INTRODUCTION

In [129…
```
# Name :- Rohit yadav
# Ph. no. :- 9311565500
# Email :- rohityadav.ry.ry94@gmail.com
```

Performing a service request data analysis of New York City 311 calls

In [130…
```
# Importing Some libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import scipy.stats as stats
```

In [131…
```
nyc_ser = pd.read_csv('311_Service_Requests_from_2010_to_Present.csv') # importing the dataset
```

```
C:\Users\Pooja\anaconda3\lib\site-packages\IPython\core\interactiveshell.py:3444: DtypeWarning: Columns (48,49) have mixed types.Specify dtype option on import or set low_memory=False.
  exec(code_obj, self.user_global_ns, self.user_ns)
```

In [132…
```
nyc_ser.head() # shows first 5 rows
```

Out[132…

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type	Incident Zip	Incident Address	...	Bridge Highway Name	Bridge Highway Direction	Road Ramp	Bridge Highway Segment	Garage Lot Name	Ferry Direction	Ferry Terminal Name	Latitude	Longitude	Location
0	32310363	12/31/2015 11:59:45 PM	01-01-2016 00:55	NYPD	New York City Police Department	Noise - Street/Sidewalk	Loud Music/Party	Street/Sidewalk	10034.0	71 VERMILYEA AVENUE	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.865682	-73.923501	(40.86568153633767, -73.92350095571744)
1	32309934	12/31/2015 11:59:44 PM	01-01-2016 01:26	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	11105.0	27-07 23 AVENUE	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.775945	-73.915094	(40.775945312321085, -73.91509393898605)
2	32309159	12/31/2015 11:59:29 PM	01-01-2016 04:51	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	10458.0	2897 VALENTINE AVENUE	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.870325	-73.888525	(40.870324522111424, -73.88852464418646)
3	32305098	12/31/2015 11:57:46 PM	01-01-2016 07:43	NYPD	New York City Police Department	Illegal Parking	Commercial Overnight Parking	Street/Sidewalk	10461.0	2940 BAISLEY AVENUE	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.835994	-73.828379	(40.83599404683083, -73.82837939584206)
4	32306529	12/31/2015 11:56:58 PM	01-01-2016 03:24	NYPD	New York City Police Department	Illegal Parking	Blocked Sidewalk	Street/Sidewalk	11373.0	87-14 57 ROAD	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.733060	-73.874170	(40.733059618956815, -73.87416975810375)

5 rows × 53 columns

In [133…
```
nyc_ser.columns # shows all Columns
```

Out[133…
```
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 [134…
```
nyc_ser.info() # to show the datatype and non-null values of all columns
```

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

In [135…
```
nyc_ser.describe(include='all')
```

Out[135…

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type	Incident Zip	Incident Address	...	Bridge Highway Name	Bridge Highway Direction	Road Ramp	Bridge Highway Segment	Garage Lot Name	Ferry Direction	Ferry Terminal Name	Latitude	Longitude	Location
count	3.006980e+05	300698	298534	300698	300698	300698	294784	300567	298083.000000	256288	...	243	243	213	213	0.0	1	2	297158.000000	297158.000000	297158
unique	NaN	259493	237165	1	3	24	45	18	NaN	107652	...	29	34	2	160	NaN	1	2	NaN	NaN	126048
top	NaN	07-11-2015 23:04	11-08-2015 07:34	NYPD	New York City Police Department	Blocked Driveway	Loud Music/Party	Street/Sidewalk	NaN	1207 BEACH AVENUE	...	FDR Dr	East/Queens Bound	Roadway	East 96th St (Exit 14) - Triborough Br (Exit 17)	NaN	Manhattan Bound	St. George Terminal (Staten Island)	NaN	NaN	(40.83036235589997, -73.86602154214397)
freq	NaN	9	24	300698	300690	77044	61430	249299	NaN	904	...	33	21	162	6	NaN	1	1	NaN	NaN	902
mean	3.130054e+07	NaN	NaN	NaN	NaN	NaN	NaN	NaN	10848.888645	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.725885	-73.925630	NaN
std	5.738547e+05	NaN	NaN	NaN	NaN	NaN	NaN	NaN	583.182081	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	0.082012	0.078454	NaN
min	3.027948e+07	NaN	NaN	NaN	NaN	NaN	NaN	NaN	83.000000	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.499135	-74.254937	NaN
25%	3.080118e+07	NaN	NaN	NaN	NaN	NaN	NaN	NaN	10310.000000	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.669796	-73.972142	NaN
50%	3.130436e+07	NaN	NaN	NaN	NaN	NaN	NaN	NaN	11208.000000	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.718661	-73.931781	NaN
75%	3.178446e+07	NaN	NaN	NaN	NaN	NaN	NaN	NaN	11238.000000	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.781840	-73.876805	NaN
max	3.231065e+07	NaN	NaN	NaN	NaN	NaN	NaN	NaN	11697.000000	NaN	...	NaN	NaN	NaN	NaN	NaN	NaN	NaN	40.912869	-73.700760	NaN

11 rows × 53 columns

Changing Datatype of columns

In [136…
```
# By using Pandas converting Data type
nyc_ser['Created Date']=pd.to_datetime(nyc_ser['Created Date'])
nyc_ser['Closed Date']=pd.to_datetime(nyc_ser['Closed Date'])
```

In [137…
```
# Creating new column
nyc_ser['Request_Closing_Time']= (nyc_ser['Closed Date']-nyc_ser['Created Date']).dt.total_seconds()
```

In [138…
```
nyc_ser.head()
```

Out[138…

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type	Incident Zip	Incident Address	...	Bridge Highway Direction	Road Ramp	Bridge Highway Segment	Garage Lot Name	Ferry Direction	Ferry Terminal Name	Latitude	Longitude	Location	Request_Closing_Time
0	32310363	2015-12-31 23:59:45	2016-01-01 00:55:00	NYPD	New York City Police Department	Noise - Street/Sidewalk	Loud Music/Party	Street/Sidewalk	10034.0	71 VERMILYEA AVENUE	...	NaN	NaN	NaN	NaN	NaN	NaN	40.865682	-73.923501	(40.86568153633767, -73.92350095571744)	3315.0
1	32309934	2015-12-31 23:59:44	2016-01-01 01:26:00	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	11105.0	27-07 23 AVENUE	...	NaN	NaN	NaN	NaN	NaN	NaN	40.775945	-73.915094	(40.775945312321085, -73.91509393898605)	5176.0
2	32309159	2015-12-31 23:59:29	2016-01-01 04:51:00	NYPD	New York City Police Department	Blocked Driveway	No Access	Street/Sidewalk	10458.0	2897 VALENTINE AVENUE	...	NaN	NaN	NaN	NaN	NaN	NaN	40.870325	-73.888525	(40.870324522111424, -73.88852464418646)	17491.0
3	32305098	2015-12-31 23:57:46	2016-01-01 07:43:00	NYPD	New York City Police Department	Illegal Parking	Commercial Overnight Parking	Street/Sidewalk	10461.0	2940 BAISLEY AVENUE	...	NaN	NaN	NaN	NaN	NaN	NaN	40.835994	-73.828379	(40.83599404683083, -73.82837939584206)	27914.0
4	32306529	2015-12-31 23:56:58	2016-01-01 03:24:00	NYPD	New York City Police Department	Illegal Parking	Blocked Sidewalk	Street/Sidewalk	11373.0	87-14 57 ROAD	...	NaN	NaN	NaN	NaN	NaN	NaN	40.733060	-73.874170	(40.733059618956815, -73.87416975810375)	12422.0

5 rows × 54 columns

In [139…
```
nyc_ser.columns
```

Out[139…
```
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',
       'Request_Closing_Time'],
      dtype='object')
```

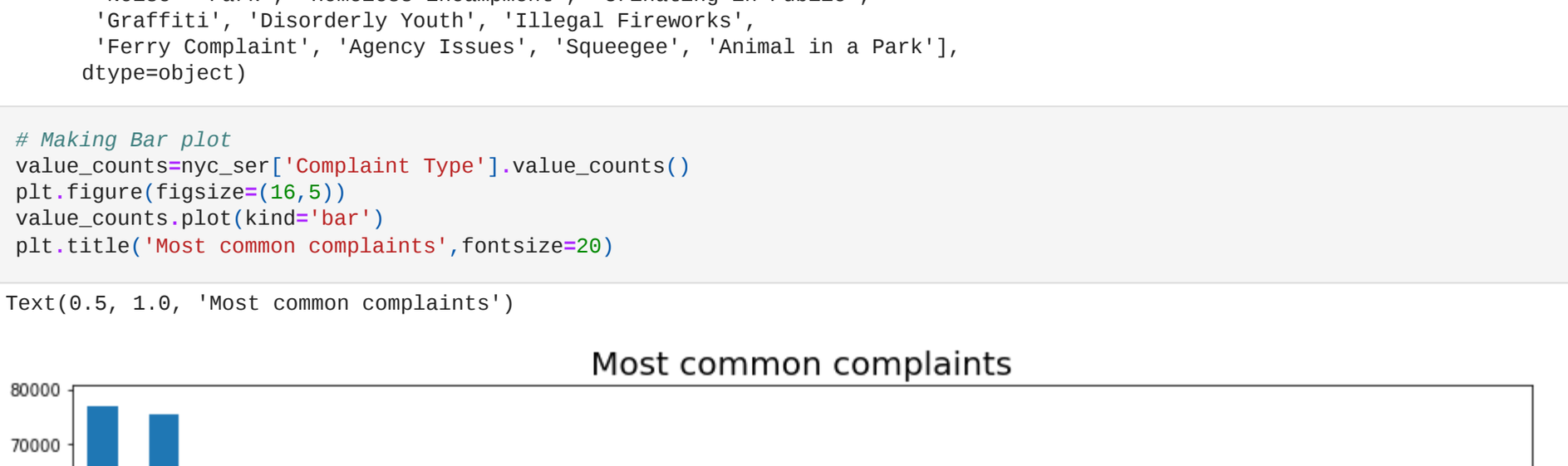
major insights/patterns

In [140…
```
# showing Unique values in Complaint type
nyc_ser['Complaint Type'].unique()
```

Out[140…
```
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 [141…
```
# Making Bar plot
value_counts=nyc_ser['Complaint Type'].value_counts()
plt.figure(figsize=(16,5))
value_counts.plot(kind='bar')
plt.title('Most common complaints',fontsize=20)
```

Out[141…
```
Text(0.5, 1.0, 'Most common complaints')
```



In [142…
```
# From above it is clear that Maximum complaints are from Complaint type (Blocked Driveway)
```

In [143…
```
# Showing Top 10 Compliants
nyc_ser['Complaint Type'].value_counts().nlargest(10)
```

Out[143…
```
Blocked Driveway           77044
Illegal Parking            75361
Noise - Street/Sidewalk    48612
Noise - Commercial         35577
Derelict Vehicle           17718
Noise - Vehicle            17083
Animal Abuse                7778
Traffic                     4498
Homeless Encampment         4416
Noise - Park                4042
Name: Complaint Type, dtype: int64
```

In [144…
```
# showing null values in City
nyc_ser['City'].isnull().sum()
```

Out[144…
```
2614
```

In [145…
```
nyc_ser['City'].unique()
```

Out[145…
```
array(['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'], dtype=object)
```

In [146…
```
# Replacing null values with 'Unknown City'
nyc_ser['City'].fillna('Unknown City',inplace=True)
nyc_ser['City'].isnull().sum()
```

Out[146…
```
0
```

In [147…
```
# as now there are no null values
```

In [148…
```
# grouping City and Complaint Type
nyc_ser.groupby(['City','Complaint Type']).size()
```

Out[148…
```
City      Complaint Type
ARVERNE   Animal Abuse                38
          Blocked Driveway            35
          Derelict Vehicle            27
          Disorderly Youth             2
          Drinking                     1
                                    ...
Woodside  Blocked Driveway            11
          Derelict Vehicle             2
          Illegal Parking            100
          Noise - Commercial           2
          Noise - Street/Sidewalk      5
Length: 782, dtype: int64
```

In [149…
```
# Lets figure out the major cities with higher complaints
per_City_Compliants= pd.crosstab(index=nyc_ser['City'],columns=nyc_ser['Complaint Type'])

print(per_City_Compliants.shape)
```

```
(54, 24)
```

In [150…
```
per_City_Compliants.head()
```

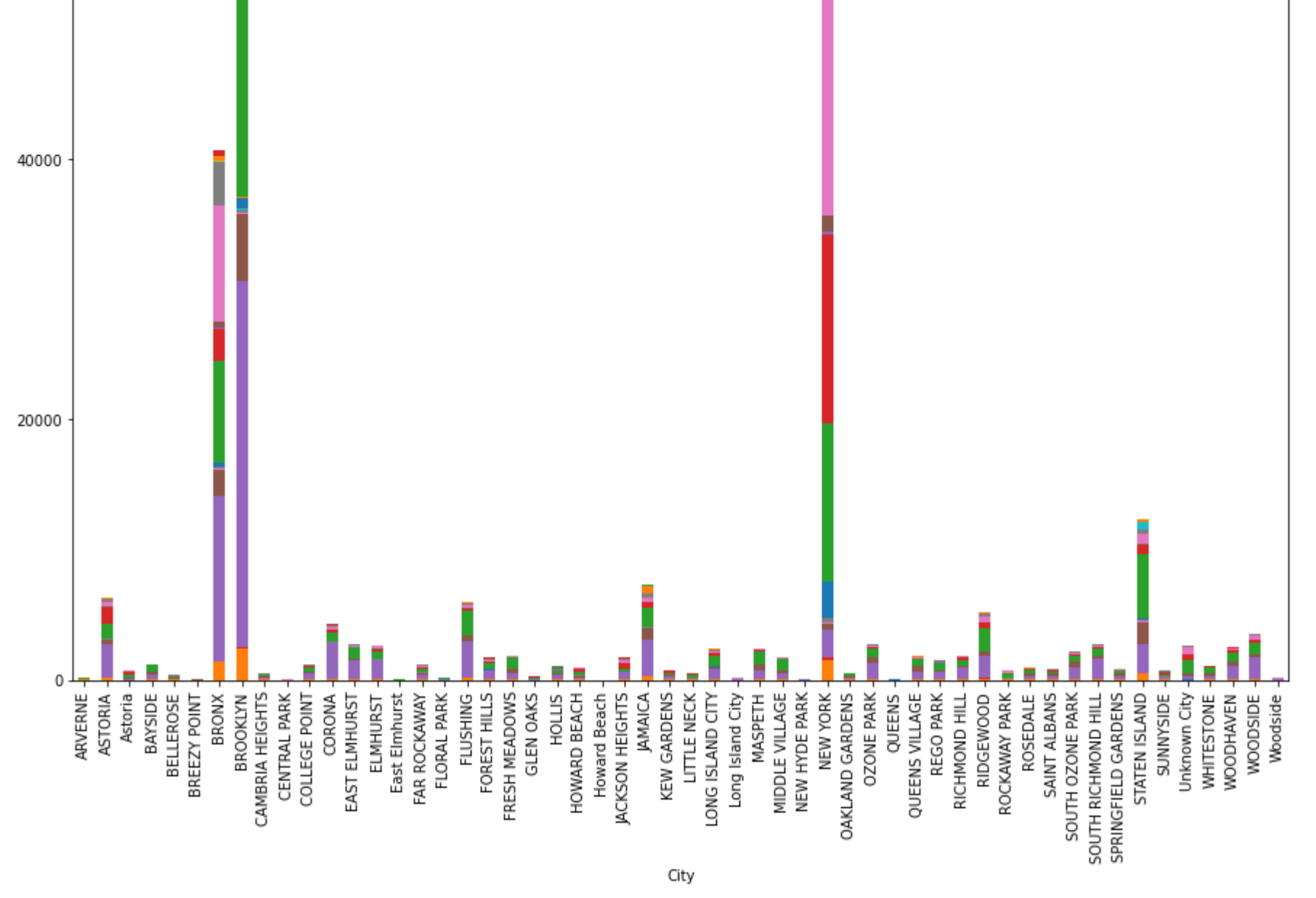
Out[150…

Complaint Type / City	Agency Issues	Animal Abuse	Animal in a Park	Bike/Roller/Skate Chronic	Blocked Driveway	Derelict Vehicle	Disorderly Youth	Drinking	Ferry Complaint	Graffiti	...	Noise - House of Worship	Noise - Park	Noise - Street/Sidewalk	Noise - Vehicle	Panhandling	Posting Advertisement	Squeegee	Traffic	Urinating in Public	Vending
ARVERNE	0	38	0	0	35	27	2	1	0	1	...	11	2	29	7	1	0	0	0	1	1
ASTORIA	0	125	0	15	2618	351	3	35	0	4	...	19	61	386	204	1	1	0	47	9	54
Astoria	0	0	0	0	116	12	0	0	0	0	...	0	0	114	0	0	0	0	0	0	0
BAYSIDE	0	37	0	0	377	198	1	1	0	3	...	2	4	15	16	0	0	0	9	0	2
BELLEROSE	0	7	0	1	95	89	2	1	0	0	...	1	1	13	10	1	1	0	7	1	0

5 rows × 24 columns

In [151…
```
# Making a stacked bar chart
per_City_Compliants.plot(kind='bar',stacked=True,figsize=(15,17))
plt.title('Compliants Per City',fontsize=20)
```

Out[151…
```
Text(0.5, 1.0, 'Compliants Per City')
```



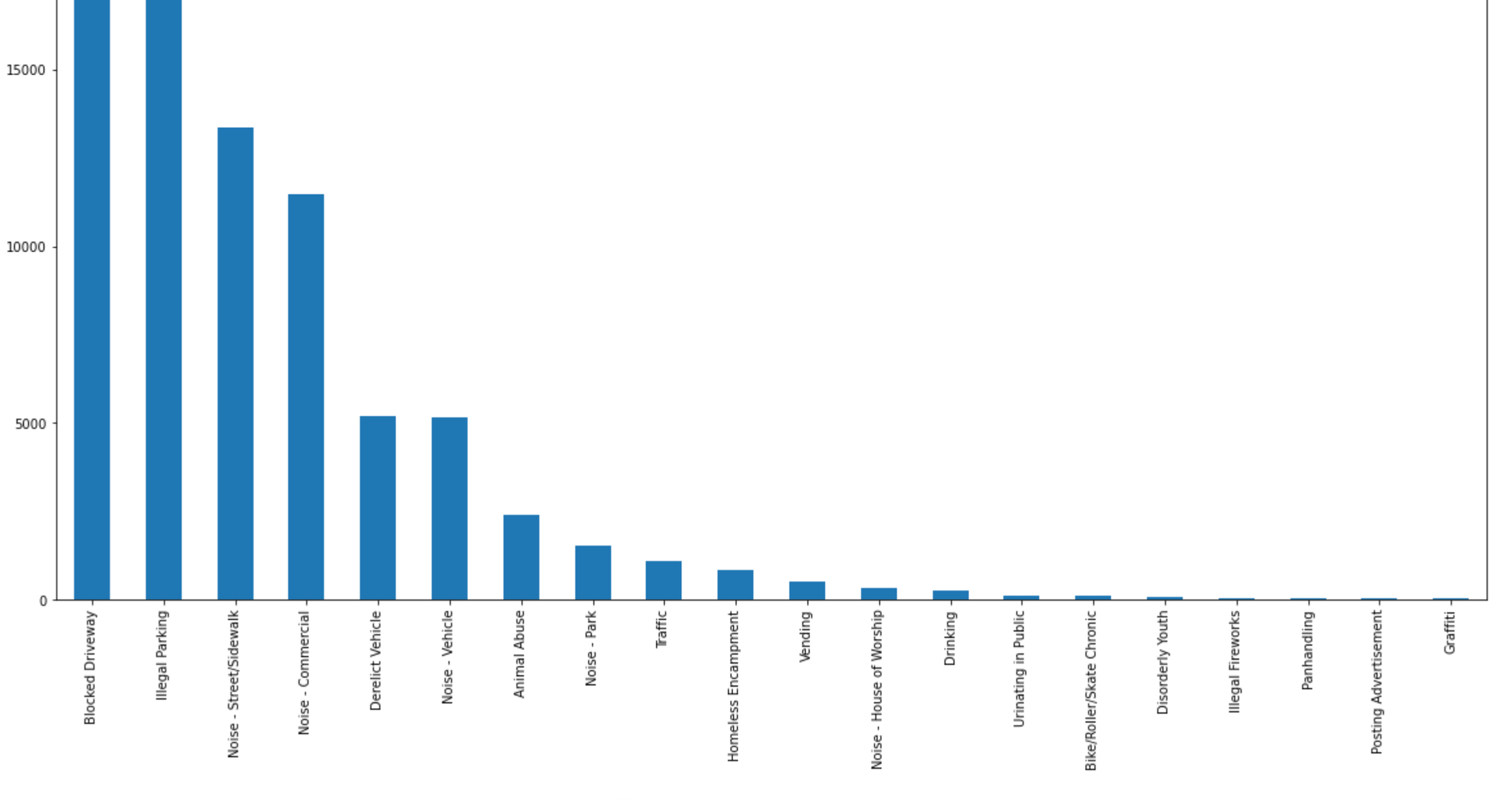
Its observed that 'Brooklyn' has the highest no. of complaints

In [152…
```
#Lets analyze the major complaint types in 'Brooklyn'
nyc_ser_Brooklyn = nyc_ser[nyc_ser['City']=='BROOKLYN' ]
nyc_ser_Brooklyn.shape
```

Out[152…
```
(98307, 54)
```

In [153…
```
Brooklyn_values = nyc_ser_Brooklyn['Complaint Type'].value_counts()
plt.figure(figsize=(20,15))
Brooklyn_values.plot(kind='bar')
plt.title('Most Common Complaints in the city',fontsize=20)
```

Out[153…
```
Text(0.5, 1.0, 'Most Common Complaints in the city')
```



Order the complaint types based on the average 'Request_Closing_Time', grouping them for different locations

In [154…
```
nyc_ser['Request_Closing_Time'].isnull().sum()
```

Out[154…
```
2164
```

In [155…
```
nyc_ser['Request_Closing_Time'].fillna(0,inplace = True)
nyc_ser['Request_Closing_Time'].isnull().sum()
```

Out[155…
```
0
```

In [156…
```
nyc_avg_response_Time= nyc_ser.groupby(['City','Complaint Type']).Request_Closing_Time.mean()
nyc_avg_response_Time.head(15)
```

Out[156…
```
City     Complaint Type
ARVERNE  Animal Abuse                7753.052632
         Blocked Driveway            9093.485714
         Derelict Vehicle           10685.592593
         Disorderly Youth           12928.500000
         Drinking                     859.000000
         Graffiti                    5520.000000
         Homeless Encampment         6533.250000
         Illegal Parking             8338.913793
         Noise - Commercial          8234.000000
         Noise - House of Worship    5623.909091
         Noise - Park                4620.000000
         Noise - Street/Sidewalk     7172.620690
         Noise - Vehicle             6695.571429
         Panhandling                 3720.000000
         Urinating in Public         2491.000000
Name: Request_Closing_Time, dtype: float64
```

In [157…
```
#Get the response time across complaints
avg_response_Time = nyc_ser.groupby(['Complaint Type']).Request_Closing_Time.mean().sort_values(ascending=True)
avg_response_Time .head(20)
```

Out[157…
```
Complaint Type
Ferry Complaint                 0.000000
Posting Advertisement        7091.006154
Illegal Fireworks            9940.101190
Noise - Commercial          11224.665065
Noise - House of Worship    11471.178303
Noise - Park                12217.881742
Noise - Street/Sidewalk     12266.052292
Traffic                     12409.731659
Disorderly Youth            12810.902098
Noise - Vehicle             12882.559796
Urinating in Public         13055.991554
Bike/Roller/Skate Chronic   13464.000000
Drinking                    13848.291406
Vending                     14423.502630
Squeegee                    14564.250000
Panhandling                 15639.410423
Homeless Encampment         15716.052536
Illegal Parking             16025.893619
Blocked Driveway            17015.421525
Animal Abuse                18743.548599
Name: Request_Closing_Time, dtype: float64
```

Perform a statistical test

In [158…
```
#From the above data, its observed that the average resolution time across the complaint types are not equal.
#But, the following complaint types have response time which were too close.

#Panhandling -  15639.410423 & Homeless Encampment - 15716.052536

#Null Hypothesis(H0) - Average response time across complaint types are equal
#Alternate Hypothesis(H1) - Average response time across complaint types are not equal
```

Let's perform one way ANOVA for the above group of complaints

In [159…
```
nyc_ser_Panhandling = nyc_ser[nyc_ser['Complaint Type']=='Panhandling']
nyc_ser_Panhandling = nyc_ser_Panhandling.loc[:,['Request_Closing_Time']]
nyc_ser_Panhandling.head()
```

Out[159…

	Request_Closing_Time
374	12731.0
2076	13383.0
3048	6195.0
3929	5103.0
5531	32897.0

In [160…
```
nyc_ser_Homeless = nyc_ser[nyc_ser['Complaint Type']=='Homeless Encampment']
nyc_ser_Homeless = nyc_ser_Homeless.loc[:,['Request_Closing_Time']]
nyc_ser_Homeless.head()
```

Out[160…

	Request_Closing_Time
392	2686.0
435	17110.0
459	7933.0
563	6206.0
566	11408.0

In [161…
```
fvalue,pvalue = stats.f_oneway(nyc_ser_Panhandling,nyc_ser_Homeless)
pvalue
```

Out[161…
```
array([0.94981493])
```

As P-value > 0.05 , we will Accept Null hypothesis(H0) for Panhandling and Homeless Encampment

In [162…
```
nyc_ser_city = pd.crosstab(nyc_ser['City'],nyc_ser['Complaint Type'])
nyc_ser_city.head()
```

Out[162…

Complaint Type / City	Agency Issues	Animal Abuse	Animal in a Park	Bike/Roller/Skate Chronic	Blocked Driveway	Derelict Vehicle	Disorderly Youth	Drinking	Ferry Complaint	Graffiti	...	Noise - House of Worship	Noise - Park	Noise - Street/Sidewalk	Noise - Vehicle	Panhandling	Posting Advertisement	Squeegee	Traffic	Urinating in Public	Vending
ARVERNE	0	38	0	0	35	27	2	1	0	1	...	11	2	29	7	1	0	0	0	1	1
ASTORIA	0	125	0	15	2618	351	3	35	0	4	...	19	61	386	204	1	1	0	47	9	54
Astoria	0	0	0	0	116	12	0	0	0	0	...	0	0	114	0	0	0	0	0	0	0
BAYSIDE	0	37	0	0	377	198	1	1	0	3	...	2	4	15	16	0	0	0	9	0	2
BELLEROSE	0	7	0	1	95	89	2	1	0	0	...	1	1	13	10	1	1	0	7	1	0

5 rows × 24 columns

In [163…
```
from scipy.stats import chi2_contingency
```

In [164…
```
#contingency table
table = nyc_ser_city

# Get chi-square value , p-value, degrees of freedom, expected frequencies using the function chi2_contingency
stat, p, dof, expected = chi2_contingency(table)

# select significance value
alpha = 0.05

# Determine whether to reject or keep your null hypothesis
print('significance=%.3f, p=%.3f' % (alpha, p))
if p <= alpha:
    print('Variables are associated (reject H0)')
else:
    print('Variables are not associated(fail to reject H0)')
```

```
significance=0.050, p=0.000
Variables are associated (reject H0)
```

In [ ]: