

Assessment Home Page Select or create a Comcast_Telecom_Consumer_C... +

localhost:8888/notebooks/Comcast_Telecom_Consumer_Complaints.ipynb#Ans--Internet-has-843-close-and-262-Open-Complaint--And-Customer-Care-Call-has...

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Import all used library

```
In [1]: import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.offline as py
import plotly.graph_objs as go
```

Read Data in csv format

```
In [2]: df=pd.read_csv("comcast_telecom_complaints_data.csv")
```

The info() function is used to print a concise summary of a DataFrame. This method prints information about a DataFrame including the index dtype and column dtypes, non-null values and memory usage.

```
In [3]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2224 entries, 0 to 2223
Data columns (total 11 columns):
 #   column                Non-Null Count  Dtype
---  --
 0   Ticket #              2224 non-null   object
 1   Customer Complaint    2224 non-null   object
 2   Date                  2224 non-null   object
 3   Date_month_year       2224 non-null   object
 4   Time                  2224 non-null   object
 5   Received Via          2224 non-null   object
 6   City                  2224 non-null   object
 7   State                 2224 non-null   object
 8   Zip code              2224 non-null   int64
 9   Status                2224 non-null   object
10   Filing on Behalf of Someone 2224 non-null   object
```

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```
5 Received Via          2224 non-null   object
6 City                  2224 non-null   object
7 State                 2224 non-null   object
8 Zip code              2224 non-null   int64
9 Status                2224 non-null   object
10 Filing on Behalf of Someone 2224 non-null   object
dtypes: int64(1), object(10)
memory usage: 191.2+ KB
```

df.head() Returns the first 5 rows of the dataframe

```
In [4]: df.head()
```

```
Out[4]:
```

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Zip code	Status	Filing on Behalf of Someone
0	250835	Comcast Cable Internet Speeds	22-04-15	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21009	Closed	No
1	223441	Payment disappear - service got disconnected	04-08-15	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	30102	Closed	No
2	242732	Speed and Service	18-04-15	18-Apr-15	9:59:47 AM	Internet	Acworth	Georgia	30101	Closed	Yes
3	277040	Comcast Imposed a New Usage Cap of 300GB that...	05-07-15	05-Jul-15	11:59:35 AM	Internet	Acworth	Georgia	30101	Open	Yes
4	307175	Comcast not working and no service to boot	28-05-15	28-May-15	1:25:28 PM	Internet	Acworth	Georgia	30101	Solved	No

Pandas to_datetime() method helps to convert string Date time into Python Date time object

```
In [5]: df['Date']=pd.to_datetime(df['Date'])
```

```
In [6]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2224 entries, 0 to 2223
Data columns (total 11 columns):
 #   column                Non-Null Count  Dtype
---  --
 0   Ticket #              2224 non-null   object
```

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```
1 df = pd.read_csv('Comcast_Telecom_Consumer_Complaints.csv')
2 df
3 Date_month_year 2224 non-null object
4 Time 2224 non-null object
5 Received_Via 2224 non-null object
6 City 2224 non-null object
7 State 2224 non-null object
8 Zip code 2224 non-null int64
9 Status 2224 non-null object
10 Filing on behalf of Someone 2224 non-null object
dtypes: datetime64[ns](1), int64(1), object(9)
memory usage: 191.2+ KB
```

dt.month_name() function to return the month names of the underlying datetime data in the given series object. Return the names of the month in English language.

In [7]: df['Month'] = df['Date'].dt.month_name()

In [8]: df

Out[8]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received_Via	City	State	Zip code	Status	Filing on Behalf of Someone	Month
0	250935	Comcast Cable Internet Speeds	2015-04-22	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21009	Closed	No	April
1	223441	Payment disappear - service got disconnected	2015-04-08	04-Aug-15	10:22:59 AM	Internet	Acworth	Georgia	30102	Closed	No	April
2	242732	Speed and Service	2015-04-16	18-Apr-15	9:55:47 AM	Internet	Acworth	Georgia	30101	Closed	Yes	April
3	277946	Comcast Imposed a New Usage Cap of 300GB that ...	2015-05-07	05-Jul-15	11:59:35 AM	Internet	Acworth	Georgia	30101	Open	Yes	May
4	307175	Comcast not working and no service to boot	2015-05-26	26-May-15	1:25:29 PM	Internet	Acworth	Georgia	30101	Solved	No	May
...
2219	213550	Service Availability	2015-04-02	04-Feb-15	9:13:18 AM	Customer Care Call	Youngstown	Florida	32466	Closed	No	April
2220	316775	Comcast Monthly Billing for Returned Modem	2015-06-02	06-Feb-15	1:24:39 PM	Customer Care Call	Ypsilanti	Michigan	48197	Solved	No	June
2221	321159	Comcast Cable Internet Speeds	2015-06-26	26-Jun-15	5:28:41 PM	Internet	Ypsilanti	Michigan	48197	Solved	No	June

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```
2222 360489 Comcast customer 06-23 23-Jun-15 11:10:00 PM Customer Care Call Ypsilanti Michigan 48197 Solved No June
2223 363614 Comcast Ypsilanti MI Internet Speed 2015-06-24 24-Jun-15 10:28:33 PM Customer Care Call Ypsilanti Michigan 48198 Open Yes June
```

2224 rows x 12 columns

Use Series value_counts() function to find the unique value counts of each element in the given Series object.

In [9]: df['Date'].value_counts()

Out[9]:

```
2015-06-24    218
2015-06-23    190
2015-06-25     98
2015-06-26     55
2015-06-30     53
...
2015-05-10      7
2015-05-24      7
2015-04-05      6
2015-04-11      5
2015-05-03      5
Name: Date, Length: 91, dtype: int64
```

groupby() - Pandas groupby is used for grouping the data according to the categories and apply a function to the categories. It also helps to aggregate data efficiently.

count() - The count() function is used to count elements on a list as well as a string.

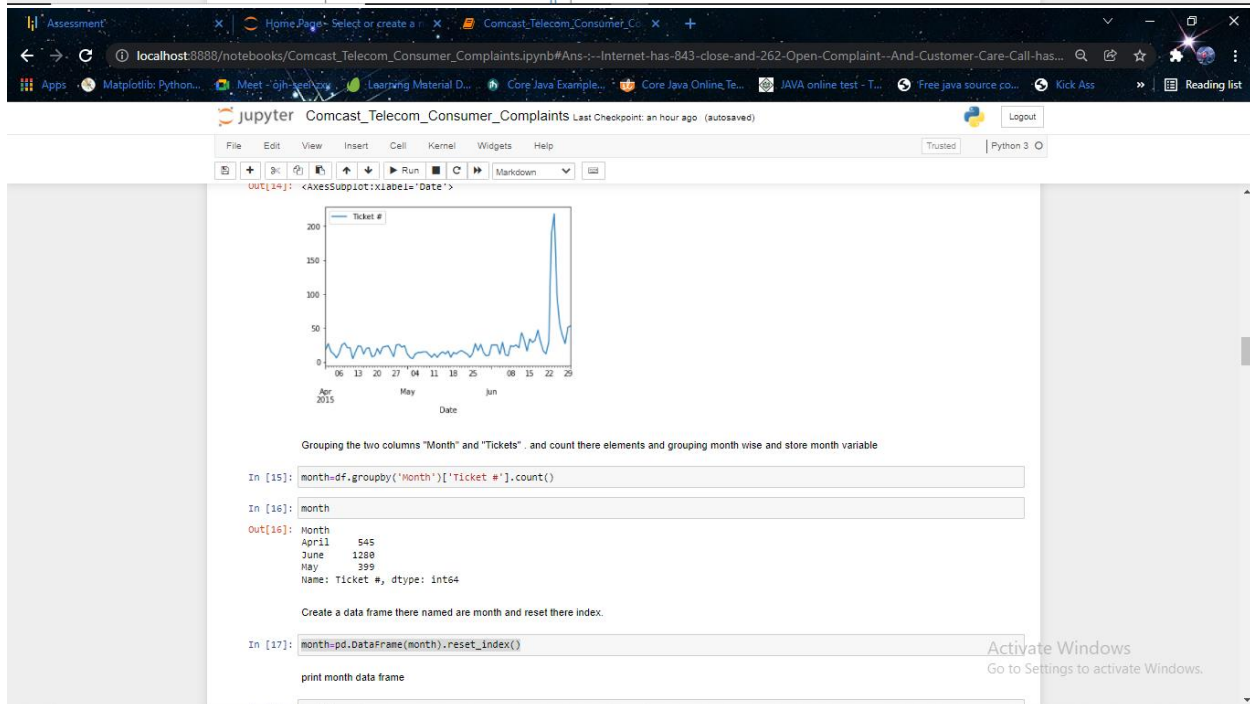
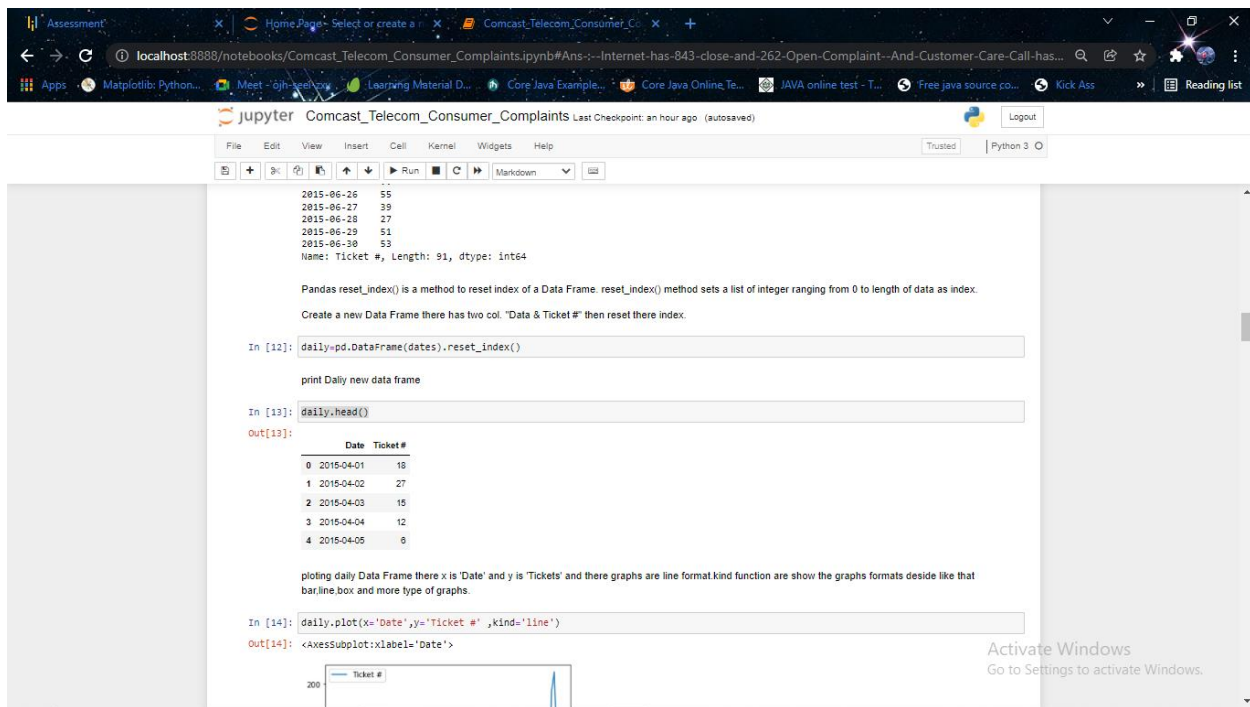
grouping the Date and ticket in dates variable and count the elements on the list .

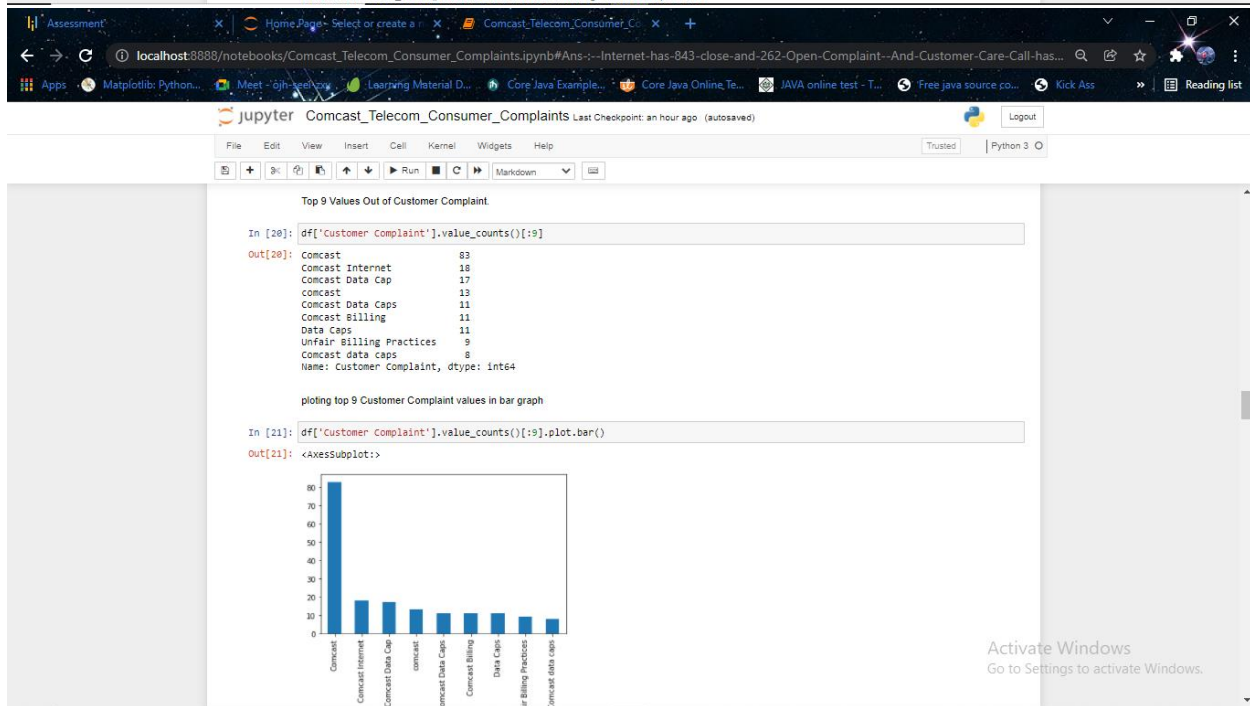
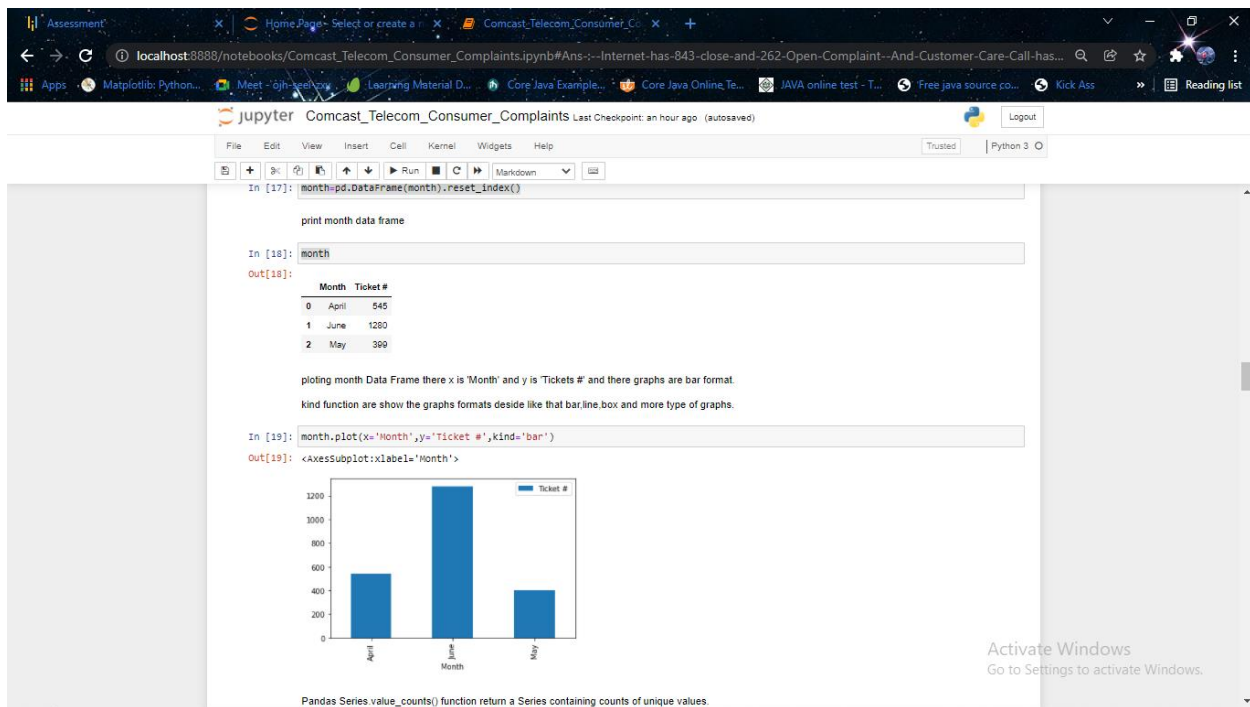
In [10]: dates = df.groupby(['Date'])['Ticket #'].count()

In [11]: dates

Out[11]:

```
Date
2015-04-01    18
2015-04-02    27
2015-04-03    15
2015-04-04    12
```





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Comcast Comcast Internet Comcast Data Cap Comcast Comcast Comcast Data Cap Comcast Billing Comcast data cap

Create a new column 'NewStatus' put a loop in it there loop are if st=='Open' or 'pending' they return 'Open' else 'Close' for st in df['Status']
[Open if st=='Open' or st=='Pending' else 'Close' for st in df['Status']]

In [22]: df['NewStatus']=['Open' if st=='Open' or st=='Pending' else 'Close' for st in df['Status']]

Show Unique element in Status column

In [23]: df['Status'].unique()
Out[23]: array(['Closed', 'Open', 'Solved', 'Pending'], dtype=object)

print Main Data Frame

In [24]: df
Out[24]:

Ticket #	Customer Complaint	Date	date_month_year	Time	Received Via	City	State	Zip code	Status	Filing on Behalf of Someone	Month	NewStatus
0 280835	Comcast Cable Internet Speeds	2015-04-22	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21008	Closed	No	April	Close
1 223441	Payment disappear - service got disconnected	2015-04-08	04-Aug-15	10:22:56 AM	Internet	Acoworth	Georgia	30102	Closed	No	April	Close
2 242732	Speed and Service	2015-04-18	18-Apr-15	9:55:47 AM	Internet	Acoworth	Georgia	30101	Closed	Yes	April	Close
3 277946	Comcast imposed a New Usage Cap of 300GB that...	2015-05-07	05-Jul-15	11:59:35 AM	Internet	Acoworth	Georgia	30101	Open	Yes	May	Open

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2224 rows x 13 columns

Unstack :- unstack is similar to stack method, it also works with multi-index objects in dataframe, producing a reshaped DataFrame with a new inner-most level of column labels.

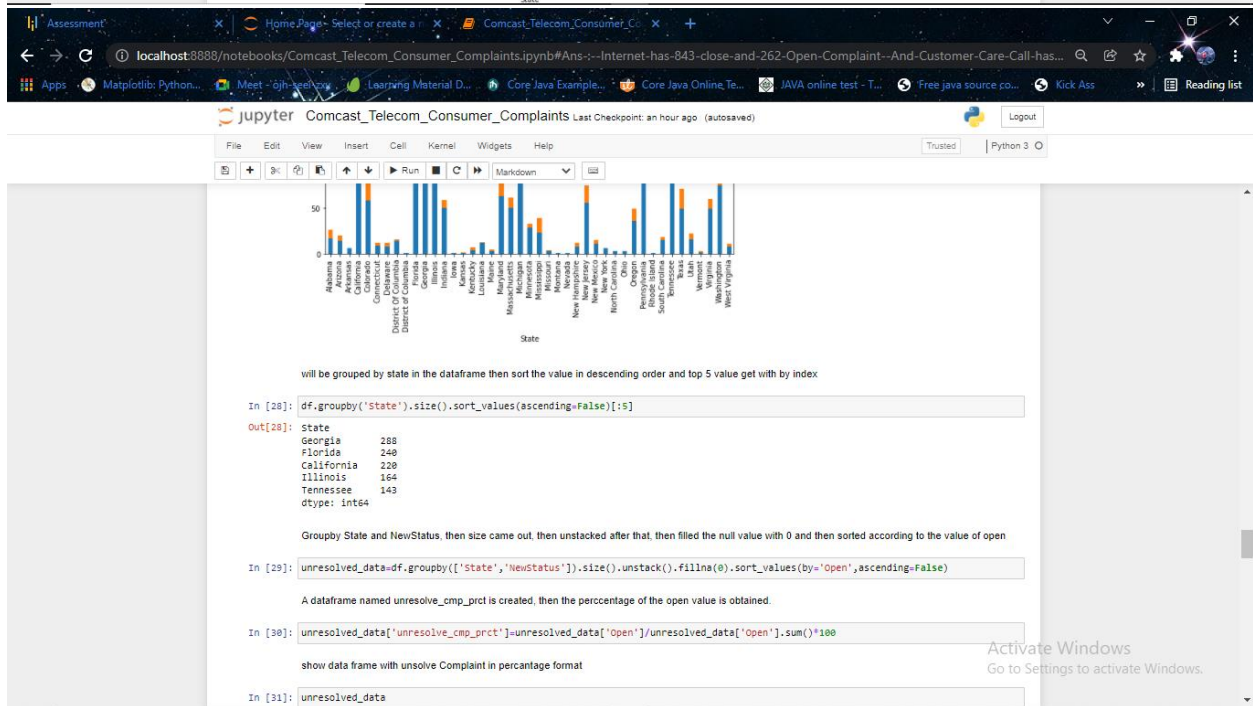
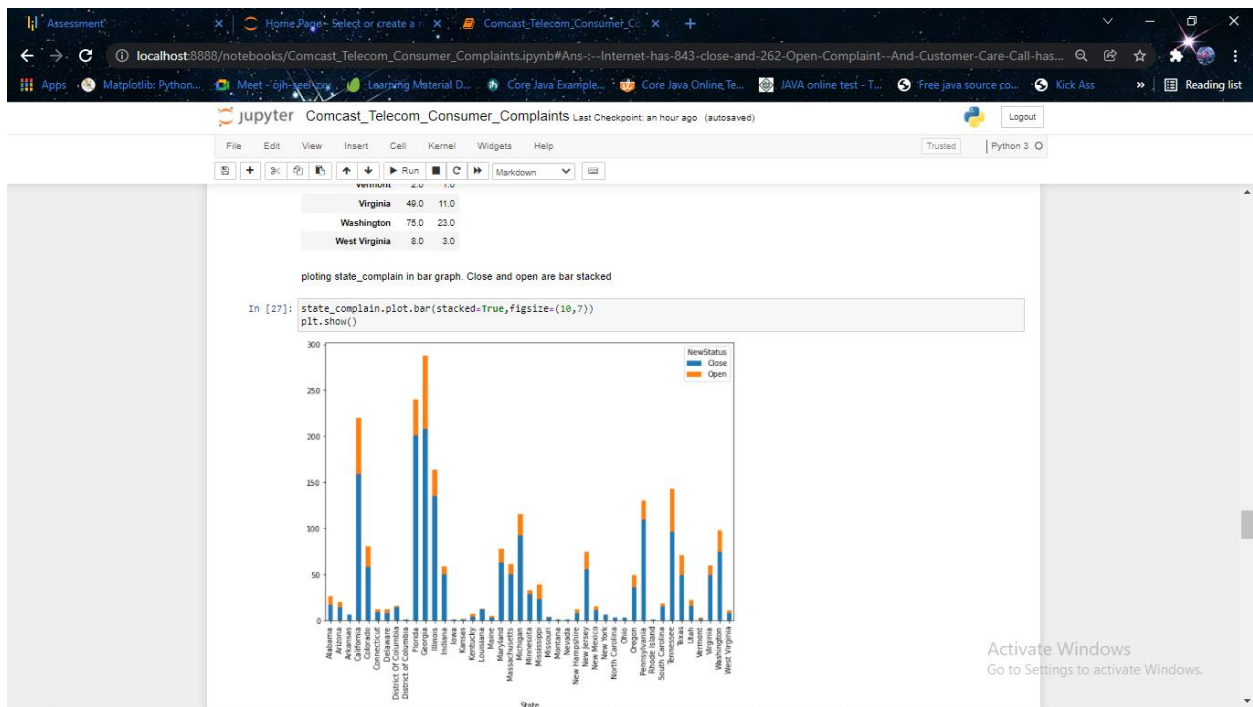
size() function count the number of elements along a given axis.

grouping two column 'State' and 'newStatus' and count number of elements and unstack(it are reshaped data frame) and store new variable (state_complain).

In [25]: state_complain=df.groupby(['State','NewStatus']).size().unstack()
show state_complain on new dataframe open ya close status

In [26]: state_complain
Out[26]:

	NewStatus	Close	Open
State			
Alabama	17.0	9.0	
Arizona	14.0	8.0	
Arkansas	8.0	NaN	
California	159.0	61.0	
Colorado	58.0	22.0	
Connecticut	9.0	3.0	
Delaware	8.0	4.0	
District Of Columbia	14.0	2.0	
District of Columbia	1.0	NaN	
Florida	201.0	39.0	
Georgia	208.0	80.0	
Illinois	138.0	29.0	
Indiana	50.0	9.0	
Iowa	1.0	NaN	



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```
In [29]: unresolved_data=df.groupby(['State','NewStatus']).size().unstack().fillna(0).sort_values(by='Open',ascending=False)
```

A dataframe named unresolved_cmp_pct is created, then the percentage of the open value is obtained.

```
In [30]: unresolved_data['unresolve_cmp_pct']=unresolved_data['open']/unresolved_data['open'].sum()*100
```

show data frame with unsolve Complaint in percentage format

```
In [31]: unresolved_data
```

```
Out[31]:
```

	NewStatus	Close	Open	unresolve_cmp_pct
	State			
	Georgia	208.0	80.0	15.473688
	California	159.0	81.0	11.796839
	Tennessee	98.0	47.0	9.090909
	Florida	201.0	38.0	7.543520
	Illinois	135.0	28.0	5.006284
	Washington	75.0	23.0	4.448743
	Michigan	92.0	23.0	4.448743
	Colorado	58.0	22.0	4.255319
	Texas	48.0	22.0	4.255319
	Pennsylvania	110.0	20.0	3.858472
	New Jersey	66.0	19.0	3.875048
	Mississippi	23.0	19.0	3.094778
	Maryland	63.0	15.0	2.901354
	Oregon	38.0	13.0	2.514507
	Virginia	49.0	11.0	2.127660
	Massachusetts	50.0	11.0	2.127660
	Alabama	17.0	9.0	1.746832

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```
District of Columbia 1.0 0.0 0.000000
North Carolina 3.0 0.0 0.000000
New York 6.0 0.0 0.000000
Nevada 1.0 0.0 0.000000
Arkansas 6.0 0.0 0.000000
Iowa 1.0 0.0 0.000000
```

grouping two column 'Received Via' and 'NewStatus' and count number of elements and unstack(it are reshaped data frame) and store new variable (resolved_data).

```
In [32]: resolved_data=df.groupby(['Received Via','NewStatus']).size().unstack()
```

Show resolved_data

```
In [33]: resolved_data
```

```
Out[33]:
```

	NewStatus	Close	Open
	Received Via		
	Customer Care Call	864	255
	Internet	843	262

A dataframe named resolved_data is created, then the percentage of the close value is obtained.

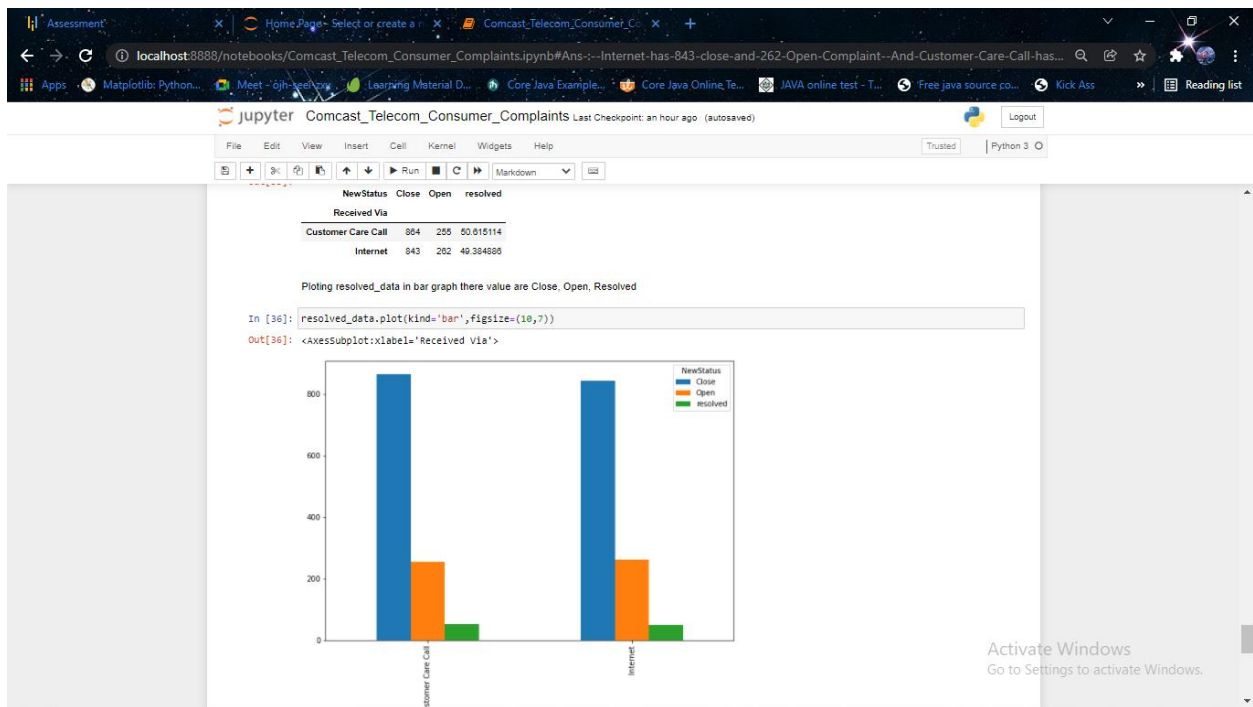
```
In [34]: resolved_data['resolved']=resolved_data['close']/resolved_data['close'].sum()*100
```

```
In [35]: resolved_data
```

```
Out[35]:
```

	NewStatus	Close	Open	resolved
	Received Via			
	Customer Care Call	864	255	50.615114
	Internet	843	262	49.384886

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Create new dataframe and count internet complaint from Customer Complaint

```
In [37]: internet_issue=df[df['Customer Complaint'].str.contains('internet')].count()
In [38]: internet_issue
Out[38]: Ticket # 195
Customer Complaint 195
Date 195
Date_month_year 195
Time 195
Received Via 195
City 195
State 195
Zip code 195
Status 195
Filing on Behalf of Someone 195
Month 195
NewStatus 195
dtype: int64
```

Results

Q. Which complaint types are maximum ?

Ans :- Internet has 843 close and 262 Open Complaint And Customer Care Call has 864 close and 255 open Complaint

Q. Which state has the maximum complaints ?

ans :- Georgia State has maximum complaints.

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```
State 195
Zip code 195
Status 195
Filing on Behalf of Someone 195
Month 195
NewStatus 195
dtype: int64
```

Results

Q. Which complaint types are maximum ?

Ans :- Internet has 843 close and 262 Open Complaint And Customer Care Call has 864 close and 255 open Complaint

Q. Which state has the maximum complaints ?

ans :- Georgia State has maximum complsints.

Q. Which state has the highest percentage of unresolved complaints ?

ans :- Georgia has the highest percentage of unresolved complaints.

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