In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
nyc311 = pd.read_csv(r"D:\Data Science\Projects\PYTHON Project\311_Service_Requests_from_2010_to_Present.csv")
```

```
C:\Users\naray\AppData\Local\Temp\ipykernel_14616\2581038215.py:1: DtypeWarning: Columns (48,49) have mixed types. Specify dtyp
e option on import or set low_memory=False.
  nyc311 = pd.read_csv(r"D:\Data Science\Projects\PYTHON Project\311_Service_Requests_from_2010_to_Present.csv")
```

In [3]:
```
nyc311.head()
```

Out[3]:

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type	Incident Zip	Incident Address	...	Bridge Highway Name	Bridge Highway Direction	Road Ramp	Bridge Highway Segment
0	32310363	12/31/2015 11:59:45 PM	01-01-16 0:55	NYPD	New York City Police Department	Noise - Street/Sidewalk	Loud Music/Party	Street/Sidewalk	10034.0	71 VERMILYEA AVENUE	...	NaN	NaN	NaN	NaN
1	32309934	12/31/2015 11:59:44 PM	01-01-16 1:26	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	11105.0	27-07 23 AVENUE	...	NaN	NaN	NaN	NaN
2	32309159	12/31/2015 11:59:29 PM	01-01-16 4:51	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	10458.0	2897 VALENTINE AVENUE	...	NaN	NaN	NaN	NaN
3	32305098	12/31/2015 11:57:46 PM	01-01-16 7:43	NYPD	New York City Police Department	Illegal Parking	Commercial Overnight Parking	Street/Sidewalk	10461.0	2940 BAISLEY AVENUE	...	NaN	NaN	NaN	NaN
4	32306529	12/31/2015 11:56:58 PM	01-01-16 3:24	NYPD	New York City Police Department	Illegal Parking	Blocked Sidewalk	Street/Sidewalk	11373.0	87-14 57 ROAD	...	NaN	NaN	NaN	NaN

5 rows × 53 columns

In [4]:
```
nyc311.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 300698 entries, 0 to 300697
Data columns (total 53 columns):
 #   Column                          Non-Null Count   Dtype
---  ------                          --------------   -----
 0   Unique Key                      300698 non-null  int64
 1   Created Date                    300698 non-null  object
 2   Closed Date                     298534 non-null  object
 3   Agency                          300698 non-null  object
 4   Agency Name                     300698 non-null  object
 5   Complaint Type                  300698 non-null  object
 6   Descriptor                      294784 non-null  object
 7   Location Type                   300567 non-null  object
 8   Incident Zip                    298083 non-null  float64
 9   Incident Address                256288 non-null  object
 10  Street Name                     256288 non-null  object
 11  Cross Street 1                  251419 non-null  object
 12  Cross Street 2                  250919 non-null  object
 13  Intersection Street 1           43858 non-null   object
```

In [5]:
```
nyc311['Created Date'] = pd.to_datetime(nyc311['Created Date'])
```

In [6]:
```
nyc311['Closed Date'] = pd.to_datetime(nyc311['Closed Date'])
```

In [9]:
```
nyc311.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 300698 entries, 0 to 300697
Data columns (total 53 columns):
 #   Column                          Non-Null Count   Dtype
---  ------                          --------------   -----
 0   Unique Key                      300698 non-null  int64
 1   Created Date                    300698 non-null  datetime64[ns]
 2   Closed Date                     298534 non-null  datetime64[ns]
 3   Agency                          300698 non-null  object
 4   Agency Name                     300698 non-null  object
 5   Complaint Type                  300698 non-null  object
 6   Descriptor                      294784 non-null  object
 7   Location Type                   300567 non-null  object
 8   Incident Zip                    298083 non-null  float64
 9   Incident Address                256288 non-null  object
 10  Street Name                     256288 non-null  object
 11  Cross Street 1                  251419 non-null  object
 12  Cross Street 2                  250919 non-null  object
 13  Intersection Street 1           43858 non-null   object
 14  Intersection Street 2           43362 non-null   object
 15  Address Type                    297883 non-null  object
 16  City                            298084 non-null  object
 17  Landmark                        349 non-null     object
 18  Facility Type                   298527 non-null  object
 19  Status                          300698 non-null  object
 20  Due Date                        300695 non-null  object
 21  Resolution Description          300698 non-null  object
 22  Resolution Action Updated Date  298511 non-null  object
 23  Community Board                 300698 non-null  object
 24  Borough                         300698 non-null  object
 25  X Coordinate (State Plane)      297158 non-null  float64
 26  Y Coordinate (State Plane)      297158 non-null  float64
 27  Park Facility Name              300698 non-null  object
 28  Park Borough                    300698 non-null  object
 29  School Name                     300698 non-null  object
 30  School Number                   300698 non-null  object
 31  School Region                   300697 non-null  object
 32  School Code                     300697 non-null  object
 33  School Phone Number             300698 non-null  object
 34  School Address                  300698 non-null  object
 35  School City                     300698 non-null  object
 36  School State                    300698 non-null  object
 37  School Zip                      300697 non-null  object
 38  School Not Found                300698 non-null  object
 39  School or Citywide Complaint    0 non-null       float64
 40  Vehicle Type                    0 non-null       float64
 41  Taxi Company Borough            0 non-null       float64
 42  Taxi Pick Up Location           0 non-null       float64
 43  Bridge Highway Name             243 non-null     object
 44  Bridge Highway Direction        243 non-null     object
 45  Road Ramp                       213 non-null     object
 46  Bridge Highway Segment          213 non-null     object
 47  Garage Lot Name                 0 non-null       float64
 48  Ferry Direction                 1 non-null       object
 49  Ferry Terminal Name             2 non-null       object
 50  Latitude                        297158 non-null  float64
 51  Longitude                       297158 non-null  float64
 52  Location                        297158 non-null  object
dtypes: datetime64[ns](2), float64(10), int64(1), object(40)
memory usage: 121.6+ MB
```

In [12]:
```
nyc311['Request_Closing_Time'] = nyc311['Closed Date'] - nyc311['Created Date']
```

In [13]:
```
nyc311['Request_Closing_Time']
```

Out[13]:
```
0        0 days 00:55:15
1        0 days 01:26:16
2        0 days 04:51:31
3        0 days 07:45:14
4        0 days 03:27:02
               ...
300693              NaT
300694   0 days 02:00:31
300695   0 days 03:07:17
300696   0 days 04:05:33
300697   0 days 04:08:49
Name: Request_Closing_Time, Length: 300698, dtype: timedelta64[ns]
```

In [14]:
```
# Request closing time in days
nyc311['Response_days'] = nyc311['Request_Closing_Time']/np.timedelta64(1, 'D')
```

In [15]:
```
nyc311['Response_days']
```

Out[15]:
```
0         0.038368
1         0.059907
2         0.202442
3         0.323079
4         0.143773
            ...
300693         NaN
300694    0.083692
300695    0.130058
300696    0.170521
300697    0.172789
Name: Response_days, Length: 300698, dtype: float64
```

In [17]:
```
#Request closing time in hours
nyc311['Response_hours'] = nyc311['Request_Closing_Time']/np.timedelta64(1, 'h')
```

In [18]:
```
nyc311['Response_hours']
```

Out[18]:
```
0         0.920833
1         1.437778
2         4.858611
3         7.753889
4         3.450556
            ...
300693         NaN
300694    2.008611
300695    3.121389
300696    4.092500
300697    4.146944
Name: Response_hours, Length: 300698, dtype: float64
```

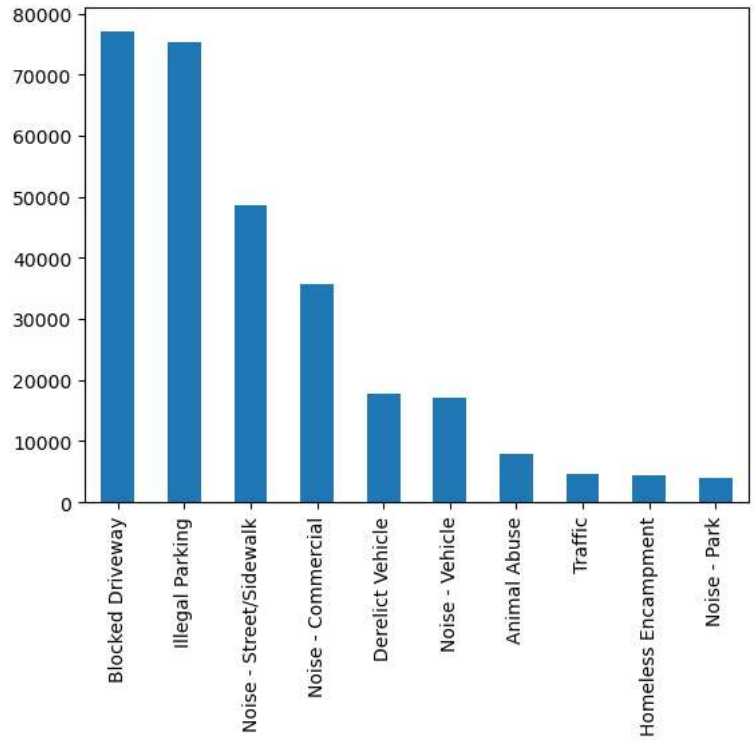
In [19]:
```
#Frequency of complaint type
nyc311['Complaint Type'].value_counts()
```

Out[19]:
```
Blocked Driveway             77044
Illegal Parking              75361
Noise - Street/Sidewalk      48612
Noise - Commercial           35577
Derelict Vehicle             17718
Noise - Vehicle              17083
Animal Abuse                  7778
Traffic                       4498
Homeless Encampment           4416
Noise - Park                  4042
Vending                       3802
Drinking                      1280
Noise - House of Worship       931
Posting Advertisement          650
Urinating in Public            592
Bike/Roller/Skate Chronic      427
Panhandling                    307
Disorderly Youth               286
Illegal Fireworks              168
Graffiti                       113
Agency Issues                    6
Squeegee                         4
Ferry Complaint                  2
Animal in a Park                 1
Name: Complaint Type, dtype: int64
```

In [21]:
```
top_10_Ctypes = nyc311['Complaint Type'].value_counts()[:10]
```

In [23]:
```
# Barplot for top10
top_10_Ctypes.plot(kind = 'bar')
```

Out[23]: <AxesSubplot:>



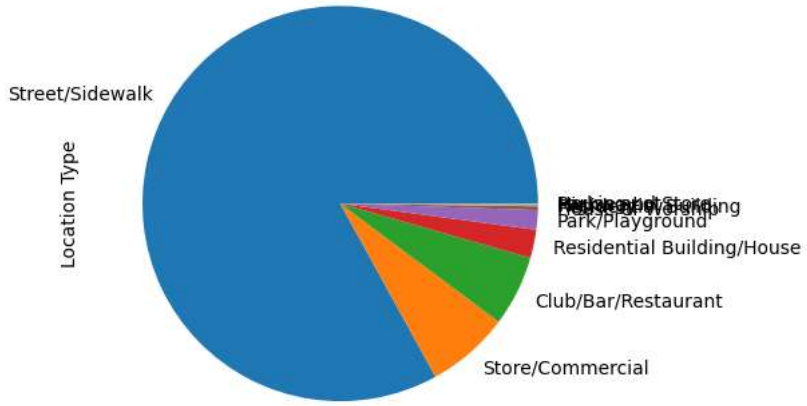
In [24]:
```
nyc311['Location Type'].value_counts()
```

Out[24]:
```
Street/Sidewalk                249299
Store/Commercial                20381
Club/Bar/Restaurant             17360
Residential Building/House       6960
Park/Playground                  4773
House of Worship                  929
Residential Building              227
Highway                           215
Parking Lot                       117
House and Store                    93
Vacant Lot                         77
Commercial                         62
Roadway Tunnel                     35
Subway Station                     34
Bridge                              2
Terminal                            1
Ferry                               1
Park                                1
Name: Location Type, dtype: int64
```

In [25]:
```
top_10_Ltypes = nyc311['Location Type'].value_counts()[:10]
```

In [27]:
```
top_10_Ltypes.plot(kind = 'pie')
```

Out[27]: <AxesSubplot:ylabel='Location Type'>



In [28]:
```
nyc311['City'].value_counts()
```

Out[28]:
```
BROOKLYN               98307
NEW YORK               65994
BRONX                  40702
STATEN ISLAND          12343
JAMAICA                 7296
ASTORIA                 6330
FLUSHING                5971
RIDGEWOOD               5163
CORONA                  4295
WOODSIDE                3544
SOUTH RICHMOND HILL     2774
OZONE PARK              2755
EAST ELMHURST           2734
ELMHURST                2673
WOODHAVEN               2464
MASPETH                 2462
LONG ISLAND CITY        2437
SOUTH OZONE PARK        2173
RICHMOND HILL           1904
FRESH MEADOWS           1899
QUEENS VILLAGE          1814
MIDDLE VILLAGE          1765
JACKSON HEIGHTS         1689
FOREST HILLS            1688
REGO PARK               1486
BAYSIDE                 1221
COLLEGE POINT           1220
FAR ROCKAWAY            1179
WHITESTONE              1098
HOLLIS                  1012
HOWARD BEACH             931
ROSEDALE                 922
SPRINGFIELD GARDENS      883
SAINT ALBANS             834
KEW GARDENS              771
ROCKAWAY PARK            745
SUNNYSIDE                723
Astoria                  717
LITTLE NECK              559
OAKLAND GARDENS          551
CAMBRIA HEIGHTS          477
BELLEROSE                375
GLEN OAKS                306
ARVERNE                  220
FLORAL PARK              152
Long Island City         134
Woodside                 120
NEW HYDE PARK             98
CENTRAL PARK              97
QUEENS                    32
BREEZY POINT              30
East Elmhurst             14
Howard Beach               1
Name: City, dtype: int64
```

In [30]:
```
# Avg Response in days by city
nyc311.groupby('City')['Response_days'].mean()
```

Out[30]:
```
City
ARVERNE                0.094372
ASTORIA                0.191621
Astoria                0.174359
BAYSIDE                0.111639
BELLEROSE              0.439852
BREEZY POINT           0.145687
BRONX                  0.254007
BROOKLYN               0.168666
CAMBRIA HEIGHTS        0.421824
CENTRAL PARK           0.137263
COLLEGE POINT          0.136401
CORONA                 0.134493
EAST ELMHURST          0.149069
ELMHURST               0.137938
East Elmhurst          0.251992
FAR ROCKAWAY           0.116250
FLORAL PARK            0.488313
FLUSHING               0.125751
FOREST HILLS           0.134340
FRESH MEADOWS          0.136002
GLEN OAKS              0.367322
HOLLIS                 0.240007
HOWARD BEACH           0.256703
Howard Beach           0.167882
JACKSON HEIGHTS        0.136403
JAMAICA                0.217088
KEW GARDENS            0.210124
LITTLE NECK            0.107403
LONG ISLAND CITY       0.272466
Long Island City       0.170865
MASPETH                0.233323
MIDDLE VILLAGE         0.224373
NEW HYDE PARK          0.314837
NEW YORK               0.123859
OAKLAND GARDENS        0.109620
OZONE PARK             0.236711
QUEENS                 0.566379
QUEENS VILLAGE         0.454452
REGO PARK              0.144212
RICHMOND HILL          0.228930
RIDGEWOOD              0.185075
ROCKAWAY PARK          0.096621
ROSEDALE               0.417964
SAINT ALBANS           0.196703
SOUTH OZONE PARK       0.221999
SOUTH RICHMOND HILL    0.234062
SPRINGFIELD GARDENS    0.382740
STATEN ISLAND          0.161664
SUNNYSIDE              0.285500
WHITESTONE             0.135201
WOODHAVEN              0.233145
WOODSIDE               0.287226
Woodside               0.216725
Name: Response_days, dtype: float64
```

In [33]:
```
# Order of the complaint types based on the average 'Request_closing_time'
# Group them for different locations
a = nyc311.groupby(['City', 'Complaint Type'])['Response_hours'].mean()
a
```

Out[33]:
```
City      Complaint Type
ARVERNE   Animal Abuse               2.153626
          Blocked Driveway           2.525968
          Derelict Vehicle           2.968220
          Disorderly Youth           3.591250
          Drinking                   0.238611
                                       ...
Woodside  Blocked Driveway           6.406212
          Derelict Vehicle           4.966667
          Illegal Parking            5.219203
          Noise - Commercial         2.394167
          Noise - Street/Sidewalk    3.411278
Name: Response_hours, Length: 764, dtype: float64
```

In [34]:
```
pd.pivot_table(nyc311, index = 'City', columns = 'Complaint Type', values = 'Response_days', aggfunc = 'mean')
```

City													
SOUTH OZONE PARK	0.145514	NaN	0.168958	0.184483	0.433272	0.111759	0.203383	NaN	0.076536	0.021076	...	0.090058	0.237763
SOUTH RICHMOND HILL	0.181988	NaN	1.287928	0.202764	0.494871	0.127708	0.240278	NaN	0.222313	0.019792	...	0.082758	0.150087
SPRINGFIELD GARDENS	0.619252	NaN	NaN	0.376495	0.486246	NaN	0.201871	NaN	0.157488	0.231516	...	0.154606	0.069456
STATEN ISLAND	0.207063	NaN	0.169891	0.169636	0.209982	0.162230	0.145549	0.398432	0.207488	0.155659	...	0.104308	0.122233
SUNNYSIDE	0.481371	NaN	0.050203	0.290349	0.409480	0.155851	0.191914	0.024688	0.299565	NaN	...	NaN	0.269326
WHITESTONE	0.116996	NaN	0.131021	0.131382	0.142264	0.136088	0.151221	0.366667	NaN	0.182141	...	NaN	0.151094
WOODHAVEN	0.206980	NaN	0.051736	0.230123	0.310421	NaN	0.119429	NaN	0.296118	NaN	...	0.137801	0.057554
WOODSIDE	0.351638	NaN	0.506198	0.269720	0.390997	0.050694	0.228381	0.374834	0.279883	0.102778	...	0.197481	0.281322
Woodside	NaN	NaN	NaN	0.266926	0.206944	NaN	NaN	NaN	NaN	NaN	...	NaN	NaN

In [ ]:
```
# y = Response_days
# by complaint types
# H0: the average response time in days is same for different complaint type
# Ha: the average response time in days is different for different complaint type
```

In [35]:
```
df1 = nyc311[nyc311['Complaint Type'] == 'Blocked Driveway']
```

In [36]:
```
df2 = nyc311[nyc311['Complaint Type'] == 'Illegal Parking']
```

In [37]:
```
df3 = nyc311[nyc311['Complaint Type'] == 'Noise - Street/Sidewalk']
```

In [38]:
```
df4 = nyc311[nyc311['Complaint Type'] == 'Noise - Commercial']
```

In [39]:
```
df5 = nyc311[nyc311['Complaint Type'] == 'Derelict Vehicle']
```

In [41]:
```
ar1 = df1['Response_days'].dropna()
```

In [42]:
```
ar2 = df2['Response_days'].dropna()
```

In [43]:
```
ar3 = df3['Response_days'].dropna()
```

In [44]:
```
ar4 = df4['Response_days'].dropna()
```

In [45]:
```
ar5 = df5['Response_days'].dropna()
```

In [48]:
```
# Run the ANOVA model

import scipy.stats as stats
```

In [49]:
```
stats.f_oneway(ar1, ar2, ar3, ar4, ar5)
```

Out[49]:
```
F_onewayResult(statistic=1799.6005241537625, pvalue=0.0)
```

In [ ]:
```
# As pvalue = 0, so we will reject null hypothesis
# the average response time in days is not same for different complaint types
```

In [ ]:
```
# Are the type of complaint or service requested and location related?
```

In [51]:
```
Top_5_complaints = nyc311['Complaint Type'].value_counts()[:5]
Top_5_complaints
```

Out[51]:
```
Blocked Driveway           77044
Illegal Parking            75361
Noise - Street/Sidewalk    48612
Noise - Commercial         35577
Derelict Vehicle           17718
Name: Complaint Type, dtype: int64
```

In [53]:
```
# Filter the date frame for top_5_compplaints
city_top5_complaints = nyc311[nyc311['Complaint Type'].isin(Top_5_complaints.index)]
city_top5_complaints
```

Out[53]:

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type	Incident Zip	Incident Address	...	Bridge Highway Segment	Garage Lot Name	Ferry Direction
0	32310363	2015-12-31 23:59:45	2016-01-01 00:55:00	NYPD	New York City Police Department	Noise - Street/Sidewalk	Loud Music/Party	Street/Sidewalk	10034.0	71 VERMILYEA AVENUE	...	NaN	NaN	NaN
1	32309934	2015-12-31 23:59:44	2016-01-01 01:26:00	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	11105.0	27-07 23 AVENUE	...	NaN	NaN	NaN
2	32309159	2015-12-31 23:59:29	2016-01-01 04:51:00	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	10458.0	2897 VALENTINE AVENUE	...	NaN	NaN	NaN
3	32305098	2015-12-31 23:57:46	2016-01-01 07:43:00	NYPD	New York City Police Department	Illegal Parking	Commercial Overnight Parking	Street/Sidewalk	10461.0	2940 BAISLEY AVENUE	...	NaN	NaN	NaN
4	32306529	2015-12-31 23:56:58	2016-01-01 03:24:00	NYPD	New York City Police Department	Illegal Parking	Blocked Sidewalk	Street/Sidewalk	11373.0	87-14 57 ROAD	...	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
300693	30281872	2015-03-29 00:33:41	NaT	NYPD	New York City Police Department	Noise - Commercial	Loud Music/Party	Club/Bar/Restaurant	NaN	CRESCENT AVENUE	...	NaN	NaN	NaN
300694	30281230	2015-03-29 00:33:28	2015-03-29 02:33:59	NYPD	New York City Police Department	Blocked Driveway	Partial Access	Street/Sidewalk	11418.0	100-17 87 AVENUE	...	NaN	NaN	NaN
300695	30283424	2015-03-29 00:33:03	2015-03-29 03:40:20	NYPD	New York City Police Department	Noise - Commercial	Loud Music/Party	Club/Bar/Restaurant	11206.0	162 THROOP AVENUE	...	NaN	NaN	NaN
300696	30280004	2015-03-29 00:33:02	2015-03-29 04:38:35	NYPD	New York City Police Department	Noise - Commercial	Loud Music/Party	Club/Bar/Restaurant	10461.0	3151 EAST TREMONT AVENUE	...	NaN	NaN	NaN
300697	30281825	2015-03-29 00:33:01	2015-03-29 04:41:50	NYPD	New York City Police Department	Noise - Commercial	Loud Music/Party	Store/Commercial	10036.0	251 WEST 48 STREET	...	NaN	NaN	NaN

254312 rows × 56 columns

In [55]:
```
# Get a crosstab of the city and complaint types

city_complaint_table = pd.crosstab(city_top5_complaints['City'], city_top5_complaints['Complaint Type'])
city_complaint_table
```

Out[55]:

Complaint Type City	Blocked Driveway	Derelict Vehicle	Illegal Parking	Noise - Commercial	Noise - Street/Sidewalk
ARVERNE	35	27	58	2	29
ASTORIA	2618	351	1068	1293	386
Astoria	116	12	213	262	114
BAYSIDE	377	198	514	40	15
BELLEROSE	95	89	106	37	13
BREEZY POINT	3	3	15	4	1
BRONX	12755	1953	7859	2434	8892
BROOKLYN	28148	5181	27462	11463	13356
CAMBRIA HEIGHTS	147	115	76	12	25
CENTRAL PARK	0	0	2	0	95
COLLEGE POINT	435	184	352	35	33
CORONA	2761	57	660	248	238
EAST ELMHURST	1408	113	877	35	107
ELMHURST	1446	78	621	81	224
East Elmhurst	0	1	13	0	0
FAR ROCKAWAY	284	187	295	48	136
FLORAL PARK	20	56	64	3	3
FLUSHING	2795	440	1829	175	225
FOREST HILLS	663	52	505	141	95
FRESH MEADOWS	503	291	885	14	42
GLEN OAKS	30	49	74	78	6
HOLLIS	342	143	151	25	41
HOWARD BEACH	167	138	281	258	21
Howard Beach	1	0	0	0	0
JACKSON HEIGHTS	568	29	184	463	217
JAMAICA	2818	954	1421	429	339
KEW GARDENS	313	14	212	164	10
LITTLE NECK	121	61	249	76	8
LONG ISLAND CITY	772	195	795	230	123
Long Island City	34	4	52	18	26
MASPETH	732	434	976	53	121
MIDDLE VILLAGE	457	296	877	10	37
NEW HYDE PARK	53	14	28	0	0
NEW YORK	2072	537	12128	14550	20433
OAKLAND GARDENS	132	86	263	0	19
OZONE PARK	1259	420	619	115	137
QUEENS	2	1	8	6	6
QUEENS VILLAGE	585	370	578	43	66
REGO PARK	611	81	537	79	57
RICHMOND HILL	872	167	394	216	87
RIDGEWOOD	1694	330	1842	398	433
ROCKAWAY PARK	70	9	317	63	189
ROSEDALE	211	208	277	25	24
SAINT ALBANS	244	202	181	29	79
SOUTH OZONE PARK	942	358	494	70	105
SOUTH RICHMOND HILL	1548	289	462	198	91
SPRINGFIELD GARDENS	262	210	238	36	38
STATEN ISLAND	2142	1766	4886	678	819
SUNNYSIDE	206	10	122	161	65
WHITESTONE	208	227	525	16	33
WOODHAVEN	1060	308	682	175	86
WOODSIDE	1613	247	891	209	250
Woodside	11	2	100	2	5

In [ ]:
```
# City and Complaint type

# Chi - Square  --  categorical values

# H0 - The city and complaint type is independent of each other
# Ha - The City and complaint type is not independent of each other
```

In [56]:
```
chi2_stats, pvalue, df, mean_val = stats.chi2_contingency(city_complaint_table)
```

In [57]:
```
chi2_stats
```

Out[57]:
```
72968.04166267907
```

In [58]:
```
pvalue
```

Out[58]:
```
0.0
```

In [59]:
```
df
```

Out[59]:
```
208
```

In [60]:
```
mean_val
```

Out[60]:
```
array([[4.60274594e+01, 1.05215387e+01, 4.45625869e+01, 2.11066371e+01,
        2.87817779e+01],
       [1.74233747e+03, 3.98285530e+02, 1.68688574e+03, 7.98977071e+02,
        1.08951419e+03],
       [2.18554228e+02, 4.99598890e+01, 2.11598508e+02, 1.00221582e+02,
        1.36665793e+02],
       [3.48711348e+02, 7.97128493e+01, 3.37613241e+02, 1.59907238e+02,
        2.18055324e+02],
       [1.03637988e+02, 2.36908818e+01, 1.00339600e+02, 4.75248783e+01,
        6.48066522e+01],
       [7.92525792e+00, 1.81165567e+00, 7.67302820e+00, 3.63425540e+00,
        4.95580282e+00],
       [1.03311833e+04, 2.36163252e+03, 1.00023825e+04, 4.73753147e+03,
        6.46027019e+03],
       [2.60954358e+04, 5.96522468e+03, 2.52649209e+04, 1.19664848e+04,
        1.63179338e+04],
       [1.14306605e+02, 2.61296490e+01, 1.10668676e+02, 5.24171452e+01,
        7.14779252e+01],
       [2.95673084e+01, 6.75886922e+00, 2.86262975e+01, 1.35585682e+01,
```

In [ ]:
```
# As the pvalue = 0 < alpha, so we will reject H0

# the city and complaint type are not independent to each other
```