```
In [1]: import numpy as np
        import pandas as pd
        import seaborn as sns
        import datetime as dt

        import matplotlib.pyplot as plt
        %matplotlib inline
        import seaborn as sns

        #import and suppress warnings
        import warnings
        warnings.filterwarnings('ignore')
```

```
In [2]: servicedata=pd.read_csv('311_Service_Requests_from_2010_to_Present.csv')
        servicedata.head()
```

Out[2]:

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type	Incident Zip	Incident Address	...	Bridge Highway Name	Bridge Highway Direction
0	32310363	12/31/2015 11:59:45 PM	01/01/2016 12:55:15 AM	NYPD	New York City Police Department	Noise - Street/Sidewalk	Loud Music/Party	Street/Sidewalk	10034.0	71 VERMILYEA AVENUE	...	NaN	
1	32309934	12/31/2015 11:59:44 PM	01/01/2016 01:26:57 AM	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	11105.0	27-07 23 AVENUE	...	NaN	
2	32309159	12/31/2015 11:59:29 PM	01/01/2016 04:51:03 AM	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	10458.0	2897 VALENTINE AVENUE	...	NaN	
3	32305098	12/31/2015 11:57:46 PM	01/01/2016 07:43:13 AM	NYPD	New York City Police Department	Illegal Parking	Commercial Overnight Parking	Street/Sidewalk	10461.0	2940 BAISLEY AVENUE	...	NaN	
4	32306529	12/31/2015 11:56:58 PM	01/01/2016 03:24:42 AM	NYPD	New York City Police Department	Illegal Parking	Blocked Sidewalk	Street/Sidewalk	11373.0	87-14 57 ROAD	...	NaN	

5 rows × 53 columns

```
In [3]: # pd.set_option('display.max_rows',None)
        # pd.set_option('display.max_columns', None)
```

```
In [4]: servicedata.shape
Out[4]: (364558, 53)
```

1. service data has 364558 rows and 53 columns

```
In [5]: servicedata.dtypes
Out[5]: Unique Key                          int64
        Created Date                       object
        Closed Date                        object
        Agency                             object
        Agency Name                        object
        Complaint Type                     object
        Descriptor                         object
        Location Type                      object
        Incident Zip                      float64
        Incident Address                   object
        Street Name                        object
        Cross Street 1                     object
        Cross Street 2                     object
        Intersection Street 1              object
        Intersection Street 2              object
        Address Type                       object
        City                               object
        Landmark                           object
        Facility Type                      object
        Status                             object
        Due Date                           object
        Resolution Description             object
        Resolution Action Updated Date     object
        Community Board                    object
        Borough                            object
        X Coordinate (State Plane)        float64
        Y Coordinate (State Plane)        float64
        Park Facility Name                 object
        Park Borough                       object
        School Name                        object
        School Number                      object
        School Region                      object
        School Code                        object
        School Phone Number                object
        School Address                     object
        School City                        object
        School State                       object
        School Zip                         object
        School Not Found                   object
        School or Citywide Complaint      float64
        Vehicle Type                      float64
        Taxi Company Borough              float64
        Taxi Pick Up Location             float64
        Bridge Highway Name                object
        Bridge Highway Direction           object
        Road Ramp                          object
        Bridge Highway Segment             object
        Garage Lot Name                   float64
        Ferry Direction                    object
        Ferry Terminal Name                object
        Latitude                          float64
        Longitude                         float64
        Location                           object
        dtype: object
```

```
In [6]: servicedata.isna().sum()
Out[6]: Unique Key                             0
        Created Date                           0
        Closed Date                         2381
        Agency                                 0
        Agency Name                            0
        Complaint Type                         0
        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
        Status                                 0
        Due Date                               3
        Resolution Description                 0
        Resolution Action Updated Date      2402
        Community Board                        0
        Borough                                0
        X Coordinate (State Plane)          4030
        Y Coordinate (State Plane)          4030
        Park Facility Name                     0
        Park Borough                           0
        School Name                            0
        School Number                          0
        School Region                          1
        School Code                            1
        School Phone Number                    0
        School Address                         0
        School City                            0
        School State                           0
        School Zip                             1
        School Not Found                       0
        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
```

2. The above list gives null values

```
In [7]: percentageofnullvalues=(servicedata.isna().sum()/servicedata.shape[0])*100
        percentageofnullvalues
Out[7]: Unique Key                          0.000000
        Created Date                        0.000000
        Closed Date                         0.653120
        Agency                              0.000000
        Agency Name                         0.000000
        Complaint Type                      0.000000
        Descriptor                          1.783255
        Location Type                       0.036483
        Incident Zip                        0.822366
        Incident Address                   14.181283
        Street Name                        14.181283
        Cross Street 1                     15.686941
        Cross Street 2                     15.856187
        Intersection Street 1              85.977540
        Intersection Street 2              86.144317
        Address Type                        0.892039
        City                                0.822091
        Landmark                           99.897136
        Facility Type                       0.655314
        Status                              0.000000
        Due Date                            0.000823
        Resolution Description              0.000000
        Resolution Action Updated Date      0.658880
        Community Board                     0.000000
        Borough                             0.000000
        X Coordinate (State Plane)          1.105448
        Y Coordinate (State Plane)          1.105448
        Park Facility Name                  0.000000
        Park Borough                        0.000000
        School Name                         0.000000
        School Number                       0.000000
        School Region                       0.000274
        School Code                         0.000274
        School Phone Number                 0.000000
        School Address                      0.000000
        School City                         0.000000
        School State                        0.000000
        School Zip                          0.000274
        School Not Found                    0.000000
        School or Citywide Complaint      100.000000
        Vehicle Type                      100.000000
        Taxi Company Borough              100.000000
        Taxi Pick Up Location             100.000000
        Bridge Highway Name                99.918531
        Bridge Highway Direction           99.918531
        Road Ramp                          99.928132
        Bridge Highway Segment             99.928132
        Garage Lot Name                   100.000000
        Ferry Direction                    99.999726
        Ferry Terminal Name                99.999451
        Latitude                            1.105448
        Longitude                           1.105448
        Location                            1.105448
        dtype: float64
```

There are 14 variables that have >30% null values.

```
In [8]: for i in servicedata.columns:
            if (((servicedata[i].isna().sum()/servicedata.shape[0])*100)>30):
                print(i)

        Intersection Street 1
        Intersection Street 2
        Landmark
        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
```

```
In [9]: for i in servicedata.columns:
            if (((servicedata[i].isna().sum()/servicedata.shape[0])*100)>30):
                servicedata.drop(i, axis=1, inplace=True)
```

```
In [10]: servicedata.columns
Out[10]: Index(['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',
                'Address Type', 'City', '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', 'Latitude', 'Longitude', 'Location'],
               dtype='object')
```

```
In [11]: redundantcol = ['Agency Name', 'Descriptor', 'Location Type', 'Incident Address', 'Street Name', 'Cross Street
                 'Address Type', 'Facility Type', 'Community Board', 'X Coordinate (State Plane)', 'Y Coordinate (State P
                 'School Name', 'School Number', 'School Region', 'School Code',
                 'School Phone Number', 'School Address', 'School City', 'School State',
                 'School Zip', 'School Not Found', 'Location']
```

```
In [12]: servicedata.drop(redundantcol, axis=1, inplace= True)
```

```
In [13]: servicedata.columns=servicedata.columns.str.replace(' ','_')
         servicedata.columns
Out[13]: Index(['Unique_Key', 'Created_Date', 'Closed_Date', 'Agency', 'Complaint_Type',
                'Incident_Zip', 'City', 'Status', 'Due_Date', 'Resolution_Description',
                'Resolution_Action_Updated_Date', 'Borough', 'Latitude', 'Longitude'],
               dtype='object')
```

```
In [14]: servicedata.Incident_Zip.dtypes
Out[14]: dtype('float64')
```

```
In [15]: locationdf = servicedata.loc[(servicedata.Latitude.isna() & servicedata.Longitude.isna() & servicedata.Incident_
```

```
In [16]: locationdf
Out[16]: Int64Index([    33,    283,    302,    416,    611,   1421,   1648,   1816,
                       1965,   1987,
                     ...
                     362943, 363376, 363378, 363614, 363643, 363789, 363805, 364053,
                     364151, 364349],
                    dtype='int64', length=2956)
```

```
In [17]: servicedata.drop(locationdf, axis=0, inplace=True)
```

```
In [18]: servicedata.shape
Out[18]: (361602, 14)
```

```
In [19]: servicedata.columns
Out[19]: Index(['Unique_Key', 'Created_Date', 'Closed_Date', 'Agency', 'Complaint_Type',
                'Incident_Zip', 'City', 'Status', 'Due_Date', 'Resolution_Description',
                'Resolution_Action_Updated_Date', 'Borough', 'Latitude', 'Longitude'],
               dtype='object')
```

```
In [20]: servicedata['Created_Date']= pd.to_datetime(servicedata['Created_Date'])
```

```
In [21]: servicedata['Created_Date'].head(1)
Out[21]: 0   2015-12-31 23:59:45
         Name: Created_Date, dtype: datetime64[ns]
```

```
In [22]: servicedata['Closed_Date']= pd.to_datetime(servicedata['Closed_Date'])
```

```
In [23]: servicedata['Resolution_Action_Updated_Date']= pd.to_datetime(servicedata['Resolution_Action_Updated_Date'])
```

```
In [24]: servicedata['Due_Date']= pd.to_datetime(servicedata['Due_Date'])
```

```
In [25]: servicedata['Closed_Date'].head(1)
Out[25]: 0   2016-01-01 00:55:15
         Name: Closed_Date, dtype: datetime64[ns]
```

```
In [26]: servicedata['Resolution_Action_Updated_Date'].head(1)
Out[26]: 0   2016-01-01 00:55:15
         Name: Resolution_Action_Updated_Date, dtype: datetime64[ns]
```

```
In [27]: servicedata['Due_Date'].head(1)
Out[27]: 0   2016-01-01 07:59:45
         Name: Due_Date, dtype: datetime64[ns]
```

```
In [28]: servicedata.columns
Out[28]: Index(['Unique_Key', 'Created_Date', 'Closed_Date', 'Agency', 'Complaint_Type',
                'Incident_Zip', 'City', 'Status', 'Due_Date', 'Resolution_Description',
                'Resolution_Action_Updated_Date', 'Borough', 'Latitude', 'Longitude'],
               dtype='object')
```

```
In [29]: date_search = servicedata.loc[(servicedata['Closed_Date'].isna() & servicedata['Resolution_Action_Updated_Date'
```

```
In [30]: date_search.shape
         index1 = date_search.index
```

```
In [31]: date_search2 = servicedata.loc[(servicedata['Closed_Date'].notna() & servicedata['Resolution_Action_Updated_Dat
```

```
In [32]: date_search2.shape
         index2 = date_search2.index
```

```
In [33]: index2
Out[33]: Int64Index([175920, 175921, 175922, 175923, 175925, 175926, 175927, 175928,
                     175929, 175930, 175931, 175932, 175933, 175937, 175938, 175939,
                     175941, 175942, 175943, 175944, 175945, 175947, 175948, 175949,
                     175950, 175951, 175952, 175953, 175956, 175958, 175961, 175962,
                     175963, 175964, 175965, 175968, 175970, 175971, 294151],
                    dtype='int64')
```

```
In [35]: servicedata.loc[(servicedata['Closed_Date'].isna() & servicedata['Resolution_Action_Updated_Date'].notna()),'Cl
```

```
In [36]: #to check
         date_search = servicedata.loc[(servicedata['Closed_Date'].isna() & servicedata['Resolution_Action_Updated_Date'
```

```
In [37]: date_search.shape
Out[37]: (0, 14)
```

```
In [38]: servicedata.loc[(servicedata['Closed_Date'].notna() & servicedata['Resolution_Action_Updated_Date'].isna()),'Re
```

```
In [39]: #to check
         date_search2 = servicedata.loc[(servicedata['Closed_Date'].notna() & servicedata['Resolution_Action_Updated_Dat
```

```
In [40]: date_search2.shape
Out[40]: (0, 14)
```

```
In [41]: servicedata.head(30)
```

Out[41]:

	Unique_Key	Created_Date	Closed_Date	Agency	Complaint_Type	Incident_Zip	City	Status	Due_Date	Resolution_Description
0	32310363	2015-12-31 23:59:45	2016-01-01 00:55:15	NYPD	Noise - Street/Sidewalk	10034.0	NEW YORK	Closed	2016-01-01 07:59:45	The Police Department responded and upon arriv...
1	32309934	2015-12-31 23:59:44	2016-01-01 01:26:57	NYPD	Blocked Driveway	11105.0	ASTORIA	Closed	2016-01-01 07:59:44	The Police Department responded to the complai...
2	32309159	2015-12-31 23:59:29	2016-01-01 04:51:03	NYPD	Blocked Driveway	10458.0	BRONX	Closed	2016-01-01 07:59:29	The Police Department responded and upon arriv...
3	32305098	2015-12-31 23:57:46	2016-01-01 07:43:13	NYPD	Illegal Parking	10461.0	BRONX	Closed	2016-01-01 07:57:46	The Police Department responded to the complai...
4	32306529	2015-12-31 23:56:58	2016-01-01 03:24:42	NYPD	Illegal Parking	11373.0	ELMHURST	Closed	2016-01-01 07:56:58	The Police Department responded and upon arriv...
5	32306554	2015-12-31 23:56:30	2016-01-01 01:50:11	NYPD	Illegal Parking	11215.0	BROOKLYN	Closed	2016-01-01 07:56:30	The Police Department responded and upon arriv...
6	32306559	2015-12-31 23:55:32	2016-01-01 01:53:54	NYPD	Illegal Parking	10032.0	NEW YORK	Closed	2016-01-01 07:55:32	The Police Department issued a summons in resp...
7	32307009	2015-12-31 23:54:05	2016-01-01 01:42:54	NYPD	Blocked Driveway	10457.0	BRONX	Closed	2016-01-01 07:54:05	The Police Department responded and upon arriv...
8	32308581	2015-12-31 23:53:58	2016-01-01 08:27:32	NYPD	Illegal Parking	11415.0	KEW GARDENS	Closed	2016-01-01 07:53:58	The Police Department responded to the complai...
9	32308391	2015-12-31 23:53:58	2016-01-01 01:17:40	NYPD	Blocked Driveway	11219.0	BROOKLYN	Closed	2016-01-01 07:53:58	The Police Department responded to the complai...
10	32305071	2015-12-31 23:52:58	2016-01-01 07:41:38	NYPD	Blocked Driveway	11372.0	JACKSON HEIGHTS	Closed	2016-01-01 07:52:58	The Police Department responded to the complai...
11	32306260	2015-12-31 23:50:57	2016-01-01 10:58:08	NYPD	Blocked Driveway	10453.0	BRONX	Closed	2016-01-01 07:50:57	The Police Department responded to the complai...
12	32306612	2015-12-31 23:48:03	2016-01-01 02:17:59	NYPD	Noise - Street/Sidewalk	10461.0	BRONX	Closed	2016-01-01 07:48:03	The Police Department responded to the complai...
13	32305074	2015-12-31 23:47:58	2016-01-01 08:18:47	NYPD	Illegal Parking	11208.0	BROOKLYN	Closed	2016-01-01 07:47:58	The Police Department responded to the complai...
14	32309424	2015-12-31 23:47:37	2016-01-01 10:17:22	NYPD	Derelict Vehicle	11379.0	MIDDLE VILLAGE	Closed	2016-01-01 07:47:37	The Police Department responded to the complai...
15	32309853	2015-12-31 23:47:30	2016-01-01 15:20:57	NYPD	Blocked Driveway	11374.0	REGO PARK	Closed	2016-01-01 07:47:30	The Police Department responded and upon arriv...
16	32305538	2015-12-31 23:47:02	2016-01-01 04:39:41	NYPD	Blocked Driveway	11412.0	SAINT ALBANS	Closed	2016-01-01 07:47:02	The Police Department issued a summons in resp...
17	32310273	2015-12-31 23:44:52	2016-01-01 00:36:10	NYPD	Noise - Commercial	11217.0	BROOKLYN	Closed	2016-01-01 07:44:52	The Police Department responded to the complai...
18	32306617	2015-12-31 23:40:59	2016-01-01 02:37:28	NYPD	Noise - Commercial	11234.0	BROOKLYN	Closed	2016-01-01 07:40:59	The Police Department responded to the complai...
19	32308195	2015-12-31 23:40:55	2016-01-01 00:28:31	NYPD	Noise - Street/Sidewalk	10026.0	NEW YORK	Closed	2016-01-01 07:40:55	The Police Department responded to the complai...
20	32310127	2015-12-31 23:40:43	2016-01-01 04:12:35	NYPD	Illegal Parking	10456.0	BRONX	Closed	2016-01-01 07:40:43	The Police Department responded to the complai...
21	32307994	2015-12-31 23:38:51	2016-01-01 09:11:33	NYPD	Illegal Parking	11379.0	MIDDLE VILLAGE	Closed	2016-01-01 07:38:51	The Police Department responded to the complai...
22	32307233	2015-12-31 23:34:18	2016-01-01 00:50:56	NYPD	Noise - Commercial	11234.0	BROOKLYN	Closed	2016-01-01 07:34:18	The Police Department responded to the complai...
23	32308765	2015-12-31 23:32:46	2016-01-01 00:25:21	NYPD	Illegal Parking	10030.0	NEW YORK	Closed	2016-01-01 07:32:46	The Police Department responded to the complai...
24	32308423	2015-12-31 23:31:40	2016-01-03 16:22:52	NYPD	Blocked Driveway	10467.0	BRONX	Closed	2016-01-01 07:31:40	The Police Department responded to the complai...
25	32308426	2015-12-31 23:30:28	2016-01-01 02:47:49	NYPD	Blocked Driveway	11432.0	JAMAICA	Closed	2016-01-01 07:30:28	The Police Department responded to the complai...
26	32305916	2015-12-31 23:26:41	2015-12-31 23:53:31	NYPD	Noise - House of Worship	10031.0	NEW YORK	Closed	2016-01-01 07:26:41	The Police Department responded to the complai...
27	32308379	2015-12-31 23:26:35	2016-01-01 05:07:29	NYPD	Blocked Driveway	11419.0	SOUTH RICHMOND HILL	Closed	2016-01-01 07:26:35	The Police Department responded to the complai...
28	32309402	2015-12-31 23:25:56	2016-01-01 01:12:02	NYPD	Illegal Parking	10024.0	NEW YORK	Closed	2016-01-01 07:25:56	The Police Department responded to the complai...
29	32308850	2015-12-31 23:25:01	2016-01-01 01:55:14	NYPD	Noise - Commercial	11201.0	BROOKLYN	Closed	2016-01-01 07:25:01	The Police Department responded to the complai...

```
In [42]: servicedata['Incident_Zip'].unique()
Out[42]: array([10034., 11105., 10458., 10461., 11373., 11215., 10032., 10457.,
                11415., 11219., 11372., 10453., 11208., 11379., 11374., 11412.,
                11217., 11234., 10026., 10456., 10030., 10467., 11432., 10031.,
                11419., 10024., 11201., 11216., 10462., 11385., [illegible] 11213.,
                [illegible] 10002., 10027., 11209.,
                [illegible] 11355., 11358., 11210.,
                [illegible] 10011., 11423., 11220.,
                [illegible] 11218., 10029., 10028.,
                [illegible] 10302., 11420., 11356.,
                [illegible] 11210., 11365., 10470.,
                [illegible] 11232., 10460., 11229.,
                [illegible] 11694., 10022., 10470.,
                [illegible] 10476., 11228., 10014.,
                [illegible] 11419., 10459., 11436.,
                [illegible] 10034., 10019., 11222.,
                [illegible] 11232., 10038., 10310.,
                [illegible] 11422., 10007., 10065.,
                [illegible] 11239., 11363., 10037.,
                [illegible] 11692., 10044., 11001.,
                [illegible]   nan,    83., 10000.,
                [illegible] 10069., 11451., 10153.,
                [illegible] 11695., 11011., 10162.,
```

```
In [43]: duedate = servicedata.loc[(servicedata.Due_Date.isna() & servicedata.Resolution_Action_Updated_Date.notna())]
```

```
In [44]: duedate
```

Out[44]:

	Unique_Key	Created_Date	Closed_Date	Agency	Complaint_Type	Incident_Zip	City	Status	Due_Date	Resolution_Description
175921	31129107	2015-07-21 16:05:39	2015-07-21 21:56:38	NYPD	Blocked Driveway	11219.0	BROOKLYN	Draft	NaT	The Police Department responded to the complai...

```
In [45]: servicedata.loc[(servicedata['Closed_Date'].isna() & servicedata.Resolution_Action_Updated_Date.notna()), 'Due_Date']
```

```
In [46]: servicedata.loc[(servicedata.Due_Date.isna() & servicedata.Resolution_Action_Updated_Date.notna()), 'Due_Date']
```

```
In [47]: duedate = servicedata.loc[(servicedata.Due_Date.isna() & servicedata.Resolution_Action_Updated_Date.notna())]
         duedate
```

Out[47]:

Unique_Key	Created_Date	Closed_Date	Agency	Complaint_Type	Incident_Zip	City	Status	Due_Date	Resolution_Description	Resolution_Ac

```
In [48]: datedf= servicedata.loc[(servicedata.Closed_Date.isna() & servicedata.Resolution_Action_Updated_Date.isna())].i
```

```
In [49]: datedf
Out[49]: Int64Index([  4715,  12938,  16703,  18513,  18945,  20759,  20804,  25344,
                      45698,  53237,  75299,  77220,  77552,  77784,  83570,  97551,
                     100221, 100817, 104744, 113102, 125624, 138357, 139138, 143194,
                     143506, 154521, 155107, 155315, 158019, 158132, 175119, 175430,
                     175777, 176491, 186564, 197328, 206849, 260378, 277720, 281464,
                     295003],
                    dtype='int64')
```

```
In [50]: datedf.shape
Out[50]: (41,)
```

```
In [51]: servicedata.iloc[412:418]
```

Out[51]:

	Unique_Key	Created_Date	Closed_Date	Agency	Complaint_Type	Incident_Zip	City	Status	Due_Date	Resolution_Description	Re
415	32305779	2015-12-31 14:17:33	2015-12-31 15:40:37	NYPD	Illegal Parking	11373.0	ELMHURST	Closed	2015-12-31 22:17:33	The Police Department issued a summons in resp...	
417	32308738	2015-12-31 14:15:49	2015-12-31 17:52:24	NYPD	Noise - Commercial	10014.0	NEW YORK	Closed	2015-12-31 22:15:49	The Police Department responded to the complai...	
418	32308816	2015-12-31 14:15:11	2015-12-31 15:40:33	NYPD	Illegal Parking	11373.0	ELMHURST	Closed	2015-12-31 22:15:11	The Police Department issued a summons in resp...	
419	32307477	2015-12-31 14:14:56	2015-12-31 15:47:07	NYPD	Noise - Street/Sidewalk	11206.0	BROOKLYN	Closed	2015-12-31 22:14:56	The Police Department responded to the complai...	
420	32310630	2015-12-31 14:13:53	2015-12-31 20:04:20	NYPD	Blocked Driveway	11419.0	SOUTH RICHMOND HILL	Closed	2015-12-31 22:13:53	The Police Department responded and upon arriv...	
421	32307228	2015-12-31 14:11:18	2015-12-31 22:43:45	NYPD	Derelict Vehicle	11218.0	BROOKLYN	Closed	2015-12-31 22:11:18	The Police Department responded to the complai...	

```
In [55]: servicedata.isna().sum()
Out[55]: Unique_Key                           0
         Created_Date                         0
         Closed_Date                         41
         Agency                               0
         Complaint_Type                       0
         Incident_Zip                        42
         City                                41
         Status                               0
         Due_Date                             0
         Resolution_Description               0
         Resolution_Action_Updated_Date      41
         Borough                              0
         Latitude                          1074
         Longitude                         1074
         dtype: int64
```

```
In [56]: locationdf.shape
Out[56]: (2956,)
```

```
In [57]: servicedata.loc[(servicedata['City'].isna() & servicedata['Incident_Zip'].notna()), ['City', 'Incident_Zip']]
```

Out[57]:

	City	Incident_Zip
42673	NaN	10021.0
99128	NaN	10021.0
250540	NaN	10022.0

```
In [58]: servicedata.loc[(servicedata['City'].isna() & servicedata['Incident_Zip'].notna()), ['City']] = 'NEW YORK'
```

```
In [59]: servicedata.loc[(servicedata['Incident_Zip'].isna() & servicedata['City'].notna()), ['City', 'Incident_Zip']]
```

Out[59]:

	City	Incident_Zip
111184	NEW YORK	NaN
117502	BRONX	NaN
218640	BRONX	NaN
283132	QUEENS	NaN

```
In [60]: servicedata.loc[(servicedata.City == 'QUEENS'), ['City', 'Incident_Zip']].mode()
```

Out[60]:

	City	Incident_Zip
0	QUEENS	11208.0

```
In [61]: servicedata.loc[(servicedata.City == 'BRONX'), ['City', 'Incident_Zip']].mode()
```

Out[61]:

	City	Incident_Zip
0	BRONX	10472.0

```
In [62]: servicedata.loc[(servicedata.City == 'NEW YORK'), ['City', 'Incident_Zip']].mode()
```

Out[62]:

	City	Incident_Zip
0	NEW YORK	10034.0

```
In [63]: servicedata.loc[(servicedata.City == 'QUEENS') & (servicedata.Incident_Zip.isna()), ['Incident_Zip']] = 11208.0
```

```
In [64]: servicedata.loc[(servicedata.City == 'BRONX') & (servicedata.Incident_Zip.isna()), ['Incident_Zip']] = 10472.0
```

```
In [65]: servicedata.loc[(servicedata.City == 'NEW YORK') & (servicedata.Incident_Zip.isna()), ['Incident_Zip']] = 10034
```

```
In [66]: servicedata.isna().sum()
Out[66]: Unique_Key                           0
         Created_Date                         0
         Closed_Date                         41
         Agency                               0
         Complaint_Type                       0
         Incident_Zip                        38
         City                                38
         Status                               0
         Due_Date                             0
         Resolution_Description               0
         Resolution_Action_Updated_Date      41
         Borough                              0
         Latitude                          1074
         Longitude                         1074
         dtype: int64
```

```
In [67]: citydf= servicedata.loc[(servicedata.City.isna() & servicedata.Incident_Zip.isna())].index
```

```
In [68]: citydf
Out[68]: Int64Index([ 15584,  68250,  68254,  87700,  89608,  94371,  96165,  96444,
                     102858, 103794, 105116, 106112, 106639, 107485, 109059, 112855,
                     118589, 120350, 122605, 123942, 124404, 126657, 127867, 136037,
                     160354, 165926, 173891, 175048, 176049, 184907, 198728, 201028,
                     206044, 207259, 236178, 255837, 279426, 286737],
                    dtype='int64')
```

```
In [69]: servicedata.drop(citydf, axis=0, inplace=True)
```

```
In [70]: servicedata.isna().sum()
Out[70]: Unique_Key                           0
         Created_Date                         0
         Closed_Date                         41
         Agency                               0
         Complaint_Type                       0
         Incident_Zip                         0
         City                                 0
         Status                               0
         Due_Date                             0
         Resolution_Description               0
         Resolution_Action_Updated_Date      41
         Borough                              0
         Latitude                          1074
         Longitude                         1074
         dtype: int64
```

```
In [71]: servicedata['Incident_Zip']= servicedata['Incident_Zip'].astype('int64')
```

```
In [72]: servicedata.Incident_Zip.dtypes
Out[72]: dtype('int64')
```

```
In [73]: latdf= servicedata.loc[(servicedata.Latitude.isna() & servicedata.Longitude.isna())].index
```

```
In [74]: latdf
Out[74]: Int64Index([   434,   1328,   1910,   2044,   2372,   2867,   3206,   4256,
                       4435,   4923,
                     ...
                     358345, 358769, 358790, 359013, 359815, 360898, 362116, 362297,
                     363157, 363718],
                    dtype='int64', length=1074)
```

```
In [75]: latdf.shape
Out[75]: (1074,)
```

```
In [76]: servicedata.drop(latdf, axis=0, inplace=True)
```

```
In [77]: servicedata.isna().sum()
Out[77]: Unique_Key                          0
         Created_Date                        0
         Closed_Date                        41
         Agency                              0
         Complaint_Type                      0
         Incident_Zip                        0
         City                                0
         Status                              0
         Due_Date                            0
         Resolution_Description              0
         Resolution_Action_Updated_Date     41
         Borough                             0
         Latitude                            0
         Longitude                           0
         dtype: int64
```

```
In [78]: servicedata.drop(datedf, axis=0, inplace=True)
```

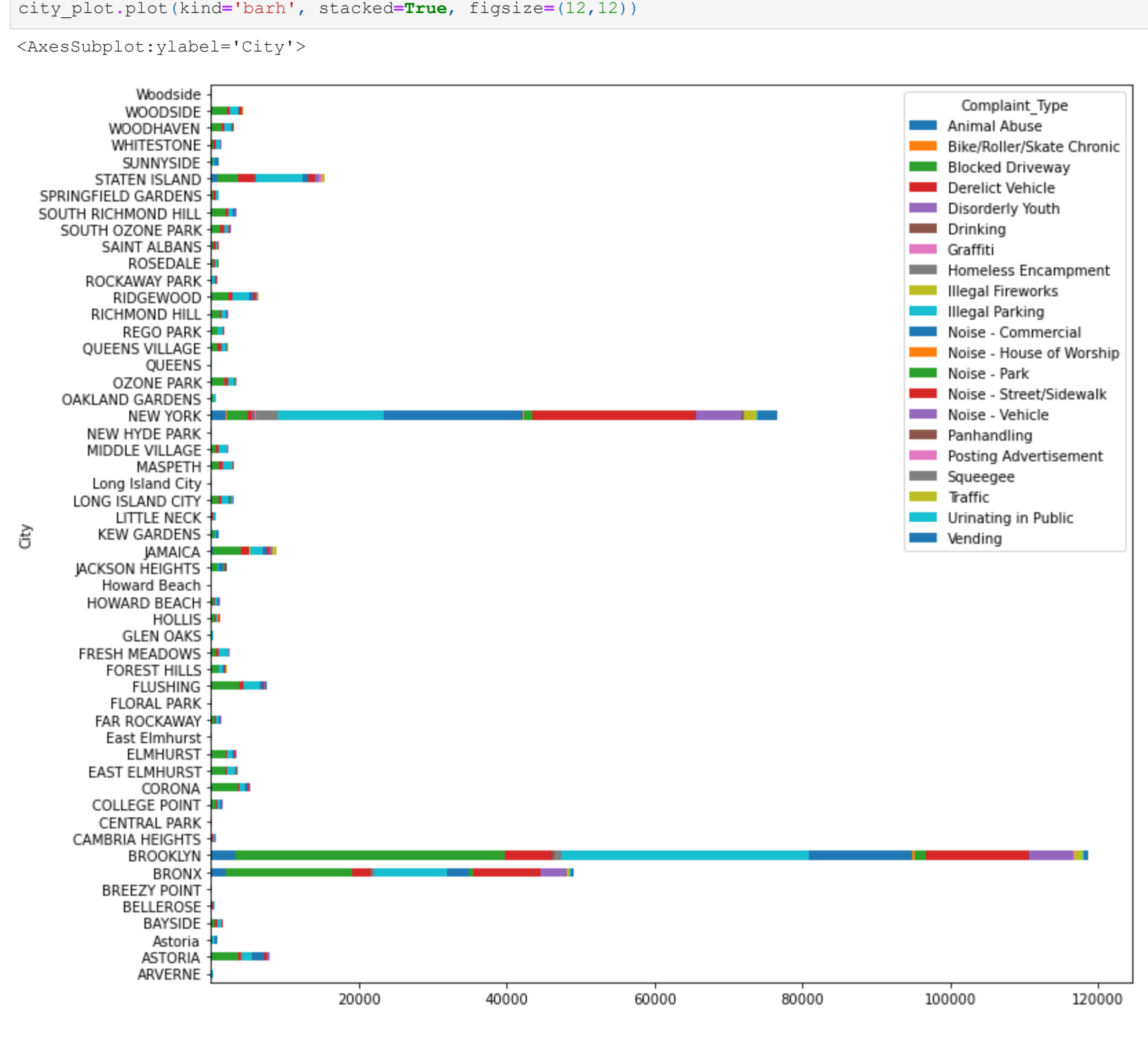
2(1). The above sequence of codes show treatment of null values. The columns that were more meaningful were retained after missing value treatment. Below is the list

```
In [79]: servicedata.isna().sum()
Out[79]: Unique_Key                        0
         Created_Date                      0
         Closed_Date                       0
         Agency                            0
         Complaint_Type                    0
         Incident_Zip                      0
         City                              0
         Status                            0
         Due_Date                          0
         Resolution_Description            0
         Resolution_Action_Updated_Date    0
         Borough                           0
         Latitude                          0
         Longitude                         0
         dtype: int64
```

```
In [80]: servicedata.dtypes
Out[80]: Unique_Key                                 int64
         Created_Date                      datetime64[ns]
         Closed_Date                       datetime64[ns]
         Agency                                    object
         Complaint_Type                            object
         Incident_Zip                               int64
         City                                      object
         Status                                    object
         Due_Date                          datetime64[ns]
         Resolution_Description                    object
         Resolution_Action_Updated_Date    datetime64[ns]
         Borough                                   object
         Latitude                                 float64
         Longitude                                float64
         dtype: object
```

```
In [81]: city_plot= pd.crosstab(servicedata['City'], servicedata['Complaint_Type'])
```

```
In [82]: city_plot.plot(kind='barh', stacked=True, figsize=(12,12))
Out[82]: <AxesSubplot:ylabel='City'>
```

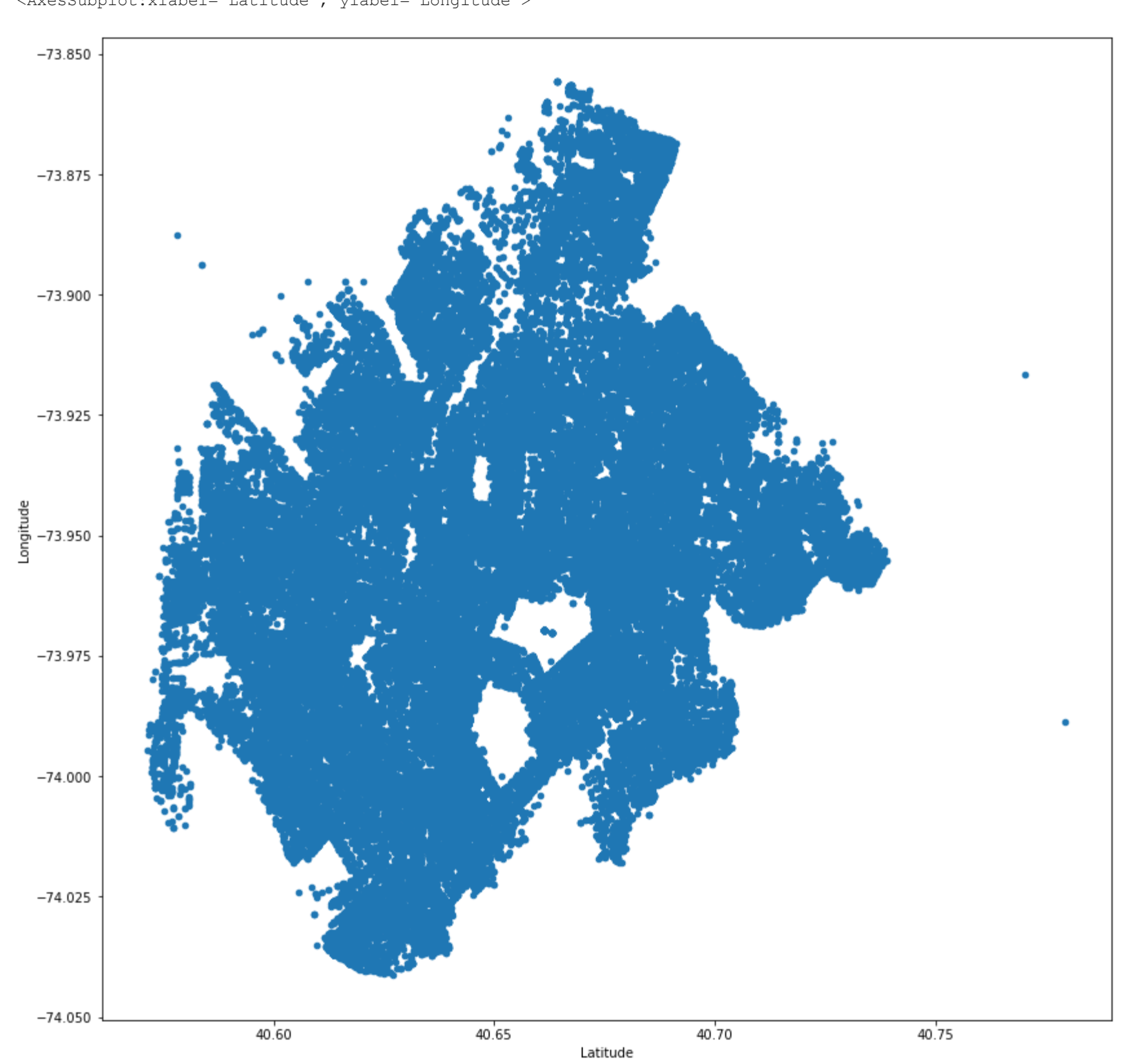


2 (3) Plot showing City-wise complaints.

Brooklyn has most number of complaints. The most common type of complaint types are 'Blocked Driveway' and 'Illegal parking'.

```
In [10]: brklndata.plot(kind='scatter', x='Latitude', y='Longitude', figsize=(14,14))
```

```
<AxesSubplot:xlabel='Latitude', ylabel='Longitude'>
```



2(4) The scatter plot shows that complaints are spreaded across all over Brooklyn

In [83]:
```
print(city_plot)
```

```
Complaint_Type       Animal Abuse  Bike/Roller/Skate Chronic  \
City
ARVERNE                        46                          0
ASTORIA                       170                         16
Astoria                         0                          0
BAYSIDE                        53                          0
BELLEROSE                      15                          1
BREEZY POINT                    2                          0
BRONX                        1967                         22
BROOKLYN                     3186                        121
CAMBRIA HEIGHTS                15                          0
CENTRAL PARK                    0                          0
COLLEGE POINT                  35                          0
CORONA                        104                          0
EAST ELMHURST                  85                          1
ELMHURST                       59                          2
East Elmhurst                   0                          0
FAR ROCKAWAY                  111                          0
FLORAL PARK                     7                          0
FLUSHING                      191                          3
FOREST HILLS                   78                          6
FRESH MEADOWS                  66                          0
GLEN OAKS                       5                          0
HOLLIS                         39                          0
HOWARD BEACH                   50                          1
Howard Beach                    0                          0
JACKSON HEIGHTS                50                          2
JAMAICA                       317                          3
KEW GARDENS                    26                          0
LITTLE NECK                    21                          0
LONG ISLAND CITY               40                          3
Long Island City                0                          0
MASPETH                        56                          1
MIDDLE VILLAGE                 35                          1
NEW HYDE PARK                   1                          0
NEW YORK                     1926                        249
OAKLAND GARDENS                29                          2
OZONE PARK                     72                          1
QUEENS                          1                          0
QUEENS VILLAGE                 90                          0
REGO PARK                      33                          0
RICHMOND HILL                  55                          0
RIDGEWOOD                     154                          3
ROCKAWAY PARK                  33                          0
ROSEDALE                       44                          1
SAINT ALBANS                   43                          0
SOUTH OZONE PARK               74                          1
SOUTH RICHMOND HILL            40                          1
SPRINGFIELD GARDENS            42                          0
STATEN ISLAND                 786                          9
SUNNYSIDE                      40                          2
WHITESTONE                     43                          4
WOODHAVEN                      57                          2
WOODSIDE                      111                          5
Woodside                        0                          0

Complaint_Type       Blocked Driveway  Derelict Vehicle  Disorderly Youth  \
City
ARVERNE                            50                32                 2
ASTORIA                          3436               426                 5
Astoria                           159                14                 0
BAYSIDE                           514               231                 2
BELLEROSE                         138               120                 2
BREEZY POINT                        3                 3                 0
BRONX                           17052              2399                66
BROOKLYN                        36433              6245                79
CAMBRIA HEIGHTS                   177               148                 0
CENTRAL PARK                        0                 0                 0
COLLEGE POINT                     597               223                 1
CORONA                           3597                72                 6
EAST ELMHURST                    1925               136                 1
ELMHURST                         1992                94                 2
East Elmhurst                       0                 2                 0
FAR ROCKAWAY                      383               215                 1
FLORAL PARK                        33                74                 1
FLUSHING                         3640               531                 2
FOREST HILLS                      873                71                 1
FRESH MEADOWS                     682               346                 0
GLEN OAKS                          48                57                 0
HOLLIS                            442               162                 1
HOWARD BEACH                      215               172                 1
Howard Beach                        1                 0                 0
JACKSON HEIGHTS                   703                41                 0
JAMAICA                          3620              1132                 9
KEW GARDENS                       429                16                 0
LITTLE NECK                       174                73                 2
LONG ISLAND CITY                 1052               219                 2
Long Island City                   55                 4                 0
MASPETH                          1000               510                 2
MIDDLE VILLAGE                    663               366                 0
NEW HYDE PARK                      76                14                 0
NEW YORK                         2688               688                80
OAKLAND GARDENS                   177               117                 1
OZONE PARK                       1681               479                 4
QUEENS                              3                 2                 0
QUEENS VILLAGE                    772               478                 0
REGO PARK                         780                93                 0
RICHMOND HILL                    1099               201                 0
RIDGEWOOD                        2160               507                 3
ROCKAWAY PARK                      80                19                 4
ROSEDALE                          270               247                 0
SAINT ALBANS                      318               248                 1
SOUTH OZONE PARK                 1202               425                 2
SOUTH RICHMOND HILL              1945               356                 2
SPRINGFIELD GARDENS               330               267                 0
STATEN ISLAND                    2844              2182                25
SUNNYSIDE                         278                17                 2
WHITESTONE                        279               279                 1
WOODHAVEN                        1363               369                 0
WOODSIDE                         2038               298                 1
Woodside                           27                 8                 0

Complaint_Type       Drinking  Graffiti  Homeless Encampment  \
City
ARVERNE                     1         1                    4
ASTORIA                    43         4                   32
Astoria                     0         0                    0
BAYSIDE                     1         3                    2
BELLEROSE                   1         0                    1
BREEZY POINT                1         0                    0
BRONX                     206        15                  274
BROOKLYN                  291        60                  939
CAMBRIA HEIGHTS             0         0                    6
CENTRAL PARK                0         0                    0
COLLEGE POINT               1         2                    3
CORONA                     34         4                   26
EAST ELMHURST               9         3                    2
ELMHURST                   13         1                   34
East Elmhurst               0         0                    0
FAR ROCKAWAY                4         0                   16
FLORAL PARK                 1         0                    0
FLUSHING                   47         6                   26
FOREST HILLS                1         3                   18
FRESH MEADOWS               2         0                    6
GLEN OAKS                   0         0                    0
HOLLIS                      3         0                    9
HOWARD BEACH                0         0                    3
Howard Beach                0         0                    0
JACKSON HEIGHTS            10         1                   11
JAMAICA                    40         3                   93
KEW GARDENS                 1         0                    5
LITTLE NECK                 1         0                    0
LONG ISLAND CITY            8         3                   10
Long Island City            0         0                    0
MASPETH                     9         1                   11
MIDDLE VILLAGE              2         0                    5
NEW HYDE PARK               0         0                    0
NEW YORK                  320        25                 3022
OAKLAND GARDENS             2         0                    1
OZONE PARK                 20         0                    8
QUEENS                      0         0                    2
QUEENS VILLAGE              5         1                   19
REGO PARK                   4         1                    6
RICHMOND HILL              10         1                   30
RIDGEWOOD                  10         3                   26
ROCKAWAY PARK              23         0                    4
ROSEDALE                    2         2                    4
SAINT ALBANS                3         0                   11
SOUTH OZONE PARK           14         2                    5
SOUTH RICHMOND HILL        25         0                   12
SPRINGFIELD GARDENS         6         0                    7
STATEN ISLAND             188         6                   77
SUNNYSIDE                  12         1                   12
WHITESTONE                  3         1                    0
WOODHAVEN                   4         0                   10
WOODSIDE                   15         4                   38
Woodside                    0         0                    0

Complaint_Type       Illegal Fireworks  Illegal Parking  ...  \
City                                                     ...
ARVERNE                              0               62  ...
ASTORIA                              4             1337  ...
Astoria                              0              277  ...
BAYSIDE                              0              637  ...
BELLEROSE                            1              132  ...
BREEZY POINT                         0               16  ...
BRONX                               24             9857  ...
BROOKLYN                            60            33461  ...
CAMBRIA HEIGHTS                      1              113  ...
CENTRAL PARK                         0                5  ...
COLLEGE POINT                        0              449  ...
CORONA                               0              791  ...
EAST ELMHURST                        0             1092  ...
ELMHURST                             1              760  ...
East Elmhurst                        0               28  ...
FAR ROCKAWAY                         0              339  ...
FLORAL PARK                          0               72  ...
FLUSHING                             2             2248  ...
FOREST HILLS                         1              626  ...
FRESH MEADOWS                        0             1155  ...
GLEN OAKS                            0               95  ...
HOLLIS                               0              181  ...
HOWARD BEACH                         4              384  ...
Howard Beach                         0                0  ...
JACKSON HEIGHTS                      1              240  ...
JAMAICA                              4             1696  ...
KEW GARDENS                          0              276  ...
LITTLE NECK                          0              322  ...
LONG ISLAND CITY                     0              984  ...
Long Island City                     0               64  ...
MASPETH                              1             1233  ...
MIDDLE VILLAGE                       0             1104  ...
NEW HYDE PARK                        0               32  ...
NEW YORK                            34            14369  ...
OAKLAND GARDENS                      0              335  ...
OZONE PARK                           1              774  ...
QUEENS                               0               10  ...
QUEENS VILLAGE                       5              669  ...
REGO PARK                            0              639  ...
RICHMOND HILL                        4              489  ...
RIDGEWOOD                            2             2234  ...
ROCKAWAY PARK                        0              336  ...
ROSEDALE                             0              324  ...
SAINT ALBANS                         0              237  ...
SOUTH OZONE PARK                     1              602  ...
SOUTH RICHMOND HILL                  2              596  ...
SPRINGFIELD GARDENS                  1              291  ...
STATEN ISLAND                       11             6222  ...
SUNNYSIDE                            0              167  ...
WHITESTONE                           1              630  ...
WOODHAVEN                            0              896  ...
WOODSIDE                             1             1081  ...
Woodside                             0              124  ...

Complaint_Type       Noise - House of Worship  Noise - Park  \
City
ARVERNE                                    14             2
ASTORIA                                    21            64
Astoria                                     0             0
BAYSIDE                                     3             3
BELLEROSE                                   1             1
BREEZY POINT                                0             0
BRONX                                      90           523
BROOKLYN                                  387          1558
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                                  217          1201
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            37
Woodside                                    0             0

Complaint_Type       Noise - Street/Sidewalk  Noise - Vehicle  Panhandling  \
City
ARVERNE                                   29                9            1
ASTORIA                                  408              236            2
Astoria                                  145                0            0
BAYSIDE                                   17               24            0
BELLEROSE                                 13               11            1
BREEZY POINT                               1                1            0
BRONX                                   9119             3545           20
BROOKLYN                               13945             5933           48
CAMBRIA HEIGHTS                           29              100            0
CENTRAL PARK                             105                0            0
COLLEGE POINT                             34              140            0
CORONA                                   242              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               69            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                                  359              336            3
KEW GARDENS                               13               23            0
LITTLE NECK                               10                8            0
LONG ISLAND CITY                         133              120            2
Long Island City                          28                0            0
MASPETH                                  124               26            0
MIDDLE VILLAGE                            38               45            0
NEW HYDE PARK                              0                2            0
NEW YORK                               22083             6179          203
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                            217               29            0
ROSEDALE                                  25               24            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                            884              423           13
SUNNYSIDE                                 69               53            0
WHITESTONE                                34               31            0
WOODHAVEN                                 89               81            1
WOODSIDE                                 261              136            0
Woodside                                   5                0            0

Complaint_Type       Posting Advertisement  Squeegee  Traffic  \
City
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      426
BROOKLYN                                58         0     1253
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       10
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     1754
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       49
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      228
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      431
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     2621
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 21 columns]
```

In [84]:
```
servicedata.City = servicedata.City.str.upper()
servicedata.City = servicedata.City.str.replace(' ','_')
```

In [85]:
```
brklndata=servicedata.loc[servicedata['City']=='BROOKLYN']
```

In [86]:
```
brklndata
```

Out[86]:

	Unique_Key	Created_Date	Closed_Date	Agency	Complaint_Type	Incident_Zip	City	Status	Due_Date	Resolution_Description
5	32306554	2015-12-31 23:56:30	2016-01-01 01:50:11	NYPD	Illegal Parking	11215	BROOKLYN	Closed	2016-01-01 07:56:30	The Police Department responded and upon arriv...
9	32308391	2015-12-31 23:53:58	2016-01-01 01:17:40	NYPD	Blocked Driveway	11219	BROOKLYN	Closed	2016-01-01 07:53:58	The Police Department responded and upon arriv...
13	32305074	2015-12-31 23:47:58	2016-01-01 08:18:47	NYPD	Illegal Parking	11208	BROOKLYN	Closed	2016-01-01 07:47:58	The Police Department responded to the complai...
17	32310273	2015-12-31 23:44:52	2016-01-01 00:36:10	NYPD	Noise - Commercial	11217	BROOKLYN	Closed	2016-01-01 07:44:52	The Police Department responded to the complai...
18	32306617	2015-12-31 23:40:59	2016-01-01 02:37:28	NYPD	Noise - Commercial	11234	BROOKLYN	Closed	2016-01-01 07:40:59	The Police Department responded to the complai...
...	...	...	...	...	...	...	...	...	...	...
364539	29608505	2015-01-01 00:23:55	2015-01-01 02:58:38	NYPD	Blocked Driveway	11201	BROOKLYN	Closed	2015-01-01 08:23:55	The Police Department responded and upon arriv...
364541	29612697	2015-01-01 00:19:22	2015-01-01 02:41:10	NYPD	Blocked Driveway	11211	BROOKLYN	Closed	2015-01-01 08:19:22	The Police Department responded and upon arriv...
364544	29613295	2015-01-01 00:17:48	2015-01-01 03:24:48	NYPD	Noise - Commercial	11217	BROOKLYN	Closed	2015-01-01 08:17:48	The Police Department responded to the complai...
364545	29613456	2015-01-01 00:17:47	2015-01-01 00:51:13	NYPD	Blocked Driveway	11237	BROOKLYN	Closed	2015-01-01 08:17:47	The Police Department issued a summons in resp...
364546	29613402	2015-01-01 00:15:45	2015-01-01 02:04:54	NYPD	Blocked Driveway	11218	BROOKLYN	Closed	2015-01-01 08:15:45	The Police Department responded and upon arriv...

118637 rows × 14 columns

In [87]:
```
cities = servicedata['City'].unique()
for i in range(len(cities)):
    exec("df_{} = servicedata.loc[(servicedata['City'] == '{}'),['Complaint_Type','Created_Date','Closed_Date']])
```

In [ ]:

In [88]:
```
servicedata.City.unique()
```

Out[88]:
```
array(['NEW_YORK', 'ASTORIA', 'BRONX', 'ELMHURST', 'BROOKLYN',
       'KEW_GARDENS', 'JACKSON_HEIGHTS', 'MIDDLE_VILLAGE', 'REGO_PARK',
       'SAINT_ALBANS', 'JAMAICA', 'SOUTH_RICHMOND_HILL', 'RIDGEWOOD',
       'HOWARD_BEACH', 'FOREST_HILLS', 'STATEN_ISLAND', 'OZONE_PARK',
       'RICHMOND_HILL', 'WOODHAVEN', 'FLUSHING', 'CORONA',
       'QUEENS_VILLAGE', 'OAKLAND_GARDENS', 'HOLLIS', 'MASPETH',
       'EAST_ELMHURST', 'SOUTH_OZONE_PARK', 'WOODSIDE', 'FRESH_MEADOWS',
       'LONG_ISLAND_CITY', 'ROCKAWAY_PARK', 'SPRINGFIELD_GARDENS',
       'COLLEGE_POINT', 'BAYSIDE', 'GLEN_OAKS', 'FAR_ROCKAWAY',
       'BELLEROSE', 'LITTLE_NECK', 'CAMBRIA_HEIGHTS', 'ROSEDALE',
       'SUNNYSIDE', 'WHITESTONE', 'ARVERNE', 'FLORAL_PARK',
       'NEW_HYDE_PARK', 'CENTRAL_PARK', 'BREEZY_POINT', 'QUEENS'],
      dtype=object)
```

In [89]:
```
df_NEW_YORK
```

Out[89]:

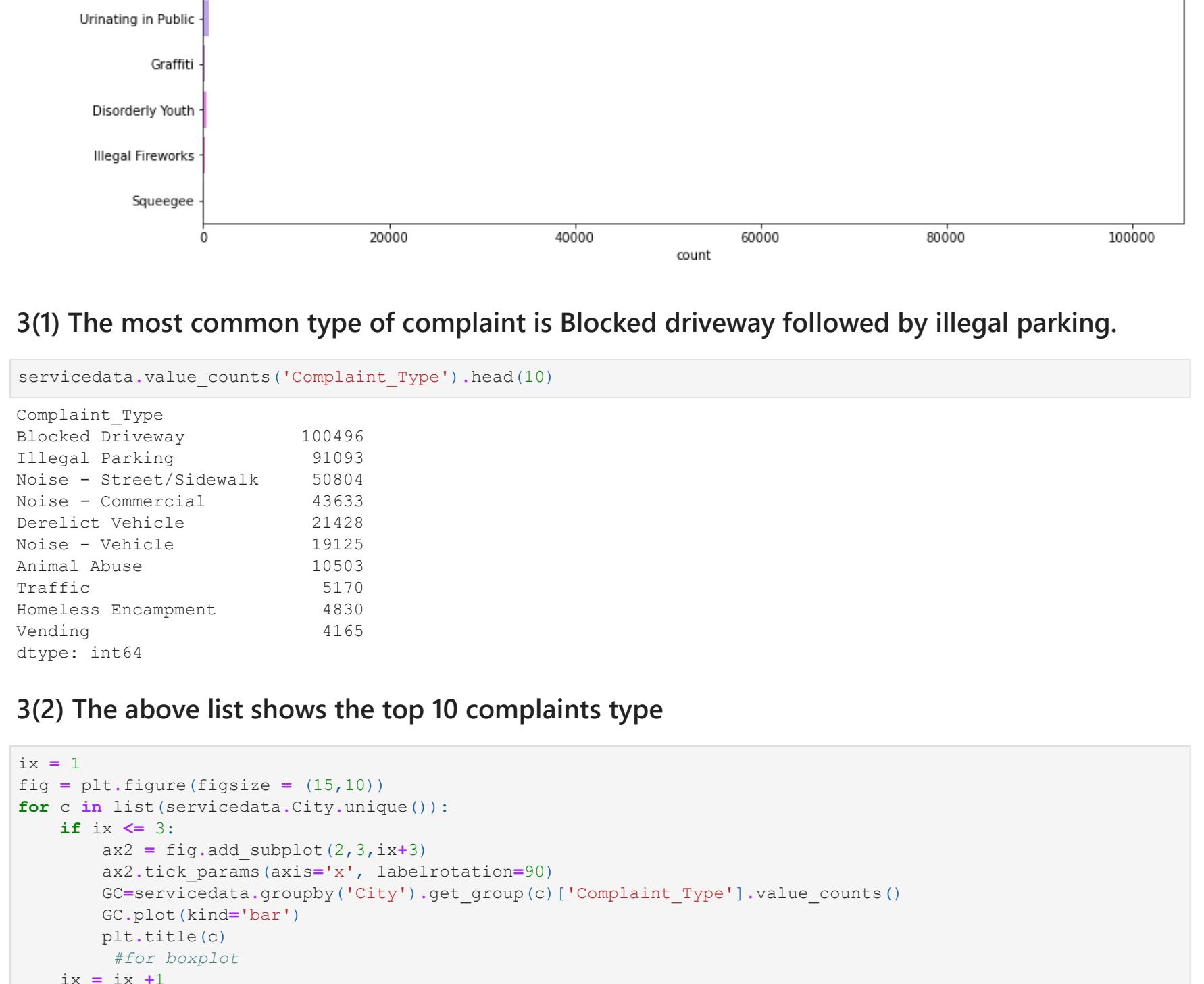
	Complaint_Type	Created_Date	Closed_Date
0	Noise - Street/Sidewalk	2015-12-31 23:59:45	2016-01-01 00:55:15
6	Illegal Parking	2015-12-31 23:55:32	2016-01-01 01:53:54
19	Noise - Street/Sidewalk	2015-12-31 23:40:55	2016-01-01 00:28:31
23	Illegal Parking	2015-12-31 23:32:46	2016-01-01 00:25:21
26	Noise - House of Worship	2015-12-31 23:26:41	2015-12-31 23:53:31
...	...	...	...
364542	Noise - Street/Sidewalk	2015-01-01 00:19:20	2015-01-01 03:17:10
364543	Noise - Street/Sidewalk	2015-01-01 00:18:49	2015-01-01 03:17:11
364547	Noise - Street/Sidewalk	2015-01-01 00:15:33	2015-01-01 00:56:37
364552	Noise - Street/Sidewalk	2015-01-01 00:05:05	2015-01-01 01:22:10
364555	Noise - Street/Sidewalk	2015-01-01 00:01:30	2015-01-01 00:20:33

76645 rows × 3 columns

3(3) The above dataframe shows an example for one of the cities displaying complaints type

In [90]:
```
plt.figure(figsize=(14,14))
sns.countplot(y='Complaint_Type',data=servicedata)
```

Out[90]:
```
<AxesSubplot:xlabel='count', ylabel='Complaint_Type'>
```



3(1) The most common type of complaint is Blocked driveway followed by illegal parking.

In [91]:
```
servicedata.value_counts('Complaint_Type').head(10)
```

Out[91]:
```
Complaint_Type
Blocked Driveway           100496
Illegal Parking             91093
Noise - Street/Sidewalk     50804
Noise - Commercial          43633
Derelict Vehicle            21428
Noise - Vehicle             19125
Animal Abuse                10503
Traffic                      5170
Homeless Encampment          4830
Vending                      4165
dtype: int64
```

3(2) The above list shows the top 10 complaints type

In [93]:
```
ix = 1
fig = plt.figure(figsize = (15,10))
for c in list(servicedata.City.unique()):
    if ix <= 3:
        ax2 = fig.add_subplot(2,3,ix+3)
        ax2.tick_params(axis='x', labelrotation=90)
        GC=servicedata.groupby('City').get_group(c)['Complaint_Type'].value_counts()
        GC.plot(kind='bar')
        plt.title(c)
        #for boxplot
    ix =ix +1
    if ix == 4:
        fig = plt.figure(figsize = (15,10))
        ix =1
```


```
<Figure size 1080x720 with 0 Axes>
```

4: The above plots show major types of complaints in each city. We can observe that for most of the cities the complaint type is 'Blocked driveway' and second most is 'illegal parking'. Central park has only two complaints that are Noise and very negligible illegal parking.

In [94]:
```
servicedata.groupby('City').get_group('NEW_YORK')['Complaint_Type'].value_counts()
```

Out[94]:
```
Noise - Street/Sidewalk      22083
Noise - Commercial           18669
Illegal Parking              14369
Noise - Vehicle               6179
Homeless Encampment           3022
Blocked Driveway              2688
Vending                       2621
Animal Abuse                  1926
Traffic                       1754
Noise - Park                  1201
Derelict Vehicle               688
Drinking                       320
Urinating in Public            264
Bike/Roller/Skate Chronic      249
Noise - House of Worship       217
Panhandling                    203
Disorderly Youth                80
Posting Advertisement           49
Illegal Fireworks               34
Graffiti                        25
Squeegee                         4
Name: Complaint_Type, dtype: int64
```

In [95]:
```
servicedata['Resopnse_Time']=servicedata['Closed_Date']-servicedata['Created_Date']
```

In [96]:
```
servicedata.head()
```

Out[96]:

	Unique_Key	Created_Date	Closed_Date	Agency	Complaint_Type	Incident_Zip	City	Status	Due_Date	Resolution_Description	Resolu
0	32310363	2015-12-31 23:59:45	2016-01-01 00:55:15	NYPD	Noise - Street/Sidewalk	10034	NEW_YORK	Closed	2016-01-01 07:59:45	The Police Department responded and upon arriv...	
1	32309934	2015-12-31 23:59:44	2016-01-01 01:26:57	NYPD	Blocked Driveway	11105	ASTORIA	Closed	2016-01-01 07:59:44	The Police Department responded to the complai...	
2	32309159	2015-12-31 23:59:29	2016-01-01 04:51:03	NYPD	Blocked Driveway	10458	BRONX	Closed	2016-01-01 07:59:29	The Police Department responded and upon arriv...	
3	32305098	2015-12-31 23:57:46	2016-01-01 07:43:13	NYPD	Illegal Parking	10461	BRONX	Closed	2016-01-01 07:57:46	The Police Department responded to the complai...	
4	32306529	2015-12-31 23:56:58	2016-01-01 03:24:42	NYPD	Illegal Parking	11373	ELMHURST	Closed	2016-01-01 07:56:58	The Police Department responded and upon arriv...	

In [97]:
```
C=servicedata.groupby('Complaint_Type')
```

In [98]:
```
C.get_group('Animal Abuse')['Resopnse_Time'].mean()
```

Out[98]:
```
Timedelta('0 days 05:00:51.110920689')
```

In [99]:
```
CU=servicedata.Complaint_Type.unique()
```

In [100…
```
for i in CU:
    print(i,' ',C.get_group(i)['Resopnse_Time'].mean())
```

```
Noise - Street/Sidewalk   0 days 03:23:37.674139831
Blocked Driveway   0 days 04:30:17.264975720
Illegal Parking   0 days 04:19:44.000713556
Derelict Vehicle   0 days 07:01:20.634263580
Noise - Commercial   0 days 03:04:00.749226502
Noise - House of Worship   0 days 03:09:58.217719132
Posting Advertisement   0 days 02:01:26.256259204
Noise - Vehicle   0 days 03:29:46.409777777
Animal Abuse   0 days 05:00:51.110920689
Vending   0 days 03:59:14.285474189
Traffic   0 days 03:25:20.261508704
Drinking   0 days 03:50:03.985000
Bike/Roller/Skate Chronic   0 days 03:35:41.995680345
Panhandling   0 days 04:23:42.803125
Noise - Park   0 days 03:23:19.201701701
Homeless Encampment   0 days 04:17:54.749068322
Urinating in Public   0 days 03:35:59.293291731
Graffiti   0 days 06:27:56.343949044
Disorderly Youth   0 days 03:26:35.754777070
Illegal Fireworks   0 days 02:48:42.347305389
Squeegee   0 days 04:02:40.250000
```

5 Derelict Vehicle complaint type was resolved in maximum time (07:01:20.634263580). Posting Advertisement was resolved in least time (02:01:26.256259204)

In [ ]: