Customer Service Requests Analysis

In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import datetime
```

In [2]:
```
# import the data
import io
%cd "E:\Data Science\Python\Data sets\Data Science with Python Two"
```

```
E:\Data Science\Python\Data sets\Data Science with Python Two
```

In [3]:
```
customer=pd.read_csv("311_Service_Requests_from_2010_to_Present.csv")
```

```
C:\Users\abhinav\anaconda3\lib\site-packages\IPython\core\interactiveshell.
py:3071: DtypeWarning: Columns (48,49) have mixed types.Specify dtype optio
n on import or set low_memory=False.
  has_raised = await self.run_ast_nodes(code_ast.body, cell_name,
```

In [4]:
```
customer.head() # by default see the first 5 rows of data
```

Out[4]:

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type
0	32310363	12/31/2015 11:59:45 PM	01-01-16 0:55	NYPD	New York City Police Department	Noise - Street/Sidewalk	Loud Music/Party	Street/Sidewalk
1	32309934	12/31/2015 11:59:44 PM	01-01-16 1:26	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk
2	32309159	12/31/2015 11:59:29 PM	01-01-16 4:51	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk
3	32305098	12/31/2015 11:57:46 PM	01-01-16 7:43	NYPD	New York City Police Department	Illegal Parking	Commercial Overnight Parking	Street/Sidewalk
4	32306529	12/31/2015 11:56:58 PM	01-01-16 3:24	NYPD	New York City Police Department	Illegal Parking	Blocked Sidewalk	Street/Sidewalk

5 rows × 53 columns

In [5]:
```
customer.shape
```

Out[5]:
```
(300698, 53)
```

In [6]:
```
customer.columns
```

Out[6]:
```
Index(['Unique Key', 'Created Date', 'Closed Date', 'Agency', 'Agency Nam
e',
       '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 Stat
e',
       '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 [7]:
```
customer.describe()
```

Out[7]:

	Unique Key	Incident Zip	X Coordinate (State Plane)	Y Coordinate (State Plane)	School or Citywide Complaint	Vehicle Type	Taxi Company Borough
count	3.006980e+05	298083.000000	2.971580e+05	297158.000000	0.0	0.0	0.0
mean	3.130054e+07	10848.888645	1.004854e+06	203754.534416	NaN	NaN	NaN
std	5.738547e+05	583.182081	2.175338e+04	29880.183529	NaN	NaN	NaN
min	3.027948e+07	83.000000	9.133570e+05	121219.000000	NaN	NaN	NaN
25%	3.080118e+07	10310.000000	9.919752e+05	183343.000000	NaN	NaN	NaN
50%	3.130436e+07	11208.000000	1.003158e+06	201110.500000	NaN	NaN	NaN
75%	3.178446e+07	11238.000000	1.018372e+06	224125.250000	NaN	NaN	NaN
max	3.231065e+07	11697.000000	1.067173e+06	271876.000000	NaN	NaN	NaN

In [8]:
```
customer.dtypes
```

Out[8]:
```
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 [9]:
```
customer["Descriptor"].unique()
```

Out[9]:
```
array(['Loud Music/Party', 'No Access', 'Commercial Overnight Parking',
       'Blocked Sidewalk', 'Posted Parking Sign Violation',
       'Blocked Hydrant', 'With License Plate', 'Partial Access',
       'Unauthorized Bus Layover', 'Double Parked Blocking Vehicle',
       'Double Parked Blocking Traffic', 'Vehicle', 'Loud Talking',
       'Banging/Pounding', 'Car/Truck Music', 'Tortured',
       'In Prohibited Area', 'Congestion/Gridlock', 'Neglected',
       'Car/Truck Horn', 'In Public', 'Other (complaint details)', nan,
       'No Shelter', 'Truck Route Violation', 'Unlicensed',
       'Overnight Commercial Storage', 'Engine Idling',
       'After Hours - Licensed Est', 'Detached Trailer',
       'Underage - Licensed Est', 'Chronic Stoplight Violation',
       'Loud Television', 'Chained', 'Building', 'In Car',
       'Police Report Requested', 'Chronic Speeding',
       'Playing in Unsuitable Place', 'Drag Racing',
       'Police Report Not Requested', 'Nuisance/Truant', 'Homeless Issue',
       'Language Access Complaint', 'Disruptive Passenger',
       'Animal Waste'], dtype=object)
```

In [10]:
```
customer["Complaint Type"].unique()
```

Out[10]:
```
array(['Noise - Street/Sidewalk', 'Blocked Driveway', 'Illegal Parking',
       'Derelict Vehicle', 'Noise - Commercial',
       'Noise - House of Worship', 'Posting Advertisement',
       'Noise - Vehicle', 'Animal Abuse', 'Vending', 'Traffic',
       'Drinking', 'Bike/Roller/Skate Chronic', 'Panhandling',
       'Noise - Park', 'Homeless Encampment', 'Urinating in Public',
       'Graffiti', 'Disorderly Youth', 'Illegal Fireworks',
       'Ferry Complaint', 'Agency Issues', 'Squeegee', 'Animal in a Park'],
      dtype=object)
```

In [11]:
```
complaintTypecity = pd.DataFrame({'count':customer.groupby(['Complaint Type','City']).size()}).reset_index()
complaintTypecity
```

Out[11]:

	Complaint Type	City	count
0	Animal Abuse	ARVERNE	38
1	Animal Abuse	ASTORIA	125
2	Animal Abuse	BAYSIDE	37
3	Animal Abuse	BELLEROSE	7
4	Animal Abuse	BREEZY POINT	2
...	...	...	...
759	Vending	STATEN ISLAND	25
760	Vending	SUNNYSIDE	15
761	Vending	WHITESTONE	1
762	Vending	WOODHAVEN	6
763	Vending	WOODSIDE	15

764 rows × 3 columns

In [12]:
```
customer.groupby(['Borough','Complaint Type','Descriptor']).size()
```

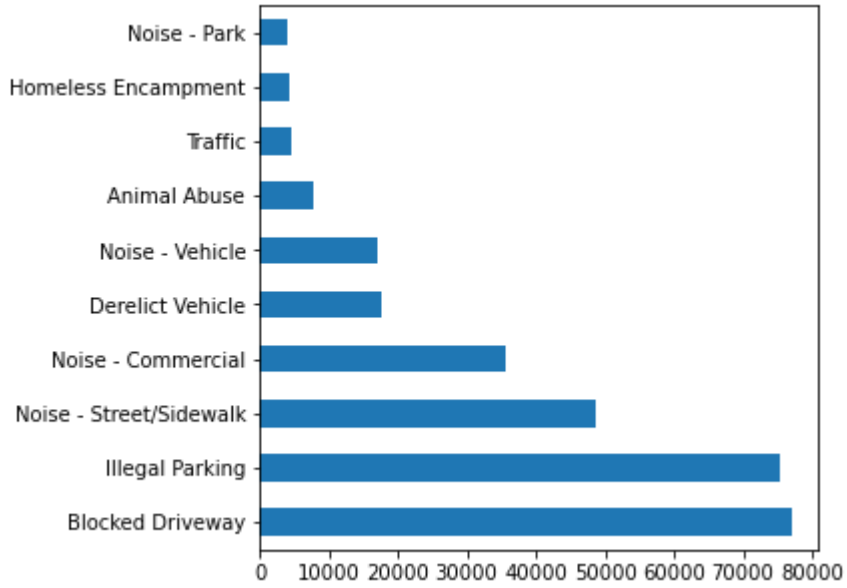
Out[12]:
```
Borough      Complaint Type         Descriptor
BRONX        Animal Abuse           Chained                     132
                                    In Car                       36
                                    Neglected                   673
                                    No Shelter                   71
                                    Other (complaint details)   311
                                                                ...
Unspecified  Noise - Vehicle        Engine Idling                11
             Posting Advertisement  Vehicle                       1
             Traffic                Truck Route Violation         1
             Vending                In Prohibited Area            2
                                    Unlicensed                    5
Length: 288, dtype: int64
```

In [13]:
```
service = pd.read_csv("311_Service_Requests_from_2010_to_Present.csv", parse_dates=["Created Date", "Closed Date"])
```

```
C:\Users\abhinav\anaconda3\lib\site-packages\IPython\core\interactiveshell.py:3071: DtypeWarning: Columns (48,49) have mixed types.Specify dtype option on import or set low_memory=False.
  has_raised = await self.run_ast_nodes(code_ast.body, cell_name,
```

In [14]:
```
service["Request_Closing_Time"] = service["Closed Date"] - service["Created Date"]
```

In [16]:
```
customer['Complaint Type'].value_counts().head(10).plot(kind='barh',figsize
=(5,5));
```



In [17]:
```
customer.groupby(["Borough","Complaint Type","Descriptor"]).size()
```

Out[17]:
```
Borough      Complaint Type         Descriptor
BRONX        Animal Abuse           Chained                     132
                                    In Car                       36
                                    Neglected                   673
                                    No Shelter                   71
                                    Other (complaint details)   311
                                                                ...
Unspecified  Noise - Vehicle        Engine Idling                11
             Posting Advertisement  Vehicle                       1
             Traffic                Truck Route Violation         1
             Vending                In Prohibited Area            2
                                    Unlicensed                    5
Length: 288, dtype: int64
```

In [18]:
```
majorcomplints=customer.dropna(subset=["Complaint Type"])
majorcomplints=customer.groupby("Complaint Type")
sortedComplaintType = majorcomplints.size().sort_values(ascending = False)
sortedComplaintType = sortedComplaintType.to_frame('count').reset_index()
sortedComplaintType
sortedComplaintType.head(10)
```

Out[18]:

	Complaint Type	count
0	Blocked Driveway	77044
1	Illegal Parking	75361
2	Noise - Street/Sidewalk	48612
3	Noise - Commercial	35577
4	Derelict Vehicle	17718
5	Noise - Vehicle	17083
6	Animal Abuse	7778
7	Traffic	4498
8	Homeless Encampment	4416
9	Noise - Park	4042

In [20]:
```
groupedby_complainttype = service.groupby('Complaint Type')
```

In [21]:
```
grp_data = groupedby_complainttype.get_group('Blocked Driveway')
grp_data.shape
```

Out[21]: (77044, 54)

In [22]:
```
service.isnull().sum().sort_values(ascending=False)
```

Out[22]:

School or Citywide Complaint	300698
Vehicle Type	300698
Taxi Company Borough	300698
Garage Lot Name	300698
Taxi Pick Up Location	300698
Ferry Direction	300697
Ferry Terminal Name	300696
Bridge Highway Segment	300485
Road Ramp	300485
Bridge Highway Name	300455
Bridge Highway Direction	300455
Landmark	300349
Intersection Street 2	257336
Intersection Street 1	256840
Cross Street 2	49779
Cross Street 1	49279
Street Name	44410
Incident Address	44410
Descriptor	5914
Y Coordinate (State Plane)	3540
X Coordinate (State Plane)	3540
Latitude	3540
Longitude	3540
Location	3540
Address Type	2815
Incident Zip	2615
City	2614
Resolution Action Updated Date	2187
Facility Type	2171
Closed Date	2164
Request_Closing_Time	2164
Location Type	131
Due Date	3
School Zip	1
School Region	1
School Code	1
Community Board	0
School City	0
Created Date	0
School Not Found	0
Agency	0
Agency Name	0
Complaint Type	0
School State	0
School Phone Number	0
School Address	0
Resolution Description	0
School Number	0
School Name	0
Park Borough	0
Park Facility Name	0
Borough	0
Status	0
Unique Key	0

dtype: int64

In [23]:
```
service['City'].dropna(inplace=True)
```

In [24]:
```
service["City"].shape
```

Out[24]:
```
(298084,)
```

In [25]:
```
grp_data['City'].isnull().sum()
```

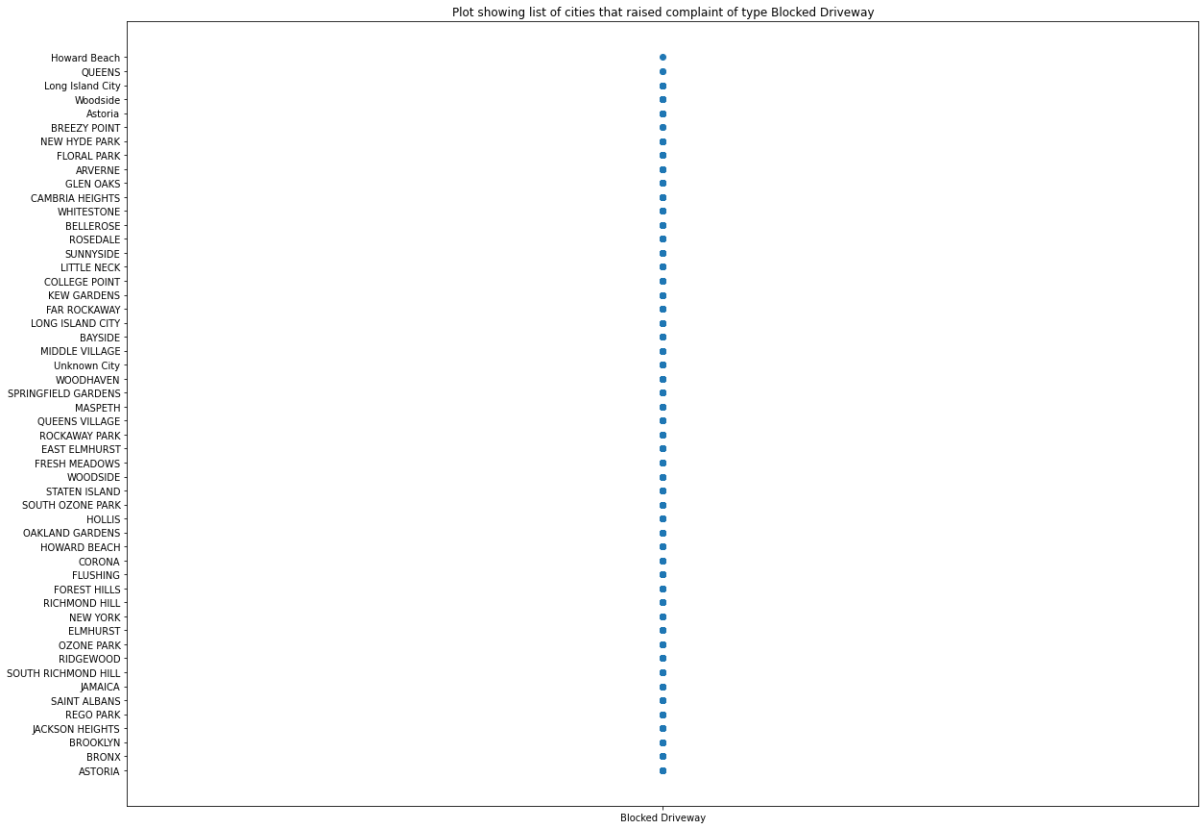
Out[25]:
```
283
```

In [26]:
```
grp_data['City'].fillna('Unknown City', inplace =True)
```

```
C:\Users\abhinav\anaconda3\lib\site-packages\pandas\core\generic.py:6245: S
ettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-doc
s/stable/user_guide/indexing.html#returning-a-view-versus-a-copy
  self._update_inplace(new_data)
```

In [27]:
```
plt.figure(figsize=(20, 15))
plt.scatter(grp_data['Complaint Type'],grp_data['City'])
plt.title('Plot showing list of cities that raised complaint of type Blocke
d Driveway')
plt.show()
```



In [ ]:
```

```