NYC 311 Project Code

In [1]:

```
import numpy as np
import pandas as pd
import warnings
from datetime import datetime
from scipy import stats
from scipy.stats import ttest_1samp
warnings.filterwarnings('ignore')
```

Task 1) Import a NYC 311 Service Request.

In [2]:

```
alldata=pd.read_csv('servicerequest.csv')
alldata.head(1)
```

Out[2]:

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location T
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/Sidew

1 rows × 53 columns

Checking Data Type of existing column 'Created Date' &'Closed Date'.

In [3]:

```
alldata[['Created Date','Closed Date']].dtypes
```

Out[3]:

```
Created Date    object
Closed Date     object
dtype: object
```

Task 2) Conversion to datetime data type.

In [4]:

```
alldata['Created Date']=pd.to_datetime(alldata['Created Date'])
alldata['Closed Date']=pd.to_datetime(alldata['Closed Date'])
alldata[['Created Date','Closed Date']].dtypes
```

Out[4]:

```
Created Date    datetime64[ns]
Closed Date     datetime64[ns]
dtype: object
```

Task 3) Creating new column 'Request_closing_Time' = Closing time - Created time.

In [5]:

```
alldata['Request_Closing_Time']=(alldata['Closed Date']-alldata['Created Date']).dt.sec
onds/60/60
alldata['Request_Closing_Time'].head()
```

Out[5]:

```
0    0.920833
1    1.437778
2    4.858611
3    7.753889
4    3.450556
Name: Request_Closing_Time, dtype: float64
```

Task 4) Conclusions from data

Conclusion No 1) Five Cities with maximum no of complaints.

In [6]:

```
alldata.City.value_counts().sort_values(ascending=False).head()
```

Out[6]:

```
BROOKLYN         98307
NEW YORK         65994
BRONX            40702
STATEN ISLAND    12343
JAMAICA           7296
Name: City, dtype: int64
```

Conclusion No 2) In each city maximum no of complain is of which type.

In [7]:

```
newframe1=pd.DataFrame(alldata.groupby('City')['Complaint Type'].value_counts())
newframe1.groupby('City').head(1)
```

Out[7]:

		Complaint Type
City	**Complaint Type**	
ARVERNE	**Illegal Parking**	58
ASTORIA	**Blocked Driveway**	2618
Astoria	**Noise - Commercial**	262
BAYSIDE	**Illegal Parking**	514
BELLEROSE	**Illegal Parking**	106
BREEZY POINT	**Illegal Parking**	15
BRONX	**Blocked Driveway**	12755
BROOKLYN	**Blocked Driveway**	28148
CAMBRIA HEIGHTS	**Blocked Driveway**	147
CENTRAL PARK	**Noise - Street/Sidewalk**	95
COLLEGE POINT	**Blocked Driveway**	435
CORONA	**Blocked Driveway**	2761
EAST ELMHURST	**Blocked Driveway**	1408
ELMHURST	**Blocked Driveway**	1446
East Elmhurst	**Illegal Parking**	13
FAR ROCKAWAY	**Illegal Parking**	295
FLORAL PARK	**Illegal Parking**	64
FLUSHING	**Blocked Driveway**	2795
FOREST HILLS	**Blocked Driveway**	663
FRESH MEADOWS	**Illegal Parking**	885
GLEN OAKS	**Noise - Commercial**	78
HOLLIS	**Blocked Driveway**	342
HOWARD BEACH	**Illegal Parking**	281
Howard Beach	**Blocked Driveway**	1
JACKSON HEIGHTS	**Blocked Driveway**	568
JAMAICA	**Blocked Driveway**	2818
KEW GARDENS	**Blocked Driveway**	313
LITTLE NECK	**Illegal Parking**	249
LONG ISLAND CITY	**Illegal Parking**	795
Long Island City	**Illegal Parking**	52
MASPETH	**Illegal Parking**	976
MIDDLE VILLAGE	**Illegal Parking**	877
NEW HYDE PARK	**Blocked Driveway**	53
NEW YORK	**Noise - Street/Sidewalk**	20433
OAKLAND GARDENS	**Illegal Parking**	263
OZONE PARK	**Blocked Driveway**	1259

		Complaint Type
City	Complaint Type	
QUEENS	Illegal Parking	8
QUEENS VILLAGE	Blocked Driveway	585
REGO PARK	Blocked Driveway	611
RICHMOND HILL	Blocked Driveway	872
RIDGEWOOD	Illegal Parking	1842
ROCKAWAY PARK	Illegal Parking	317
ROSEDALE	Illegal Parking	277
SAINT ALBANS	Blocked Driveway	244
SOUTH OZONE PARK	Blocked Driveway	942
SOUTH RICHMOND HILL	Blocked Driveway	1548
SPRINGFIELD GARDENS	Blocked Driveway	262
STATEN ISLAND	Illegal Parking	4886
SUNNYSIDE	Blocked Driveway	206
WHITESTONE	Illegal Parking	525
WOODHAVEN	Blocked Driveway	1060
WOODSIDE	Blocked Driveway	1613
Woodside	Illegal Parking	100

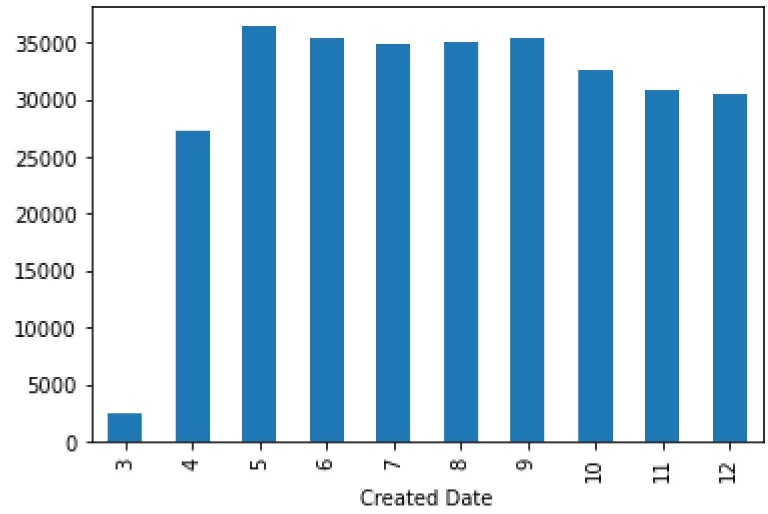
Conclusion No3) No of Complaints month wise in form of bar chart.

In [8]:

```
newframe2=pd.DataFrame(alldata['Created Date'].dt.month)
newframe2.groupby('Created Date').value_counts().plot(kind='bar')
```

Out[8]:

```
<AxesSubplot:xlabel='Created Date'>
```



Above chart shows maximum complaints are from 5th month and least complaints are from 3rd month

Conclusion 4) No of unique Complaint types

In [9]:

```
alldata['Complaint Type'].nunique()
```

Out[9]:

```
24
```

Task 5) Order the complaint types based on the average ‘Request_Closing_Time’, grouping them for different location Type

In [24]:

```
alldata.groupby(['Location Type','Complaint Type'])['Request_Closing_Time'].mean()
```

Out[24]:

```
Location Type         Complaint Type        
Bridge                Homeless Encampment     3.819306
Club/Bar/Restaurant   Drinking                4.019785
                      Noise - Commercial      2.891485
                      Urinating in Public     4.491429
Commercial            Animal Abuse            4.568575
                                                ...   
Street/Sidewalk       Vending                 3.791013
Subway Station        Animal Abuse            3.035606
                      Urinating in Public     1.152130
Terminal              Ferry Complaint              NaN
Vacant Lot            Derelict Vehicle        4.045354
Name: Request_Closing_Time, Length: 71, dtype: float64
```

Task 6) Hypothesis Testing

Whether the average response time across complaint types is similar or not (overall)

In [11]:

```
Hnull1='The average response time across complaint types is similar'
Halternate1='The average response time across complaint types is not similar'
```

In [12]:

```
newframe3=alldata[alldata['Request_Closing_Time'].notnull()]
Sample=newframe3.sample(n=2500)
ttest,pvalue=ttest_1samp(Sample['Request_Closing_Time'],newframe3['Request_Closing_Tim
e'].mean())
```

In [13]:

```
if(pvalue>0.05):
    print("Null Hypothesis is accepted,",Hnull1)
else:print("Null Hypothesis is Rejected",Halternate1)
```

```
Null Hypothesis is accepted, The average response time across complaint ty
pes is similar
```

Are the type of complaint or service requested and location related

In [14]:

```
Hnull2='The type of complaint or service requested and location are not related'
Halternate2='The type of complaint or service requested and location are related'
```

In [15]:

```
newframe4=pd.crosstab(newframe3['Complaint Type'],newframe3['Location Type'])
observedval=newframe4.values
squarex,pvalue,dof,expected=stats.chi2_contingency(newframe4)
```

In [16]:

```
if(pvalue>0.05): print("Null Hypothesis accepted",(Hnull2))
else:(print("Null Hypothesis is rejected,",Halternate2))
```

```
Null Hypothesis is rejected, The type of complaint or service requested an
d location are related
```