

# Untitled-Copy1

October 16, 2020

```
In [140]: import pandas as pd
import numpy as np
import matplotlib as mp
import scipy
import scipy.stats

In [141]: b=pd.read_csv("311_Service_Requests_from_2010_to_Present.csv") #import dataset
# 1 Import a 311 NYC service request.
a=b

In [142]: a.columns
#column names of data set

Out[142]: 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',
'Intersection Street 1', 'Intersection Street 2', 'Address Type',
'City', 'Landmark', 'Facility Type', 'Status', 'Due Date',
'Resolution Description', 'Resolution Action Updated Date',
'Community Board', 'Borough', 'X Coordinate (State Plane)',
'Y Coordinate (State Plane)', 'Park Facility Name', 'Park Borough',
'School Name', 'School Number', 'School Region', 'School Code',
'School Phone Number', 'School Address', 'School City', 'School State',
'School Zip', 'School Not Found', 'School or Citywide Complaint',
'Vehicle Type', 'Taxi Company Borough', 'Taxi Pick Up Location',
'Bridge Highway Name', 'Bridge Highway Direction', 'Road Ramp',
'Bridge Highway Segment', 'Garage Lot Name', 'Ferry Direction',
'Ferry Terminal Name', 'Latitude', 'Longitude', 'Location'],
dtype='object')

In [143]: a.describe(include='all')

Out[143]:
```

|        | Unique Key   | Created Date   | Closed Date   | Agency \ |
|--------|--------------|----------------|---------------|----------|
| count  | 3.006980e+05 | 300698         | 298534        | 300698   |
| unique | NaN          | 259493         | 237165        | 1        |
| top    | NaN          | 06-06-15 22:23 | 11-08-15 7:34 | NYPD     |
| freq   | NaN          | 9              | 24            | 300698   |
| mean   | 3.130054e+07 | NaN            | NaN           | NaN      |

|     |              |     |     |     |
|-----|--------------|-----|-----|-----|
| std | 5.738547e+05 | NaN | NaN | NaN |
| min | 3.027948e+07 | NaN | NaN | NaN |
| 25% | 3.080118e+07 | NaN | NaN | NaN |
| 50% | 3.130436e+07 | NaN | NaN | NaN |
| 75% | 3.178446e+07 | NaN | NaN | NaN |
| max | 3.231065e+07 | NaN | NaN | NaN |

|        | Agency Name                     | Complaint Type   | Descriptor \     |
|--------|---------------------------------|------------------|------------------|
| count  | 300698                          | 300698           | 294784           |
| unique | 3                               | 24               | 45               |
| top    | New York City Police Department | Blocked Driveway | Loud Music/Party |
| freq   | 300690                          | 77044            | 61430            |
| mean   | NaN                             | NaN              | NaN              |
| std    | NaN                             | NaN              | NaN              |
| min    | NaN                             | NaN              | NaN              |
| 25%    | NaN                             | NaN              | NaN              |
| 50%    | NaN                             | NaN              | NaN              |
| 75%    | NaN                             | NaN              | NaN              |
| max    | NaN                             | NaN              | NaN              |

|        | Location Type   | Incident Zip  | Incident Address \ |
|--------|-----------------|---------------|--------------------|
| count  | 300567          | 298083.000000 | 256288             |
| unique | 18              | NaN           | 107652             |
| top    | Street/Sidewalk | NaN           | 1207 BEACH AVENUE  |
| freq   | 249299          | NaN           | 904                |
| mean   | NaN             | 10848.888645  | NaN                |
| std    | NaN             | 583.182081    | NaN                |
| min    | NaN             | 83.000000     | NaN                |
| 25%    | NaN             | 10310.000000  | NaN                |
| 50%    | NaN             | 11208.000000  | NaN                |
| 75%    | NaN             | 11238.000000  | NaN                |
| max    | NaN             | 11697.000000  | NaN                |

|        | ... | Bridge Highway Name \ |
|--------|-----|-----------------------|
| count  | ... | 243                   |
| unique | ... | 29                    |
| top    | ... | FDR Dr                |
| freq   | ... | 33                    |
| mean   | ... | NaN                   |
| std    | ... | NaN                   |
| min    | ... | NaN                   |
| 25%    | ... | NaN                   |
| 50%    | ... | NaN                   |
| 75%    | ... | NaN                   |
| max    | ... | NaN                   |

|       | Bridge Highway Direction | Road Ramp \ |
|-------|--------------------------|-------------|
| count | 243                      | 213         |

|        |                   |         |
|--------|-------------------|---------|
| unique | 34                | 2       |
| top    | East/Queens Bound | Roadway |
| freq   | 21                | 162     |
| mean   | NaN               | NaN     |
| std    | NaN               | NaN     |
| min    | NaN               | NaN     |
| 25%    | NaN               | NaN     |
| 50%    | NaN               | NaN     |
| 75%    | NaN               | NaN     |
| max    | NaN               | NaN     |

|        | Bridge Highway Segment                           | Garage Lot Name \ |
|--------|--|-------------------|
| count  | 213  | 0.0               |
| unique | 160  | NaN               |
| top    | East 96th St (Exit 14) - Triborough Br (Exit 17) | NaN               |
| freq   | 6  | NaN               |
| mean   | NaN  | NaN               |
| std    | NaN  | NaN               |
| min    | NaN  | NaN               |
| 25%    | NaN  | NaN               |
| 50%    | NaN  | NaN               |
| 75%    | NaN  | NaN               |
| max    | NaN  | NaN               |

|        | Ferry Direction | Ferry Terminal Name | Latitude      | Longitude \   |
|--------|-----------------|---------------------|---------------|---------------|
| count  | 1               | 2                   | 297158.000000 | 297158.000000 |
| unique | 1               | 2                   | NaN           | NaN           |
| top    | Manhattan Bound | Barberi             | NaN           | NaN           |
| freq   | 1               | 1                   | NaN           | NaN           |
| mean   | NaN             | NaN                 | 40.725885     | -73.925630    |
| std    | NaN             | NaN                 | 0.082012      | 0.078454      |
| min    | NaN             | NaN                 | 40.499135     | -74.254937    |
| 25%    | NaN             | NaN                 | 40.669796     | -73.972142    |
| 50%    | NaN             | NaN                 | 40.718661     | -73.931781    |
| 75%    | NaN             | NaN                 | 40.781840     | -73.876805    |
| max    | NaN             | NaN                 | 40.912869     | -73.700760    |

|        | Location                                |
|--------|---|
| count  | 297158                                  |
| unique | 126048                                  |
| top    | (40.83036235589997, -73.86602154214397) |
| freq   | 902                                     |
| mean   | NaN                                     |
| std    | NaN                                     |
| min    | NaN                                     |
| 25%    | NaN                                     |
| 50%    | NaN                                     |
| 75%    | NaN                                     |

max

NaN

[11 rows x 53 columns]

```
In [144]: print(a.dtypes)
          #data types
```

|                                |         |
|--------------------------------|---------|
| 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 [145]: print(a["Created Date"])
          #created date formats
```

```
0      12/31/2015 11:59:45 PM
1      12/31/2015 11:59:44 PM
2      12/31/2015 11:59:29 PM
3      12/31/2015 11:57:46 PM
4      12/31/2015 11:56:58 PM
5      12/31/2015 11:56:30 PM
6      12/31/2015 11:55:32 PM
7      12/31/2015 11:54:05 PM
8      12/31/2015 11:53:58 PM
9      12/31/2015 11:53:58 PM
10     12/31/2015 11:52:58 PM
11     12/31/2015 11:50:57 PM
12     12/31/2015 11:48:03 PM
13     12/31/2015 11:47:58 PM
14     12/31/2015 11:47:37 PM
15     12/31/2015 11:47:30 PM
16     12/31/2015 11:47:02 PM
17     12/31/2015 11:44:52 PM
18     12/31/2015 11:40:59 PM
19     12/31/2015 11:40:55 PM
20     12/31/2015 11:40:43 PM
21     12/31/2015 11:38:51 PM
22     12/31/2015 11:34:18 PM
23     12/31/2015 11:32:46 PM
24     12/31/2015 11:31:40 PM
25     12/31/2015 11:30:28 PM
26     12/31/2015 11:26:41 PM
27     12/31/2015 11:26:35 PM
28     12/31/2015 11:25:56 PM
29     12/31/2015 11:25:01 PM
```

```

...
300668    03/29/2015 01:03:20 AM
300669    03/29/2015 01:02:05 AM
300670    03/29/2015 01:01:25 AM
300671    03/29/2015 12:58:08 AM
300672    03/29/2015 12:57:27 AM
300673    03/29/2015 12:57:25 AM
300674    03/29/2015 12:57:19 AM
300675    03/29/2015 12:56:22 AM
300676    03/29/2015 12:55:56 AM
300677    03/29/2015 12:55:33 AM
300678    03/29/2015 12:50:12 AM
300679    03/29/2015 12:49:51 AM
300680    03/29/2015 12:49:27 AM
300681    03/29/2015 12:48:23 AM
300682    03/29/2015 12:46:26 AM
300683    03/29/2015 12:44:36 AM
300684    03/29/2015 12:43:20 AM
300685    03/29/2015 12:43:16 AM
300686    03/29/2015 12:43:06 AM
300687    03/29/2015 12:42:48 AM
300688    03/29/2015 12:37:15 AM
300689    03/29/2015 12:35:28 AM
300690    03/29/2015 12:35:23 AM
300691    03/29/2015 12:35:04 AM
300692    03/29/2015 12:34:32 AM
300693    03/29/2015 12:33:41 AM
300694    03/29/2015 12:33:28 AM
300695    03/29/2015 12:33:03 AM
300696    03/29/2015 12:33:02 AM
300697    03/29/2015 12:33:01 AM
Name: Created Date, Length: 300698, dtype: object

```

```

In [146]: print(a["Closed Date"])
          # check closed date formats

```

```

0          01-01-16 0:55
1          01-01-16 1:26
2          01-01-16 4:51
3          01-01-16 7:43
4          01-01-16 3:24
5          01-01-16 1:50
6          01-01-16 1:53
7          01-01-16 1:42
8          01-01-16 8:27
9          01-01-16 1:17
10         01-01-16 7:41

```

|        |                        |
|--------|------------------------|
| 11     | 01-01-16 10:58         |
| 12     | 01-01-16 2:17          |
| 13     | 01-01-16 8:18          |
| 14     | 01-01-16 10:17         |
| 15     | 01-01-16 15:20         |
| 16     | 01-01-16 4:39          |
| 17     | 01-01-16 0:36          |
| 18     | 01-01-16 2:37          |
| 19     | 01-01-16 0:28          |
| 20     | 01-01-16 4:12          |
| 21     | 01-01-16 9:11          |
| 22     | 01-01-16 0:50          |
| 23     | 01-01-16 0:25          |
| 24     | 01-03-16 16:22         |
| 25     | 01-01-16 2:47          |
| 26     | 12/31/2015 11:53:31 PM |
| 27     | 01-01-16 5:07          |
| 28     | 01-01-16 1:12          |
| 29     | 01-01-16 1:55          |
|        | ...                    |
| 300668 | 03/29/2015 03:40:19 AM |
| 300669 | 03/29/2015 05:26:38 AM |
| 300670 | 03/29/2015 09:26:52 AM |
| 300671 | 03/29/2015 04:44:02 AM |
| 300672 | 03/29/2015 04:39:53 PM |
| 300673 | 03/29/2015 02:25:31 AM |
| 300674 | 03/29/2015 03:17:59 AM |
| 300675 | 03/29/2015 01:57:52 AM |
| 300676 | 03/29/2015 08:08:27 AM |
| 300677 | 03/29/2015 07:12:39 AM |
| 300678 | 03/29/2015 07:06:29 AM |
| 300679 | 03/29/2015 02:02:21 AM |
| 300680 | 03/29/2015 04:25:53 AM |
| 300681 | 03/29/2015 03:42:33 AM |
| 300682 | 03/29/2015 07:12:20 AM |
| 300683 | 03/29/2015 03:40:20 AM |
| 300684 | 03/29/2015 01:10:55 AM |
| 300685 | 03/29/2015 04:25:50 AM |
| 300686 | 03/29/2015 12:57:23 AM |
| 300687 | 03/29/2015 02:57:41 AM |
| 300688 | 03/29/2015 01:02:39 AM |
| 300689 | 03/29/2015 04:14:27 AM |
| 300690 | 03/29/2015 08:41:24 AM |
| 300691 | 03/29/2015 02:52:28 AM |
| 300692 | 03/29/2015 01:13:01 AM |
| 300693 | NaN                    |
| 300694 | 03/29/2015 02:33:59 AM |
| 300695 | 03/29/2015 03:40:20 AM |

```

300696    03/29/2015 04:38:35 AM
300697    03/29/2015 04:41:50 AM
Name: Closed Date, Length: 300698, dtype: object

```

```
In [147]: import datetime as dt #import datetime
```

```
In [148]: a.columns=a.columns.str.replace(' ','')
          #remove spaces from columns for ease
          a.columns
```

```
Out[148]: Index(['UniqueKey', 'CreatedDate', 'ClosedDate', 'Agency', 'AgencyName',
                'ComplaintType', 'Descriptor', 'LocationType', 'IncidentZip',
                'IncidentAddress', 'StreetName', 'CrossStreet1', 'CrossStreet2',
                'IntersectionStreet1', 'IntersectionStreet2', 'AddressType', 'City',
                'Landmark', 'FacilityType', 'Status', 'DueDate',
                'ResolutionDescription', 'ResolutionActionUpdatedDate',
                'CommunityBoard', 'Borough', 'XCoordinate(StatePlane)',
                'YCoordinate(StatePlane)', 'ParkFacilityName', 'ParkBorough',
                'SchoolName', 'SchoolNumber', 'SchoolRegion', 'SchoolCode',
                'SchoolPhoneNumber', 'SchoolAddress', 'SchoolCity', 'SchoolState',
                'SchoolZip', 'SchoolNotFound', 'SchoolorCitywideComplaint',
                'VehicleType', 'TaxiCompanyBorough', 'TaxiPickUpLocation',
                'BridgeHighwayName', 'BridgeHighwayDirection', 'RoadRamp',
                'BridgeHighwaySegment', 'GarageLotName', 'FerryDirection',
                'FerryTerminalName', 'Latitude', 'Longitude', 'Location'],
                dtype='object')
```

```
In [149]: closed=a["ClosedDate"]
          # if closed date is nan fill nan else check if the
          #string contains - use the
          #mm-dd-yy h:m format with 24 hours
          # else use mm/dd/yy h:m am/pm format
          #convert into datetime object
          #and replace with closeddate column
          a.ClosedDate=a.ClosedDate.apply(lambda row: np.nan if type(row)==type(0.0)\
          else(dt.datetime.strptime(row,"%m-%d-%y %H:%M") if '-' \
          in row else dt.datetime.strptime(row,"%m/%d/%Y %I:%M:%S %p")))
          print("\nn\n\nnnnnnnnn")
          a
```

n

nnnnnnnn

```
Out[149]:
```

|   | UniqueKey | CreatedDate            | ClosedDate          | Agency | \ |
|---|-----------|------------------------|---------------------|--------|---|
| 0 | 32310363  | 12/31/2015 11:59:45 PM | 2016-01-01 00:55:00 | NYPD   |   |



|        |          |            |          |     |            |          |      |
|--------|----------|------------|----------|-----|------------|----------|------|
| 1      | 32309934 | 12/31/2015 | 11:59:44 | PM  | 2016-01-01 | 01:26:00 | NYPD |
| 2      | 32309159 | 12/31/2015 | 11:59:29 | PM  | 2016-01-01 | 04:51:00 | NYPD |
| 3      | 32305098 | 12/31/2015 | 11:57:46 | PM  | 2016-01-01 | 07:43:00 | NYPD |
| 4      | 32306529 | 12/31/2015 | 11:56:58 | PM  | 2016-01-01 | 03:24:00 | NYPD |
| 5      | 32306554 | 12/31/2015 | 11:56:30 | PM  | 2016-01-01 | 01:50:00 | NYPD |
| 6      | 32306559 | 12/31/2015 | 11:55:32 | PM  | 2016-01-01 | 01:53:00 | NYPD |
| 7      | 32307009 | 12/31/2015 | 11:54:05 | PM  | 2016-01-01 | 01:42:00 | NYPD |
| 8      | 32308581 | 12/31/2015 | 11:53:58 | PM  | 2016-01-01 | 08:27:00 | NYPD |
| 9      | 32308391 | 12/31/2015 | 11:53:58 | PM  | 2016-01-01 | 01:17:00 | NYPD |
| 10     | 32305071 | 12/31/2015 | 11:52:58 | PM  | 2016-01-01 | 07:41:00 | NYPD |
| 11     | 32306260 | 12/31/2015 | 11:50:57 | PM  | 2016-01-01 | 10:58:00 | NYPD |
| 12     | 32306612 | 12/31/2015 | 11:48:03 | PM  | 2016-01-01 | 02:17:00 | NYPD |
| 13     | 32305074 | 12/31/2015 | 11:47:58 | PM  | 2016-01-01 | 08:18:00 | NYPD |
| 14     | 32309424 | 12/31/2015 | 11:47:37 | PM  | 2016-01-01 | 10:17:00 | NYPD |
| 15     | 32309853 | 12/31/2015 | 11:47:30 | PM  | 2016-01-01 | 15:20:00 | NYPD |
| 16     | 32305538 | 12/31/2015 | 11:47:02 | PM  | 2016-01-01 | 04:39:00 | NYPD |
| 17     | 32310273 | 12/31/2015 | 11:44:52 | PM  | 2016-01-01 | 00:36:00 | NYPD |
| 18     | 32306617 | 12/31/2015 | 11:40:59 | PM  | 2016-01-01 | 02:37:00 | NYPD |
| 19     | 32308195 | 12/31/2015 | 11:40:55 | PM  | 2016-01-01 | 00:28:00 | NYPD |
| 20     | 32310127 | 12/31/2015 | 11:40:43 | PM  | 2016-01-01 | 04:12:00 | NYPD |
| 21     | 32307994 | 12/31/2015 | 11:38:51 | PM  | 2016-01-01 | 09:11:00 | NYPD |
| 22     | 32307233 | 12/31/2015 | 11:34:18 | PM  | 2016-01-01 | 00:50:00 | NYPD |
| 23     | 32308765 | 12/31/2015 | 11:32:46 | PM  | 2016-01-01 | 00:25:00 | NYPD |
| 24     | 32308423 | 12/31/2015 | 11:31:40 | PM  | 2016-01-03 | 16:22:00 | NYPD |
| 25     | 32308426 | 12/31/2015 | 11:30:28 | PM  | 2016-01-01 | 02:47:00 | NYPD |
| 26     | 32305916 | 12/31/2015 | 11:26:41 | PM  | 2015-12-31 | 23:53:31 | NYPD |
| 27     | 32308379 | 12/31/2015 | 11:26:35 | PM  | 2016-01-01 | 05:07:00 | NYPD |
| 28     | 32309402 | 12/31/2015 | 11:25:56 | PM  | 2016-01-01 | 01:12:00 | NYPD |
| 29     | 32308850 | 12/31/2015 | 11:25:01 | PM  | 2016-01-01 | 01:55:00 | NYPD |
| ...    | ...      | ...        | ...      | ... | ...        | ...      | ...  |
| 300668 | 30282107 | 03/29/2015 | 01:03:20 | AM  | 2015-03-29 | 03:40:19 | NYPD |
| 300669 | 30283741 | 03/29/2015 | 01:02:05 | AM  | 2015-03-29 | 05:26:38 | NYPD |
| 300670 | 30284125 | 03/29/2015 | 01:01:25 | AM  | 2015-03-29 | 09:26:52 | NYPD |
| 300671 | 30283901 | 03/29/2015 | 12:58:08 | AM  | 2015-03-29 | 04:44:02 | NYPD |
| 300672 | 30282374 | 03/29/2015 | 12:57:27 | AM  | 2015-03-29 | 16:39:53 | NYPD |
| 300673 | 30280817 | 03/29/2015 | 12:57:25 | AM  | 2015-03-29 | 02:25:31 | NYPD |
| 300674 | 30283364 | 03/29/2015 | 12:57:19 | AM  | 2015-03-29 | 03:17:59 | NYPD |
| 300675 | 30280353 | 03/29/2015 | 12:56:22 | AM  | 2015-03-29 | 01:57:52 | NYPD |
| 300676 | 30280974 | 03/29/2015 | 12:55:56 | AM  | 2015-03-29 | 08:08:27 | NYPD |
| 300677 | 30280622 | 03/29/2015 | 12:55:33 | AM  | 2015-03-29 | 07:12:39 | NYPD |
| 300678 | 30282979 | 03/29/2015 | 12:50:12 | AM  | 2015-03-29 | 07:06:29 | NYPD |
| 300679 | 30281254 | 03/29/2015 | 12:49:51 | AM  | 2015-03-29 | 02:02:21 | NYPD |
| 300680 | 30281090 | 03/29/2015 | 12:49:27 | AM  | 2015-03-29 | 04:25:53 | NYPD |
| 300681 | 30283933 | 03/29/2015 | 12:48:23 | AM  | 2015-03-29 | 03:42:33 | NYPD |
| 300682 | 30283186 | 03/29/2015 | 12:46:26 | AM  | 2015-03-29 | 07:12:20 | NYPD |
| 300683 | 30284534 | 03/29/2015 | 12:44:36 | AM  | 2015-03-29 | 03:40:20 | NYPD |
| 300684 | 30281081 | 03/29/2015 | 12:43:20 | AM  | 2015-03-29 | 01:10:55 | NYPD |
| 300685 | 30280506 | 03/29/2015 | 12:43:16 | AM  | 2015-03-29 | 04:25:50 | NYPD |

|        |          |            |          |    |            |          |      |
|--------|----------|------------|----------|----|------------|----------|------|
| 300686 | 30281145 | 03/29/2015 | 12:43:06 | AM | 2015-03-29 | 00:57:23 | NYPD |
| 300687 | 30282599 | 03/29/2015 | 12:42:48 | AM | 2015-03-29 | 02:57:41 | NYPD |
| 300688 | 30280732 | 03/29/2015 | 12:37:15 | AM | 2015-03-29 | 01:02:39 | NYPD |
| 300689 | 30283432 | 03/29/2015 | 12:35:28 | AM | 2015-03-29 | 04:14:27 | NYPD |
| 300690 | 30280538 | 03/29/2015 | 12:35:23 | AM | 2015-03-29 | 08:41:24 | NYPD |
| 300691 | 30279999 | 03/29/2015 | 12:35:04 | AM | 2015-03-29 | 02:52:28 | NYPD |
| 300692 | 30281370 | 03/29/2015 | 12:34:32 | AM | 2015-03-29 | 01:13:01 | NYPD |
| 300693 | 30281872 | 03/29/2015 | 12:33:41 | AM |            | NaT      | NYPD |
| 300694 | 30281230 | 03/29/2015 | 12:33:28 | AM | 2015-03-29 | 02:33:59 | NYPD |
| 300695 | 30283424 | 03/29/2015 | 12:33:03 | AM | 2015-03-29 | 03:40:20 | NYPD |
| 300696 | 30280004 | 03/29/2015 | 12:33:02 | AM | 2015-03-29 | 04:38:35 | NYPD |
| 300697 | 30281825 | 03/29/2015 | 12:33:01 | AM | 2015-03-29 | 04:41:50 | NYPD |

|        | AgencyName                      | ComplaintType \          |
|--------|---------------------------------|--------------------------|
| 0      | New York City Police Department | Noise - Street/Sidewalk  |
| 1      | New York City Police Department | Blocked Driveway         |
| 2      | New York City Police Department | Blocked Driveway         |
| 3      | New York City Police Department | Illegal Parking          |
| 4      | New York City Police Department | Illegal Parking          |
| 5      | New York City Police Department | Illegal Parking          |
| 6      | New York City Police Department | Illegal Parking          |
| 7      | New York City Police Department | Blocked Driveway         |
| 8      | New York City Police Department | Illegal Parking          |
| 9      | New York City Police Department | Blocked Driveway         |
| 10     | New York City Police Department | Blocked Driveway         |
| 11     | New York City Police Department | Blocked Driveway         |
| 12     | New York City Police Department | Noise - Street/Sidewalk  |
| 13     | New York City Police Department | Illegal Parking          |
| 14     | New York City Police Department | Derelict Vehicle         |
| 15     | New York City Police Department | Blocked Driveway         |
| 16     | New York City Police Department | Blocked Driveway         |
| 17     | New York City Police Department | Noise - Commercial       |
| 18     | New York City Police Department | Noise - Commercial       |
| 19     | New York City Police Department | Noise - Street/Sidewalk  |
| 20     | New York City Police Department | Illegal Parking          |
| 21     | New York City Police Department | Illegal Parking          |
| 22     | New York City Police Department | Noise - Commercial       |
| 23     | New York City Police Department | Illegal Parking          |
| 24     | New York City Police Department | Blocked Driveway         |
| 25     | New York City Police Department | Blocked Driveway         |
| 26     | New York City Police Department | Noise - House of Worship |
| 27     | New York City Police Department | Blocked Driveway         |
| 28     | New York City Police Department | Illegal Parking          |
| 29     | New York City Police Department | Noise - Commercial       |
| ...    | ...                             | ...                      |
| 300668 | New York City Police Department | Noise - Commercial       |
| 300669 | New York City Police Department | Noise - Street/Sidewalk  |
| 300670 | New York City Police Department | Illegal Parking          |

|        |                                 |                         |
|--------|---------------------------------|-------------------------|
| 300671 | New York City Police Department | Illegal Parking         |
| 300672 | New York City Police Department | Blocked Driveway        |
| 300673 | New York City Police Department | Noise - Commercial      |
| 300674 | New York City Police Department | Noise - Street/Sidewalk |
| 300675 | New York City Police Department | Noise - Street/Sidewalk |
| 300676 | New York City Police Department | Noise - Commercial      |
| 300677 | New York City Police Department | Noise - Commercial      |
| 300678 | New York City Police Department | Noise - Vehicle         |
| 300679 | New York City Police Department | Blocked Driveway        |
| 300680 | New York City Police Department | Noise - Vehicle         |
| 300681 | New York City Police Department | Noise - Street/Sidewalk |
| 300682 | New York City Police Department | Noise - Commercial      |
| 300683 | New York City Police Department | Noise - Street/Sidewalk |
| 300684 | New York City Police Department | Noise - Commercial      |
| 300685 | New York City Police Department | Noise - Vehicle         |
| 300686 | New York City Police Department | Noise - Commercial      |
| 300687 | New York City Police Department | Blocked Driveway        |
| 300688 | New York City Police Department | Noise - Commercial      |
| 300689 | New York City Police Department | Noise - Street/Sidewalk |
| 300690 | New York City Police Department | Illegal Parking         |
| 300691 | New York City Police Department | Noise - Commercial      |
| 300692 | New York City Police Department | Noise - Commercial      |
| 300693 | New York City Police Department | Noise - Commercial      |
| 300694 | New York City Police Department | Blocked Driveway        |
| 300695 | New York City Police Department | Noise - Commercial      |
| 300696 | New York City Police Department | Noise - Commercial      |
| 300697 | New York City Police Department | Noise - Commercial      |

|    | Descriptor                    | LocationType        | IncidentZip | \ |
|----|-------------------------------|---------------------|-------------|---|
| 0  | Loud Music/Party              | Street/Sidewalk     | 10034.0     |   |
| 1  | No Access                     | Street/Sidewalk     | 11105.0     |   |
| 2  | No Access                     | Street/Sidewalk     | 10458.0     |   |
| 3  | Commercial Overnight Parking  | Street/Sidewalk     | 10461.0     |   |
| 4  | Blocked Sidewalk              | Street/Sidewalk     | 11373.0     |   |
| 5  | Posted Parking Sign Violation | Street/Sidewalk     | 11215.0     |   |
| 6  | Blocked Hydrant               | Street/Sidewalk     | 10032.0     |   |
| 7  | No Access                     | Street/Sidewalk     | 10457.0     |   |
| 8  | Posted Parking Sign Violation | Street/Sidewalk     | 11415.0     |   |
| 9  | No Access                     | Street/Sidewalk     | 11219.0     |   |
| 10 | No Access                     | Street/Sidewalk     | 11372.0     |   |
| 11 | No Access                     | Street/Sidewalk     | 10453.0     |   |
| 12 | Loud Music/Party              | Street/Sidewalk     | 10461.0     |   |
| 13 | Posted Parking Sign Violation | Street/Sidewalk     | 11208.0     |   |
| 14 | With License Plate            | Street/Sidewalk     | 11379.0     |   |
| 15 | Partial Access                | Street/Sidewalk     | 11374.0     |   |
| 16 | No Access                     | Street/Sidewalk     | 11412.0     |   |
| 17 | Loud Music/Party              | Club/Bar/Restaurant | 11217.0     |   |
| 18 | Loud Music/Party              | Club/Bar/Restaurant | 11234.0     |   |

|        |                                |                     |         |
|--------|--------------------------------|---------------------|---------|
| 19     | Loud Music/Party               | Street/Sidewalk     | 10026.0 |
| 20     | Unauthorized Bus Layover       | Street/Sidewalk     | 10456.0 |
| 21     | Posted Parking Sign Violation  | Street/Sidewalk     | 11379.0 |
| 22     | Loud Music/Party               | Store/Commercial    | 11234.0 |
| 23     | Double Parked Blocking Vehicle | Street/Sidewalk     | 10030.0 |
| 24     | No Access                      | Street/Sidewalk     | 10467.0 |
| 25     | No Access                      | Street/Sidewalk     | 11432.0 |
| 26     | Loud Music/Party               | House of Worship    | 10031.0 |
| 27     | No Access                      | Street/Sidewalk     | 11419.0 |
| 28     | Posted Parking Sign Violation  | Street/Sidewalk     | 10024.0 |
| 29     | Loud Music/Party               | Club/Bar/Restaurant | 11201.0 |
| ...    | ...                            | ...                 | ...     |
| 300668 | Loud Music/Party               | Club/Bar/Restaurant | 11216.0 |
| 300669 | Loud Music/Party               | Street/Sidewalk     | 10031.0 |
| 300670 | Blocked Hydrant                | Street/Sidewalk     | 11354.0 |
| 300671 | Blocked Hydrant                | Street/Sidewalk     | 10019.0 |
| 300672 | No Access                      | Street/Sidewalk     | 11208.0 |
| 300673 | Loud Music/Party               | Club/Bar/Restaurant | 11203.0 |
| 300674 | Loud Music/Party               | Street/Sidewalk     | 10025.0 |
| 300675 | Loud Music/Party               | Street/Sidewalk     | 10031.0 |
| 300676 | Loud Music/Party               | Store/Commercial    | 11377.0 |
| 300677 | Loud Music/Party               | Club/Bar/Restaurant | 11237.0 |
| 300678 | Car/Truck Music                | Street/Sidewalk     | 11206.0 |
| 300679 | No Access                      | Street/Sidewalk     | 11385.0 |
| 300680 | Car/Truck Music                | Street/Sidewalk     | 10028.0 |
| 300681 | Loud Music/Party               | Street/Sidewalk     | 11238.0 |
| 300682 | Loud Music/Party               | Club/Bar/Restaurant | 11249.0 |
| 300683 | Loud Talking                   | Street/Sidewalk     | 11238.0 |
| 300684 | Loud Music/Party               | Store/Commercial    | 10002.0 |
| 300685 | Car/Truck Music                | Street/Sidewalk     | 10028.0 |
| 300686 | Loud Music/Party               | Store/Commercial    | 10014.0 |
| 300687 | No Access                      | Street/Sidewalk     | 11385.0 |
| 300688 | Loud Music/Party               | Club/Bar/Restaurant | 10014.0 |
| 300689 | Loud Music/Party               | Street/Sidewalk     | 11233.0 |
| 300690 | Commercial Overnight Parking   | Street/Sidewalk     | 10466.0 |
| 300691 | Loud Music/Party               | Store/Commercial    | 10034.0 |
| 300692 | Loud Music/Party               | Store/Commercial    | 10002.0 |
| 300693 | Loud Music/Party               | Club/Bar/Restaurant | NaN     |
| 300694 | Partial Access                 | Street/Sidewalk     | 11418.0 |
| 300695 | Loud Music/Party               | Club/Bar/Restaurant | 11206.0 |
| 300696 | Loud Music/Party               | Club/Bar/Restaurant | 10461.0 |
| 300697 | Loud Music/Party               | Store/Commercial    | 10036.0 |

|   |                       |     |
|---|-----------------------|-----|
|   | IncidentAddress       | ... |
| 0 | 71 VERMILYEA AVENUE   | ... |
| 1 | 27-07 23 AVENUE       | ... |
| 2 | 2897 VALENTINE AVENUE | ... |
| 3 | 2940 BAISLEY AVENUE   | ... |

\

|        |                           |     |
|--------|---------------------------|-----|
| 4      | 87-14 57 ROAD             | ... |
| 5      | 260 21 STREET             | ... |
| 6      | 524 WEST 169 STREET       | ... |
| 7      | 501 EAST 171 STREET       | ... |
| 8      | 83-44 LEFFERTS BOULEVARD  | ... |
| 9      | 1408 66 STREET            | ... |
| 10     | 34-06 73 STREET           | ... |
| 11     | 1770 UNDERCLIFF AVENUE    | ... |
| 12     | 1701 PILGRIM AVENUE       | ... |
| 13     | 38 COX PLACE              | ... |
| 14     | 62-13 62 AVENUE           | ... |
| 15     | 61-34 AUSTIN STREET       | ... |
| 16     | 192-05 LINDEN BOULEVARD   | ... |
| 17     | 622 DEGRAW STREET         | ... |
| 18     | 2192 FLATBUSH AVENUE      | ... |
| 19     | 264 WEST 118 STREET       | ... |
| 20     | 1417 WEBSTER AVENUE       | ... |
| 21     | 78-42 METROPOLITAN AVENUE | ... |
| 22     | 3622 QUENTIN ROAD         | ... |
| 23     | 133 WEST 134 STREET       | ... |
| 24     | 3025 WALLACE AVENUE       | ... |
| 25     | 175-18 90 AVENUE          | ... |
| 26     | 452 WEST 147 STREET       | ... |
| 27     | 103-28 118 STREET         | ... |
| 28     | 131 WEST 86 STREET        | ... |
| 29     | 216 DUFFIELD STREET       | ... |
| ...    | ...                       | ... |
| 300668 | 305 HALSEY STREET         | ... |
| 300669 | NaN                       | ... |
| 300670 | 33-16 143 STREET          | ... |
| 300671 | 446 WEST 49 STREET        | ... |
| 300672 | 326 MCKINLEY AVENUE       | ... |
| 300673 | 196 EAST 51 STREET        | ... |
| 300674 | 220 WEST 107 STREET       | ... |
| 300675 | 501 WEST 139 STREET       | ... |
| 300676 | 50 STREET                 | ... |
| 300677 | 302 IRVING AVENUE         | ... |
| 300678 | 29 LOCUST STREET          | ... |
| 300679 | 1912 GROVE STREET         | ... |
| 300680 | 420 EAST 86 STREET        | ... |
| 300681 | 799 DEAN STREET           | ... |
| 300682 | 98A SOUTH 4 STREET        | ... |
| 300683 | 801 DEAN STREET           | ... |
| 300684 | 9 STANTON STREET          | ... |
| 300685 | 415 EAST 86 STREET        | ... |
| 300686 | 185 CHRISTOPHER STREET    | ... |
| 300687 | 77-03 79 PLACE            | ... |
| 300688 | 22 9 AVENUE               | ... |

|        |                          |     |
|--------|--------------------------|-----|
| 300689 | 120 CHAUNCEY STREET      | ... |
| 300690 | NaN                      | ... |
| 300691 | 97 SHERMAN AVENUE        | ... |
| 300692 | 81 HESTER STREET         | ... |
| 300693 | CRESCENT AVENUE          | ... |
| 300694 | 100-17 87 AVENUE         | ... |
| 300695 | 162 THROOP AVENUE        | ... |
| 300696 | 3151 EAST TREMONT AVENUE | ... |
| 300697 | 251 WEST 48 STREET       | ... |

|        | BridgeHighwayName | BridgeHighwayDirection | RoadRamp | BridgeHighwaySegment | \   |
|--------|-------------------|------------------------|----------|----------------------|-----|
| 0      | NaN               | NaN                    | NaN      | NaN                  |     |
| 1      | NaN               | NaN                    | NaN      | NaN                  |     |
| 2      | NaN               | NaN                    | NaN      | NaN                  |     |
| 3      | NaN               | NaN                    | NaN      | NaN                  |     |
| 4      | NaN               | NaN                    | NaN      | NaN                  |     |
| 5      | NaN               | NaN                    | NaN      | NaN                  |     |
| 6      | NaN               | NaN                    | NaN      | NaN                  |     |
| 7      | NaN               | NaN                    | NaN      | NaN                  |     |
| 8      | NaN               | NaN                    | NaN      | NaN                  |     |
| 9      | NaN               | NaN                    | NaN      | NaN                  |     |
| 10     | NaN               | NaN                    | NaN      | NaN                  |     |
| 11     | NaN               | NaN                    | NaN      | NaN                  |     |
| 12     | NaN               | NaN                    | NaN      | NaN                  |     |
| 13     | NaN               | NaN                    | NaN      | NaN                  |     |
| 14     | NaN               | NaN                    | NaN      | NaN                  |     |
| 15     | NaN               | NaN                    | NaN      | NaN                  |     |
| 16     | NaN               | NaN                    | NaN      | NaN                  |     |
| 17     | NaN               | NaN                    | NaN      | NaN                  |     |
| 18     | NaN               | NaN                    | NaN      | NaN                  |     |
| 19     | NaN               | NaN                    | NaN      | NaN                  |     |
| 20     | NaN               | NaN                    | NaN      | NaN                  |     |
| 21     | NaN               | NaN                    | NaN      | NaN                  |     |
| 22     | NaN               | NaN                    | NaN      | NaN                  |     |
| 23     | NaN               | NaN                    | NaN      | NaN                  |     |
| 24     | NaN               | NaN                    | NaN      | NaN                  |     |
| 25     | NaN               | NaN                    | NaN      | NaN                  |     |
| 26     | NaN               | NaN                    | NaN      | NaN                  |     |
| 27     | NaN               | NaN                    | NaN      | NaN                  |     |
| 28     | NaN               | NaN                    | NaN      | NaN                  |     |
| 29     | NaN               | NaN                    | NaN      | NaN                  |     |
| ...    | ...               | ...                    | ...      | ...                  | ... |
| 300668 | NaN               | NaN                    | NaN      | NaN                  |     |
| 300669 | NaN               | NaN                    | NaN      | NaN                  |     |
| 300670 | NaN               | NaN                    | NaN      | NaN                  |     |
| 300671 | NaN               | NaN                    | NaN      | NaN                  |     |
| 300672 | NaN               | NaN                    | NaN      | NaN                  |     |
| 300673 | NaN               | NaN                    | NaN      | NaN                  |     |

|        |     |     |     |     |
|--------|-----|-----|-----|-----|
| 300674 | NaN | NaN | NaN | NaN |
| 300675 | NaN | NaN | NaN | NaN |
| 300676 | NaN | NaN | NaN | NaN |
| 300677 | NaN | NaN | NaN | NaN |
| 300678 | NaN | NaN | NaN | NaN |
| 300679 | NaN | NaN | NaN | NaN |
| 300680 | NaN | NaN | NaN | NaN |
| 300681 | NaN | NaN | NaN | NaN |
| 300682 | NaN | NaN | NaN | NaN |
| 300683 | NaN | NaN | NaN | NaN |
| 300684 | NaN | NaN | NaN | NaN |
| 300685 | NaN | NaN | NaN | NaN |
| 300686 | NaN | NaN | NaN | NaN |
| 300687 | NaN | NaN | NaN | NaN |
| 300688 | NaN | NaN | NaN | NaN |
| 300689 | NaN | NaN | NaN | NaN |
| 300690 | NaN | NaN | NaN | NaN |
| 300691 | NaN | NaN | NaN | NaN |
| 300692 | NaN | NaN | NaN | NaN |
| 300693 | NaN | NaN | NaN | NaN |
| 300694 | NaN | NaN | NaN | NaN |
| 300695 | NaN | NaN | NaN | NaN |
| 300696 | NaN | NaN | NaN | NaN |
| 300697 | NaN | NaN | NaN | NaN |

|    | GarageLotName | FerryDirection | FerryTerminalName | Latitude  | Longitude  | \ |
|----|---------------|----------------|-------------------|-----------|------------|---|
| 0  | NaN           | NaN            | NaN               | 40.865682 | -73.923501 |   |
| 1  | NaN           | NaN            | NaN               | 40.775945 | -73.915094 |   |
| 2  | NaN           | NaN            | NaN               | 40.870325 | -73.888525 |   |
| 3  | NaN           | NaN            | NaN               | 40.835994 | -73.828379 |   |
| 4  | NaN           | NaN            | NaN               | 40.733060 | -73.874170 |   |
| 5  | NaN           | NaN            | NaN               | 40.660823 | -73.992568 |   |
| 6  | NaN           | NaN            | NaN               | 40.840848 | -73.937375 |   |
| 7  | NaN           | NaN            | NaN               | 40.837503 | -73.902905 |   |
| 8  | NaN           | NaN            | NaN               | 40.704977 | -73.832605 |   |
| 9  | NaN           | NaN            | NaN               | 40.623793 | -73.999539 |   |
| 10 | NaN           | NaN            | NaN               | 40.752600 | -73.893363 |   |
| 11 | NaN           | NaN            | NaN               | 40.851555 | -73.919997 |   |
| 12 | NaN           | NaN            | NaN               | 40.845545 | -73.833585 |   |
| 13 | NaN           | NaN            | NaN               | 40.687511 | -73.874505 |   |
| 14 | NaN           | NaN            | NaN               | 40.714093 | -73.899384 |   |
| 15 | NaN           | NaN            | NaN               | 40.729679 | -73.870417 |   |
| 16 | NaN           | NaN            | NaN               | 40.692520 | -73.759264 |   |
| 17 | NaN           | NaN            | NaN               | 40.679154 | -73.983430 |   |
| 18 | NaN           | NaN            | NaN               | 40.616550 | -73.930202 |   |
| 19 | NaN           | NaN            | NaN               | 40.805267 | -73.953353 |   |
| 20 | NaN           | NaN            | NaN               | 40.836727 | -73.907106 |   |
| 21 | NaN           | NaN            | NaN               | 40.713198 | -73.874139 |   |

|        |     |     |     |           |            |
|--------|-----|-----|-----|-----------|------------|
| 22     | NaN | NaN | NaN | 40.614784 | -73.936568 |
| 23     | NaN | NaN | NaN | 40.814002 | -73.942664 |
| 24     | NaN | NaN | NaN | 40.870063 | -73.864322 |
| 25     | NaN | NaN | NaN | 40.709827 | -73.786257 |
| 26     | NaN | NaN | NaN | 40.826102 | -73.945663 |
| 27     | NaN | NaN | NaN | 40.687117 | -73.825597 |
| 28     | NaN | NaN | NaN | 40.786930 | -73.973202 |
| 29     | NaN | NaN | NaN | 40.691599 | -73.984379 |
| ...    | ... | ... | ... | ...       | ...        |
| 300668 | NaN | NaN | NaN | 40.682906 | -73.940357 |
| 300669 | NaN | NaN | NaN | 40.821446 | -73.950379 |
| 300670 | NaN | NaN | NaN | 40.767869 | -73.826216 |
| 300671 | NaN | NaN | NaN | 40.763425 | -73.990766 |
| 300672 | NaN | NaN | NaN | 40.681068 | -73.863917 |
| 300673 | NaN | NaN | NaN | 40.657327 | -73.929979 |
| 300674 | NaN | NaN | NaN | 40.801410 | -73.965947 |
| 300675 | NaN | NaN | NaN | 40.821561 | -73.950631 |
| 300676 | NaN | NaN | NaN | 40.743181 | -73.914894 |
| 300677 | NaN | NaN | NaN | 40.698976 | -73.914319 |
| 300678 | NaN | NaN | NaN | 40.699334 | -73.937486 |
| 300679 | NaN | NaN | NaN | 40.706475 | -73.907504 |
| 300680 | NaN | NaN | NaN | 40.776591 | -73.948719 |
| 300681 | NaN | NaN | NaN | 40.679237 | -73.963355 |
| 300682 | NaN | NaN | NaN | 40.712285 | -73.964001 |
| 300683 | NaN | NaN | NaN | 40.679226 | -73.963309 |
| 300684 | NaN | NaN | NaN | 40.722621 | -73.992435 |
| 300685 | NaN | NaN | NaN | 40.776646 | -73.948805 |
| 300686 | NaN | NaN | NaN | 40.732486 | -74.009688 |
| 300687 | NaN | NaN | NaN | 40.706353 | -73.871245 |
| 300688 | NaN | NaN | NaN | 40.740361 | -74.005781 |
| 300689 | NaN | NaN | NaN | 40.680399 | -73.929417 |
| 300690 | NaN | NaN | NaN | 40.900403 | -73.840809 |
| 300691 | NaN | NaN | NaN | 40.863805 | -73.925358 |
| 300692 | NaN | NaN | NaN | 40.716053 | -73.991378 |
| 300693 | NaN | NaN | NaN | NaN       | NaN        |
| 300694 | NaN | NaN | NaN | 40.694077 | -73.846087 |
| 300695 | NaN | NaN | NaN | 40.699590 | -73.944234 |
| 300696 | NaN | NaN | NaN | 40.837708 | -73.834587 |
| 300697 | NaN | NaN | NaN | 40.760583 | -73.985922 |

|   | Location                                 |
|---|--|
| 0 | (40.86568153633767, -73.92350095571744)  |
| 1 | (40.775945312321085, -73.91509393898605) |
| 2 | (40.870324522111424, -73.88852464418646) |
| 3 | (40.83599404683083, -73.82837939584206)  |
| 4 | (40.733059618956815, -73.87416975810375) |
| 5 | (40.66082272389114, -73.99256786342693)  |
| 6 | (40.840847591440415, -73.9373750864581)  |



7 (40.83750262540012, -73.90290517326568)  
 8 (40.704977164399935, -73.8326047502584)  
 9 (40.623793065806524, -73.99953890121567)  
 10 (40.752599671969676, -73.8933632141368)  
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 13 (40.68751060232221, -73.87450451131276)  
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 20 (40.83672658684552, -73.90710561784778)  
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 22 (40.61478362623815, -73.93656784825214)  
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 300668 (40.68290569745191, -73.94035735919954)  
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 300674 (40.80140973782622, -73.96594656979163)  
 300675 (40.82156143682672, -73.95063141802162)  
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 300677 (40.698976356744375, -73.91431921502723)  
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 300680 (40.776590982604596, -73.94871864443712)  
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 300691 (40.863805379005, -73.92535778152539)

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300693                                           NaN
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300695    (40.69959035300927, -73.94423377144169)
300696    (40.8377075854206, -73.83458731019586)
300697    (40.76058322950115, -73.98592204392392)

```

```
[300698 rows x 53 columns]
```

```

In [150]: a.CreatedDate=a.CreatedDate.apply(lambda x: \
dt.datetime.strptime(x,"%m-%d-%y %H:%M") \
if '-' in x \
else (null if len(x)==0 \
else dt.datetime.strptime(x,"%m/%d/%Y %I:%M:%S %p")))
#created date can not be nan
#use mm-dd-yy h:m if strin contains - else uuse mm/dd/yy h:m am/pm
a.CreatedDate

```

```

Out[150]: 0      2015-12-31 23:59:45
1      2015-12-31 23:59:44
2      2015-12-31 23:59:29
3      2015-12-31 23:57:46
4      2015-12-31 23:56:58
5      2015-12-31 23:56:30
6      2015-12-31 23:55:32
7      2015-12-31 23:54:05
8      2015-12-31 23:53:58
9      2015-12-31 23:53:58
10     2015-12-31 23:52:58
11     2015-12-31 23:50:57
12     2015-12-31 23:48:03
13     2015-12-31 23:47:58
14     2015-12-31 23:47:37
15     2015-12-31 23:47:30
16     2015-12-31 23:47:02
17     2015-12-31 23:44:52
18     2015-12-31 23:40:59
19     2015-12-31 23:40:55
20     2015-12-31 23:40:43
21     2015-12-31 23:38:51
22     2015-12-31 23:34:18
23     2015-12-31 23:32:46
24     2015-12-31 23:31:40
25     2015-12-31 23:30:28
26     2015-12-31 23:26:41
27     2015-12-31 23:26:35
28     2015-12-31 23:25:56
29     2015-12-31 23:25:01

```

```

...
300668    2015-03-29 01:03:20
300669    2015-03-29 01:02:05
300670    2015-03-29 01:01:25
300671    2015-03-29 00:58:08
300672    2015-03-29 00:57:27
300673    2015-03-29 00:57:25
300674    2015-03-29 00:57:19
300675    2015-03-29 00:56:22
300676    2015-03-29 00:55:56
300677    2015-03-29 00:55:33
300678    2015-03-29 00:50:12
300679    2015-03-29 00:49:51
300680    2015-03-29 00:49:27
300681    2015-03-29 00:48:23
300682    2015-03-29 00:46:26
300683    2015-03-29 00:44:36
300684    2015-03-29 00:43:20
300685    2015-03-29 00:43:16
300686    2015-03-29 00:43:06
300687    2015-03-29 00:42:48
300688    2015-03-29 00:37:15
300689    2015-03-29 00:35:28
300690    2015-03-29 00:35:23
300691    2015-03-29 00:35:04
300692    2015-03-29 00:34:32
300693    2015-03-29 00:33:41
300694    2015-03-29 00:33:28
300695    2015-03-29 00:33:03
300696    2015-03-29 00:33:02
300697    2015-03-29 00:33:01
Name: CreatedDate, Length: 300698, dtype: datetime64[ns]

```

```

In [151]: #Calculate difference in seconds using
          #datetime diff and save in new column
          #if closeddate is nan fill
          #this new column row value with nan
a["Request_Closing_Time"]=a.apply(lambda row:\
    (row.ClosedDate-row.CreatedDate).total_seconds()\
    if pd.notnull(row["ClosedDate"]) else np.nan,axis=1)
#a.ClosedDate.describe()
a["Request_Closing_Time"]
#2 Read or convert the columns
#Created Date and Closed Date to datetime datatype
#and create a new column Request_Closing_Time as the
#time elapsed between request creation and request closing.
 #(Hint: Explore the package/module datetime)

```

```

Out[151]: 0          3315.0

```

|        |          |
|--------|----------|
| 1      | 5176.0   |
| 2      | 17491.0  |
| 3      | 27914.0  |
| 4      | 12422.0  |
| 5      | 6810.0   |
| 6      | 7048.0   |
| 7      | 6475.0   |
| 8      | 30782.0  |
| 9      | 4982.0   |
| 10     | 28082.0  |
| 11     | 40023.0  |
| 12     | 8937.0   |
| 13     | 30602.0  |
| 14     | 37763.0  |
| 15     | 55950.0  |
| 16     | 17518.0  |
| 17     | 3068.0   |
| 18     | 10561.0  |
| 19     | 2825.0   |
| 20     | 16277.0  |
| 21     | 34329.0  |
| 22     | 4542.0   |
| 23     | 3134.0   |
| 24     | 233420.0 |
| 25     | 11792.0  |
| 26     | 1610.0   |
| 27     | 20425.0  |
| 28     | 6364.0   |
| 29     | 8999.0   |
|        | ...      |
| 300668 | 9419.0   |
| 300669 | 15873.0  |
| 300670 | 30327.0  |
| 300671 | 13554.0  |
| 300672 | 56546.0  |
| 300673 | 5286.0   |
| 300674 | 8440.0   |
| 300675 | 3690.0   |
| 300676 | 25951.0  |
| 300677 | 22626.0  |
| 300678 | 22577.0  |
| 300679 | 4350.0   |
| 300680 | 12986.0  |
| 300681 | 10450.0  |
| 300682 | 23154.0  |
| 300683 | 10544.0  |
| 300684 | 1655.0   |
| 300685 | 13354.0  |

```

300686      857.0
300687     8093.0
300688     1524.0
300689    13139.0
300690    29161.0
300691     8244.0
300692     2309.0
300693         NaN
300694     7231.0
300695    11237.0
300696    14733.0
300697    14929.0
Name: Request_Closing_Time, Length: 300698, dtype: float64

```

```

In [152]: import matplotlib as mp
          import matplotlib.pyplot as plt

```

```

In [153]: print(a.City.unique()) #print city names

```

```

['NEW YORK' 'ASTORIA' 'BRONX' 'ELMHURST' 'BROOKLYN' 'KEW GARDENS'
 'JACKSON HEIGHTS' 'MIDDLE VILLAGE' 'REGO PARK' 'SAINT ALBANS' 'JAMAICA'
 'SOUTH RICHMOND HILL' nan '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'
 'Astoria' 'Long Island City' 'Woodside' 'East Elmhurst' 'Howard Beach']

```

```

In [154]: b=a #make a copy
          b.dropna(subset=['City'],inplace=True)
          #drop rows with nan city
          b.City=b.City.str.upper()
          #convert all to same case
          print(b.City.unique())
          #print city names again duuplicates are merged now

```

```

['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']
```

```
In [155]: print(b.City.value_counts())  
          #check value counts
```

|                     |       |
|---------------------|-------|
| BROOKLYN            | 98307 |
| NEW YORK            | 65994 |
| BRONX               | 40702 |
| STATEN ISLAND       | 12343 |
| JAMAICA             | 7296  |
| ASTORIA             | 7047  |
| FLUSHING            | 5971  |
| RIDGEWOOD           | 5163  |
| CORONA              | 4295  |
| WOODSIDE            | 3664  |
| SOUTH RICHMOND HILL | 2774  |
| OZONE PARK          | 2755  |
| EAST ELMHURST       | 2748  |
| ELMHURST            | 2673  |
| LONG ISLAND CITY    | 2571  |
| WOODHAVEN           | 2464  |
| MASPETH             | 2462  |
| 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        | 932   |
| ROSEDALE            | 922   |
| SPRINGFIELD GARDENS | 883   |
| SAINT ALBANS        | 834   |
| KEW GARDENS         | 771   |
| ROCKAWAY PARK       | 745   |
| SUNNYSIDE           | 723   |
| LITTLE NECK         | 559   |
| OAKLAND GARDENS     | 551   |
| CAMBRIA HEIGHTS     | 477   |
| BELLEROSE           | 375   |
| GLEN OAKS           | 306   |

```
ARVERNE                220
FLORAL PARK            152
NEW HYDE PARK          98
CENTRAL PARK           97
QUEENS                 32
BREEZY POINT           30
Name: City, dtype: int64
```

```
In [156]: fig = plt.figure(figsize=[30, 30])
          ax = fig.add_subplot(111)

          cmap = plt.cm.prism
          #colors = cmap(np.linspace(0., 1., len(b.City.value_counts().index)))

          labels =list(b.City.value_counts().index)

          ax.pie(b.City.value_counts(),\
                 labels=labels, labeldistance=1.05)
          ax.set_title("City pie chart");
```

[illegible]

```
In [157]: from matplotlib.ticker import PercentFormatter
```

```
def _plot_pareto_by(df_, group_by, column):

    df = df_.groupby(group_by)[column].sum().reset_index()
    df = df.sort_values(by=column, ascending=False)

    df["cumpercentage"] = df[column].cumsum()/df[column].sum()*100

    fig, ax = plt.subplots(figsize=(20,5))
    ax.bar(df[group_by], df[column], color="C0")
```



```

ax2 = ax.twinx()
ax2.plot(df[group_by], df["cumpercentage"], color="C1", marker="D", ms=7)
ax2.yaxis.set_major_formatter(PercentFormatter())

ax.tick_params(axis="y", colors="C0")
ax2.tick_params(axis="y", colors="C1")

for tick in ax.get_xticklabels():
    tick.set_rotation(45)
plt.show()

```

```

In [158]: #ax.pie(b.City.value_counts(), labels=labels, labeldistance=1.05)
df_city=pd.DataFrame({'labels':labels, 'values':b.City.value_counts()})
print(df_city.describe())
_plot_pareto_by(df_city,'labels','values')

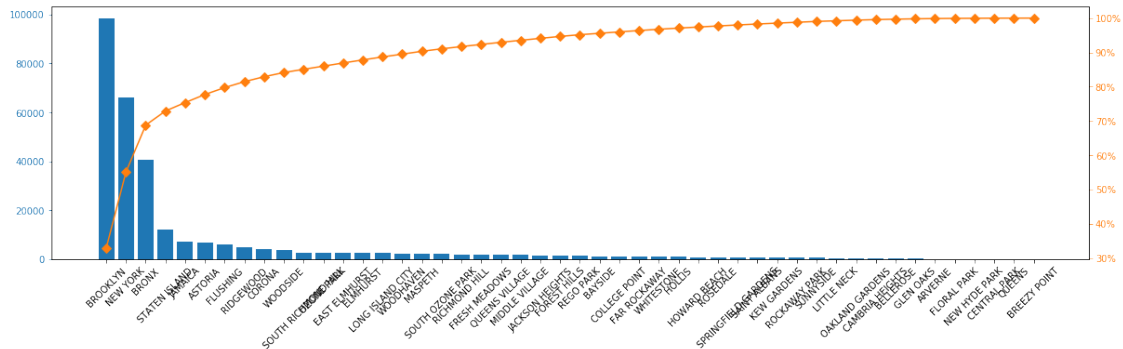
```

```

#inference 1
# Brooklyn, New york, BBronx, staten island and
#jamaica combined contribute to around 80% of complaints
# 1 these cities might need appropriate
#awareness programs to reduce the behaviours causing complaints
# 2 caution: the values are not
#adjusted based on population / population
#density which is a hidden variable
# 3 this might also mean causality
#on other way meaning people
#are not aware of 311 service in the other areas/cities

```

|       | values       |
|-------|--------------|
| count | 48.000000    |
| mean  | 6210.083333  |
| std   | 17419.756849 |
| min   | 30.000000    |
| 25%   | 739.500000   |
| 50%   | 1587.000000  |
| 75%   | 2749.750000  |
| max   | 98307.000000 |



```
In [159]: print(a.ComplaintType.unique())
          #print complaint types
```

```
['Noise - Street/Sidewalk' 'Blocked Driveway' 'Illegal Parking'
 'Derelict Vehicle' 'Noise - Commercial' 'Noise - House of Worship'
 'Posting Advertisement' 'Noise - Vehicle' 'Animal Abuse' 'Vending'
 'Traffic' 'Drinking' 'Bike/Roller/Skate Chronic' 'Panhandling'
 'Noise - Park' 'Homeless Encampment' 'Urinating in Public' 'Graffiti'
 'Disorderly Youth' 'Illegal Fireworks' 'Squeegee' 'Animal in a Park']
```

```
In [160]: b=a
          b.dropna(subset=['ComplaintType'],inplace=True)
          #drop na
          b.ComplaintType=b.ComplaintType.str.upper()
          #make in upper case to makes sure no duplicates happen
          print(b.ComplaintType.unique())
          #cross check cateorical variable
```

```
['NOISE - STREET/SIDEWALK' 'BLOCKED DRIVEWAY' 'ILLEGAL PARKING'
 'DERELICT VEHICLE' 'NOISE - COMMERCIAL' 'NOISE - HOUSE OF WORSHIP'
 'POSTING ADVERTISEMENT' 'NOISE - VEHICLE' 'ANIMAL ABUSE' 'VENDING'
 'TRAFFIC' 'DRINKING' 'BIKE/ROLLER/SKATE CHRONIC' 'PANHANDLING'
 'NOISE - PARK' 'HOMELESS ENCAMPMENT' 'URINATING IN PUBLIC' 'GRAFFITI'
 'DISORDERLY YOUTH' 'ILLEGAL FIREWORKS' 'SQUEEGEE' 'ANIMAL IN A PARK']
```

```
In [161]: print(b.ComplaintType.value_counts())
          #print value counts
```

|                         |       |
|-------------------------|-------|
| BLOCKED DRIVEWAY        | 76761 |
| ILLEGAL PARKING         | 74318 |
| NOISE - STREET/SIDEWALK | 48000 |
| NOISE - COMMERCIAL      | 35200 |
| DERELICT VEHICLE        | 17547 |

|                           |       |
|---------------------------|-------|
| NOISE - VEHICLE           | 17029 |
| ANIMAL ABUSE              | 7767  |
| TRAFFIC                   | 4495  |
| HOMELESS ENCAMPMENT       | 4415  |
| NOISE - PARK              | 4016  |
| VENDING                   | 3795  |
| DRINKING                  | 1272  |
| NOISE - HOUSE OF WORSHIP  | 929   |
| POSTING ADVERTISEMENT     | 649   |
| URINATING IN PUBLIC       | 592   |
| BIKE/ROLLER/SKATE CHRONIC | 422   |
| PANHANDLING               | 305   |
| DISORDERLY YOUTH          | 286   |
| ILLEGAL FIREWORKS         | 168   |
| GRAFFITI                  | 113   |
| SQUEEGEE                  | 4     |
| ANIMAL IN A PARK          | 1     |

Name: ComplaintType, dtype: int64

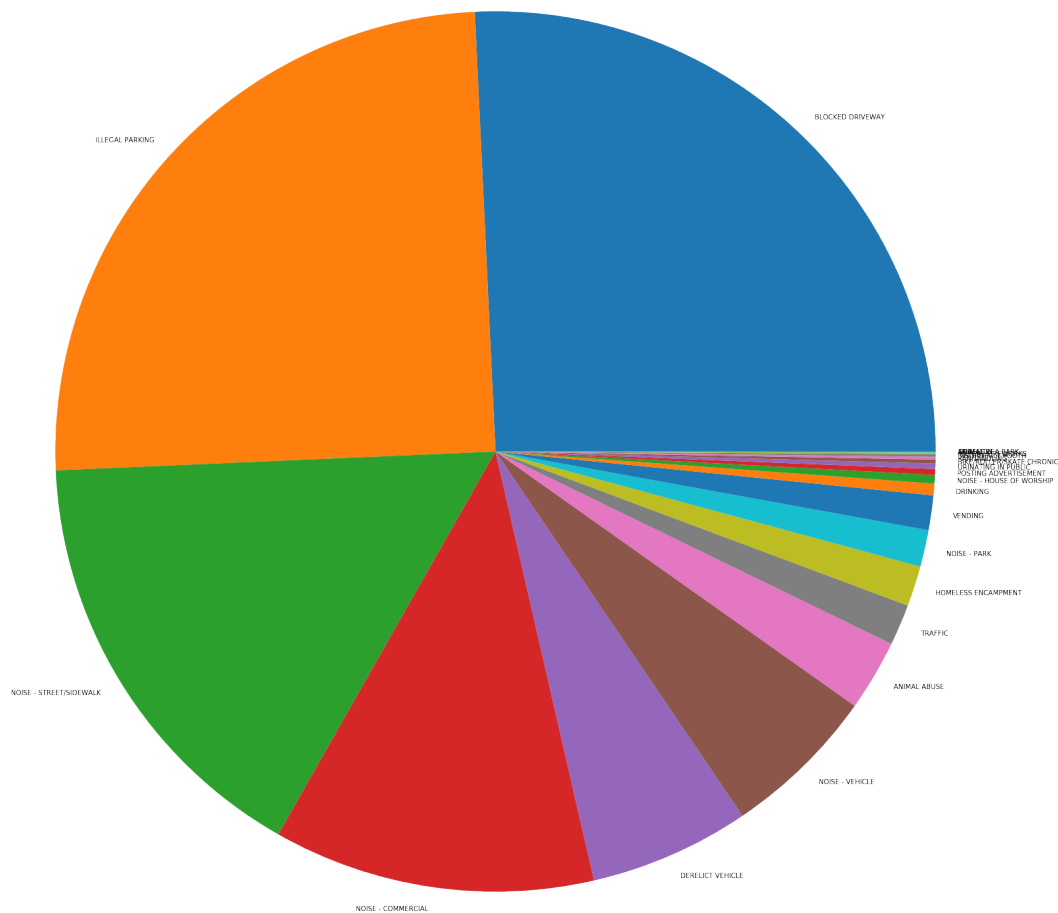
```
In [162]: fig = plt.figure(figsize=[30, 30])
          ax = fig.add_subplot(111)

          cmap = plt.cm.prism

          labels = list(b.ComplaintType.value_counts().index)

          ax.pie(b.ComplaintType.value_counts(), labels=labels, labeldistance=1.05)
          ax.set_title("Figure 1");
```

Figure 1



```
In [163]: df_comp=pd.DataFrame({'labels':labels, 'values':b.ComplaintType.value_counts()})
print(df_comp.describe())
_plot_pareto_by(df_comp,'labels','values')
```

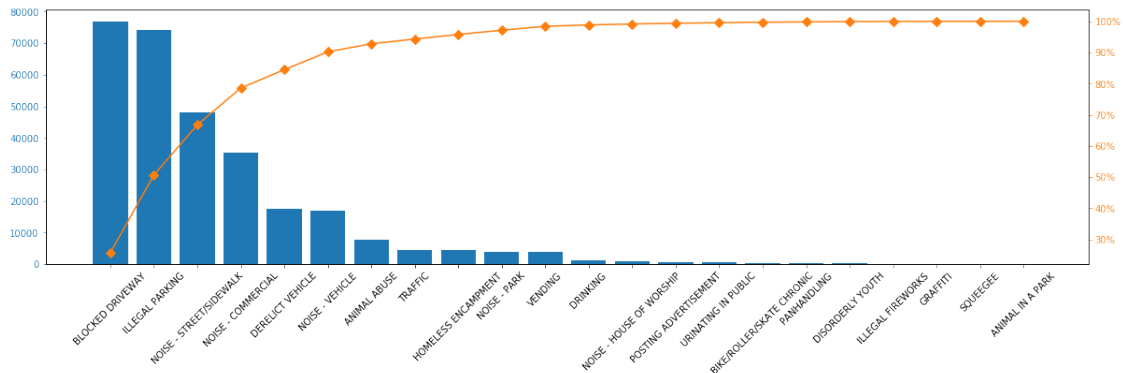
```
#inference 2
# blocked driveway, illegal parking,
#noise -street/sidewalk ammount to around 80% complaints
#noise - commercial, noise-vehicle,
#derelict vehicle and animal abuse add upto total 90%
# 1 regulation, enforcement and awareness
#on guidelines and best practices can be performed to reduce these issues

values
```

```

count      22.000000
mean    13549.272727
std     23555.122088
min        1.000000
25%       334.250000
50%       2533.500000
75%      14713.500000
max      76761.000000

```



```
In [ ]:
```

```
In [164]: a.Status.unique()
```

```

b=a
#b=a[[a['status']]]
b.dropna(subset=['Status'],inplace=True)
b.Status=b.Status.str.upper()

```

```
labels =list(b.Status.value_counts().index)
```

```

df_comp=pd.DataFrame({'labels':labels, 'values':b.Status.value_counts()})
print(df_comp)
_plot_pareto_by(df_comp,'labels','values')

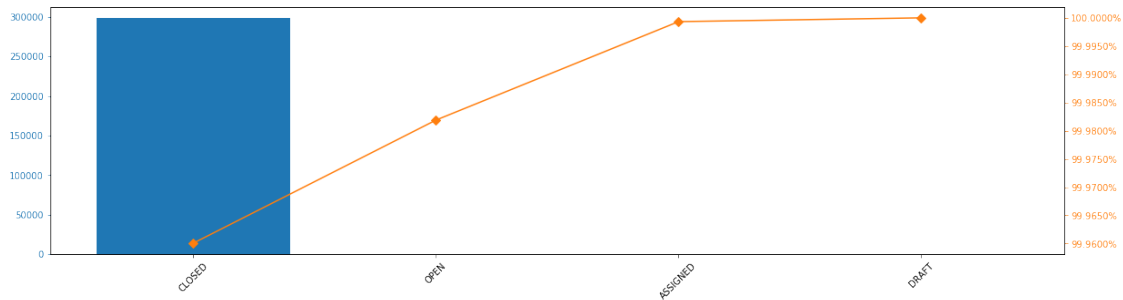
```

```

#inference 3
#majority of complaints are closed by now 99.9% complaints get closed

```

|          | labels   | values |
|----------|----------|--------|
| CLOSED   | CLOSED   | 297965 |
| OPEN     | OPEN     | 65     |
| ASSIGNED | ASSIGNED | 52     |
| DRAFT    | DRAFT    | 2      |



```
In [165]: print(a.ComplaintType.unique())
```

```
['NOISE - STREET/SIDEWALK' 'BLOCKED DRIVEWAY' 'ILLEGAL PARKING'
 'DERELICT VEHICLE' 'NOISE - COMMERCIAL' 'NOISE - HOUSE OF WORSHIP'
 'POSTING ADVERTISEMENT' 'NOISE - VEHICLE' 'ANIMAL ABUSE' 'VENDING'
 'TRAFFIC' 'DRINKING' 'BIKE/ROLLER/SKATE CHRONIC' 'PANHANDLING'
 'NOISE - PARK' 'HOMELESS ENCAMPMENT' 'URINATING IN PUBLIC' 'GRAFFITI'
 'DISORDERLY YOUTH' 'ILLEGAL FIREWORKS' 'SQUEEGEE' 'ANIMAL IN A PARK']
```

```
In [166]: b=a.loc[a['Status']!='CLOSED']
          b.dropna(subset=['ComplaintType'],inplace=True)
          b.ComplaintType=b.ComplaintType.str.upper()
          print(b.ComplaintType.unique())
```

```
['BLOCKED DRIVEWAY' 'ILLEGAL PARKING' 'NOISE - COMMERCIAL'
 'DERELICT VEHICLE' 'NOISE - STREET/SIDEWALK' 'TRAFFIC' 'NOISE - PARK'
 'POSTING ADVERTISEMENT' 'NOISE - VEHICLE' 'VENDING' 'HOMELESS ENCAMPMENT'
 'ANIMAL ABUSE']
```

C:\Users\Deepak\Anaconda3\lib\site-packages\ipykernel\_launcher.py:2: SettingWithCopyWarning:  
A value is trying to be set on a copy of a slice from a DataFrame

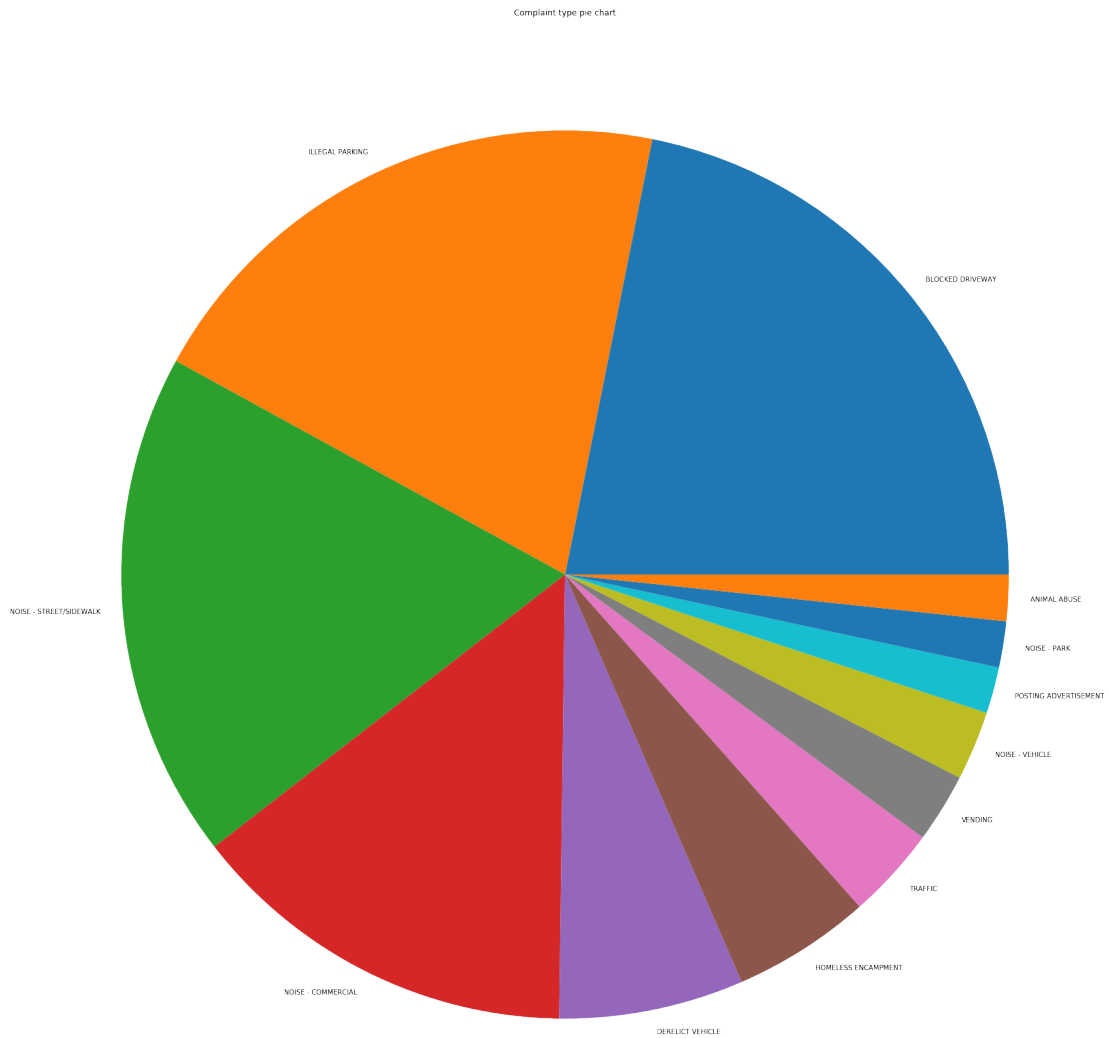
See the caveats in the documentation: <http://pandas.pydata.org/pandas-docs/stable/indexing.html>

```
In [167]: fig = plt.figure(figsize=[30, 30])
          ax = fig.add_subplot(111)

          cmap = plt.cm.prism

          labels =list(b.ComplaintType.value_counts().index)

          ax.pie(b.ComplaintType.value_counts(), labels=labels, labeldistance=1.05)
          ax.set_title("Complaint type pie chart");
```

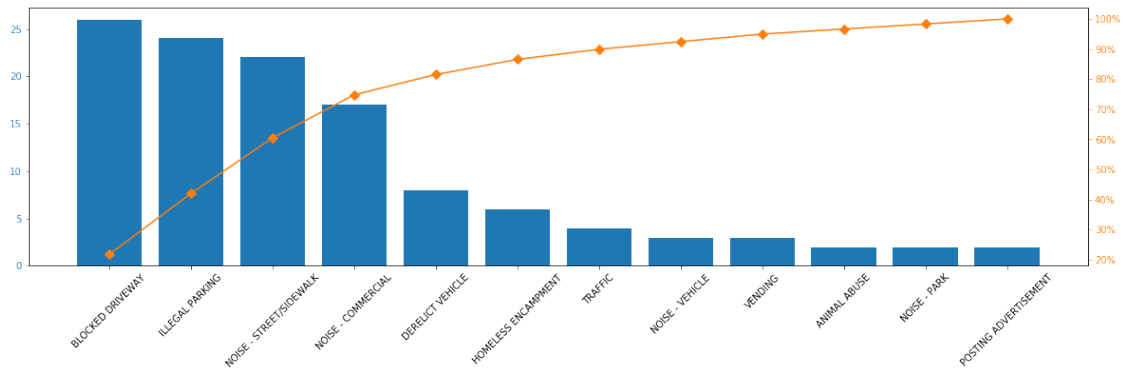


```
In [168]: labels =list(b.ComplaintType.value_counts().index)
```

```
df_comp=pd.DataFrame({'labels':labels, 'values':b.ComplaintType.value_counts()})
print(df_comp)
_plot_pareto_by(df_comp,'labels','values')
```

|                         | labels                  | values |
|-------------------------|-------------------------|--------|
| BLOCKED DRIVEWAY        | BLOCKED DRIVEWAY        | 26     |
| ILLEGAL PARKING         | ILLEGAL PARKING         | 24     |
| NOISE - STREET/SIDEWALK | NOISE - STREET/SIDEWALK | 22     |
| NOISE - COMMERCIAL      | NOISE - COMMERCIAL      | 17     |
| DERELICT VEHICLE        | DERELICT VEHICLE        | 8      |
| HOMELESS ENCAMPMENT     | HOMELESS ENCAMPMENT     | 6      |

|                       |                       |   |
|-----------------------|-----------------------|---|
| TRAFFIC               | TRAFFIC               | 4 |
| VENDING               | VENDING               | 3 |
| NOISE - VEHICLE       | NOISE - VEHICLE       | 3 |
| POSTING ADVERTISEMENT | POSTING ADVERTISEMENT | 2 |
| NOISE - PARK          | NOISE - PARK          | 2 |
| ANIMAL ABUSE          | ANIMAL ABUSE          | 2 |



```
In [169]: import scipy
import scipy.stats
b=a.loc[a['Status']!='CLOSED']
b.dropna(subset=['ComplaintType'],inplace=True)
b.ComplaintType=b.ComplaintType.str.upper()
print(b.ComplaintType.unique())
print(b.ComplaintType.value_counts())
```

```
['BLOCKED DRIVEWAY' 'ILLEGAL PARKING' 'NOISE - COMMERCIAL'
 'DERELICT VEHICLE' 'NOISE - STREET/SIDEWALK' 'TRAFFIC' 'NOISE - PARK'
 'POSTING ADVERTISEMENT' 'NOISE - VEHICLE' 'VENDING' 'HOMELESS ENCAMPMENT'
 'ANIMAL ABUSE']
```

|                         |    |
|-------------------------|----|
| BLOCKED DRIVEWAY        | 26 |
| ILLEGAL PARKING         | 24 |
| NOISE - STREET/SIDEWALK | 22 |
| NOISE - COMMERCIAL      | 17 |
| DERELICT VEHICLE        | 8  |
| HOMELESS ENCAMPMENT     | 6  |
| TRAFFIC                 | 4  |
| VENDING                 | 3  |
| NOISE - VEHICLE         | 3  |
| POSTING ADVERTISEMENT   | 2  |
| NOISE - PARK            | 2  |
| ANIMAL ABUSE            | 2  |



Name: ComplaintType, dtype: int64

C:\Users\Deepak\Anaconda3\lib\site-packages\ipykernel\_launcher.py:4: SettingWithCopyWarning:  
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: <http://pandas.pydata.org/pandas-docs/stable/indexing.html>  
after removing the cwd from sys.path.

```
In [170]: stat, p, dof, expected = scipy.stats.chi2_contingency(pd.crosstab(b.City, b.Status,
```

```
    alpha = 0.05
    print("p value is " + str(p))
    if p <= alpha:
        print('Dependent (reject H0)')
    else:
        print('Independent (H0 holds true)')
```

```
    stat, p, dof, expected = scipy.stats.chi2_contingency(pd.crosstab(b.ComplaintType,
```

```
    alpha = 0.05
    print("p value is " + str(p))
    if p <= alpha:
        print('Dependent (reject H0)')
    else:
        print('Independent (H0 holds true)')
```

```
p value is 0.8204247422385368
Independent (H0 holds true)
p value is 0.5997330636852322
Independent (H0 holds true)
```

```
In [171]:
```

```
pd.crosstab(b.Status, b.ComplaintType)
```

```
#inference 4
# 75% of the complaints that stay open are
#from Blocked driveway, illegal parking, noise street/sidewalk
#and noise commercial type
#chi square test however significantly
#proves that complaint type and status are independent
#similarly city and status are also independent
#cross table shows the data for this
```

```
Out[171]: ComplaintType  ANIMAL ABUSE  BLOCKED DRIVEWAY  DERELICT VEHICLE  \
Status
```

|          |   |    |   |
|----------|---|----|---|
| ASSIGNED | 2 | 17 | 1 |
| DRAFT    | 0 | 1  | 0 |
| OPEN     | 0 | 8  | 7 |

|               |                     |                 |                    |   |
|---------------|---------------------|-----------------|--------------------|---|
| ComplaintType | HOMELESS ENCAMPMENT | ILLEGAL PARKING | NOISE - COMMERCIAL | \ |
| Status        |                     |                 |                    |   |
| ASSIGNED      | 4                   | 9               | 7                  |   |
| DRAFT         | 0                   | 0               | 0                  |   |
| OPEN          | 2                   | 15              | 10                 |   |

|               |              |                         |                 |   |
|---------------|--------------|-------------------------|-----------------|---|
| ComplaintType | NOISE - PARK | NOISE - STREET/SIDEWALK | NOISE - VEHICLE | \ |
| Status        |              |                         |                 |   |
| ASSIGNED      | 1            | 6                       | 2               |   |
| DRAFT         | 0            | 1                       | 0               |   |
| OPEN          | 1            | 15                      | 1               |   |

|               |                       |         |         |
|---------------|-----------------------|---------|---------|
| ComplaintType | POSTING ADVERTISEMENT | TRAFFIC | VENDING |
| Status        |                       |         |         |
| ASSIGNED      | 1                     | 1       | 1       |
| DRAFT         | 0                     | 0       | 0       |
| OPEN          | 1                     | 3       | 2       |

In [172]: pd.crosstab(b.Status, b.City)

|                |         |         |       |          |        |               |          |   |
|----------------|---------|---------|-------|----------|--------|---------------|----------|---|
| Out[172]: City | ASTORIA | BAYSIDE | BRONX | BROOKLYN | CORONA | EAST ELMHURST | ELMHURST | \ |
| Status         |         |         |       |          |        |               |          |   |
| ASSIGNED       | 0       | 2       | 6     | 19       | 0      | 0             | 0        |   |
| DRAFT          | 0       | 0       | 1     | 1        | 0      | 0             | 0        |   |
| OPEN           | 1       | 0       | 5     | 12       | 1      | 1             | 1        |   |

|          |          |               |                 |     |   |
|----------|----------|---------------|-----------------|-----|---|
| City     | FLUSHING | FRESH MEADOWS | JACKSON HEIGHTS | ... | \ |
| Status   |          |               |                 | ... |   |
| ASSIGNED | 2        | 0             | 0               | ... |   |
| DRAFT    | 0        | 0             | 0               | ... |   |
| OPEN     | 1        | 2             | 1               | ... |   |

|          |                  |         |          |            |               |   |
|----------|------------------|---------|----------|------------|---------------|---|
| City     | LONG ISLAND CITY | MASPETH | NEW YORK | OZONE PARK | RICHMOND HILL | \ |
| Status   |                  |         |          |            |               |   |
| ASSIGNED | 1                | 2       | 15       | 1          | 1             |   |
| DRAFT    | 0                | 0       | 0        | 0          | 0             |   |
| OPEN     | 1                | 0       | 18       | 0          | 1             |   |

|          |           |                     |               |           |          |
|----------|-----------|---------------------|---------------|-----------|----------|
| City     | RIDGEWOOD | SPRINGFIELD GARDENS | STATEN ISLAND | WOODHAVEN | WOODSIDE |
| Status   |           |                     |               |           |          |
| ASSIGNED | 0         | 0                   | 2             | 0         | 0        |
| DRAFT    | 0         | 0                   | 0             | 0         | 0        |
| OPEN     | 1         | 1                   | 6             | 2         | 1        |

[3 rows x 21 columns]

```

In [173]: b=a
          stat, p, dof, expected = \
          scipy.stats.chi2_contingency(pd.crosstab(b.City, b.Status))

          alpha = 0.05
          print("p value is " + str(p))
          if p <= alpha:
              print('Dependent (reject H0)')
          else:
              print('Independent (H0 holds true)')

          stat, p, dof, expected = \
          scipy.stats.chi2_contingency(pd.crosstab(b.ComplaintType, b.Status))

          alpha = 0.05
          print("p value is " + str(p))
          if p <= alpha:
              print('Dependent (reject H0)')
          else:
              print('Independent (H0 holds true)')

```

```

p value is 0.9843050081122676
Independent (H0 holds true)
p value is 0.7120747699575024
Independent (H0 holds true)

```

```

In [174]: pd.crosstab(b.Status, b.ComplaintType)

```

```

Out[174]: ComplaintType  ANIMAL ABUSE  ANIMAL IN A PARK  BIKE/ROLLER/SKATE CHRONIC \
Status
ASSIGNED                2                0                0
CLOSED                7765                1                422
DRAFT                  0                0                0
OPEN                  0                0                0

ComplaintType  BLOCKED DRIVEWAY  DERELICT VEHICLE  DISORDERLY YOUTH  DRINKING \
Status
ASSIGNED                17                1                0                0
CLOSED                76735            17539            286            1272
DRAFT                  1                0                0                0
OPEN                  8                7                0                0

ComplaintType  GRAFFITI  HOMELESS ENCAMPMENT  ILLEGAL FIREWORKS  ... \
Status
ASSIGNED                0                4                0  ...

```

|        |     |      |     |     |
|--------|-----|------|-----|-----|
| CLOSED | 113 | 4409 | 168 | ... |
| DRAFT  | 0   | 0    | 0   | ... |
| OPEN   | 0   | 2    | 0   | ... |

|               |                          |              |   |
|---------------|--------------------------|--------------|---|
| ComplaintType | NOISE - HOUSE OF WORSHIP | NOISE - PARK | \ |
| Status        |                          |              |   |
| ASSIGNED      | 0                        | 1            |   |
| CLOSED        | 929                      | 4014         |   |
| DRAFT         | 0                        | 0            |   |
| OPEN          | 0                        | 1            |   |

|               |                         |                 |             |   |
|---------------|-------------------------|-----------------|-------------|---|
| ComplaintType | NOISE - STREET/SIDEWALK | NOISE - VEHICLE | PANHANDLING | \ |
| Status        |                         |                 |             |   |
| ASSIGNED      | 6                       | 2               | 0           |   |
| CLOSED        | 47978                   | 17026           | 305         |   |
| DRAFT         | 1                       | 0               | 0           |   |
| OPEN          | 15                      | 1               | 0           |   |

|               |                       |          |         |                     |   |
|---------------|-----------------------|----------|---------|---------------------|---|
| ComplaintType | POSTING ADVERTISEMENT | SQUEEGEE | TRAFFIC | URINATING IN PUBLIC | \ |
| Status        |                       |          |         |                     |   |
| ASSIGNED      | 1                     | 0        | 1       | 0                   |   |
| CLOSED        | 647                   | 4        | 4491    | 592                 |   |
| DRAFT         | 0                     | 0        | 0       | 0                   |   |
| OPEN          | 1                     | 0        | 3       | 0                   |   |

|               |         |
|---------------|---------|
| ComplaintType | VENDING |
| Status        |         |
| ASSIGNED      | 1       |
| CLOSED        | 3792    |
| DRAFT         | 0       |
| OPEN          | 2       |

[4 rows x 22 columns]

```
In [175]: #print(a.columns)
#pd.crosstab(a.ComplaintType, a.Agency)
#a['year']=a.apply(lambda row: row.CreatedDate.month)

a["month"]=a.apply(lambda row: row.CreatedDate.month,axis=1)#(row.ClosedDate.year))
a["year"]=a.apply(lambda row: row.CreatedDate.year,axis=1)#(row.ClosedDate.year))

print(a['month'])
print(a['year'])

#most of the data is from same
#year from march to december of 2015
#we need more data from multiple
#years to analyze if particular months/quarters/seasons
```

*#have significant difference in the  
#numbers and types of complaints that get raised*

|        |    |
|--------|----|
| 0      | 12 |
| 1      | 12 |
| 2      | 12 |
| 3      | 12 |
| 4      | 12 |
| 5      | 12 |
| 6      | 12 |
| 7      | 12 |
| 8      | 12 |
| 9      | 12 |
| 10     | 12 |
| 11     | 12 |
| 12     | 12 |
| 13     | 12 |
| 14     | 12 |
| 15     | 12 |
| 16     | 12 |
| 17     | 12 |
| 18     | 12 |
| 19     | 12 |
| 20     | 12 |
| 21     | 12 |
| 22     | 12 |
| 23     | 12 |
| 24     | 12 |
| 25     | 12 |
| 26     | 12 |
| 27     | 12 |
| 28     | 12 |
| 29     | 12 |
|        | .. |
| 300667 | 3  |
| 300668 | 3  |
| 300669 | 3  |
| 300670 | 3  |
| 300671 | 3  |
| 300672 | 3  |
| 300673 | 3  |
| 300674 | 3  |
| 300675 | 3  |
| 300676 | 3  |
| 300677 | 3  |
| 300678 | 3  |
| 300679 | 3  |
| 300680 | 3  |

|        |   |
|--------|---|
| 300681 | 3 |
| 300682 | 3 |
| 300683 | 3 |
| 300684 | 3 |
| 300685 | 3 |
| 300686 | 3 |
| 300687 | 3 |
| 300688 | 3 |
| 300689 | 3 |
| 300690 | 3 |
| 300691 | 3 |
| 300692 | 3 |
| 300694 | 3 |
| 300695 | 3 |
| 300696 | 3 |
| 300697 | 3 |

Name: month, Length: 298084, dtype: int64

|     |      |
|-----|------|
| 0   | 2015 |
| 1   | 2015 |
| 2   | 2015 |
| 3   | 2015 |
| 4   | 2015 |
| 5   | 2015 |
| 6   | 2015 |
| 7   | 2015 |
| 8   | 2015 |
| 9   | 2015 |
| 10  | 2015 |
| 11  | 2015 |
| 12  | 2015 |
| 13  | 2015 |
| 14  | 2015 |
| 15  | 2015 |
| 16  | 2015 |
| 17  | 2015 |
| 18  | 2015 |
| 19  | 2015 |
| 20  | 2015 |
| 21  | 2015 |
| 22  | 2015 |
| 23  | 2015 |
| 24  | 2015 |
| 25  | 2015 |
| 26  | 2015 |
| 27  | 2015 |
| 28  | 2015 |
| 29  | 2015 |
| ... |      |

```

300667    2015
300668    2015
300669    2015
300670    2015
300671    2015
300672    2015
300673    2015
300674    2015
300675    2015
300676    2015
300677    2015
300678    2015
300679    2015
300680    2015
300681    2015
300682    2015
300683    2015
300684    2015
300685    2015
300686    2015
300687    2015
300688    2015
300689    2015
300690    2015
300691    2015
300692    2015
300694    2015
300695    2015
300696    2015
300697    2015

```

Name: year, Length: 298084, dtype: int64

```

In [176]: pd.crosstab(a.City,a.ComplaintType)
          #we want to see if cities differ
          #in the complaint types significantly

```

```

Out[176]: ComplaintType      ANIMAL ABUSE  ANIMAL IN A PARK \
City
ARVERNE                      38                0
ASTORIA                     125                0
BAYSIDE                      37                0
BELLEROSE                    7                 0
BREEZY POINT                 2                 0
BRONX                       1415                0
BROOKLYN                    2394                0
CAMBRIA HEIGHTS              11                0
CENTRAL PARK                 0                 0

```

|                     |      |   |
|---------------------|------|---|
| COLLEGE POINT       | 28   | 0 |
| CORONA              | 61   | 0 |
| EAST ELMHURST       | 59   | 0 |
| ELMHURST            | 38   | 0 |
| FAR ROCKAWAY        | 89   | 0 |
| FLORAL PARK         | 2    | 0 |
| FLUSHING            | 143  | 0 |
| FOREST HILLS        | 45   | 0 |
| FRESH MEADOWS       | 45   | 0 |
| GLEN OAKS           | 5    | 0 |
| HOLLIS              | 33   | 0 |
| HOWARD BEACH        | 31   | 0 |
| JACKSON HEIGHTS     | 42   | 0 |
| JAMAICA             | 229  | 0 |
| KEW GARDENS         | 19   | 0 |
| LITTLE NECK         | 15   | 0 |
| LONG ISLAND CITY    | 30   | 0 |
| MASPETH             | 36   | 0 |
| MIDDLE VILLAGE      | 22   | 0 |
| NEW HYDE PARK       | 1    | 0 |
| NEW YORK            | 1525 | 0 |
| OAKLAND GARDENS     | 19   | 0 |
| OZONE PARK          | 48   | 0 |
| QUEENS              | 0    | 1 |
| QUEENS VILLAGE      | 66   | 0 |
| REGO PARK           | 26   | 0 |
| RICHMOND HILL       | 32   | 0 |
| RIDGEWOOD           | 117  | 0 |
| ROCKAWAY PARK       | 30   | 0 |
| ROSEDALE            | 33   | 0 |
| SAINT ALBANS        | 30   | 0 |
| SOUTH OZONE PARK    | 55   | 0 |
| SOUTH RICHMOND HILL | 26   | 0 |
| SPRINGFIELD GARDENS | 24   | 0 |
| STATEN ISLAND       | 557  | 0 |
| SUNNYSIDE           | 35   | 0 |
| WHITESTONE          | 28   | 0 |
| WOODHAVEN           | 45   | 0 |
| WOODSIDE            | 69   | 0 |

| ComplaintType | BIKE/ROLLER/SKATE CHRONIC | BLOCKED DRIVEWAY \ |
|---------------|---------------------------|--------------------|
| City          |                           |                    |
| ARVERNE       | 0                         | 35                 |
| ASTORIA       | 15                        | 2734               |
| BAYSIDE       | 0                         | 377                |
| BELLEROSE     | 1                         | 95                 |
| BREEZY POINT  | 0                         | 3                  |
| BRONX         | 20                        | 12755              |



|                     |     |       |
|---------------------|-----|-------|
| BROOKLYN            | 111 | 28148 |
| CAMBRIA HEIGHTS     | 0   | 147   |
| CENTRAL PARK        | 0   | 0     |
| COLLEGE POINT       | 0   | 435   |
| CORONA              | 0   | 2761  |
| EAST ELMHURST       | 1   | 1408  |
| ELMHURST            | 2   | 1446  |
| FAR ROCKAWAY        | 0   | 284   |
| FLORAL PARK         | 0   | 20    |
| FLUSHING            | 3   | 2795  |
| FOREST HILLS        | 5   | 663   |
| FRESH MEADOWS       | 0   | 503   |
| GLEN OAKS           | 0   | 30    |
| HOLLIS              | 0   | 342   |
| HOWARD BEACH        | 1   | 168   |
| JACKSON HEIGHTS     | 2   | 568   |
| JAMAICA             | 2   | 2818  |
| KEW GARDENS         | 0   | 313   |
| LITTLE NECK         | 0   | 121   |
| LONG ISLAND CITY    | 3   | 806   |
| MASPETH             | 1   | 732   |
| MIDDLE VILLAGE      | 1   | 457   |
| NEW HYDE PARK       | 0   | 53    |
| NEW YORK            | 225 | 2072  |
| OAKLAND GARDENS     | 2   | 132   |
| OZONE PARK          | 1   | 1259  |
| QUEENS              | 0   | 2     |
| QUEENS VILLAGE      | 0   | 585   |
| REGO PARK           | 0   | 611   |
| RICHMOND HILL       | 0   | 872   |
| RIDGEWOOD           | 3   | 1694  |
| ROCKAWAY PARK       | 0   | 70    |
| ROSEDALE            | 2   | 211   |
| SAINT ALBANS        | 0   | 244   |
| SOUTH OZONE PARK    | 1   | 942   |
| SOUTH RICHMOND HILL | 1   | 1548  |
| SPRINGFIELD GARDENS | 0   | 262   |
| STATEN ISLAND       | 7   | 2142  |
| SUNNYSIDE           | 2   | 206   |
| WHITESTONE          | 4   | 208   |
| WOODHAVEN           | 2   | 1060  |
| WOODSIDE            | 4   | 1624  |

| ComplaintType | DERELICT VEHICLE | DISORDERLY YOUTH | DRINKING | GRAFFITI \ |
|---------------|------------------|------------------|----------|------------|
| City          |                  |                  |          |            |
| ARVERNE       | 27               | 2                | 1        | 1          |
| ASTORIA       | 363              | 3                | 35       | 4          |
| BAYSIDE       | 198              | 1                | 1        | 3          |

|                     |      |    |     |    |
|---------------------|------|----|-----|----|
| BELLEROSE           | 89   | 2  | 1   | 0  |
| BREEZY POINT        | 3    | 0  | 1   | 0  |
| BRONX               | 1953 | 63 | 188 | 9  |
| BROOKLYN            | 5181 | 72 | 257 | 43 |
| CAMBRIA HEIGHTS     | 115  | 0  | 0   | 0  |
| CENTRAL PARK        | 0    | 0  | 0   | 0  |
| COLLEGE POINT       | 184  | 1  | 0   | 1  |
| CORONA              | 57   | 6  | 33  | 2  |
| EAST ELMHURST       | 114  | 1  | 9   | 3  |
| ELMHURST            | 78   | 2  | 13  | 0  |
| FAR ROCKAWAY        | 187  | 1  | 4   | 0  |
| FLORAL PARK         | 56   | 1  | 1   | 0  |
| FLUSHING            | 440  | 2  | 40  | 4  |
| FOREST HILLS        | 52   | 1  | 1   | 3  |
| FRESH MEADOWS       | 291  | 0  | 2   | 0  |
| GLEN OAKS           | 49   | 0  | 0   | 0  |
| HOLLIS              | 143  | 1  | 3   | 0  |
| HOWARD BEACH        | 138  | 1  | 4   | 0  |
| JACKSON HEIGHTS     | 29   | 0  | 9   | 0  |
| JAMAICA             | 954  | 8  | 34  | 3  |
| KEW GARDENS         | 14   | 0  | 1   | 0  |
| LITTLE NECK         | 61   | 2  | 1   | 0  |
| LONG ISLAND CITY    | 199  | 1  | 7   | 2  |
| MASPETH             | 434  | 2  | 9   | 0  |
| MIDDLE VILLAGE      | 296  | 0  | 2   | 0  |
| NEW HYDE PARK       | 14   | 0  | 0   | 0  |
| NEW YORK            | 537  | 69 | 295 | 22 |
| OAKLAND GARDENS     | 86   | 1  | 1   | 0  |
| OZONE PARK          | 420  | 4  | 19  | 0  |
| QUEENS              | 1    | 0  | 0   | 0  |
| QUEENS VILLAGE      | 370  | 0  | 5   | 1  |
| REGO PARK           | 81   | 0  | 4   | 1  |
| RICHMOND HILL       | 167  | 0  | 9   | 1  |
| RIDGEWOOD           | 330  | 3  | 10  | 2  |
| ROCKAWAY PARK       | 9    | 4  | 20  | 0  |
| ROSEDALE            | 208  | 0  | 2   | 1  |
| SAINT ALBANS        | 202  | 1  | 3   | 0  |
| SOUTH OZONE PARK    | 358  | 2  | 13  | 0  |
| SOUTH RICHMOND HILL | 289  | 2  | 23  | 0  |
| SPRINGFIELD GARDENS | 210  | 0  | 6   | 0  |
| STATEN ISLAND       | 1766 | 23 | 175 | 2  |
| SUNNYSIDE           | 10   | 2  | 10  | 1  |
| WHITESTONE          | 227  | 1  | 2   | 1  |
| WOODHAVEN           | 308  | 0  | 3   | 0  |
| WOODSIDE            | 249  | 1  | 15  | 3  |

ComplaintType HOMELESS ENCAMPMENT ILLEGAL FIREWORKS ... \

City ...

|                     |      |    |     |
|---------------------|------|----|-----|
| ARVERNE             | 4    | 0  | ... |
| ASTORIA             | 32   | 4  | ... |
| BAYSIDE             | 2    | 0  | ... |
| BELLEROSE           | 1    | 1  | ... |
| BREEZY POINT        | 0    | 0  | ... |
| BRONX               | 247  | 24 | ... |
| BROOKLYN            | 857  | 61 | ... |
| CAMBRIA HEIGHTS     | 5    | 1  | ... |
| CENTRAL PARK        | 0    | 0  | ... |
| COLLEGE POINT       | 3    | 0  | ... |
| CORONA              | 19   | 0  | ... |
| EAST ELMHURST       | 2    | 0  | ... |
| ELMHURST            | 32   | 1  | ... |
| FAR ROCKAWAY        | 14   | 0  | ... |
| FLORAL PARK         | 0    | 0  | ... |
| FLUSHING            | 26   | 2  | ... |
| FOREST HILLS        | 18   | 1  | ... |
| FRESH MEADOWS       | 5    | 0  | ... |
| GLEN OAKS           | 0    | 0  | ... |
| HOLLIS              | 9    | 0  | ... |
| HOWARD BEACH        | 3    | 3  | ... |
| JACKSON HEIGHTS     | 11   | 1  | ... |
| JAMAICA             | 79   | 4  | ... |
| KEW GARDENS         | 5    | 0  | ... |
| LITTLE NECK         | 0    | 0  | ... |
| LONG ISLAND CITY    | 10   | 0  | ... |
| MASPETH             | 10   | 1  | ... |
| MIDDLE VILLAGE      | 5    | 0  | ... |
| NEW HYDE PARK       | 0    | 0  | ... |
| NEW YORK            | 2775 | 36 | ... |
| OAKLAND GARDENS     | 1    | 0  | ... |
| OZONE PARK          | 6    | 1  | ... |
| QUEENS              | 2    | 0  | ... |
| QUEENS VILLAGE      | 15   | 5  | ... |
| REGO PARK           | 6    | 0  | ... |
| RICHMOND HILL       | 28   | 4  | ... |
| RIDGEWOOD           | 23   | 2  | ... |
| ROCKAWAY PARK       | 4    | 0  | ... |
| ROSEDALE            | 4    | 0  | ... |
| SAINT ALBANS        | 8    | 0  | ... |
| SOUTH OZONE PARK    | 4    | 1  | ... |
| SOUTH RICHMOND HILL | 11   | 2  | ... |
| SPRINGFIELD GARDENS | 5    | 1  | ... |
| STATEN ISLAND       | 71   | 10 | ... |
| SUNNYSIDE           | 11   | 0  | ... |
| WHITESTONE          | 0    | 1  | ... |
| WOODHAVEN           | 9    | 0  | ... |
| WOODSIDE            | 33   | 1  | ... |

| ComplaintType<br>City | NOISE - HOUSE OF WORSHIP | NOISE - PARK \ |
|-----------------------|--------------------------|----------------|
| ARVERNE               | 11                       | 2              |
| ASTORIA               | 19                       | 61             |
| BAYSIDE               | 2                        | 4              |
| BELLEROSE             | 1                        | 1              |
| BREEZY POINT          | 0                        | 0              |
| BRONX                 | 79                       | 547            |
| BROOKLYN              | 340                      | 1555           |
| CAMBRIA HEIGHTS       | 2                        | 0              |
| CENTRAL PARK          | 0                        | 0              |
| COLLEGE POINT         | 0                        | 2              |
| CORONA                | 3                        | 24             |
| EAST ELMHURST         | 18                       | 5              |
| ELMHURST              | 5                        | 34             |
| FAR ROCKAWAY          | 1                        | 23             |
| FLORAL PARK           | 0                        | 0              |
| FLUSHING              | 5                        | 58             |
| FOREST HILLS          | 1                        | 20             |
| FRESH MEADOWS         | 0                        | 8              |
| GLEN OAKS             | 0                        | 37             |
| HOLLIS                | 187                      | 17             |
| HOWARD BEACH          | 1                        | 2              |
| JACKSON HEIGHTS       | 2                        | 8              |
| JAMAICA               | 13                       | 38             |
| KEW GARDENS           | 1                        | 0              |
| LITTLE NECK           | 0                        | 2              |
| LONG ISLAND CITY      | 0                        | 54             |
| MASPETH               | 2                        | 3              |
| MIDDLE VILLAGE        | 0                        | 4              |
| NEW HYDE PARK         | 0                        | 0              |
| NEW YORK              | 194                      | 1211           |
| OAKLAND GARDENS       | 0                        | 14             |
| OZONE PARK            | 3                        | 18             |
| 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      | 3                        | 4              |
| SOUTH RICHMOND HILL   | 3                        | 2              |
| SPRINGFIELD GARDENS   | 1                        | 1              |
| STATEN ISLAND         | 17                       | 67             |
| SUNNYSIDE             | 0                        | 15             |

|            |   |    |
|------------|---|----|
| WHITESTONE | 0 | 6  |
| WOODHAVEN  | 3 | 3  |
| WOODSIDE   | 3 | 38 |

| ComplaintType<br>City | NOISE - STREET/SIDEWALK | NOISE - VEHICLE | PANHANDLING \ |
|-----------------------|-------------------------|-----------------|---------------|
| ARVERNE               | 29                      | 7               | 1             |
| ASTORIA               | 500                     | 204             | 1             |
| BAYSIDE               | 15                      | 16              | 0             |
| BELLEROSE             | 13                      | 10              | 1             |
| BREEZY POINT          | 1                       | 1               | 0             |
| BRONX                 | 8892                    | 3396            | 19            |
| BROOKLYN              | 13356                   | 5177            | 49            |
| CAMBRIA HEIGHTS       | 25                      | 77              | 0             |
| CENTRAL PARK          | 95                      | 0               | 0             |
| COLLEGE POINT         | 33                      | 131             | 0             |
| CORONA                | 238                     | 100             | 1             |
| EAST ELMHURST         | 107                     | 61              | 0             |
| ELMHURST              | 224                     | 47              | 3             |
| FAR ROCKAWAY          | 136                     | 77              | 0             |
| FLORAL PARK           | 3                       | 2               | 0             |
| FLUSHING              | 225                     | 129             | 2             |
| FOREST HILLS          | 95                      | 57              | 5             |
| FRESH MEADOWS         | 42                      | 88              | 1             |
| GLEN OAKS             | 6                       | 4               | 0             |
| HOLLIS                | 41                      | 47              | 0             |
| HOWARD BEACH          | 21                      | 5               | 1             |
| JACKSON HEIGHTS       | 217                     | 58              | 1             |
| JAMAICA               | 339                     | 302             | 3             |
| KEW GARDENS           | 10                      | 18              | 0             |
| LITTLE NECK           | 8                       | 5               | 0             |
| LONG ISLAND CITY      | 149                     | 107             | 2             |
| MASPETH               | 121                     | 19              | 0             |
| MIDDLE VILLAGE        | 37                      | 42              | 0             |
| NEW HYDE PARK         | 0                       | 2               | 0             |
| NEW YORK              | 20433                   | 5485            | 193           |
| OAKLAND GARDENS       | 19                      | 5               | 0             |
| OZONE PARK            | 137                     | 71              | 7             |
| QUEENS                | 6                       | 2               | 0             |
| QUEENS VILLAGE        | 66                      | 41              | 1             |
| REGO PARK             | 57                      | 43              | 0             |
| RICHMOND HILL         | 87                      | 64              | 0             |
| RIDGEWOOD             | 433                     | 217             | 0             |
| ROCKAWAY PARK         | 189                     | 27              | 0             |
| ROSEDALE              | 24                      | 25              | 0             |
| SAINT ALBANS          | 79                      | 41              | 0             |
| SOUTH OZONE PARK      | 105                     | 85              | 0             |
| SOUTH RICHMOND HILL   | 91                      | 81              | 0             |

|                     |     |     |    |
|---------------------|-----|-----|----|
| SPRINGFIELD GARDENS | 38  | 42  | 2  |
| STATEN ISLAND       | 819 | 356 | 12 |
| SUNNYSIDE           | 65  | 48  | 0  |
| WHITESTONE          | 33  | 28  | 0  |
| WOODHAVEN           | 86  | 74  | 0  |
| WOODSIDE            | 255 | 105 | 0  |

| ComplaintType    | POSTING | ADVERTISEMENT | SQUEEGEE | TRAFFIC | \ |
|------------------|---------|---------------|----------|---------|---|
| City             |         |               |          |         |   |
| ARVERNE          | 0       | 0             | 0        |         |   |
| ASTORIA          | 1       | 0             | 47       |         |   |
| BAYSIDE          | 0       | 0             | 9        |         |   |
| BELLEROSE        | 1       | 0             | 7        |         |   |
| BREEZY POINT     | 0       | 0             | 0        |         |   |
| BRONX            | 17      | 0             | 355      |         |   |
| BROOKLYN         | 45      | 0             | 1085     |         |   |
| CAMBRIA HEIGHTS  | 0       | 0             | 6        |         |   |
| CENTRAL PARK     | 0       | 0             | 0        |         |   |
| COLLEGE POINT    | 0       | 0             | 14       |         |   |
| CORONA           | 1       | 0             | 12       |         |   |
| EAST ELMHURST    | 1       | 0             | 20       |         |   |
| ELMHURST         | 1       | 0             | 14       |         |   |
| FAR ROCKAWAY     | 0       | 0             | 10       |         |   |
| FLORAL PARK      | 0       | 0             | 0        |         |   |
| FLUSHING         | 1       | 0             | 47       |         |   |
| FOREST HILLS     | 3       | 0             | 60       |         |   |
| FRESH MEADOWS    | 0       | 0             | 13       |         |   |
| GLEN OAKS        | 0       | 0             | 3        |         |   |
| HOLLIS           | 0       | 0             | 11       |         |   |
| HOWARD BEACH     | 0       | 0             | 9        |         |   |
| JACKSON HEIGHTS  | 1       | 0             | 13       |         |   |
| JAMAICA          | 7       | 0             | 560      |         |   |
| KEW GARDENS      | 0       | 0             | 10       |         |   |
| LITTLE NECK      | 1       | 0             | 17       |         |   |
| LONG ISLAND CITY | 1       | 0             | 72       |         |   |
| MASPETH          | 0       | 0             | 55       |         |   |
| MIDDLE VILLAGE   | 0       | 0             | 12       |         |   |
| NEW HYDE PARK    | 0       | 0             | 0        |         |   |
| NEW YORK         | 41      | 4             | 1549     |         |   |
| OAKLAND GARDENS  | 0       | 0             | 6        |         |   |
| OZONE PARK       | 3       | 0             | 19       |         |   |
| QUEENS           | 0       | 0             | 2        |         |   |
| QUEENS VILLAGE   | 1       | 0             | 26       |         |   |
| REGO PARK        | 0       | 0             | 14       |         |   |
| RICHMOND HILL    | 1       | 0             | 7        |         |   |
| RIDGEWOOD        | 1       | 0             | 42       |         |   |
| ROCKAWAY PARK    | 0       | 0             | 7        |         |   |
| ROSEDALE         | 0       | 0             | 23       |         |   |

|                     |     |   |     |
|---------------------|-----|---|-----|
| SAINT ALBANS        | 0   | 0 | 11  |
| SOUTH OZONE PARK    | 1   | 0 | 28  |
| SOUTH RICHMOND HILL | 0   | 0 | 11  |
| SPRINGFIELD GARDENS | 2   | 0 | 11  |
| STATEN ISLAND       | 516 | 0 | 200 |
| SUNNYSIDE           | 2   | 0 | 16  |
| WHITESTONE          | 0   | 0 | 17  |
| WOODHAVEN           | 0   | 0 | 6   |
| WOODSIDE            | 0   | 0 | 39  |

| ComplaintType    | URINATING IN PUBLIC | VENDING |
|------------------|---------------------|---------|
| City             |                     |         |
| ARVERNE          | 1                   | 1       |
| ASTORIA          | 9                   | 54      |
| BAYSIDE          | 0                   | 2       |
| BELLEROSE        | 1                   | 0       |
| BREEZY POINT     | 0                   | 0       |
| BRONX            | 51                  | 379     |
| BROOKLYN         | 136                 | 515     |
| CAMBRIA HEIGHTS  | 0                   | 0       |
| CENTRAL PARK     | 0                   | 0       |
| COLLEGE POINT    | 0                   | 1       |
| CORONA           | 7                   | 62      |
| EAST ELMHURST    | 5                   | 9       |
| ELMHURST         | 10                  | 21      |
| FAR ROCKAWAY     | 1                   | 9       |
| FLORAL PARK      | 0                   | 0       |
| FLUSHING         | 12                  | 33      |
| FOREST HILLS     | 2                   | 10      |
| FRESH MEADOWS    | 1                   | 1       |
| GLEN OAKS        | 2                   | 18      |
| HOLLIS           | 2                   | 0       |
| HOWARD BEACH     | 0                   | 5       |
| JACKSON HEIGHTS  | 2                   | 78      |
| JAMAICA          | 33                  | 20      |
| KEW GARDENS      | 3                   | 1       |
| LITTLE NECK      | 1                   | 0       |
| LONG ISLAND CITY | 3                   | 30      |
| MASPETH          | 2                   | 6       |
| MIDDLE VILLAGE   | 0                   | 0       |
| NEW HYDE PARK    | 0                   | 0       |
| NEW YORK         | 251                 | 2399    |
| OAKLAND GARDENS  | 0                   | 2       |
| OZONE PARK       | 4                   | 1       |
| QUEENS           | 1                   | 0       |
| QUEENS VILLAGE   | 5                   | 2       |
| REGO PARK        | 1                   | 3       |
| RICHMOND HILL    | 5                   | 13      |

|                     |    |    |
|---------------------|----|----|
| RIDGEWOOD           | 8  | 8  |
| ROCKAWAY PARK       | 1  | 2  |
| ROSEDALE            | 0  | 16 |
| SAINT ALBANS        | 1  | 2  |
| SOUTH OZONE PARK    | 2  | 5  |
| SOUTH RICHMOND HILL | 0  | 24 |
| SPRINGFIELD GARDENS | 3  | 1  |
| STATEN ISLAND       | 14 | 25 |
| SUNNYSIDE           | 2  | 15 |
| WHITESTONE          | 0  | 1  |
| WOODHAVEN           | 2  | 6  |
| WOODSIDE            | 8  | 15 |

[48 rows x 22 columns]

```
In [177]: #stat, p, dof, expected = chi2_contingency(data)

# interpret p-value

stat, p, dof, expected = \
    scipy.stats.chi2_contingency(pd.crosstab(a.ComplaintType, a.City))

alpha = 0.05
print("p value is " + str(p))
if p <= alpha:
    print('Dependent (reject H0)')
else:
    print('Independent (H0 holds true)')

print(expected)
# Inference 5
#Complaint types are significantly
#dependent on the cities they are made from

p value is 0.0
Dependent (reject H0)
[[5.73241100e+00 1.83619547e+02 3.18148810e+01 ... 2.86099422e+01
  6.42030032e+01 9.54706995e+01]
 [7.38046993e-04 2.36409871e-02 4.09616081e-03 ... 3.68352545e-03
  8.26612633e-03 1.22918372e-02]
 [3.11455831e-01 9.97649656e+00 1.72857986e+00 ... 1.55444774e+00
  3.48830531e+00 5.18715530e+00]
 ...
 [3.31752124e+00 1.06266237e+02 1.84122429e+01 ... 1.65574469e+01
  3.71562378e+01 5.52518082e+01]
 [4.36923820e-01 1.39954644e+01 2.42492720e+00 ... 2.18064707e+00
  4.89354679e+00 7.27676762e+00]
 [2.80088834e+00 8.97175461e+01 1.55449303e+01 ... 1.39789791e+01
```



```
3.13699494e+01 4.66475222e+01]]
```

```
In [178]: print(a.ComplaintType.unique())
```

```
['NOISE - STREET/SIDEWALK' 'BLOCKED DRIVEWAY' 'ILLEGAL PARKING'
 'DERELICT VEHICLE' 'NOISE - COMMERCIAL' 'NOISE - HOUSE OF WORSHIP'
 'POSTING ADVERTISEMENT' 'NOISE - VEHICLE' 'ANIMAL ABUSE' 'VENDING'
 'TRAFFIC' 'DRINKING' 'BIKE/ROLLER/SKATE CHRONIC' 'PANHANDLING'
 'NOISE - PARK' 'HOMELESS ENCAMPMENT' 'URINATING IN PUBLIC' 'GRAFFITI'
 'DISORDERLY YOUTH' 'ILLEGAL FIREWORKS' 'SQUEEGEE' 'ANIMAL IN A PARK']
```

```
In [179]: d=a.loc[a['ComplaintType'].isin(\
['NOISE - STREET/SIDEWALK' , 'BLOCKED DRIVEWAY' , 'ILLEGAL PARKING',
 'DERELICT VEHICLE', 'NOISE - COMMERCIAL', 'NOISE - HOUSE OF WORSHIP',
 'POSTING ADVERTISEMENT', 'NOISE - VEHICLE', 'ANIMAL ABUSE', 'VENDING',
 'TRAFFIC', 'DRINKING' , 'BIKE/ROLLER/SKATE CHRONIC', 'PANHANDLING',
 'NOISE - PARK', 'HOMELESS ENCAMPMENT', 'URINATING IN PUBLIC' , 'GRAFFITI'
 , 'DISORDERLY YOUTH', 'ILLEGAL FIREWORKS' ])]
d=d[d.Request_Closing_Time.notnull()]
d=d[d.Request_Closing_Time.notna()]
d['Request_Closing_Time']=d['Request_Closing_Time']/3600
print(d.describe())
#we convert request time to hours
#drop nan and nat closing times
#from open states and check the data readiness for anova
```

|       | UniqueKey    | IncidentZip   | XCoordinate(StatePlane) \ |
|-------|--------------|---------------|---------------------------|
| count | 2.980230e+05 | 298020.000000 | 2.970570e+05              |
| mean  | 3.130104e+07 | 10848.949322  | 1.004858e+06              |
| std   | 5.741221e+05 | 583.166243    | 2.175286e+04              |
| min   | 3.027948e+07 | 83.000000     | 9.133570e+05              |
| 25%   | 3.080153e+07 | 10310.000000  | 9.919810e+05              |
| 50%   | 3.130567e+07 | 11208.000000  | 1.003168e+06              |
| 75%   | 3.178605e+07 | 11238.000000  | 1.018375e+06              |
| max   | 3.231065e+07 | 11697.000000  | 1.067173e+06              |

|       | YCoordinate(StatePlane) | SchoolorCitywideComplaint | VehicleType \ |
|-------|-------------------------|---------------------------|---------------|
| count | 297057.000000           | 0.0                       | 0.0           |
| mean  | 203753.627206           | NaN                       | NaN           |
| std   | 29882.139736            | NaN                       | NaN           |
| min   | 121219.000000           | NaN                       | NaN           |
| 25%   | 183332.000000           | NaN                       | NaN           |
| 50%   | 201110.000000           | NaN                       | NaN           |
| 75%   | 224136.000000           | NaN                       | NaN           |
| max   | 271876.000000           | NaN                       | NaN           |

| TaxiCompanyBorough | TaxiPickUpLocation | GarageLotName | Latitude \ |
|--------------------|--------------------|---------------|------------|
|--------------------|--------------------|---------------|------------|

|       |     |     |     |               |
|-------|-----|-----|-----|---------------|
| count | 0.0 | 0.0 | 0.0 | 297057.000000 |
| mean  | NaN | NaN | NaN | 40.725882     |
| std   | NaN | NaN | NaN | 0.082018      |
| min   | NaN | NaN | NaN | 40.499135     |
| 25%   | NaN | NaN | NaN | 40.669780     |
| 50%   | NaN | NaN | NaN | 40.718658     |
| 75%   | NaN | NaN | NaN | 40.781858     |
| max   | NaN | NaN | NaN | 40.912869     |

|       | Longitude     | Request_Closing_Time | month         | year     |
|-------|---------------|----------------------|---------------|----------|
| count | 297057.000000 | 298023.000000        | 298023.000000 | 298023.0 |
| mean  | -73.925615    | 4.305093             | 7.931301      | 2015.0   |
| std   | 0.078453      | 6.047619             | 2.536092      | 0.0      |
| min   | -74.254937    | 0.016667             | 3.000000      | 2015.0   |
| 25%   | -73.972111    | 1.273333             | 6.000000      | 2015.0   |
| 50%   | -73.931765    | 2.710000             | 8.000000      | 2015.0   |
| 75%   | -73.876788    | 5.339722             | 10.000000     | 2015.0   |
| max   | -73.700760    | 592.872778           | 12.000000     | 2015.0   |

```
In [180]: print(a.ComplaintType.unique())
```

```
['NOISE - STREET/SIDEWALK' 'BLOCKED DRIVEWAY' 'ILLEGAL PARKING'
 'DERELICT VEHICLE' 'NOISE - COMMERCIAL' 'NOISE - HOUSE OF WORSHIP'
 'POSTING ADVERTISEMENT' 'NOISE - VEHICLE' 'ANIMAL ABUSE' 'VENDING'
 'TRAFFIC' 'DRINKING' 'BIKE/ROLLER/SKATE CHRONIC' 'PANHANDLING'
 'NOISE - PARK' 'HOMELESS ENCAMPMENT' 'URINATING IN PUBLIC' 'GRAFFITI'
 'DISORDERLY YOUTH' 'ILLEGAL FIREWORKS' 'SQUEEGEE' 'ANIMAL IN A PARK']
```

```
In [181]: #perform one way anova to check if
          #complaint type affects request
          #losing time with statistical significance
          print(d.dtypes)
```

|                     |                |
|---------------------|----------------|
| UniqueKey           | int64          |
| CreatedDate         | datetime64[ns] |
| ClosedDate          | datetime64[ns] |
| Agency              | object         |
| AgencyName          | object         |
| ComplaintType       | object         |
| Descriptor          | object         |
| LocationType        | object         |
| IncidentZip         | float64        |
| IncidentAddress     | object         |
| StreetName          | object         |
| CrossStreet1        | object         |
| CrossStreet2        | object         |
| IntersectionStreet1 | object         |

|                             |         |
|-----------------------------|---------|
| IntersectionStreet2         | object  |
| AddressType                 | object  |
| City                        | object  |
| Landmark                    | object  |
| FacilityType                | object  |
| Status                      | object  |
| DueDate                     | object  |
| ResolutionDescription       | object  |
| ResolutionActionUpdatedDate | object  |
| CommunityBoard              | object  |
| Borough                     | object  |
| XCoordinate(StatePlane)     | float64 |
| YCoordinate(StatePlane)     | float64 |
| ParkFacilityName            | object  |
| ParkBorough                 | object  |
| SchoolName                  | object  |
| SchoolNumber                | object  |
| SchoolRegion                | object  |
| SchoolCode                  | object  |
| SchoolPhoneNumber           | object  |
| SchoolAddress               | object  |
| SchoolCity                  | object  |
| SchoolState                 | object  |
| SchoolZip                   | object  |
| SchoolNotFound              | object  |
| SchoolorCitywideComplaint   | float64 |
| VehicleType                 | float64 |
| TaxiCompanyBorough          | float64 |
| TaxiPickUpLocation          | float64 |
| BridgeHighwayName           | object  |
| BridgeHighwayDirection      | object  |
| RoadRamp                    | object  |
| BridgeHighwaySegment        | object  |
| GarageLotName               | float64 |
| FerryDirection              | object  |
| FerryTerminalName           | object  |
| Latitude                    | float64 |
| Longitude                   | float64 |
| Location                    | object  |
| Request_Closing_Time        | float64 |
| month                       | int64   |
| year                        | int64   |
| dtype:                      | object  |

```
In [182]: print(d.describe(include='all'))
```

|       | UniqueKey    | CreatedDate | ClosedDate | Agency | \ |
|-------|--------------|-------------|------------|--------|---|
| count | 2.980230e+05 | 298023      | 298023     | 298023 |   |

|        |              |                     |                     |        |
|--------|--------------|---------------------|---------------------|--------|
| unique | NaN          | 257332              | 236785              | 1      |
| top    | NaN          | 2015-07-11 23:04:00 | 2015-11-08 07:34:00 | NYPD   |
| freq   | NaN          | 9                   | 24                  | 298023 |
| first  | NaN          | 2015-03-29 00:33:01 | 2015-03-29 00:57:23 | NaN    |
| last   | NaN          | 2015-12-31 23:59:45 | 2016-01-03 16:22:00 | NaN    |
| mean   | 3.130104e+07 | NaN                 | NaN                 | NaN    |
| std    | 5.741221e+05 | NaN                 | NaN                 | NaN    |
| min    | 3.027948e+07 | NaN                 | NaN                 | NaN    |
| 25%    | 3.080153e+07 | NaN                 | NaN                 | NaN    |
| 50%    | 3.130567e+07 | NaN                 | NaN                 | NaN    |
| 75%    | 3.178605e+07 | NaN                 | NaN                 | NaN    |
| max    | 3.231065e+07 | NaN                 | NaN                 | NaN    |

|        |                                 |                  |                  |
|--------|---------------------------------|------------------|------------------|
|        | AgencyName                      | ComplaintType    | Descriptor \     |
| count  | 298023                          | 298023           | 292121           |
| unique | 2                               | 20               | 41               |
| top    | New York City Police Department | BLOCKED DRIVEWAY | Loud Music/Party |
| freq   | 298022                          | 76752            | 60719            |
| first  | NaN                             | NaN              | NaN              |
| last   | NaN                             | NaN              | NaN              |
| mean   | NaN                             | NaN              | NaN              |
| std    | NaN                             | NaN              | NaN              |
| min    | NaN                             | NaN              | NaN              |
| 25%    | NaN                             | NaN              | NaN              |
| 50%    | NaN                             | NaN              | NaN              |
| 75%    | NaN                             | NaN              | NaN              |
| max    | NaN                             | NaN              | NaN              |

|        |                 |               |                   |     |   |
|--------|-----------------|---------------|-------------------|-----|---|
|        | LocationType    | IncidentZip   | IncidentAddress   | ... | \ |
| count  | 297901          | 298020.000000 | 253663            | ... |   |
| unique | 15              | NaN           | 106183            | ... |   |
| top    | Street/Sidewalk | NaN           | 1207 BEACH AVENUE | ... |   |
| freq   | 247072          | NaN           | 901               | ... |   |
| first  | NaN             | NaN           | NaN               | ... |   |
| last   | NaN             | NaN           | NaN               | ... |   |
| mean   | NaN             | 10848.949322  | NaN               | ... |   |
| std    | NaN             | 583.166243    | NaN               | ... |   |
| min    | NaN             | 83.000000     | NaN               | ... |   |
| 25%    | NaN             | 10310.000000  | NaN               | ... |   |
| 50%    | NaN             | 11208.000000  | NaN               | ... |   |
| 75%    | NaN             | 11238.000000  | NaN               | ... |   |
| max    | NaN             | 11697.000000  | NaN               | ... |   |

|        |  |                 |
|--------|--|-----------------|
|        | BridgeHighwaySegment                             | GarageLotName \ |
| count  | 210  | 0.0             |
| unique | 158  | NaN             |
| top    | East 96th St (Exit 14) - Triborough Br (Exit 17) | NaN             |
| freq   | 6  | NaN             |

|       |     |     |
|-------|-----|-----|
| first | NaN | NaN |
| last  | NaN | NaN |
| mean  | NaN | NaN |
| std   | NaN | NaN |
| min   | NaN | NaN |
| 25%   | NaN | NaN |
| 50%   | NaN | NaN |
| 75%   | NaN | NaN |
| max   | NaN | NaN |

|        | FerryDirection | FerryTerminalName | Latitude      | Longitude \   |
|--------|----------------|-------------------|---------------|---------------|
| count  | 0.0            | 0.0               | 297057.000000 | 297057.000000 |
| unique | 0.0            | 0.0               | NaN           | NaN           |
| top    | NaN            | NaN               | NaN           | NaN           |
| freq   | NaN            | NaN               | NaN           | NaN           |
| first  | NaN            | NaN               | NaN           | NaN           |
| last   | NaN            | NaN               | NaN           | NaN           |
| mean   | NaN            | NaN               | 40.725882     | -73.925615    |
| std    | NaN            | NaN               | 0.082018      | 0.078453      |
| min    | NaN            | NaN               | 40.499135     | -74.254937    |
| 25%    | NaN            | NaN               | 40.669780     | -73.972111    |
| 50%    | NaN            | NaN               | 40.718658     | -73.931765    |
| 75%    | NaN            | NaN               | 40.781858     | -73.876788    |
| max    | NaN            | NaN               | 40.912869     | -73.700760    |

|        | Location                                | Request_Closing_Time \ |
|--------|---|------------------------|
| count  | 297057                                  | 298023.000000          |
| unique | 126029                                  | NaN                    |
| top    | (40.83036235589997, -73.86602154214397) | NaN                    |
| freq   | 901                                     | NaN                    |
| first  | NaN                                     | NaN                    |
| last   | NaN                                     | NaN                    |
| mean   | NaN                                     | 4.305093               |
| std    | NaN                                     | 6.047619               |
| min    | NaN                                     | 0.016667               |
| 25%    | NaN                                     | 1.273333               |
| 50%    | NaN                                     | 2.710000               |
| 75%    | NaN                                     | 5.339722               |
| max    | NaN                                     | 592.872778             |

|        | month         | year     |
|--------|---------------|----------|
| count  | 298023.000000 | 298023.0 |
| unique | NaN           | NaN      |
| top    | NaN           | NaN      |
| freq   | NaN           | NaN      |
| first  | NaN           | NaN      |
| last   | NaN           | NaN      |
| mean   | 7.931301      | 2015.0   |

|     |           |        |
|-----|-----------|--------|
| std | 2.536092  | 0.0    |
| min | 3.000000  | 2015.0 |
| 25% | 6.000000  | 2015.0 |
| 50% | 8.000000  | 2015.0 |
| 75% | 10.000000 | 2015.0 |
| max | 12.000000 | 2015.0 |

[13 rows x 56 columns]

```
In [183]: print(d.groupby('ComplaintType')['Request_Closing_Time'].mean())
```

```
ComplaintType
ANIMAL ABUSE                5.213476
BIKE/ROLLER/SKATE CHRONIC   3.756540
BLOCKED DRIVEWAY            4.738188
DERELICT VEHICLE            7.346087
DISORDERLY YOUTH            3.558584
DRINKING                     3.855364
GRAFFITI                     7.151251
HOMELESS ENCAMPMENT         4.365985
ILLEGAL FIREWORKS           2.761139
ILLEGAL PARKING              4.486003
NOISE - COMMERCIAL           3.136894
NOISE - HOUSE OF WORSHIP     3.193298
NOISE - PARK                 3.401711
NOISE - STREET/SIDEWALK      3.438576
NOISE - VEHICLE              3.588587
PANHANDLING                  4.372768
POSTING ADVERTISEMENT       1.975803
TRAFFIC                      3.446332
URINATING IN PUBLIC         3.626664
VENDING                      4.013628
Name: Request_Closing_Time, dtype: float64
```

```
In [184]: print(d.groupby('ComplaintType')['Request_Closing_Time'].var())
```

```
ComplaintType
ANIMAL ABUSE                74.334762
BIKE/ROLLER/SKATE CHRONIC   17.880692
BLOCKED DRIVEWAY            31.032251
DERELICT VEHICLE            122.431498
DISORDERLY YOUTH            13.919854
DRINKING                     27.068920
GRAFFITI                     78.312325
HOMELESS ENCAMPMENT         29.111272
ILLEGAL FIREWORKS           12.567231
ILLEGAL PARKING              35.450069
```

|                          |           |
|--------------------------|-----------|
| NOISE - COMMERCIAL       | 16.589343 |
| NOISE - HOUSE OF WORSHIP | 20.019854 |
| NOISE - PARK             | 16.026368 |
| NOISE - STREET/SIDEWALK  | 29.633128 |
| NOISE - VEHICLE          | 21.184613 |
| PANHANDLING              | 87.154038 |
| POSTING ADVERTISEMENT    | 5.968570  |
| TRAFFIC                  | 22.465421 |
| URINATING IN PUBLIC      | 26.088689 |
| VENDING                  | 22.590072 |

Name: Request\_Closing\_Time, dtype: float64

```
In [185]: print(d.groupby('ComplaintType')['Request_Closing_Time'].std())
```

| ComplaintType             |           |
|---------------------------|-----------|
| ANIMAL ABUSE              | 8.621761  |
| BIKE/ROLLER/SKATE CHRONIC | 4.228557  |
| BLOCKED DRIVEWAY          | 5.570660  |
| DERELICT VEHICLE          | 11.064877 |
| DISORDERLY YOUTH          | 3.730932  |
| DRINKING                  | 5.202780  |
| GRAFFITI                  | 8.849425  |
| HOMELESS ENCAMPMENT       | 5.395486  |
| ILLEGAL FIREWORKS         | 3.545029  |
| ILLEGAL PARKING           | 5.953996  |
| NOISE - COMMERCIAL        | 4.073002  |
| NOISE - HOUSE OF WORSHIP  | 4.474355  |
| NOISE - PARK              | 4.003295  |
| NOISE - STREET/SIDEWALK   | 5.443632  |
| NOISE - VEHICLE           | 4.602675  |
| PANHANDLING               | 9.335633  |
| POSTING ADVERTISEMENT     | 2.443066  |
| TRAFFIC                   | 4.739770  |
| URINATING IN PUBLIC       | 5.107709  |
| VENDING                   | 4.752901  |

Name: Request\_Closing\_Time, dtype: float64

```
In [186]: print(d.groupby('ComplaintType')['Request_Closing_Time'].count())
```

| ComplaintType             |       |
|---------------------------|-------|
| ANIMAL ABUSE              | 7767  |
| BIKE/ROLLER/SKATE CHRONIC | 422   |
| BLOCKED DRIVEWAY          | 76752 |
| DERELICT VEHICLE          | 17542 |
| DISORDERLY YOUTH          | 286   |
| DRINKING                  | 1272  |
| GRAFFITI                  | 113   |

```

HOMELESS ENCAMPMENT      4415
ILLEGAL FIREWORKS        168
ILLEGAL PARKING          74311
NOISE - COMMERCIAL       35185
NOISE - HOUSE OF WORSHIP  929
NOISE - PARK             4015
NOISE - STREET/SIDEWALK  47986
NOISE - VEHICLE          17027
PANHANDLING              305
POSTING ADVERTISEMENT    648
TRAFFIC                  4494
URINATING IN PUBLIC      592
VENDING                  3794
Name: Request_Closing_Time, dtype: int64

```

```

In [187]: # Order the complaint types based on the average
          # Request_Closing_Time, grouping them for different locations.
          ctype_sorted = \
          d.groupby('ComplaintType')['Request_Closing_Time']. \
          mean().sort_values(ascending=False)

          d['ComplaintType'] = pd.Categorical(d['ComplaintType'], \
          ordered=True, categories=ctype_sorted.index)
          dd = d.sort_values('ComplaintType')
          dd.groupby('Location')
          #dd.groupby('ComplaintType')['Request_Closing_Time'].mean().sort_values(ascending=Fa

```

```

Out[187]: <pandas.core.groupby.groupby.DataFrameGroupBy object at 0x00000152847ED630>

```

```

In [188]: print(dd[['ComplaintType', 'Request_Closing_Time', 'Location']])

```

```

          ComplaintType  Request_Closing_Time  \
150172    DERELICT VEHICLE      12.801111
30308     DERELICT VEHICLE       4.466667
30297     DERELICT VEHICLE       8.883333
156226    DERELICT VEHICLE       2.550000
30294     DERELICT VEHICLE       5.933333
270597    DERELICT VEHICLE       2.083333
230949    DERELICT VEHICLE       2.466667
30288     DERELICT VEHICLE       4.133333
30286     DERELICT VEHICLE      11.016667
30284     DERELICT VEHICLE       0.700000
230947    DERELICT VEHICLE       3.050000
248881    DERELICT VEHICLE      16.933333
230945    DERELICT VEHICLE      18.250000
203749    DERELICT VEHICLE       1.663889
156214    DERELICT VEHICLE      65.116667
30273     DERELICT VEHICLE       4.683333

```



|        |                       |           |
|--------|-----------------------|-----------|
| 156213 | DERELICT VEHICLE      | 3.866667  |
| 270589 | DERELICT VEHICLE      | 8.516667  |
| 156210 | DERELICT VEHICLE      | 15.416667 |
| 248887 | DERELICT VEHICLE      | 1.323611  |
| 30254  | DERELICT VEHICLE      | 3.750000  |
| 30246  | DERELICT VEHICLE      | 5.783333  |
| 270573 | DERELICT VEHICLE      | 12.566667 |
| 30277  | DERELICT VEHICLE      | 1.033333  |
| 230959 | DERELICT VEHICLE      | 6.816667  |
| 30314  | DERELICT VEHICLE      | 6.000000  |
| 270611 | DERELICT VEHICLE      | 5.350000  |
| 99907  | DERELICT VEHICLE      | 4.357500  |
| 230971 | DERELICT VEHICLE      | 3.183333  |
| 270663 | DERELICT VEHICLE      | 7.500000  |
| ...    | ...                   | ...       |
| 24530  | POSTING ADVERTISEMENT | 0.083333  |
| 24531  | POSTING ADVERTISEMENT | 0.133333  |
| 66404  | POSTING ADVERTISEMENT | 0.177500  |
| 16076  | POSTING ADVERTISEMENT | 1.062222  |
| 208163 | POSTING ADVERTISEMENT | 6.130000  |
| 66409  | POSTING ADVERTISEMENT | 0.166667  |
| 66413  | POSTING ADVERTISEMENT | 0.179167  |
| 75288  | POSTING ADVERTISEMENT | 0.245556  |
| 75291  | POSTING ADVERTISEMENT | 0.276944  |
| 75294  | POSTING ADVERTISEMENT | 0.303889  |
| 75296  | POSTING ADVERTISEMENT | 0.335556  |
| 191301 | POSTING ADVERTISEMENT | 1.650000  |
| 159461 | POSTING ADVERTISEMENT | 1.116667  |
| 57884  | POSTING ADVERTISEMENT | 1.300000  |
| 66396  | POSTING ADVERTISEMENT | 0.548889  |
| 57886  | POSTING ADVERTISEMENT | 1.333333  |
| 57889  | POSTING ADVERTISEMENT | 1.366667  |
| 121535 | POSTING ADVERTISEMENT | 1.166667  |
| 121538 | POSTING ADVERTISEMENT | 0.100000  |
| 57903  | POSTING ADVERTISEMENT | 5.300000  |
| 121545 | POSTING ADVERTISEMENT | 1.233333  |
| 121547 | POSTING ADVERTISEMENT | 1.283333  |
| 121553 | POSTING ADVERTISEMENT | 1.300000  |
| 24579  | POSTING ADVERTISEMENT | 0.266667  |
| 159725 | POSTING ADVERTISEMENT | 0.233333  |
| 24562  | POSTING ADVERTISEMENT | 0.150000  |
| 216531 | POSTING ADVERTISEMENT | 6.280000  |
| 216555 | POSTING ADVERTISEMENT | 0.983611  |
| 279167 | POSTING ADVERTISEMENT | 1.948333  |
| 31545  | POSTING ADVERTISEMENT | 0.683889  |

#### Location

150172 (40.90069766587088, -73.84388629371023)

30308 (40.678267180443584, -73.80119044881643)  
 30297 (40.686026995855244, -73.82505149980587)  
 156226 (40.73203591796679, -73.88474729397775)  
 30294 (40.69767686249072, -73.96389345962581)  
 270597 (40.741988203308075, -73.85758161144662)  
 230949 (40.609913299394286, -74.14810446087115)  
 30288 (40.714252700057585, -73.87433512262524)  
 30286 NaN  
 30284 (40.66443740417039, -73.94875800926245)  
 230947 (40.78386976893237, -73.85496793998632)  
 248881 (40.68863522548323, -73.82916613658938)  
 230945 (40.652915461109714, -73.95703782609316)  
 203749 (40.63594907894763, -74.08423072387717)  
 156214 (40.695331708094066, -73.8919690543844)  
 30273 (40.563716459837, -74.10484885254655)  
 156213 (40.62262199163514, -73.9402671368443)  
 270589 (40.68445070185194, -73.79777191313805)  
 156210 (40.60633346293819, -74.06147937078893)  
 248887 (40.55656156139566, -74.17239268150108)  
 30254 (40.66447344310802, -73.94956539670133)  
 30246 (40.68844110978502, -73.7943919594514)  
 270573 NaN  
 30277 (40.764088176974035, -73.78609745313372)  
 230959 (40.84538898574046, -73.85199655699928)  
 30314 (40.63809913464068, -73.91326960816869)  
 270611 (40.75047675533487, -73.7084495235509)  
 99907 (40.73201259784201, -73.81437319623333)  
 230971 (40.64534814490304, -74.0902604338813)  
 270663 (40.69678991725842, -73.80335668801987)  
 ... ..  
 24530 (40.54919922420646, -74.17470179978285)  
 24531 (40.54919922420646, -74.17470179978285)  
 66404 (40.549082676972034, -74.17372635207464)  
 16076 (40.6068298797936, -73.94309037376156)  
 208163 (40.6792861048084, -73.8326223682394)  
 66409 (40.549093797686275, -74.17363282481907)  
 66413 (40.549093797686275, -74.17363282481907)  
 75288 (40.54919922420646, -74.17470179978285)  
 75291 (40.549093797686275, -74.17363282481907)  
 75294 (40.549082676972034, -74.17372635207464)  
 75296 (40.549082676972034, -74.17372635207464)  
 191301 (40.62108515189641, -73.98111732979655)  
 159461 (40.71178238135804, -73.99959600597562)  
 57884 (40.54919922420646, -74.17470179978285)  
 66396 (40.54919922420646, -74.17470179978285)  
 57886 (40.549082676972034, -74.17372635207464)  
 57889 (40.549093797686275, -74.17363282481907)  
 121535 (40.549093797686275, -74.17363282481907)

```

121538 (40.549093797686275, -74.17363282481907)
57903 (40.62903143916563, -74.03098971208289)
121545 (40.549082676972034, -74.17372635207464)
121547 (40.54919922420646, -74.17470179978285)
121553 (40.54919922420646, -74.17470179978285)
24579 (40.549093797686275, -74.17363282481907)
159725 (40.66359619236984, -73.97997348787192)
24562 (40.549093797686275, -74.17363282481907)
216531 (40.6284466030692, -74.14988203739759)
216555 (40.816683766307456, -73.84913043110924)
279167 (40.71178238135804, -73.99959600597562)
31545 (40.54919922420646, -74.17470179978285)

```

```
[298023 rows x 3 columns]
```

```
In [189]: print(ctype_sorted)
```

```

ComplaintType
DERELICT VEHICLE      7.346087
GRAFFITI              7.151251
ANIMAL ABUSE          5.213476
BLOCKED DRIVEWAY      4.738188
ILLEGAL PARKING       4.486003
PANHANDLING           4.372768
HOMELESS ENCAMPMENT   4.365985
VENDING               4.013628
DRINKING              3.855364
BIKE/ROLLER/SKATE CHRONIC 3.756540
URINATING IN PUBLIC   3.626664
NOISE - VEHICLE       3.588587
DISORDERLY YOUTH      3.558584
TRAFFIC               3.446332
NOISE - STREET/SIDEWALK 3.438576
NOISE - PARK          3.401711
NOISE - HOUSE OF WORSHIP 3.193298
NOISE - COMMERCIAL     3.136894
ILLEGAL FIREWORKS     2.761139
POSTING ADVERTISEMENT 1.975803
Name: Request_Closing_Time, dtype: float64

```

```

In [190]: res=scipy.stats.f_oneway\
(d['Request_Closing_Time'][d['ComplaintType']=='BLOCKED DRIVEWAY'],\
d['Request_Closing_Time'][d['ComplaintType']=='NOISE - STREET/SIDEWALK'],\
d['Request_Closing_Time'][d['ComplaintType']=='ILLEGAL PARKING'],\
d['Request_Closing_Time'][d['ComplaintType']=='DERELICT VEHICLE'],\
d['Request_Closing_Time'][d['ComplaintType']=='NOISE - COMMERCIAL'],\

```

```

d['Request_Closing_Time'][d['ComplaintType']=='NOISE - HOUSE OF WORSHIP'],\
d['Request_Closing_Time'][d['ComplaintType']=='ANIMAL ABUSE'],\
d['Request_Closing_Time'][d['ComplaintType']=='VENDING'],\
d['Request_Closing_Time'][d['ComplaintType']=='POSTING ADVERTISEMENT'],\
d['Request_Closing_Time'][d['ComplaintType']=='NOISE - VEHICLE'],\
d['Request_Closing_Time'][d['ComplaintType']=='TRAFFIC'],\
d['Request_Closing_Time'][d['ComplaintType']=='DRINKING' ],\
d['Request_Closing_Time'][d['ComplaintType']=='BIKE/ROLLER/SKATE CHRONIC'],\
d['Request_Closing_Time'][d['ComplaintType']=='PANHANDLING'],\
d['Request_Closing_Time'][d['ComplaintType']=='NOISE - PARK'],\
d['Request_Closing_Time'][d['ComplaintType']=='HOMELESS ENCAMPMENT'],\
d['Request_Closing_Time'][d['ComplaintType']=='URINATING IN PUBLIC'],\
d['Request_Closing_Time'][d['ComplaintType']=='GRAFFITI'],\
#d['Request_Closing_Time'][d['ComplaintType']=='ANIMAL IN A PARK'],\
d['Request_Closing_Time'][d['ComplaintType']=='ILLEGAL FIREWORKS'],\
#d['Request_Closing_Time'][d['ComplaintType']=='SQUEEGEE'],\
d['Request_Closing_Time'][d['ComplaintType']=='DISORDERLY YOUTH'])
print(res)

```

```

F_onewayResult(statistic=431.7056990381209, pvalue=0.0)

```

```

In [191]: #The complaint type affects request closing time

```

```

In [192]: d=d[d.Latitude.notnull()]
d=d[d.Latitude.notna()]
res=scipy.stats.f_oneway(d['Latitude'][d['ComplaintType']=='BLOCKED DRIVEWAY'],\
d['Latitude'][d['ComplaintType']=='NOISE - STREET/SIDEWALK'],\
d['Latitude'][d['ComplaintType']=='ILLEGAL PARKING'],\

d['Latitude'][d['ComplaintType']=='DERELICT VEHICLE'],\
d['Latitude'][d['ComplaintType']=='NOISE - COMMERCIAL'],\
d['Latitude'][d['ComplaintType']=='NOISE - HOUSE OF WORSHIP'],\

d['Latitude'][d['ComplaintType']=='ANIMAL ABUSE'],\
d['Latitude'][d['ComplaintType']=='VENDING'],\
d['Latitude'][d['ComplaintType']=='POSTING ADVERTISEMENT'],\
d['Latitude'][d['ComplaintType']=='NOISE - VEHICLE'],\

d['Latitude'][d['ComplaintType']=='TRAFFIC'],\
d['Latitude'][d['ComplaintType']=='DRINKING' ],\
d['Latitude'][d['ComplaintType']=='BIKE/ROLLER/SKATE CHRONIC'],\
d['Latitude'][d['ComplaintType']=='PANHANDLING'],\

d['Latitude'][d['ComplaintType']=='NOISE - PARK'],\
d['Latitude'][d['ComplaintType']=='HOMELESS ENCAMPMENT'],\
d['Latitude'][d['ComplaintType']=='URINATING IN PUBLIC'],\

```

```

        d['Latitude'][d['ComplaintType']=='GRAFFITI'],\
        #         d['Request_Closing_Time'][d['ComplaintType']=='ANIMAL IN A PARK'],\
        d['Latitude'][d['ComplaintType']=='ILLEGAL FIREWORKS'],\
        #         d['Request_Closing_Time'][d['ComplaintType']=='SQUEEGEE'],\
        d['Latitude'][d['ComplaintType']=='DISORDERLY YOUTH'])

print(res)
#complaint type and latitude are significantly dependant

F_onewayResult(statistic=1223.0071704454256, pvalue=0.0)

In [193]: d=d[d.Longitude.notnull()]
          d=d[d.Longitude.notna()]
          res=scipy.stats.f_oneway(d['Longitude'][d['ComplaintType']=='BLOCKED DRIVEWAY'],\
                                   d['Longitude'][d['ComplaintType']=='NOISE - STREET/SIDEWALK'],\
                                   d['Longitude'][d['ComplaintType']=='ILLEGAL PARKING'],\

                                   d['Longitude'][d['ComplaintType']=='DERELICT VEHICLE'],\
                                   d['Longitude'][d['ComplaintType']=='NOISE - COMMERCIAL'],\
                                   d['Longitude'][d['ComplaintType']=='NOISE - HOUSE OF WORSHIP'],\

                                   d['Longitude'][d['ComplaintType']=='ANIMAL ABUSE'],\
                                   d['Longitude'][d['ComplaintType']=='VENDING'],\
                                   d['Longitude'][d['ComplaintType']=='POSTING ADVERTISEMENT'],\
                                   d['Longitude'][d['ComplaintType']=='NOISE - VEHICLE'],\

                                   d['Longitude'][d['ComplaintType']=='TRAFFIC'],\
                                   d['Longitude'][d['ComplaintType']=='DRINKING' ],\
                                   d['Longitude'][d['ComplaintType']=='BIKE/ROLLER/SKATE CHRONIC'],\
                                   d['Longitude'][d['ComplaintType']=='PANHANDLING'],\

                                   d['Longitude'][d['ComplaintType']=='NOISE - PARK'],\
                                   d['Longitude'][d['ComplaintType']=='HOMELESS ENCAMPMENT'],\
                                   d['Longitude'][d['ComplaintType']=='URINATING IN PUBLIC'],\
                                   d['Longitude'][d['ComplaintType']=='GRAFFITI'],\

                                   #         d['Request_Closing_Time'][d['ComplaintType']=='ANIMAL IN A PARK'],\
                                   d['Longitude'][d['ComplaintType']=='ILLEGAL FIREWORKS'],\
                                   #         d['Request_Closing_Time'][d['ComplaintType']=='SQUEEGEE'],\
                                   d['Longitude'][d['ComplaintType']=='DISORDERLY YOUTH'])

print(res)

#complaint type and longitude are significantly dependant
#hence complaint type is significantly proven
#to be dependent on location

F_onewayResult(statistic=1024.170428561391, pvalue=0.0)

```

```
In [ ]:
```

```
In [194]: #stat, p, dof, expected = chi2_contingency(data)
```

```
    # interpret p-value
```

```
    stat, p, dof, expected = scipy.stats.chi2_contingency(pd.crosstab(a.ComplaintType
```

```
    alpha = 0.05
```

```
    print("p value is " + str(p))
```

```
    if p <= alpha:
```

```
        print('Dependent (reject H0)')
```

```
    else:
```

```
        print('Independent (H0 holds true)')
```

```
    #inference 6
```

```
    #complaint type depends significantly on the location type
```

p value is 0.0

Dependent (reject H0)

```
In [195]: pd.crosstab(a.ComplaintType, a.LocationType)
```

```
Out[195]: LocationType      Bridge  Club/Bar/Restaurant  Commercial  Highway \
ComplaintType
ANIMAL ABUSE                0                0            62          0
ANIMAL IN A PARK            0                0             0          0
BIKE/ROLLER/SKATE CHRONIC   0                0             0          0
BLOCKED DRIVEWAY           0                0             0          0
DERELICT VEHICLE           0                0             0         13
DISORDERLY YOUTH           0                0             0          0
DRINKING                   0               365             0          0
GRAFFITI                   0                0             0          0
HOMELESS ENCAMPMENT        2                0             0         14
ILLEGAL FIREWORKS          0                0             0          0
ILLEGAL PARKING            0                0             0          0
NOISE - COMMERCIAL          0               16835            0          0
NOISE - HOUSE OF WORSHIP    0                0             0          0
NOISE - PARK               0                0             0          0
NOISE - STREET/SIDEWALK     0                0             0          0
NOISE - VEHICLE            0                0             0          0
PANHANDLING                0                0             0          0
POSTING ADVERTISEMENT      0                0             0          0
SQUEEGEE                  0                0             0          0
TRAFFIC                    0                0             0         184
URINATING IN PUBLIC        0                21             0          0
```

|         |   |   |   |   |
|---------|---|---|---|---|
| VENDING | 0 | 0 | 0 | 0 |
|---------|---|---|---|---|

| LocationType              | House and Store | House of Worship | Park | \ |
|---------------------------|-----------------|------------------|------|---|
| ComplaintType             |                 |                  |      |   |
| ANIMAL ABUSE              | 93              | 0                | 0    |   |
| ANIMAL IN A PARK          | 0               | 0                | 1    |   |
| BIKE/ROLLER/SKATE CHRONIC | 0               | 0                | 0    |   |
| BLOCKED DRIVEWAY          | 0               | 0                | 0    |   |
| DERELICT VEHICLE          | 0               | 0                | 0    |   |
| DISORDERLY YOUTH          | 0               | 0                | 0    |   |
| DRINKING                  | 0               | 0                | 0    |   |
| GRAFFITI                  | 0               | 0                | 0    |   |
| HOMELESS ENCAMPMENT       | 0               | 0                | 0    |   |
| ILLEGAL FIREWORKS         | 0               | 0                | 0    |   |
| ILLEGAL PARKING           | 0               | 0                | 0    |   |
| NOISE - COMMERCIAL        | 0               | 0                | 0    |   |
| NOISE - HOUSE OF WORSHIP  | 0               | 927              | 0    |   |
| NOISE - PARK              | 0               | 0                | 0    |   |
| NOISE - STREET/SIDEWALK   | 0               | 0                | 0    |   |
| NOISE - VEHICLE           | 0               | 0                | 0    |   |
| PANHANDLING               | 0               | 0                | 0    |   |
| POSTING ADVERTISEMENT     | 0               | 0                | 0    |   |
| SQUEEGEE                  | 0               | 0                | 0    |   |
| TRAFFIC                   | 0               | 0                | 0    |   |
| URINATING IN PUBLIC       | 0               | 0                | 0    |   |
| VENDING                   | 0               | 0                | 0    |   |

| LocationType              | Park/Playground | Parking Lot | Residential Building | \ |
|---------------------------|-----------------|-------------|----------------------|---|
| ComplaintType             |                 |             |                      |   |
| ANIMAL ABUSE              | 122             | 110         | 227                  |   |
| ANIMAL IN A PARK          | 0               | 0           | 0                    |   |
| BIKE/ROLLER/SKATE CHRONIC | 0               | 0           | 0                    |   |
| BLOCKED DRIVEWAY          | 0               | 0           | 0                    |   |
| DERELICT VEHICLE          | 0               | 0           | 0                    |   |
| DISORDERLY YOUTH          | 0               | 0           | 0                    |   |
| DRINKING                  | 97              | 0           | 0                    |   |
| GRAFFITI                  | 0               | 0           | 0                    |   |
| HOMELESS ENCAMPMENT       | 353             | 0           | 0                    |   |
| ILLEGAL FIREWORKS         | 8               | 0           | 0                    |   |
| ILLEGAL PARKING           | 0               | 0           | 0                    |   |
| NOISE - COMMERCIAL        | 0               | 0           | 0                    |   |
| NOISE - HOUSE OF WORSHIP  | 0               | 0           | 0                    |   |
| NOISE - PARK              | 4015            | 0           | 0                    |   |
| NOISE - STREET/SIDEWALK   | 0               | 0           | 0                    |   |
| NOISE - VEHICLE           | 0               | 0           | 0                    |   |
| PANHANDLING               | 6               | 0           | 0                    |   |
| POSTING ADVERTISEMENT     | 0               | 7           | 0                    |   |
| SQUEEGEE                  | 0               | 0           | 0                    |   |

|                     |     |   |   |
|---------------------|-----|---|---|
| TRAFFIC             | 0   | 0 | 0 |
| URINATING IN PUBLIC | 38  | 0 | 0 |
| VENDING             | 105 | 0 | 0 |

| LocationType              | Residential Building/House | Roadway Tunnel | \ |
|---------------------------|----------------------------|----------------|---|
| ComplaintType             |                            |                |   |
| ANIMAL ABUSE              | 5081                       | 0              |   |
| ANIMAL IN A PARK          | 0                          | 0              |   |
| BIKE/ROLLER/SKATE CHRONIC | 25                         | 0              |   |
| BLOCKED DRIVEWAY          | 0                          | 0              |   |
| DERELICT VEHICLE          | 0                          | 5              |   |
| DISORDERLY YOUTH          | 77                         | 0              |   |
| DRINKING                  | 289                        | 0              |   |
| GRAFFITI                  | 56                         | 0              |   |
| HOMELESS ENCAMPMENT       | 983                        | 1              |   |
| ILLEGAL FIREWORKS         | 33                         | 0              |   |
| ILLEGAL PARKING           | 0                          | 0              |   |
| NOISE - COMMERCIAL        | 0                          | 0              |   |
| NOISE - HOUSE OF WORSHIP  | 0                          | 0              |   |
| NOISE - PARK              | 0                          | 0              |   |
| NOISE - STREET/SIDEWALK   | 0                          | 0              |   |
| NOISE - VEHICLE           | 0                          | 0              |   |
| PANHANDLING               | 16                         | 0              |   |
| POSTING ADVERTISEMENT     | 54                         | 0              |   |
| SQUEEGEE                  | 0                          | 0              |   |
| TRAFFIC                   | 0                          | 29             |   |
| URINATING IN PUBLIC       | 138                        | 0              |   |
| VENDING                   | 201                        | 0              |   |

| LocationType              | Store/Commercial | Street/Sidewalk | Subway Station | \ |
|---------------------------|------------------|-----------------|----------------|---|
| ComplaintType             |                  |                 |                |   |
| ANIMAL ABUSE              | 521              | 1526            | 22             |   |
| ANIMAL IN A PARK          | 0                | 0               | 0              |   |
| BIKE/ROLLER/SKATE CHRONIC | 53               | 344             | 0              |   |
| BLOCKED DRIVEWAY          | 0                | 76724           | 0              |   |
| DERELICT VEHICLE          | 0                | 17444           | 0              |   |
| DISORDERLY YOUTH          | 8                | 201             | 0              |   |
| DRINKING                  | 90               | 430             | 0              |   |
| GRAFFITI                  | 32               | 25              | 0              |   |
| HOMELESS ENCAMPMENT       | 512              | 2541            | 0              |   |
| ILLEGAL FIREWORKS         | 2                | 125             | 0              |   |
| ILLEGAL PARKING           | 0                | 74283           | 0              |   |
| NOISE - COMMERCIAL        | 18360            | 0               | 0              |   |
| NOISE - HOUSE OF WORSHIP  | 0                | 0               | 0              |   |
| NOISE - PARK              | 0                | 0               | 0              |   |
| NOISE - STREET/SIDEWALK   | 0                | 47991           | 0              |   |
| NOISE - VEHICLE           | 0                | 17026           | 0              |   |
| PANHANDLING               | 60               | 223             | 0              |   |



|                       |     |      |    |
|-----------------------|-----|------|----|
| POSTING ADVERTISEMENT | 6   | 581  | 0  |
| SQUEEGEE              | 0   | 4    | 0  |
| TRAFFIC               | 0   | 4277 | 0  |
| URINATING IN PUBLIC   | 66  | 316  | 12 |
| VENDING               | 432 | 3055 | 0  |

| LocationType              | Vacant Lot |
|---------------------------|------------|
| ComplaintType             |            |
| ANIMAL ABUSE              | 0          |
| ANIMAL IN A PARK          | 0          |
| BIKE/ROLLER/SKATE CHRONIC | 0          |
| BLOCKED DRIVEWAY          | 0          |
| DERELICT VEHICLE          | 77         |
| DISORDERLY YOUTH          | 0          |
| DRINKING                  | 0          |
| GRAFFITI                  | 0          |
| HOMELESS ENCAMPMENT       | 0          |
| ILLEGAL FIREWORKS         | 0          |
| ILLEGAL PARKING           | 0          |
| NOISE - COMMERCIAL        | 0          |
| NOISE - HOUSE OF WORSHIP  | 0          |
| NOISE - PARK              | 0          |
| NOISE - STREET/SIDEWALK   | 0          |
| NOISE - VEHICLE           | 0          |
| PANHANDLING               | 0          |
| POSTING ADVERTISEMENT     | 0          |
| SQUEEGEE                  | 0          |
| TRAFFIC                   | 0          |
| URINATING IN PUBLIC       | 0          |
| VENDING                   | 0          |

In [196]: # *Import a 311 NYC service request done.*

```
# Read or convert the columns
#Created Date and Closed Date to datetime datatype
#and create a new column Request_Closing_Time as the
#time elapsed between request creation and request closing.
#(Hint: Explore the package/module datetime) done
```

```
# Provide major insights/patterns
#that you can offer in a visual format (graphs or tables);
#at least 4 major conclusions that you can come up with after generic data mining. #
```

```
#inference 1
# Brooklyn, New york, BBronx, staten island and
#jamaica combined contribute to around 80% of complaints
# 1 these cities might need appropriate
```

*#awareness programs to reduce the behaviours causing complaints*  
*# 2 caution: the values are not*  
*#adjusted based on population / population*  
*#density which is a hidden variable*  
*# 3 this might also mean causality*  
*#on other way meaning people*  
*#are not aware of 311 service in the other areas/cities*

*#inference 2*  
*# blocked driveway, illegal parking,*  
*#noise -street/sidewalk ammount to around 80% complaints*  
*#noise - commercial, noise-vehicle,*  
*#derelict vehicle and animal abuse add upto total 90%*  
*# 1 regulation, enforcement and awareness*  
*#on guidelines and best practices can be performed to reduce these issues*

*#inference 3*  
*#majority of complaints are closed by now 99.9% complaints get closed*

*#inference 4*  
*# 75% of the complaints that stay open are*  
*#from Blocked driveway, illegal parking, noise street/sidewalk*  
*#and noise commercial type*  
*#chi square test however significantly*  
*#proves that complaint type and status are independent*  
*#similarly city and status are also independent*  
*#cross table shows the data for this*

*# Inference 5*  
*#Complaint types are significantly*  
*#dependent on the cities they are made from*

*#inference 6*  
*#complaint type depends significantly on the location type*

*# Order the complaint types based on the average Request\_Closing\_Time,*  
*#grouping them for different locations.done*

*#most of the data is from same*  
*#year from march to december of 2015*  
*#we need more data from multiple*

```
#years to analyze if particular months/quarters/seasons  
#have significant difference in the  
#numbers and types of complaints that get raised
```

```
#Perform a statistical test for the following:
```

```
#Please note: For the below statements you need to state the Null and  
#Alternate and then provide a statistical test to accept or reject the  
#Null Hypothesis along with the corresponding p-value.
```

```
# Whether the average response time across complaint types is similar or not (over  
#Null hypothesis - average response time does not depend on complaint type  
#Alternate hypothesis - average response time depends on complaint type  
#result Alternate hypothesis is significantly proven  
#F_onewayResult(statistic=431.7056990381209, pvalue=0.0)
```

```
#Are the type of complaint or service requested and location related?  
#Null hypothesis - service requested does not depend on location  
#Alternate hypothesis - service requested does depend on location  
#result Alternate hypothesis is significantly proven  
#F_onewayResult(statistic=1223.0071704454256, pvalue=0.0)  
#for latitude  
#complaint type and longitude are significantly dependant  
#hence complaint type is significantly proven  
#to be dependent on location  
#F_onewayResult(statistic=1024.170428561391, pvalue=0.0)  
#for longitude
```

In [ ]: