NYC Service Request Calls Analysis

–Python Project

Problem Statement

Perform a service request data analysis of New York City 311 calls.

Import a 311 NYC service request
Basic data exploratory analysis

- Explore data
- Find patterns
- Display the complaint type and city together

Analysis :

Import the Required Libraries , Data and Perform data Exploration

Project 03: NYC 311 Service Request Analysis

You don't need to limit yourself to the number of rows/cells provided. You can add additional rows in each section to add more lines of code.

Happy coding!

Import Required Libraries for Data Analysis and Visualizations

In [17]:
```
import pandas as pd
from pandas import Series,DataFrame
import numpy as np
import matplotlib.pyplot  as plt
import seaborn as sns
%matplotlib inline
```

Verify the Data Import :

Use head() , tail(), shape() to verify the Imported Data .

Verify the Imported Data

```
In [19]: SR_311_NYC_Data.head()
```

Out[19]:

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type	Incident Zip	Incident Address	...	Bridge Highway Name	Bridge Highway Direction
0	12822544	01/01/2009 12:00:00 AM	01/07/2009 12:00:00 AM	HPD	Department of Housing Preservation and Develop...	HEATING	HEAT	RESIDENTIAL BUILDING	11225	55 WINTHROP STREET	...	NaN	NaN
1	12818524	01/01/2009 12:00:00 AM	NaN	DOHMH	Department of Health and Mental Hygiene	Smoking	Smoking Violation	Restaurant/Bar /Deli/Bakery	11102	29-35 NEWTOWN AVENUE	...	NaN	NaN
2	12823061	01/01/2009 12:00:00 AM	01/01/2009 12:00:00 AM	DOT	Department of Transportation	Traffic Signal Condition	Controller	NaN	11220	NaN	...	NaN	NaN
3	12823062	01/01/2009 12:00:00 AM	01/01/2009 12:00:00 AM	DOT	Department of Transportation	Traffic Signal Condition	Controller	NaN	11201	NaN	...	NaN	NaN
4	12823063	01/01/2009 12:00:00 AM	01/01/2009 12:00:00 AM	DOT	Department of Transportation	Traffic Signal Condition	Controller	NaN	11235	NaN	...	NaN	NaN

.

```
In [20]: SR_311_NYC_Data.tail()
```

Out[20]:

	Unique Key	Created Date	Closed Date	Agency	Agency Name	Complaint Type	Descriptor	Location Type	Incident Zip	Incident Address
1783128	15481288	12/11/2009 12:00:00 AM	12/18/2009 12:00:00 AM	HPD	Department of Housing Preservation and Develop...	GENERAL CONSTRUCTION	DOORS	RESIDENTIAL BUILDING	11221	96 MALCOLM X BOULEVARD
1783129	15348603	11/22/2009 12:00:00 AM	12/18/2009 12:00:00 AM	HPD	Department of Housing Preservation and Develop...	APPLIANCE	ELECTRIC/GAS-RANGE	RESIDENTIAL BUILDING	10451	280 EAST 161 STREET
1783130	15056076	10/13/2009 12:00:00 AM	11/16/2009 12:00:00 AM	HPD	Department of Housing Preservation and Develop...	APPLIANCE	ELECTRIC/GAS-RANGE	RESIDENTIAL BUILDING	10035	1469 5 AVENUE
1783131	12981671	01/21/2009 12:00:00 AM	06/24/2011 12:00:00 AM	DPR	Department of Parks and Recreation	Animal in a Park	Dead Animal	Street/Curbside	10038	59 MAIDEN LANE

Find the count of /presence of missing Values in Every Column by counting the Number of Records Imported .

Count the Number of Records in the Input Dataset

```
In [21]: SR_311_NYC_Data.count()
```

```
Out[21]: Unique Key                      1783133
         Created Date                    1783133
         Closed Date                     1723802
         Agency                          1783133
         Agency Name                     1783133
         Complaint Type                  1783133
         Descriptor                      1777593
         Location Type                   1208722
         Incident Zip                    1660108
         Incident Address                1400797
         Street Name                     1400580
         Cross Street 1                  1397587
         Cross Street 2                  1389088
         Intersection Street 1            352267
         Intersection Street 2            352291
         Address Type                    1730915
         City                            1661318
         Landmark                          2061
         Facility Type                   228059
         Status                          1783133
         Due Date                         518738
         Resolution Action Updated Date  1768946
         Community Board                 1783133
         Borough                         1783133
         X Coordinate (State Plane)      1651563
         Y Coordinate (State Plane)      1651563
         Park Facility Name              1783133
```

Verify the Number of Records - Alternate Way

```
In [22]: SR_311_NYC_Data.shape[0]
```

```
Out[22]: 1783133
```

Problem Statement:

Find major complaint types

- Find the top 10 complaint types
- Plot a bar graph of count vs. complaint types

Display the Count of the Top 10 Complaints in the NYC Service Request Calls Dataset.

Display the Count of the Top 10 Complaints in the NYC Service Request Data

```
In [23]: SR_311_NYC_Data['Complaint Type'].value_counts().nlargest(10)

Out[23]: HEATING                          238995
         Street Light Condition           130242
         GENERAL CONSTRUCTION             121048
         PLUMBING                         104931
         Street Condition                 102150
         PAINT - PLASTER                   84324
         NONCONST                          67325
         Water System                      62991
         General Construction/Plumbing     61288
         Traffic Signal Condition          60995
         Name: Complaint Type, dtype: int64
```

INFERENCE :

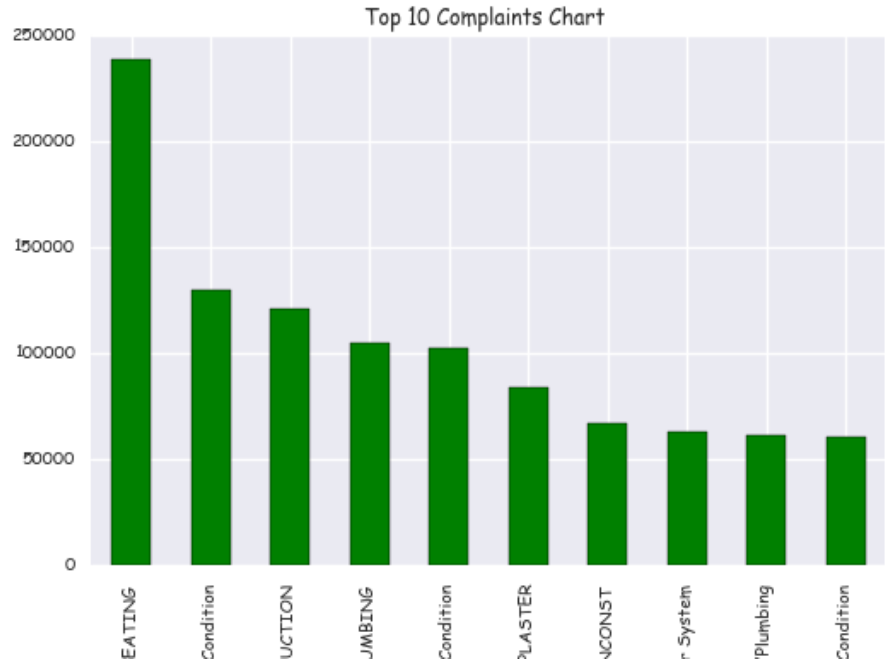
Heating ,Street Lighting ,Plumbing are the Top 3 Complaints .

BAR PLOT OF TOP 10 Complaints:

Plot the Top 10 Complaint Types in the Input Dataset

In [35]:
```
plt.figure(figsize=(6,4))
CSfont = {'fontname':'Comic Sans MS'}
SR_311_NYC_Data['Complaint Type'].value_counts().nlargest(10).plot(kind='bar',color='green')
plt.title('Top 10 Complaints Chart ',**CSfont)
```

Out[35]: <matplotlib.text.Text at 0x5689ef28>



Problem Statement:

Visualize the complaint types

- Display the major complaint types and their count

Analysis Approach :

Use Value_Counts on Complaint Type Field to obtain Count of the Complaints.

Display the Counts of the Complaints by Complaint Type

In [25]:
```
Counts_By_Complaint_Type = SR_311_NYC_Data['Complaint Type'].value_counts()
Counts_By_Complaint_Type
```

Out[25]:

HEATING	238995
Street Light Condition	130242
GENERAL CONSTRUCTION	121048
PLUMBING	104931
Street Condition	102150
PAINT - PLASTER	84324
NONCONST	67325
Water System	62991
General Construction/Plumbing	61288
Traffic Signal Condition	60995
Blocked Driveway	52163
Sewer	49849
Dirty Conditions	40732
ELECTRIC	38349
Building/Use	35495
Noise	33707
Sanitation Condition	32851
Noise - Street/Sidewalk	27923
Noise - Commercial	25234
Rodent	21622
Taxi Complaint	20909
Noise - Vehicle	20237
Damaged Tree	19738
Consumer Complaint	18935
Graffiti	17947

```
Highway Sign - Damaged                       77
DOF Parking - Payment Issue                  77
Parent Leadership                            71
Special Natural Area District (SNAD)         71
Unsanitary Animal Facility                   70
Animal Facility - No Permit                  64
Stalled Sites                                62
Drinking Water                               57
No Child Left Behind                         48
Illegal Animal Sold                          38
Calorie Labeling                             37
Legal Services Provider Complaint            34
Public Toilet                                31
Ferry Permit                                 28
Bottled Water                                24
Illegal Animal - Sold/Kept                   23
Highway Sign - Missing                       21
X-Ray Machine/Equipment                      19
DOF Property - RPIE Issue                    16
Lifeguard                                    16
Highway Sign - Dangling                      15
Parking Card                                 13
Adopt-A-Basket                               12
Trans Fat                                    11
Tunnel Condition                             11
Radioactive Material                         11
Transportation Provider Complaint             9
Squeegee                                      8
Forensic Engineering                          6
Trapping Pigeon                               1
Name: Complaint Type, dtype: int64
```

Problem Statement

- Display the complaint type and city together

Group the Complaints by City

```
In [26]: Complaint_Type_City = SR_311_NYC_Data.groupby(['Complaint Type','City'])
```

Display the Number of Complaints in every city based on every complaint Category

```
In [27]: Complaint_Type_City.size()
```

```
Out[27]: Complaint Type          City
         APPLIANCE               ARVERNE                 70
                                 ASTORIA                 82
                                 BAYSIDE                  4
                                 BELLEROSE                4
                                 BRONX                 5042
                                 BROOKLYN              5275
                                 CAMBRIA HEIGHTS          7
                                 COLLEGE POINT           19
                                 CORONA                  51
                                 EAST ELMHURST           49
                                 ELMHURST                84
                                 FAR ROCKAWAY           191
                                 FLUSHING               111
                                 FOREST HILLS            50
                                 FRESH MEADOWS            6
                                 GLEN OAKS                5
                                 HOLLIS                  52
                                 HOWARD BEACH            16
```

Display the Cities with highest count of each complaint Type

In [28]:
```
SR_311_NYC_Data.groupby('Complaint Type')['City'].value_counts().nlargest(10)
```

Out[28]:
```
Complaint Type         City
HEATING                BROOKLYN    79838
                       BRONX       76587
                       NEW YORK    48375
GENERAL CONSTRUCTION   BROOKLYN    42562
                       BRONX       39158
PLUMBING               BROOKLYN    36698
                       BRONX       33284
Street Condition       BROOKLYN    29428
PAINT - PLASTER        BRONX       28788
                       BROOKLYN    28464
Name: City, dtype: int64
```

Display the Complaint Types that were reported Maximum in each of the Cities

In [29]:
```
SR_311_NYC_Data.groupby('City')['Complaint Type'].value_counts().nlargest(10)
```

Out[29]:
```
City      Complaint Type
BROOKLYN  HEATING                 79838
BRONX     HEATING                 76587
NEW YORK  HEATING                 48375
BROOKLYN  GENERAL CONSTRUCTION    42562
BRONX     GENERAL CONSTRUCTION    39158
BROOKLYN  PLUMBING                36698
BRONX     PLUMBING                33284
BROOKLYN  Street Condition        29428
BRONX     PAINT - PLASTER         28788
BROOKLYN  PAINT - PLASTER         28464
Name: Complaint Type, dtype: int64
```

In [36]:
```
sns.set(font_scale=0.75,font='Comic Sans MS')

sns.countplot(x='Complaint Type', hue='City', data=SR_311_NYC_Data_Selected,
              order=['HEATING','GENERAL CONSTRUCTION','PLUMBING']);
plt.title('Analysis of Top Complaints in Major Cities');
```

- Source Code

Project 3.ipynb