name	Latitude	\
0	NaN	NaN	NaN	40.865682	
1	NaN	NaN	NaN	40.775945	
2	NaN	NaN	NaN	40.870325	
3	NaN	NaN	NaN	40.835994	
4	NaN	NaN	NaN	40.733060	
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364553	NaN	NaN	NaN	40.695145	
364554	NaN	NaN	NaN	40.867830	
364555	NaN	NaN	NaN	40.821647	
364556	NaN	NaN	NaN	40.886361	
364557	NaN	NaN	NaN	40.674212	

	Longitude	Location
0	-73.923501	(40.86568153633767, -73.92350095571744)
1	-73.915094	(40.775945312321085, -73.91509393898605)
2	-73.888525	(40.870324522111424, -73.88852464418646)
3	-73.828379	(40.83599404683083, -73.82837939584206)
4	-73.874170	(40.733059618956815, -73.87416975810375)
...

```

364553 -73.860949 (40.69514470265117, -73.86094888534394)
364554 -73.907178 (40.86782963689454, -73.90717786644662)
364555 -73.950873 (40.821646626438095, -73.95087342885292)
364556 -73.853290 (40.88636077906953, -73.85329048666742)
364557 -73.803585 (40.674211762243935, -73.80358548685278)

```

```
[364558 rows x 53 columns]>
```

```
[6]: # Identify variables with null values
```

```

null_counts = data.isnull().sum()
print("Variables with Null Values:")
print(null_counts[null_counts > 0])

```

Variables with Null Values:

Closed Date	2381
Descriptor	6501
Location Type	133
Incident Zip	2998
Incident Address	51699
Street Name	51699
Cross Street 1	57188
Cross Street 2	57805
Intersection Street 1	313438
Intersection Street 2	314046
Address Type	3252
City	2997
Landmark	364183
Facility Type	2389
Due Date	3
Resolution Action Updated Date	2402
X Coordinate (State Plane)	4030
Y Coordinate (State Plane)	4030
School Region	1
School Code	1
School Zip	1
School or Citywide Complaint	364558
Vehicle Type	364558
Taxi Company Borough	364558
Taxi Pick Up Location	364558
Bridge Highway Name	364261
Bridge Highway Direction	364261
Road Ramp	364296
Bridge Highway Segment	364296
Garage Lot Name	364558
Ferry Direction	364557
Ferry Terminal Name	364556
Latitude	4030

```

Longitude          4030
Location           4030
dtype: int64

```

```

[7]: # Performing basic data exploratory analysis
      # Utilizing missing value treatment
      # Let's drop rows with missing 'Closed Date' and fill 'Descriptor' with a
      ↪placeholder value.

      data.dropna(subset=['Closed Date'], inplace=True)
      data['Descriptor'].fillna("No Descriptor", inplace=True)

```

```

[8]: # Analyzing the date column and remove entries if it has an incorrect timeline

      data['Created Date'] = pd.to_datetime(data['Created Date'], errors='coerce')
      data.dropna(subset=['Created Date'], inplace=True)
      data

```

```

[8]:
      Unique Key      Created Date      Closed Date Agency \
0      32310363  2015-12-31 23:59:45  01/01/2016 12:55:15 AM  NYPD
1      32309934  2015-12-31 23:59:44  01/01/2016 01:26:57 AM  NYPD
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4      32306529  2015-12-31 23:56:58  01/01/2016 03:24:42 AM  NYPD
...      ...
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      Agency Name      Complaint Type \
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3      New York City Police Department  Illegal Parking
4      New York City Police Department  Illegal Parking
...      ...
364553      New York City Police Department  Illegal Parking
364554      New York City Police Department  Noise - Vehicle
364555      New York City Police Department  Noise - Street/Sidewalk
364556      New York City Police Department  Blocked Driveway
364557      New York City Police Department  Blocked Driveway

      Descriptor      Location Type      Incident Zip \
0      Loud Music/Party  Street/Sidewalk      10034.0
1      No Access      Street/Sidewalk      11105.0

```

2	No Access	Street/Sidewalk	10458.0
3	Commercial Overnight Parking	Street/Sidewalk	10461.0
4	Blocked Sidewalk	Street/Sidewalk	11373.0
...
364553	Blocked Hydrant	Street/Sidewalk	11421.0
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364555	Loud Music/Party	Street/Sidewalk	10031.0
364556	No Access	Street/Sidewalk	10466.0
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	Incident Address	...	Bridge Highway Name	\
0	71 VERMILYEA AVENUE	...	NaN	
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2	2897 VALENTINE AVENUE	...	NaN	
3	2940 BAISLEY AVENUE	...	NaN	
4	87-14 57 ROAD	...	NaN	
...	
364553	84-25 85 ROAD	...	NaN	
364554	2555 SEDGWICK AVENUE	...	NaN	
364555	508 WEST 139 STREET	...	NaN	
364556	931 EAST 226 STREET	...	NaN	
364557	123-19 135 STREET	...	NaN	

	Bridge Highway Direction	Road Ramp	Bridge Highway Segment	\
0	NaN	NaN	NaN	
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4	NaN	NaN	NaN	
...	
364553	NaN	NaN	NaN	
364554	NaN	NaN	NaN	
364555	NaN	NaN	NaN	
364556	NaN	NaN	NaN	
364557	NaN	NaN	NaN	

	Garage Lot Name	Ferry Direction	Ferry Terminal Name	Latitude	\
0	NaN	NaN	NaN	40.865682	
1	NaN	NaN	NaN	40.775945	
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3	NaN	NaN	NaN	40.835994	
4	NaN	NaN	NaN	40.733060	
...	
364553	NaN	NaN	NaN	40.695145	
364554	NaN	NaN	NaN	40.867830	
364555	NaN	NaN	NaN	40.821647	
364556	NaN	NaN	NaN	40.886361	

364557 NaN NaN NaN 40.674212

	Longitude	Location
0	-73.923501	(40.86568153633767, -73.92350095571744)
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2	-73.888525	(40.870324522111424, -73.88852464418646)
3	-73.828379	(40.83599404683083, -73.82837939584206)
4	-73.874170	(40.733059618956815, -73.87416975810375)
...
364553	-73.860949	(40.69514470265117, -73.86094888534394)
364554	-73.907178	(40.86782963689454, -73.90717786644662)
364555	-73.950873	(40.821646626438095, -73.95087342885292)
364556	-73.853290	(40.88636077906953, -73.85329048666742)
364557	-73.803585	(40.674211762243935, -73.80358548685278)

[362177 rows x 53 columns]

```
[9]: # Displaying Complaint type and city together
```

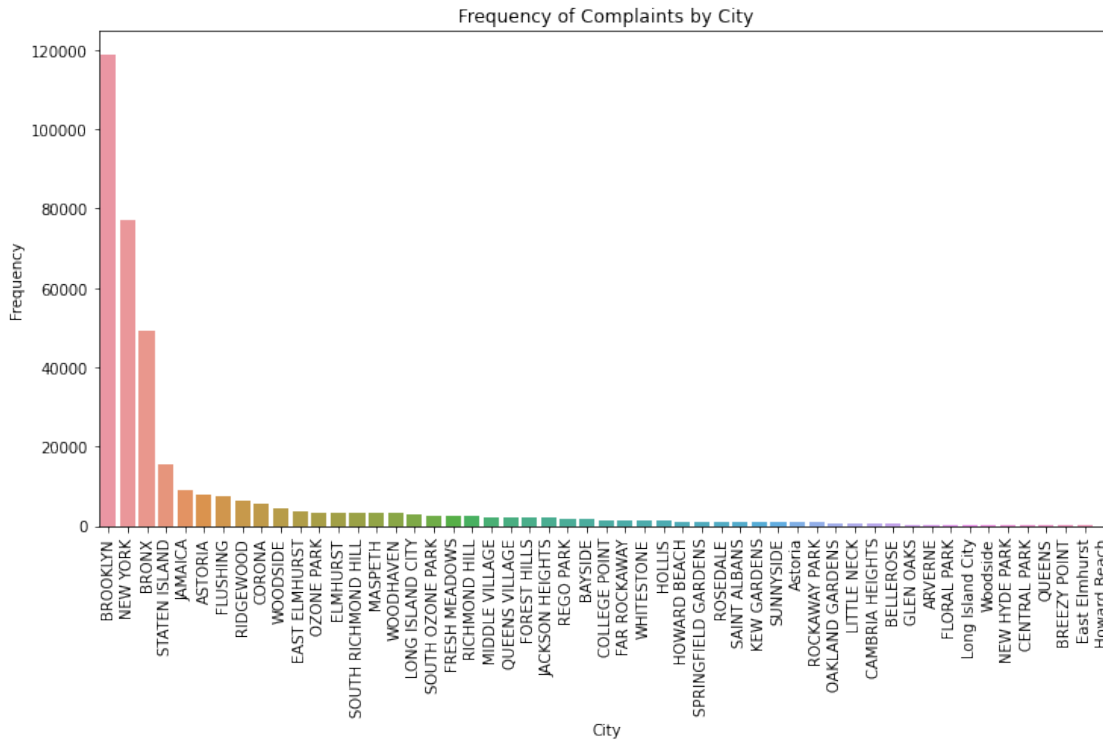
```
data.loc[:,['Complaint Type','City']]
```

	Complaint Type	City
0	Noise - Street/Sidewalk	NEW YORK
1	Blocked Driveway	ASTORIA
2	Blocked Driveway	BRONX
3	Illegal Parking	BRONX
4	Illegal Parking	ELMHURST
...
364553	Illegal Parking	WOODHAVEN
364554	Noise - Vehicle	BRONX
364555	Noise - Street/Sidewalk	NEW YORK
364556	Blocked Driveway	BRONX
364557	Blocked Driveway	SOUTH OZONE PARK

[362177 rows x 2 columns]

```
[10]: # Plotting a frequency plot for city-wise complaints
```

```
plt.figure(figsize=(12, 6))
sns.countplot(x='City', data=data, order=data['City'].value_counts().index)
plt.xticks(rotation=90)
plt.title('Frequency of Complaints by City')
plt.xlabel('City')
plt.ylabel('Frequency')
plt.show()
```



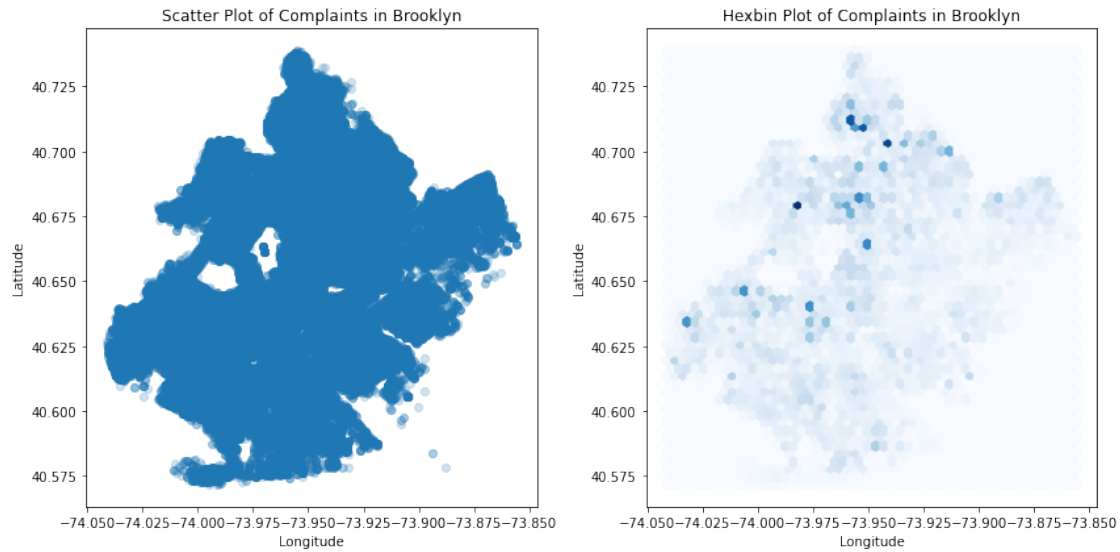
[11]: *# Plotting scatter and hexbin plots for complaint concentration across Brooklyn*

```
brooklyn_data = data[data['Borough'] == 'BROOKLYN']
plt.figure(figsize=(12, 6))

# Scatter plot
plt.subplot(1, 2, 1)
plt.scatter(brooklyn_data['Longitude'], brooklyn_data['Latitude'], alpha=0.2)
plt.title('Scatter Plot of Complaints in Brooklyn')
plt.xlabel('Longitude')
plt.ylabel('Latitude')

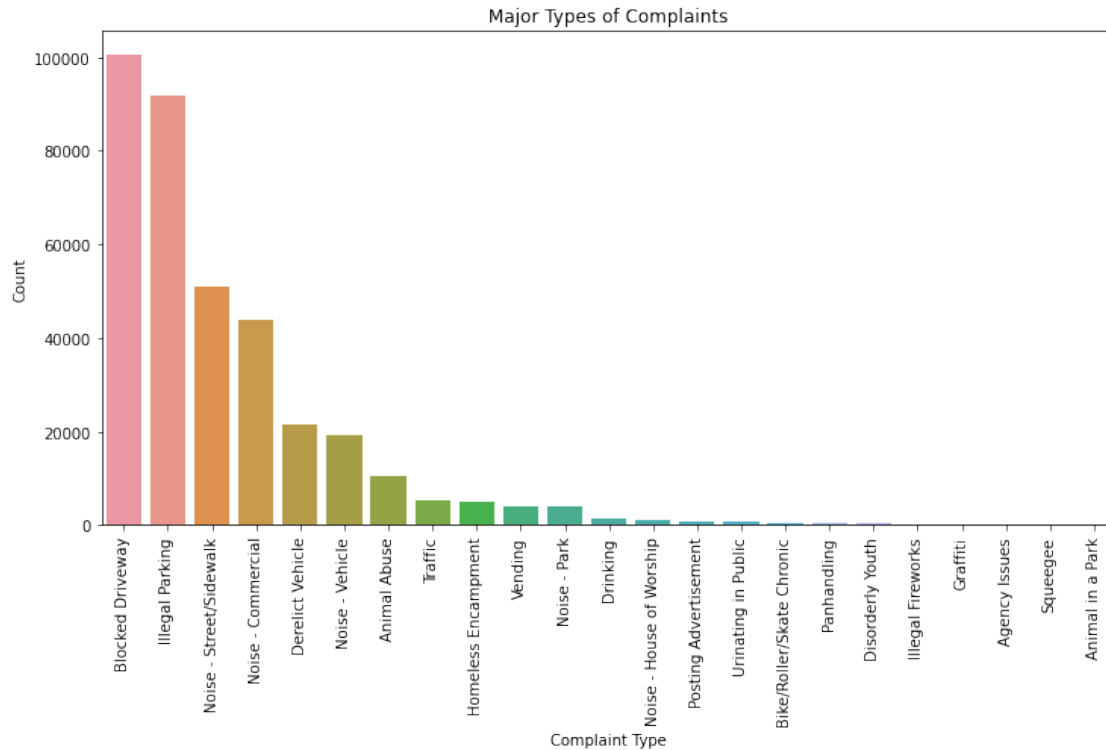
# Hexbin plot
plt.subplot(1, 2, 2)
plt.hexbin(brooklyn_data['Longitude'], brooklyn_data['Latitude'], gridsize=50, cmap='Blues')
plt.title('Hexbin Plot of Complaints in Brooklyn')
plt.xlabel('Longitude')
plt.ylabel('Latitude')

plt.tight_layout()
plt.show()
```



```
[12]: # Finding major types of complaints
      # Plotting a bar graph of count vs. complaint types

      plt.figure(figsize=(12, 6))
      sns.countplot(x='Complaint Type', data=data, order=data['Complaint Type'].
                    ↪value_counts().index)
      plt.xticks(rotation=90)
      plt.title('Major Types of Complaints')
      plt.xlabel('Complaint Type')
      plt.ylabel('Count')
      plt.show()
```



```
[13]: # Finding the top 10 types of complaints

top_10_complaints = data['Complaint Type'].value_counts().head(10)
print("Top 10 Complaint Types:")
print(top_10_complaints)
```

```
Top 10 Complaint Types:
Blocked Driveway      100624
Illegal Parking       91716
Noise - Street/Sidewalk 51139
Noise - Commercial    43751
Derelict Vehicle      21518
Noise - Vehicle       19301
Animal Abuse          10530
Traffic               5196
Homeless Encampment   4879
Vending               4185
Name: Complaint Type, dtype: int64
```

```
[14]: data['Complaint Type'].unique()
```

```
[14]: array(['Noise - Street/Sidewalk', 'Blocked Driveway', 'Illegal Parking',
        'Derelict Vehicle', 'Noise - Commercial',
```

```
'Noise - House of Worship', 'Posting Advertisement',
'Noise - Vehicle', 'Animal Abuse', 'Vending', 'Traffic',
'Drinking', 'Bike/Roller/Skate Chronic', 'Panhandling',
'Noise - Park', 'Homeless Encampment', 'Urinating in Public',
'Graffiti', 'Disorderly Youth', 'Illegal Fireworks',
'Agency Issues', 'Squeegee', 'Animal in a Park'], dtype=object)
```

```
[15]: data['Complaint Type'].nunique()
```

```
[15]: 23
```

```
[16]: # Displaying the types of complaints in each city in a separate dataset

complaints_by_city = data.groupby('City')['Complaint Type'].value_counts().
    ↪unstack(fill_value=0)
print("Complaints by City:")
print(complaints_by_city)
```

Complaints by City:

Complaint Type	Animal Abuse	Animal in a Park \
City		
ARVERNE	46	0
ASTORIA	170	0
Astoria	0	0
BAYSIDE	53	0
BELLEROSE	15	0
BREEZY POINT	2	0
BRONX	1971	0
BROOKLYN	3191	0
CAMBRIA HEIGHTS	15	0
CENTRAL PARK	0	0
COLLEGE POINT	35	0
CORONA	104	0
EAST ELMHURST	85	0
ELMHURST	59	0
East Elmhurst	0	0
FAR ROCKAWAY	111	0
FLORAL PARK	7	0
FLUSHING	191	0
FOREST HILLS	78	0
FRESH MEADOWS	66	0
GLEN OAKS	5	0
HOLLIS	39	0
HOWARD BEACH	51	0
Howard Beach	0	0
JACKSON HEIGHTS	50	0
JAMAICA	317	0
KEW GARDENS	26	0

LITTLE NECK	21	0
LONG ISLAND CITY	40	0
Long Island City	0	0
MASPETH	56	0
MIDDLE VILLAGE	36	0
NEW HYDE PARK	1	0
NEW YORK	1941	0
OAKLAND GARDENS	29	0
OZONE PARK	72	0
QUEENS	1	1
QUEENS VILLAGE	90	0
REGO PARK	33	0
RICHMOND HILL	55	0
RIDGEWOOD	154	0
ROCKAWAY PARK	33	0
ROSEDALE	44	0
SAINT ALBANS	43	0
SOUTH OZONE PARK	74	0
SOUTH RICHMOND HILL	40	0
SPRINGFIELD GARDENS	42	0
STATEN ISLAND	786	0
SUNNYSIDE	40	0
WHITESTONE	43	0
WOODHAVEN	57	0
WOODSIDE	111	0
Woodside	0	0

Complaint Type City	Bike/Roller/Skate Chronic	Blocked Driveway \
ARVERNE	0	50
ASTORIA	16	3436
Astoria	0	159
BAYSIDE	0	514
BELLEROSE	1	138
BREEZY POINT	0	3
BRONX	22	17062
BROOKLYN	124	36445
CAMBRIA HEIGHTS	0	177
CENTRAL PARK	0	0
COLLEGE POINT	0	597
CORONA	0	3597
EAST ELMHURST	1	1925
ELMHURST	2	1992
East Elmhurst	0	0
FAR ROCKAWAY	0	383
FLORAL PARK	0	33
FLUSHING	3	3640
FOREST HILLS	6	873

FRESH MEADOWS	0	682
GLEN OAKS	0	48
HOLLIS	0	442
HOWARD BEACH	1	215
Howard Beach	0	1
JACKSON HEIGHTS	2	703
JAMAICA	3	3620
KEW GARDENS	0	429
LITTLE NECK	0	174
LONG ISLAND CITY	3	1052
Long Island City	0	55
MASPETH	1	1000
MIDDLE VILLAGE	1	663
NEW HYDE PARK	0	76
NEW YORK	254	2705
OAKLAND GARDENS	2	177
OZONE PARK	1	1681
QUEENS	0	3
QUEENS VILLAGE	0	772
REGO PARK	0	780
RICHMOND HILL	0	1099
RIDGEWOOD	3	2161
ROCKAWAY PARK	0	80
ROSEDALE	2	270
SAINT ALBANS	0	318
SOUTH OZONE PARK	1	1202
SOUTH RICHMOND HILL	1	1946
SPRINGFIELD GARDENS	0	330
STATEN ISLAND	10	2845
SUNNYSIDE	2	278
WHITESTONE	4	279
WOODHAVEN	2	1363
WOODSIDE	5	2038
Woodside	0	27

Complaint Type City	Derelect Vehicle	Disorderly Youth	Drinking	Graffiti \
ARVERNE	32	2	1	1
ASTORIA	426	5	43	4
Astoria	14	0	0	0
BAYSIDE	231	2	1	3
BELLEROSE	120	2	1	0
BREEZY POINT	3	0	1	0
BRONX	2402	66	206	15
BROOKLYN	6257	79	291	60
CAMBRIA HEIGHTS	148	0	0	0
CENTRAL PARK	0	0	0	0
COLLEGE POINT	223	1	1	2

CORONA	72	6	34	4
EAST ELMHURST	136	1	9	3
ELMHURST	94	2	13	1
East Elmhurst	2	0	0	0
FAR ROCKAWAY	215	1	4	0
FLORAL PARK	74	1	1	0
FLUSHING	532	2	47	6
FOREST HILLS	71	1	1	3
FRESH MEADOWS	347	0	2	0
GLEN OAKS	57	0	0	0
HOLLIS	162	1	3	0
HOWARD BEACH	172	1	4	0
Howard Beach	0	0	0	0
JACKSON HEIGHTS	41	0	10	1
JAMAICA	1132	9	40	3
KEW GARDENS	16	0	1	0
LITTLE NECK	73	2	1	0
LONG ISLAND CITY	220	2	8	3
Long Island City	4	0	0	0
MASPETH	510	2	9	1
MIDDLE VILLAGE	366	0	2	0
NEW HYDE PARK	14	0	0	0
NEW YORK	695	81	321	25
OAKLAND GARDENS	117	1	2	0
OZONE PARK	479	4	20	0
QUEENS	2	0	0	0
QUEENS VILLAGE	478	0	5	1
REGO PARK	94	0	4	1
RICHMOND HILL	200	0	10	1
RIDGEWOOD	507	3	10	3
ROCKAWAY PARK	19	4	23	0
ROSEDALE	247	0	2	2
SAINT ALBANS	248	1	3	0
SOUTH OZONE PARK	425	2	14	2
SOUTH RICHMOND HILL	356	2	25	0
SPRINGFIELD GARDENS	267	0	6	0
STATEN ISLAND	2184	25	188	6
SUNNYSIDE	17	2	12	1
WHITESTONE	279	1	3	1
WOODHAVEN	369	0	4	0
WOODSIDE	298	1	15	4
Woodside	8	0	0	0

Complaint Type	Homeless Encampment	Illegal Fireworks	...	\
City			...	
ARVERNE	4	0	...	
ASTORIA	32	4	...	
Astoria	0	0	...	

BAYSIDE	2	0 ...
BELLEROSE	1	1 ...
BREEZY POINT	0	0 ...
BRONX	275	24 ...
BROOKLYN	948	61 ...
CAMBRIA HEIGHTS	6	1 ...
CENTRAL PARK	0	0 ...
COLLEGE POINT	3	0 ...
CORONA	26	0 ...
EAST ELMHURST	2	0 ...
ELMHURST	34	1 ...
East Elmhurst	0	0 ...
FAR ROCKAWAY	16	0 ...
FLORAL PARK	0	0 ...
FLUSHING	26	2 ...
FOREST HILLS	18	1 ...
FRESH MEADOWS	6	0 ...
GLEN OAKS	0	0 ...
HOLLIS	9	0 ...
HOWARD BEACH	3	4 ...
Howard Beach	0	0 ...
JACKSON HEIGHTS	11	1 ...
JAMAICA	93	4 ...
KEW GARDENS	5	0 ...
LITTLE NECK	0	0 ...
LONG ISLAND CITY	10	0 ...
Long Island City	0	0 ...
MASPETH	11	1 ...
MIDDLE VILLAGE	5	0 ...
NEW HYDE PARK	0	0 ...
NEW YORK	3060	38 ...
OAKLAND GARDENS	1	0 ...
OZONE PARK	8	1 ...
QUEENS	2	0 ...
QUEENS VILLAGE	19	5 ...
REGO PARK	6	0 ...
RICHMOND HILL	30	4 ...
RIDGEWOOD	26	2 ...
ROCKAWAY PARK	4	0 ...
ROSEDALE	4	0 ...
SAINT ALBANS	11	0 ...
SOUTH OZONE PARK	5	1 ...
SOUTH RICHMOND HILL	12	2 ...
SPRINGFIELD GARDENS	7	1 ...
STATEN ISLAND	77	11 ...
SUNNYSIDE	12	0 ...
WHITESTONE	0	1 ...
WOODHAVEN	10	0 ...

WOODSIDE	38	1	...
Woodside	0	0	...

Complaint Type	Noise - House of Worship	Noise - Park	\
City			
ARVERNE	14	2	
ASTORIA	21	64	
Astoria	0	0	
BAYSIDE	3	4	
BELLEROSE	1	1	
BREEZY POINT	0	0	
BRONX	90	548	
BROOKLYN	389	1575	
CAMBRIA HEIGHTS	2	0	
CENTRAL PARK	0	0	
COLLEGE POINT	2	2	
CORONA	3	24	
EAST ELMHURST	25	5	
ELMHURST	6	35	
East Elmhurst	0	0	
FAR ROCKAWAY	1	23	
FLORAL PARK	0	0	
FLUSHING	5	61	
FOREST HILLS	1	20	
FRESH MEADOWS	0	8	
GLEN OAKS	0	38	
HOLLIS	215	17	
HOWARD BEACH	1	2	
Howard Beach	0	0	
JACKSON HEIGHTS	2	8	
JAMAICA	15	38	
KEW GARDENS	1	0	
LITTLE NECK	0	2	
LONG ISLAND CITY	0	55	
Long Island City	0	0	
MASPETH	2	3	
MIDDLE VILLAGE	0	4	
NEW HYDE PARK	0	0	
NEW YORK	222	1243	
OAKLAND GARDENS	0	14	
OZONE PARK	4	20	
QUEENS	1	0	
QUEENS VILLAGE	2	2	
REGO PARK	1	22	
RICHMOND HILL	0	4	
RIDGEWOOD	2	28	
ROCKAWAY PARK	0	2	
ROSEDALE	2	69	

SAINT ALBANS	1	1
SOUTH OZONE PARK	5	4
SOUTH RICHMOND HILL	3	2
SPRINGFIELD GARDENS	1	1
STATEN ISLAND	18	67
SUNNYSIDE	0	16
WHITESTONE	0	7
WOODHAVEN	3	3
WOODSIDE	4	38
Woodside	0	0

Complaint Type City	Noise - Street/Sidewalk	Noise - Vehicle	Panhandling \
ARVERNE	29	10	1
ASTORIA	409	236	2
Astoria	145	0	0
BAYSIDE	17	24	0
BELLEROSE	13	11	1
BREEZY POINT	1	1	0
BRONX	9144	3556	20
BROOKLYN	13982	5965	49
CAMBRIA HEIGHTS	29	100	0
CENTRAL PARK	105	0	0
COLLEGE POINT	34	140	0
CORONA	243	110	1
EAST ELMHURST	110	82	0
ELMHURST	228	69	3
East Elmhurst	0	0	0
FAR ROCKAWAY	140	83	0
FLORAL PARK	3	2	0
FLUSHING	241	147	2
FOREST HILLS	102	70	6
FRESH MEADOWS	48	97	1
GLEN OAKS	6	4	0
HOLLIS	43	52	0
HOWARD BEACH	22	10	2
Howard Beach	0	0	0
JACKSON HEIGHTS	238	75	1
JAMAICA	365	337	3
KEW GARDENS	13	23	0
LITTLE NECK	10	8	0
LONG ISLAND CITY	133	124	2
Long Island City	28	0	0
MASPETH	124	26	0
MIDDLE VILLAGE	38	45	0
NEW HYDE PARK	0	2	0
NEW YORK	22245	6294	206
OAKLAND GARDENS	20	7	0

OZONE PARK	140	81	7
QUEENS	6	2	0
QUEENS VILLAGE	69	54	1
REGO PARK	64	60	0
RICHMOND HILL	93	69	0
RIDGEWOOD	448	249	0
ROCKAWAY PARK	218	29	0
ROSEDALE	26	25	0
SAINT ALBANS	81	50	0
SOUTH OZONE PARK	108	97	0
SOUTH RICHMOND HILL	93	93	0
SPRINGFIELD GARDENS	42	48	2
STATEN ISLAND	885	424	13
SUNNYSIDE	69	53	0
WHITESTONE	35	31	0
WOODHAVEN	89	81	1
WOODSIDE	261	136	0
Woodside	5	0	0

Complaint Type City	Posting Advertisement	Squeegee	Traffic \
ARVERNE	0	0	1
ASTORIA	3	0	60
Astoria	0	0	0
BAYSIDE	0	0	9
BELLEROSE	1	0	9
BREEZY POINT	0	0	0
BRONX	18	0	427
BROOKLYN	58	0	1258
CAMBRIA HEIGHTS	0	0	7
CENTRAL PARK	0	0	0
COLLEGE POINT	0	0	16
CORONA	1	0	14
EAST ELMHURST	1	0	24
ELMHURST	1	0	18
East Elmhurst	0	0	0
FAR ROCKAWAY	0	0	11
FLORAL PARK	0	0	0
FLUSHING	1	0	59
FOREST HILLS	4	0	65
FRESH MEADOWS	0	0	15
GLEN OAKS	0	0	3
HOLLIS	0	0	11
HOWARD BEACH	0	0	9
Howard Beach	0	0	0
JACKSON HEIGHTS	1	0	13
JAMAICA	8	0	632
KEW GARDENS	1	0	10

LITTLE NECK	1	0	20
LONG ISLAND CITY	2	0	83
Long Island City	0	0	0
MASPETH	0	0	71
MIDDLE VILLAGE	0	0	14
NEW HYDE PARK	0	0	0
NEW YORK	49	4	1769
OAKLAND GARDENS	0	0	6
OZONE PARK	3	0	21
QUEENS	0	0	2
QUEENS VILLAGE	1	0	27
REGO PARK	0	0	16
RICHMOND HILL	2	0	8
RIDGEWOOD	1	0	50
ROCKAWAY PARK	0	0	7
ROSEDALE	0	0	25
SAINT ALBANS	0	0	14
SOUTH OZONE PARK	1	0	36
SOUTH RICHMOND HILL	0	0	12
SPRINGFIELD GARDENS	2	0	12
STATEN ISLAND	516	0	229
SUNNYSIDE	3	0	17
WHITESTONE	0	0	32
WOODHAVEN	0	0	7
WOODSIDE	0	0	45
Woodside	0	0	0

Complaint Type	Urinating in Public	Vending
City		
ARVERNE	1	1
ASTORIA	10	57
Astoria	0	0
BAYSIDE	0	2
BELLEROSE	1	0
BREEZY POINT	0	0
BRONX	54	433
BROOKLYN	155	575
CAMBRIA HEIGHTS	0	0
CENTRAL PARK	0	0
COLLEGE POINT	0	1
CORONA	7	65
EAST ELMHURST	6	9
ELMHURST	10	25
East Elmhurst	0	0
FAR ROCKAWAY	1	10
FLORAL PARK	0	0
FLUSHING	12	37
FOREST HILLS	2	10

FRESH MEADOWS	1	1
GLEN OAKS	2	19
HOLLIS	2	0
HOWARD BEACH	0	5
Howard Beach	0	0
JACKSON HEIGHTS	3	86
JAMAICA	37	24
KEW GARDENS	3	1
LITTLE NECK	1	0
LONG ISLAND CITY	3	31
Long Island City	0	0
MASPETH	2	7
MIDDLE VILLAGE	0	0
NEW HYDE PARK	0	0
NEW YORK	264	2638
OAKLAND GARDENS	0	2
OZONE PARK	4	1
QUEENS	1	0
QUEENS VILLAGE	5	2
REGO PARK	1	3
RICHMOND HILL	5	15
RIDGEWOOD	9	9
ROCKAWAY PARK	1	2
ROSEDALE	0	19
SAINT ALBANS	1	2
SOUTH OZONE PARK	2	5
SOUTH RICHMOND HILL	1	24
SPRINGFIELD GARDENS	3	1
STATEN ISLAND	19	25
SUNNYSIDE	2	15
WHITESTONE	0	1
WOODHAVEN	2	6
WOODSIDE	8	15
Woodside	0	0

[53 rows x 22 columns]

```
[17]: # Visualizing the major types of complaints in each city
# Creating a subset of the data containing only the top 10 complaint types

top_10_complaint_types = data['Complaint Type'].value_counts().head(10).index
data_top_10 = data[data['Complaint Type'].isin(top_10_complaint_types)]
```

```
[18]: # Creating a pivot table to count complaints by city and complaint type

complaints_by_city_type = data_top_10.pivot_table(index='City',
↪columns='Complaint Type', aggfunc='size', fill_value=0)
```

complaints_by_city_type

[18]: Complaint Type	Animal Abuse	Blocked Driveway	Derelict Vehicle	\
City				
ARVERNE	46	50	32	
ASTORIA	170	3436	426	
Astoria	0	159	14	
BAYSIDE	53	514	231	
BELLEROSE	15	138	120	
BREEZY POINT	2	3	3	
BRONX	1971	17062	2402	
BROOKLYN	3191	36445	6257	
CAMBRIA HEIGHTS	15	177	148	
CENTRAL PARK	0	0	0	
COLLEGE POINT	35	597	223	
CORONA	104	3597	72	
EAST ELMHURST	85	1925	136	
ELMHURST	59	1992	94	
East Elmhurst	0	0	2	
FAR ROCKAWAY	111	383	215	
FLORAL PARK	7	33	74	
FLUSHING	191	3640	532	
FOREST HILLS	78	873	71	
FRESH MEADOWS	66	682	347	
GLEN OAKS	5	48	57	
HOLLIS	39	442	162	
HOWARD BEACH	51	215	172	
Howard Beach	0	1	0	
JACKSON HEIGHTS	50	703	41	
JAMAICA	317	3620	1132	
KEW GARDENS	26	429	16	
LITTLE NECK	21	174	73	
LONG ISLAND CITY	40	1052	220	
Long Island City	0	55	4	
MASPETH	56	1000	510	
MIDDLE VILLAGE	36	663	366	
NEW HYDE PARK	1	76	14	
NEW YORK	1941	2705	695	
OAKLAND GARDENS	29	177	117	
OZONE PARK	72	1681	479	
QUEENS	1	3	2	
QUEENS VILLAGE	90	772	478	
REGO PARK	33	780	94	
RICHMOND HILL	55	1099	200	
RIDGEWOOD	154	2161	507	
ROCKAWAY PARK	33	80	19	
ROSEDALE	44	270	247	

SAINT ALBANS	43	318	248
SOUTH OZONE PARK	74	1202	425
SOUTH RICHMOND HILL	40	1946	356
SPRINGFIELD GARDENS	42	330	267
STATEN ISLAND	786	2845	2184
SUNNYSIDE	40	278	17
WHITESTONE	43	279	279
WOODHAVEN	57	1363	369
WOODSIDE	111	2038	298
Woodside	0	27	8

Complaint Type	Homeless Encampment	Illegal Parking	Noise - Commercial \
City			
ARVERNE	4	62	2
ASTORIA	32	1340	1653
Astoria	0	277	310
BAYSIDE	2	638	47
BELLEROSE	1	132	38
BREEZY POINT	0	16	4
BRONX	275	9889	2944
BROOKLYN	948	33532	13855
CAMBRIA HEIGHTS	6	113	19
CENTRAL PARK	0	5	0
COLLEGE POINT	3	449	38
CORONA	26	791	281
EAST ELMHURST	2	1092	41
ELMHURST	34	760	85
East Elmhurst	0	28	0
FAR ROCKAWAY	16	339	59
FLORAL PARK	0	72	3
FLUSHING	26	2250	222
FOREST HILLS	18	627	163
FRESH MEADOWS	6	1158	21
GLEN OAKS	0	95	84
HOLLIS	9	181	54
HOWARD BEACH	3	384	258
Howard Beach	0	0	0
JACKSON HEIGHTS	11	240	619
JAMAICA	93	1698	552
KEW GARDENS	5	276	203
LITTLE NECK	0	322	77
LONG ISLAND CITY	10	987	269
Long Island City	0	64	19
MASPETH	11	1234	57
MIDDLE VILLAGE	5	1104	13
NEW HYDE PARK	0	32	4
NEW YORK	3060	14549	18686

OAKLAND GARDENS	1	337	2
OZONE PARK	8	774	125
QUEENS	2	10	6
QUEENS VILLAGE	19	669	49
REGO PARK	6	640	82
RICHMOND HILL	30	489	249
RIDGEWOOD	26	2235	491
ROCKAWAY PARK	4	337	72
ROSEDALE	4	326	28
SAINT ALBANS	11	237	36
SOUTH OZONE PARK	5	602	82
SOUTH RICHMOND HILL	12	596	223
SPRINGFIELD GARDENS	7	291	38
STATEN ISLAND	77	6224	783
SUNNYSIDE	12	167	238
WHITESTONE	0	631	21
WOODHAVEN	10	896	209
WOODSIDE	38	1083	256
Woodside	0	124	2

Complaint Type	Noise - Street/Sidewalk	Noise - Vehicle	Traffic \
City			
ARVERNE	29	10	1
ASTORIA	409	236	60
Astoria	145	0	0
BAYSIDE	17	24	9
BELLEROSE	13	11	9
BREEZY POINT	1	1	0
BRONX	9144	3556	427
BROOKLYN	13982	5965	1258
CAMBRIA HEIGHTS	29	100	7
CENTRAL PARK	105	0	0
COLLEGE POINT	34	140	16
CORONA	243	110	14
EAST ELMHURST	110	82	24
ELMHURST	228	69	18
East Elmhurst	0	0	0
FAR ROCKAWAY	140	83	11
FLORAL PARK	3	2	0
FLUSHING	241	147	59
FOREST HILLS	102	70	65
FRESH MEADOWS	48	97	15
GLEN OAKS	6	4	3
HOLLIS	43	52	11
HOWARD BEACH	22	10	9
Howard Beach	0	0	0
JACKSON HEIGHTS	238	75	13

JAMAICA	365	337	632
KEW GARDENS	13	23	10
LITTLE NECK	10	8	20
LONG ISLAND CITY	133	124	83
Long Island City	28	0	0
MASPETH	124	26	71
MIDDLE VILLAGE	38	45	14
NEW HYDE PARK	0	2	0
NEW YORK	22245	6294	1769
OAKLAND GARDENS	20	7	6
OZONE PARK	140	81	21
QUEENS	6	2	2
QUEENS VILLAGE	69	54	27
REGO PARK	64	60	16
RICHMOND HILL	93	69	8
RIDGEWOOD	448	249	50
ROCKAWAY PARK	218	29	7
ROSEDALE	26	25	25
SAINT ALBANS	81	50	14
SOUTH OZONE PARK	108	97	36
SOUTH RICHMOND HILL	93	93	12
SPRINGFIELD GARDENS	42	48	12
STATEN ISLAND	885	424	229
SUNNYSIDE	69	53	17
WHITESTONE	35	31	32
WOODHAVEN	89	81	7
WOODSIDE	261	136	45
Woodside	5	0	0

Complaint Type	Vending
City	
ARVERNE	1
ASTORIA	57
Astoria	0
BAYSIDE	2
BELLEROSE	0
BREEZY POINT	0
BRONX	433
BROOKLYN	575
CAMBRIA HEIGHTS	0
CENTRAL PARK	0
COLLEGE POINT	1
CORONA	65
EAST ELMHURST	9
ELMHURST	25
East Elmhurst	0
FAR ROCKAWAY	10

FLORAL PARK	0
FLUSHING	37
FOREST HILLS	10
FRESH MEADOWS	1
GLEN OAKS	19
HOLLIS	0
HOWARD BEACH	5
Howard Beach	0
JACKSON HEIGHTS	86
JAMAICA	24
KEW GARDENS	1
LITTLE NECK	0
LONG ISLAND CITY	31
Long Island City	0
MASPETH	7
MIDDLE VILLAGE	0
NEW HYDE PARK	0
NEW YORK	2638
OAKLAND GARDENS	2
OZONE PARK	1
QUEENS	0
QUEENS VILLAGE	2
REGO PARK	3
RICHMOND HILL	15
RIDGEWOOD	9
ROCKAWAY PARK	2
ROSEDALE	19
SAINT ALBANS	2
SOUTH OZONE PARK	5
SOUTH RICHMOND HILL	24
SPRINGFIELD GARDENS	1
STATEN ISLAND	25
SUNNYSIDE	15
WHITESTONE	1
WOODHAVEN	6
WOODSIDE	15
Woodside	0

Conclusion: The analysis of the dataset reveals the top 10 types of complaints reported in New York City, along with their respective counts:

1. **Blocked Driveway:** With a staggering count of 100,624 complaints, “Blocked Driveway” is the most frequently reported issue. This suggests that parking-related problems, specifically vehicles blocking driveways, are a major concern for residents.
2. **Illegal Parking:** “Illegal Parking” ranks second with 91,716 complaints. This further underscores the significance of parking-related issues in the city.
3. **Noise - Street/Sidewalk:** Noise disturbances on streets and sidewalks, such as loud gath-

erings or construction, are the third most common complaint type, with 51,139 reports.

4. **Noise - Commercial:** Complaints related to noise from commercial establishments rank fourth, with 43,751 instances. This indicates that noise pollution from businesses is a notable concern.
5. **Derelict Vehicle:** “Derelict Vehicle” complaints, which refer to abandoned or inoperable vehicles, are the fifth most reported issue, with 21,518 cases.
6. **Noise - Vehicle:** Complaints about noise originating from vehicles, including loud engines or music, are the sixth most common, with 19,301 reports.
7. **Animal Abuse:** Reports of “Animal Abuse” rank seventh, indicating concerns about the welfare of animals in the city, with 10,530 complaints.
8. **Traffic:** “Traffic” complaints, encompassing various traffic-related issues, are the eighth most reported, with 5,196 instances.
9. **Homeless Encampment:** “Homeless Encampment” complaints, reflecting concerns about people living in public spaces, rank ninth, with 4,879 reports.
10. **Vending:** The tenth most common complaint type is “Vending,” which may involve unlicensed street vending or related issues, with 4,185 complaints.

Key Insights:

1. **Parking and Noise:** Parking-related complaints, including blocked driveways and illegal parking, dominate the top positions, highlighting the challenges related to vehicular congestion and parking violations in the city.
2. **Noise Pollution:** Noise-related complaints, both from commercial establishments and vehicles, are significant issues, indicating the impact of noise pollution on residents’ quality of life.
3. **Quality of Life Concerns:** Complaints about animal abuse, homeless encampments, and street vending underscore concerns related to public safety, animal welfare, and urban living conditions.
4. **Traffic Issues:** While traffic-related complaints are present in the top 10, they are relatively lower in frequency compared to parking and noise complaints.

*Understanding these top complaint types is essential for city officials and agencies to allocate resources effectively, address priority concerns, and enhance the overall urban experience for residents. It also highlights the need for proactive measures and policies to mitigate these common issues and improve the livability of New York City.

```
[19]: # Plotting a stacked bar chart to visualize the major types of complaints in
      ↪ each city
```

```
plt.figure(figsize=(12, 8))
complaints_by_city_type.plot(kind='bar', stacked=True)
plt.title('Major Types of Complaints in Each City')
plt.xlabel('City')
plt.ylabel('Count')
```


Animal Abuse	5.009043
Blocked Driveway	4.509034
Panhandling	4.403764
Illegal Parking	4.347343
Homeless Encampment	4.292051
Squeegee	4.044514
Vending	3.990633
Drinking	3.839250
Bike/Roller/Skate Chronic	3.645469
Urinating in Public	3.599804
Noise - Vehicle	3.489389
Disorderly Youth	3.434375
Traffic	3.419200
Noise - Street/Sidewalk	3.397582
Noise - Park	3.396127
Noise - House of Worship	3.164191
Noise - Commercial	3.079378
Illegal Fireworks	2.809301
Posting Advertisement	2.023960
Name: Response Time, dtype: float64	

Conclusions:

1. **Variation in Response Times:** There is significant variation in the average response times for different types of complaints. Some complaint types have much longer average response times than others.
2. **Longest Response Time:** “Animal in a Park” has the longest average response time, with an average of approximately 336.84 hours (or about 14 days). This suggests that complaints related to animals in parks may require a longer response time, possibly due to the nature of the issue.
3. **Shortest Response Time:** “Posting Advertisement” has the shortest average response time, with an average of approximately 2.02 hours. This indicates that complaints related to posting advertisements typically receive quicker responses.
4. **Middle Range Response Times:** Complaint types like “Derelict Vehicle,” “Graffiti,” “Agency Issues,” “Animal Abuse,” and others have response times in the middle range, ranging from a few hours to several days.
5. **Service Improvement Insights:** Understanding the variation in response times can provide insights into areas where service improvements may be needed. For example, if response times for certain complaint types are consistently long, it might indicate a need for more efficient handling of those issues.
6. **Resource Allocation:** This information can also help in resource allocation and prioritizing response efforts. Complaint types with longer response times may require additional resources or process optimizations to reduce the waiting time for residents.

Overall, analyzing average response times by complaint type can assist in better managing service requests and improving the efficiency of the response process, ensuring that the most critical issues receive prompt attention while also addressing less urgent matters in a timely manner.