```
import pandas as pd
import numpy as np

df = pd.read_csv('311_Service_Requests_from_2010_to_Present.csv')

df.shape

(45425, 53)

df.isna()
```

	Unique Key	Created Date	Closed Date	Agency	Agency Name
0	False	False	False	False	False
1	False	False	False	False	False
2	False	False	False	False	False
3	False	False	False	False	False
4	False	False	False	False	False
...	...	...	...	...	...
1625	False	False	False	False	False
1626	False	False	False	False	False
1627	False	False	False	False	False
1628	False	False	False	False	False
1629	False	False	False	False	False

	Complaint Type	Descriptor	Location Type	Incident Zip
0	False	False	False	False
1	False	False	False	False
2	False	False	False	False
3	False	False	False	False
4	False	False	False	False
...	...	...	...	...
1625	False	False	False	False
1626	False	False	False	False
1627	False	False	False	False
1628	False	False	False	False
1629	False	False	False	False

	Incident Address	...	Bridge Highway Name	Bridge Highway Direction
0	False	...	True	True
1	False	...	True	True
2	False	...	True	True
3	False	...	True	True
4	False	...	True	True
...	...	...	...	...

```
1625               False  ...                    True
True
1626               False  ...                    True
True
1627               False  ...                    True
True
1628               False  ...                    True
True
1629               False  ...                    True
True

       Road Ramp  Bridge Highway Segment  Garage Lot Name  Ferry
Direction  \
0          True                    True              True
True
1          True                    True              True
True
2          True                    True              True
True
3          True                    True              True
True
4          True                    True              True
True
...         ...                     ...               ...
...
1625       True                    True              True
True
1626       True                    True              True
True
1627       True                    True              True
True
1628       True                    True              True
True
1629       True                    True              True
True

       Ferry Terminal Name  Latitude  Longitude  Location
0                     True     False      False     False
1                     True     False      False     False
2                     True     False      False     False
3                     True     False      False     False
4                     True     False      False     False
...                    ...       ...        ...       ...
1625                  True     False      False     False
1626                  True     False      False     False
1627                  True     False      False     False
1628                  True     False      False     False
1629                  True      True       True      True

[1630 rows x 53 columns]
```

```python
df.isna().sum(axis=0)
```

```
Unique Key                          0
Created Date                        0
Closed Date                       251
Agency                              0
Agency Name                         1
Complaint Type                      1
Descriptor                        641
Location Type                       1
Incident Zip                      294
Incident Address                 5286
Street Name                      5286
Cross Street 1                   5970
Cross Street 2                   6016
Intersection Street 1           40192
Intersection Street 2           40244
Address Type                      334
City                              295
Landmark                        45400
Facility Type                     247
Status                              1
Due Date                            1
Resolution Description              1
Resolution Action Updated Date    247
Community Board                     1
Borough                             1
X Coordinate (State Plane)        387
Y Coordinate (State Plane)        387
Park Facility Name                  1
Park Borough                        1
School Name                         1
School Number                       1
School Region                       1
School Code                         1
School Phone Number                 1
School Address                      1
School City                         1
School State                        1
School Zip                          1
School Not Found                    1
School or Citywide Complaint    45425
Vehicle Type                    45425
Taxi Company Borough            45425
Taxi Pick Up Location           45425
Bridge Highway Name             45384
Bridge Highway Direction        45384
Road Ramp                       45392
Bridge Highway Segment          45392
Garage Lot Name                 45425
```

```
Ferry Direction              45425
Ferry Terminal Name          45425
Latitude                       387
Longitude                      387
Location                       387
dtype: int64

df.head()
   Unique Key        Created Date          Closed Date
Agency  \
0   32310363  12/31/2015 11:59:45 PM  01/01/2016 12:55:15 AM    NYPD

1   32309934  12/31/2015 11:59:44 PM  01/01/2016 01:26:57 AM    NYPD

2   32309159  12/31/2015 11:59:29 PM  01/01/2016 04:51:03 AM    NYPD

3   32305098  12/31/2015 11:57:46 PM  01/01/2016 07:43:13 AM    NYPD

4   32306529  12/31/2015 11:56:58 PM  01/01/2016 03:24:42 AM    NYPD


                       Agency Name          Complaint Type  \
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

                      Descriptor    Location Type  Incident Zip  \
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

        Incident Address  ... Bridge Highway Name Bridge Highway
Direction  \
0   71 VERMILYEA AVENUE  ...                 NaN
NaN
1       27-07 23 AVENUE  ...                 NaN
NaN
2  2897 VALENTINE AVENUE  ...                NaN
NaN
3    2940 BAISLEY AVENUE  ...                NaN
NaN
4         87-14 57 ROAD  ...                 NaN
NaN

  Road Ramp Bridge Highway Segment Garage Lot Name Ferry Direction  \
```

```
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

  Ferry Terminal Name   Latitude  Longitude  \
0                 NaN  40.865682 -73.923501
1                 NaN  40.775945 -73.915094
2                 NaN  40.870325 -73.888525
3                 NaN  40.835994 -73.828379
4                 NaN  40.733060 -73.874170

                                    Location
0   (40.86568153633767, -73.92350095571744)
1   (40.775945312321085, -73.91509393898605)
2   (40.870324522111424, -73.8885264418646)
3    (40.83599404683083, -73.82837939584206)
4   (40.733059618956815, -73.87416975810375)

[5 rows x 53 columns]

df1=df.drop(["Garage Lot Name","Taxi Pick Up Location","Taxi Company
Borough","Vehicle Type","School or Citywide Complaint"],axis=1)
df1.head()

   Unique Key          Created Date           Closed Date
Agency  \
0   32310363  12/31/2015 11:59:45 PM  01/01/2016 12:55:15 AM   NYPD

1   32309934  12/31/2015 11:59:44 PM  01/01/2016 01:26:57 AM   NYPD

2   32309159  12/31/2015 11:59:29 PM  01/01/2016 04:51:03 AM   NYPD

3   32305098  12/31/2015 11:57:46 PM  01/01/2016 07:43:13 AM   NYPD

4   32306529  12/31/2015 11:56:58 PM  01/01/2016 03:24:42 AM   NYPD


                        Agency Name         Complaint Type  \
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

                   Descriptor    Location Type  Incident Zip  \
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

         Incident Address  ...  School Not Found Bridge Highway Name  \
0     71 VERMILYEA AVENUE  ...                 N                  NaN
1         27-07 23 AVENUE  ...                 N                  NaN
2   2897 VALENTINE AVENUE  ...                 N                  NaN
3     2940 BAISLEY AVENUE  ...                 N                  NaN
4            87-14 57 ROAD  ...                 N                  NaN

   Bridge Highway Direction Road Ramp Bridge Highway Segment Ferry
Direction  \
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

   Ferry Terminal Name   Latitude  Longitude  \
0                  NaN  40.865682 -73.923501
1                  NaN  40.775945 -73.915094
2                  NaN  40.870325 -73.888525
3                  NaN  40.835994 -73.828379
4                  NaN  40.733060 -73.874170

                                  Location
0   (40.86568153633767, -73.92350095571744)
1   (40.775945312321085, -73.91509393898605)
2   (40.870324522111424, -73.8852464418646)
3    (40.83599404683083, -73.82837939584206)
4   (40.733059618956815, -73.87416975810375)

[5 rows x 48 columns]

df1.describe()

         Unique Key   Incident Zip  X Coordinate (State Plane)  \
count  4.542500e+04   45131.000000                  4.503800e+04
mean   3.215563e+07   10879.935455                  1.004437e+06
std    8.979573e+04     569.021977                  2.232763e+04
min    3.198915e+07      83.000000                  9.133570e+05
25%    3.207949e+07   10451.000000                  9.905362e+05
50%    3.216017e+07   11211.000000                  1.002846e+06
75%    3.223294e+07   11249.000000                  1.019540e+06
max    3.231065e+07   11697.000000                  1.067154e+06
```

```
          Y Coordinate (State Plane)  Ferry Direction  Ferry Terminal
Name  \
count                 45038.000000              0.0
0.0
mean                 201502.299813              NaN
NaN
std                   29391.512030              NaN
NaN
min                  121998.000000              NaN
NaN
25%                  180395.500000              NaN
NaN
50%                  199591.000000              NaN
NaN
75%                  218654.750000              NaN
NaN
max                  271391.000000              NaN
NaN


            Latitude      Longitude
count   45038.000000   45038.000000
mean       40.719702     -73.927135
std         0.080668       0.080526
min        40.501279     -74.254937
25%        40.661683     -73.977318
50%        40.714470     -73.932897
75%        40.766782     -73.872700
max        40.911533     -73.700837
```

```python
df2=df1.loc[:,['Complaint Type','City']]
df2
```

```
               Complaint Type        City
0      Noise - Street/Sidewalk   NEW YORK
1             Blocked Driveway    ASTORIA
2             Blocked Driveway      BRONX
3              Illegal Parking      BRONX
4              Illegal Parking   ELMHURST
...                        ...        ...
45420            Animal Abuse      BRONX
45421       Noise - Commercial   BROOKLYN
45422         Blocked Driveway      BRONX
45423          Noise - Vehicle   BROOKLYN
45424                      NaN        NaN

[45425 rows x 2 columns]
```

```python
from matplotlib import pyplot as plt
plt.rcParams["figure.figsize"] = [7.50, 3.50]
```

```python
plt.rcParams["figure.autolayout"] = True

fig, ax = plt.subplots()

df2['City'].value_counts().plot(ax=ax, kind='bar', xlabel='City',
ylabel='frequency')

plt.show()
```
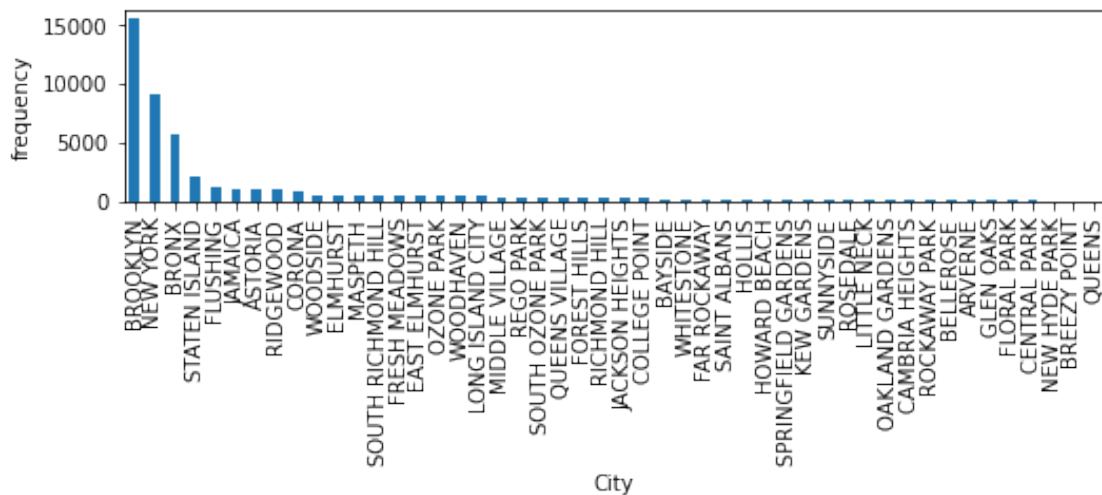


```python
df_Brooklyn = df1[df1['City']=='BROOKLYN']
```

```python
df_Brooklyn.shape
```

```
(15540, 48)
```

```python
(df_Brooklyn['Complaint
Type'].value_counts()).head(25).plot(kind='bar',

figsize=(10,6),title = 'Most Frequent Complaints in Brooklyn')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f765cac62d0>
```

Most Frequent Complaints in Brooklyn
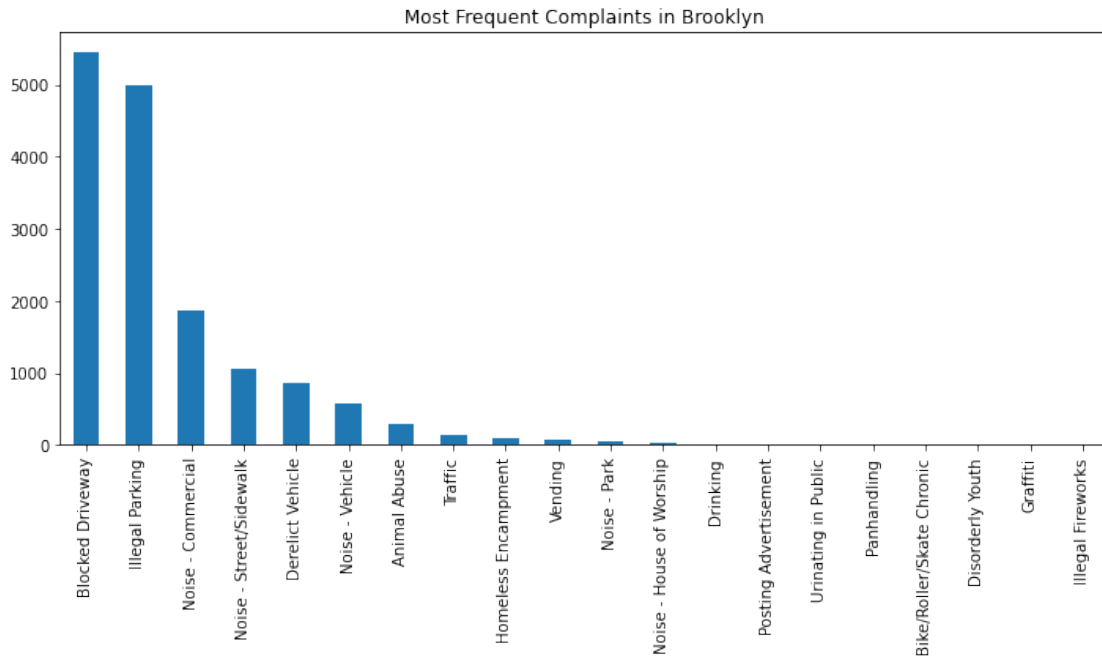
```python
df_Brooklyn[['Longitude', 'Latitude']].plot(kind='scatter',
    x='Longitude', y='Latitude', figsize=(10,8),title = 'Complaints
concentration across Brooklyn').axis('equal')
```

```
(-74.04945047182034, -73.84655347013327, 40.564484620321984,
40.74633990839177)
```

Complaints concentration across Brooklyn
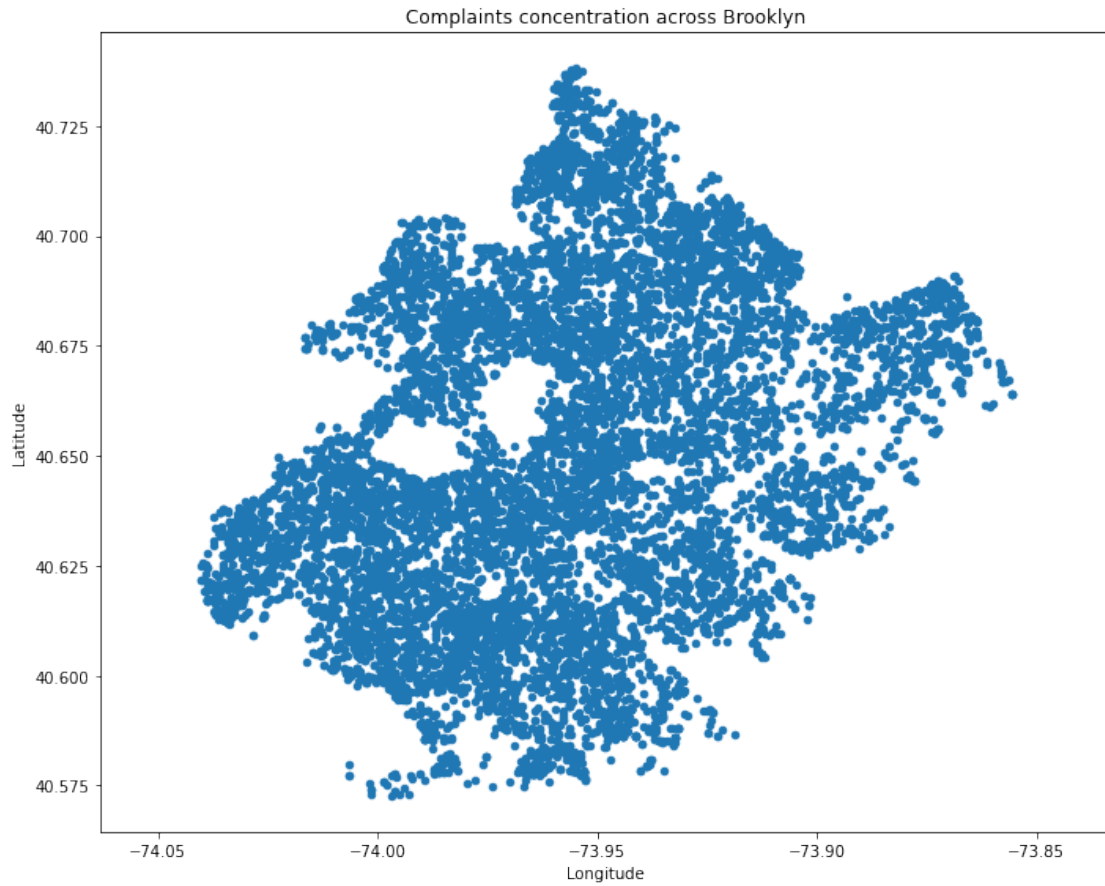

```
df_Brooklyn.plot(kind='hexbin',x='Latitude',y='Longitude',gridsize=40,
colormap = 'jet',mincnt=1,title = 'Complaints concentration across
Brooklyn\n', figsize=(10,6)).axis('equal')
```

(40.56485355251938, 40.74632234036472, -74.04896675723657, -
73.84657650416106)

Complaints concentration across Brooklyn
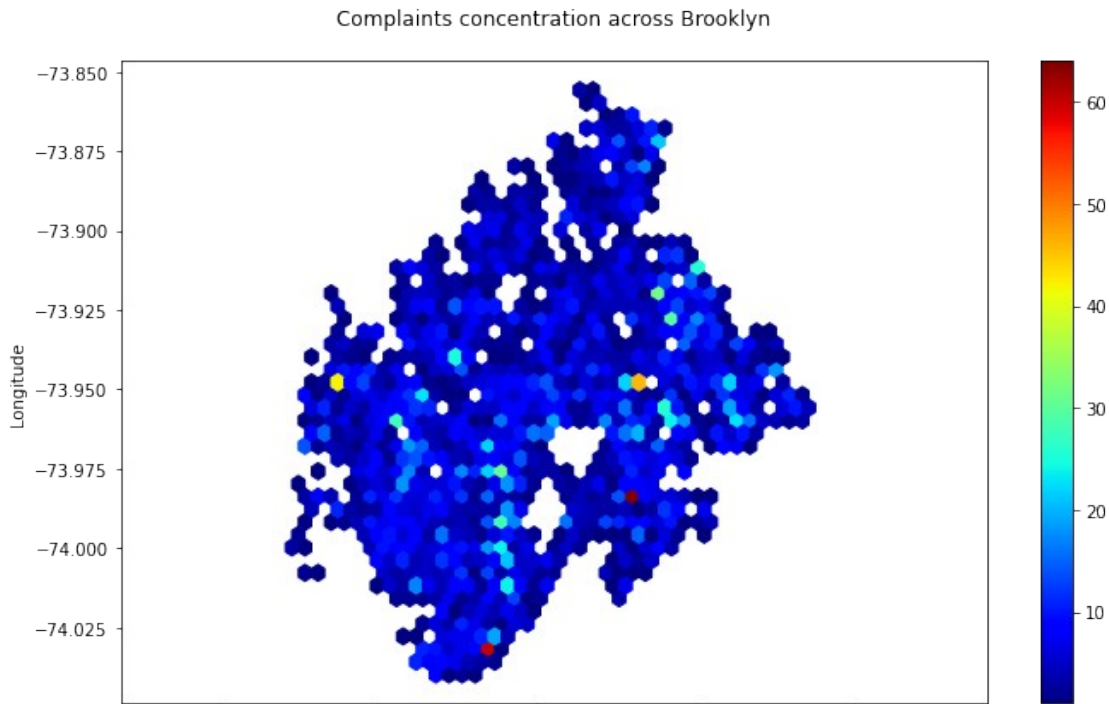
```python
major=df2.loc[:,"Complaint Type"]
major
```

```
0         Noise - Street/Sidewalk
1                Blocked Driveway
2                Blocked Driveway
3                 Illegal Parking
4                 Illegal Parking
                   ...
45420                 Animal Abuse
45421           Noise - Commercial
45422             Blocked Driveway
45423                Noise - Vehicle
45424                          NaN
Name: Complaint Type, Length: 45425, dtype: object
```

```python
major.unique()
```

```
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', nan],
      dtype=object)
```

```python
major.nunique()
```

20

```
top=major.value_counts()
top
```

```
Blocked Driveway              14371
Illegal Parking               13116
Noise - Commercial             5888
Noise - Street/Sidewalk        3910
Derelict Vehicle               2766
Noise - Vehicle                1855
Animal Abuse                   1128
Traffic                         629
Homeless Encampment             508
Vending                         471
Posting Advertisement           235
Noise - Park                    166
Drinking                        157
Noise - House of Worship         69
Panhandling                      44
Urinating in Public              43
Bike/Roller/Skate Chronic        42
Graffiti                         12
Disorderly Youth                 11
Illegal Fireworks                 3
Name: Complaint Type, dtype: int64
```
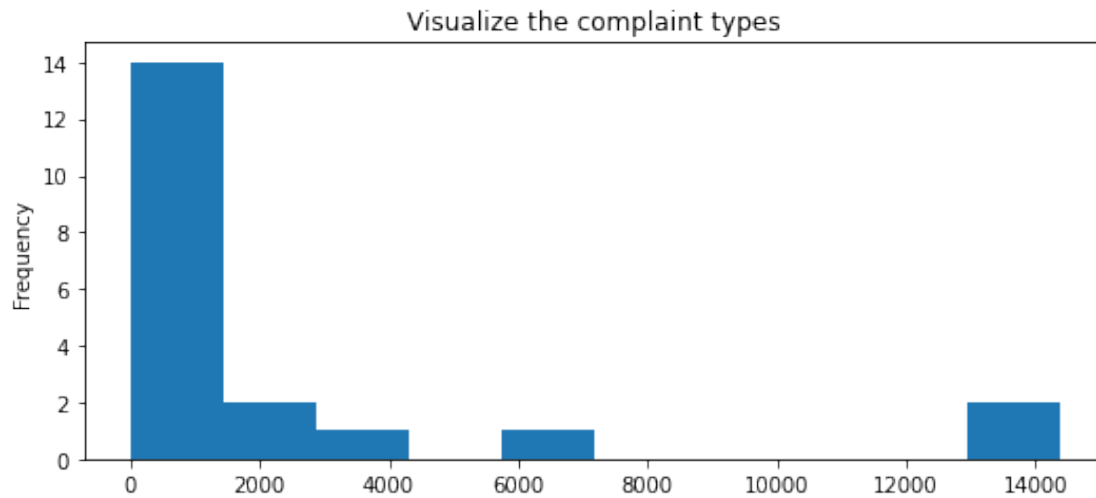
```
major.value_counts().plot(kind='bar',title='count vs. complaint
types')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f765a568310>
```
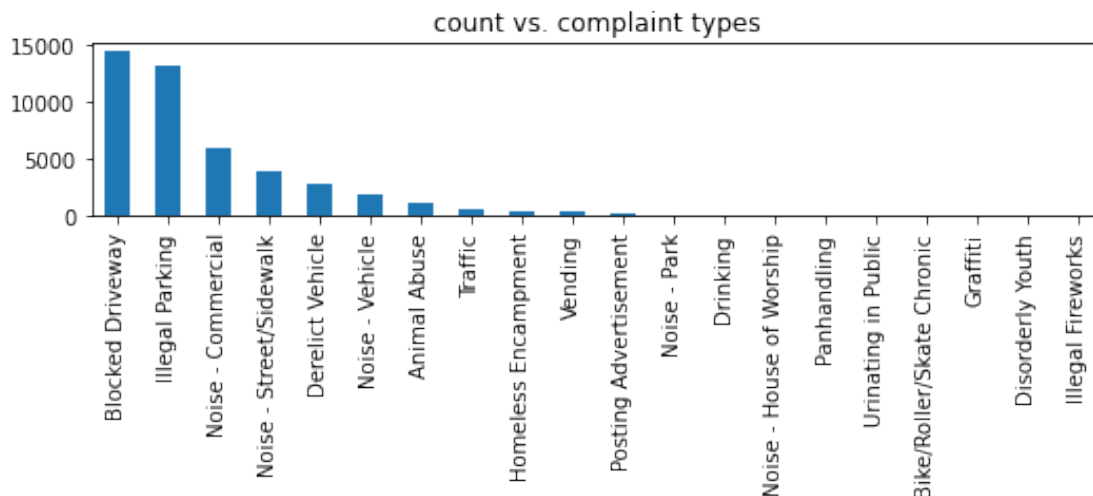


```
#  Visualize the complaint types
top.plot(kind='hist',title='Visualize the complaint types')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f765ca1d5d0>
```

Visualize the complaint types

```
#o   Display the major complaint types and their count
top.head(10).plot(kind='bar',title='The major complaint types and
their count')
```

```
<matplotlib.axes._subplots.AxesSubplot at 0x7f765a5671d0>
```