In [1]:

```
print ("hello world")
```

```
hello world
```

In [4]:

```
import numpy as np
```

In [5]:

```
import pandas as pd
```

In [6]:

```
import matplotlib.pyplot as mp
```

In [7]:

```
# Import data into Python environment.
df= pd.read_csv("/home/siddharth/Desktop/Telecom_complaints_data.csv")
```

In [8]:

```
df.head()
```

Out[8]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Zi cod
0	250635	Comcast Cable Internet Speeds	22-04-15	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	2100
1	223441	Payment disappear - service got disconnected	04-08-15	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	3010
2	242732	Speed and Service	18-04-15	18-Apr-15	9:55:47 AM	Internet	Acworth	Georgia	3010
3	277946	Comcast Imposed a New Usage Cap of 300GB that ...	05-07-15	05-Jul-15	11:59:35 AM	Internet	Acworth	Georgia	3010
4	307175	Comcast not working and no service to boot	26-05-15	26-May-15	1:25:26 PM	Internet	Acworth	Georgia	3010

In [9]:

```
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
dtypes: int64(1), object(10)
memory usage: 191.2+ KB
```

In [38]:

```
# Provide the trend chart for the number of complaints at monthly and daily granula
```

In [10]:

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

In [11]:

```
df['Month']=df['Date'].dt.month_name()
```

In [12]:

```
df.head()
```

Out[12]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Z co
0	250635	Comcast Cable Internet Speeds	2015-04-22	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	210
1	223441	Payment disappear - service got disconnected	2015-04-08	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	301
2	242732	Speed and Service	2015-04-18	18-Apr-15	9:55:47 AM	Internet	Acworth	Georgia	301
3	277946	Comcast Imposed a New Usage Cap of 300GB that ...	2015-05-07	05-Jul-15	11:59:35 AM	Internet	Acworth	Georgia	301
4	307175	Comcast not working and no service to boot	2015-05-26	26-May-15	1:25:26 PM	Internet	Acworth	Georgia	301

In [13]:

```
daily= df["Date"].value_counts()
print(daily)
```

```
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
```

In [14]:

```
dates=df.groupby('Date').count()["Ticket #"]
```

In [15]:

```
daily_rate=pd.DataFrame(dates).reset_index()
daily_rate.head()
```

Out[15]:

	Date	Ticket #
0	2015-04-01	18
1	2015-04-02	27
2	2015-04-03	15
3	2015-04-04	12
4	2015-04-05	6

In [16]:

```
months=df.groupby("Month").count()["Ticket #"]
monthly_rate=pd.DataFrame(months).reset_index()
monthly_rate.head()
```

Out[16]:

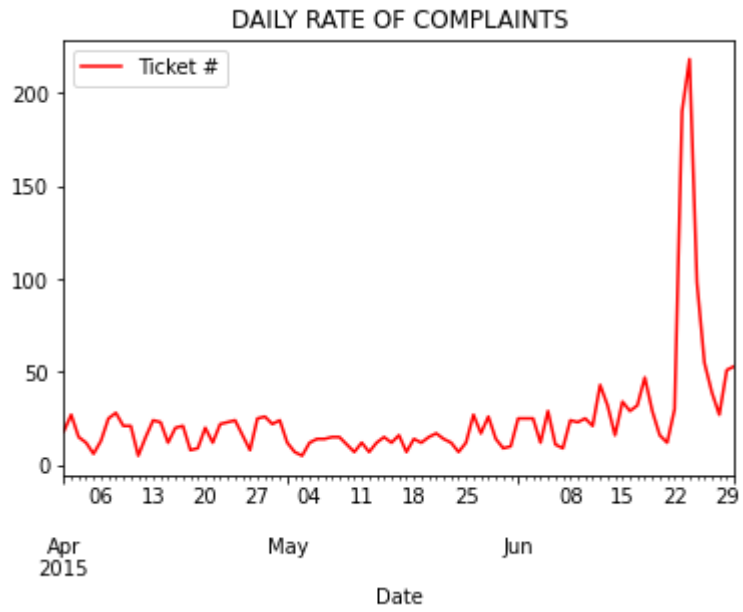
	Month	Ticket #
0	April	545
1	June	1280
2	May	399

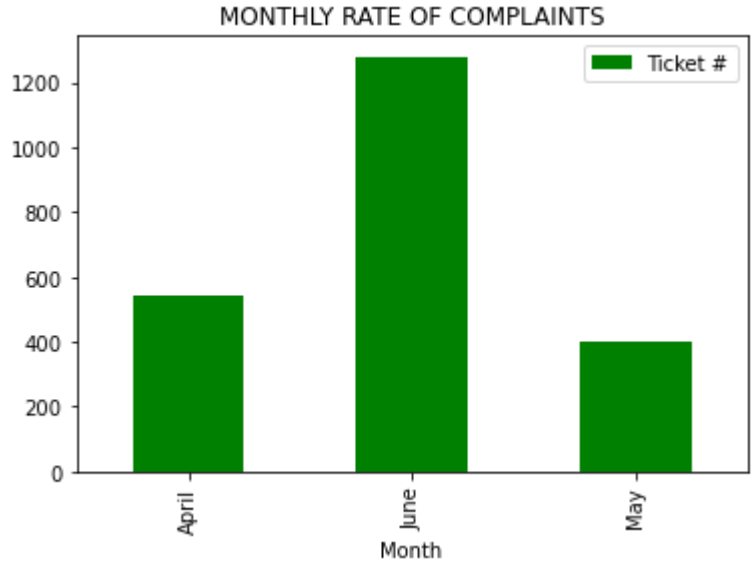
In [17]:

```
daily_rate.plot(x= "Date", y="Ticket #", color="r", kind="line", title="DAILY RATE
monthly_rate.plot(x= "Month", y="Ticket #", color="g", kind="bar", title="MONTHLY R
```

Out[17]:

```
<AxesSubplot:title={'center':'MONTHLY RATE OF COMPLAINTS'}, xlabel='M
onth'>
```





In [18]:

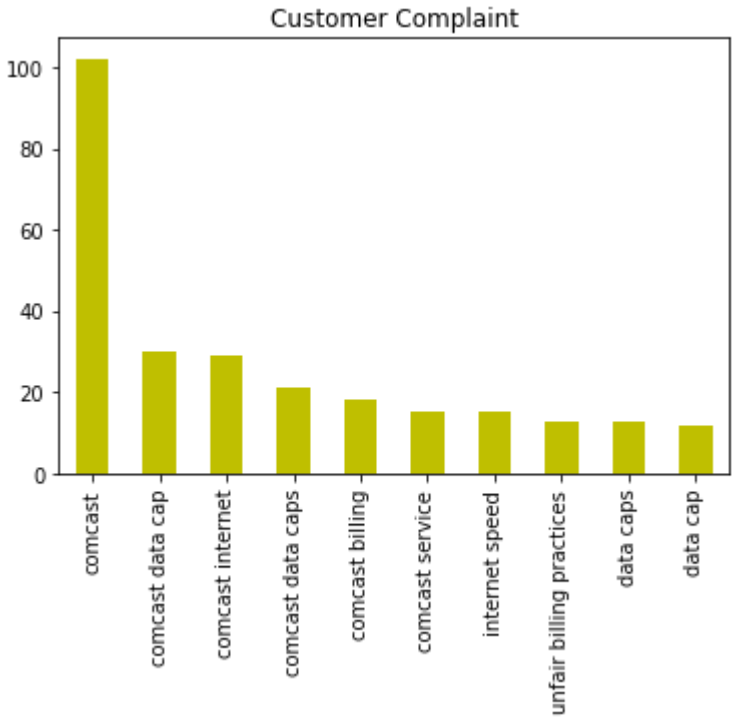
```
#Which complaint types are maximum i.e., around internet, network issues, or across
df["Customer Complaint"].unique()
df["Customer Complaint"]=df['Customer Complaint'].apply(lambda x: str(x).lower())
```

In [203]:

```
df['Customer Complaint'].value_counts()[:10].plot.bar(title= "Customer Complaint",
frequency={"Frequency":df["Customer Complaint"].value_counts()}
frequency= pd.DataFrame(frequency)
frequency.head()
```

Out[203]:

	Frequency
comcast	102
comcast data cap	30
comcast internet	29
comcast data caps	21
comcast billing	18



In [ ]:

```
#- Create a new categorical variable with value as Open and Closed. Open & Pending
```

In [20]:

```
df["Status"].unique()
```

Out[20]:

```
array(['Closed', 'Open', 'Solved', 'Pending'], dtype=object)
```

In [163]:

```
df["New_Status"]= ["Closed" if st=="Closed" or st=="Solved" else "Open" for st in d
```

In [164]:

```
df.head()
```

Out[164]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Z co
0	250635	comcast cable internet speeds	2015-04-22	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	210
1	223441	payment disappear - service got disconnected	2015-04-08	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	301
2	242732	speed and service	2015-04-18	18-Apr-15	9:55:47 AM	Internet	Acworth	Georgia	301
3	277946	comcast imposed a new usage cap of 300gb that ...	2015-05-07	05-Jul-15	11:59:35 AM	Internet	Acworth	Georgia	301
4	307175	comcast not working and no service to boot	2015-05-26	26-May-15	1:25:26 PM	Internet	Acworth	Georgia	301

In [23]:

```
# Provide state wise status of complaints in a stacked bar chart. Use the categoriz

State_complaints=df.groupby(["State","New_Status"]).size().unstack().fillna(0)
```

In [24]:

```
State_complaints
```

Out[24]:

New_Status State	CLOSED	PENDING
Alabama	17.0	9.0
Arizona	14.0	6.0
Arkansas	6.0	0.0
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	0.0
Florida	201.0	39.0
Georgia	208.0	80.0
Illinois	135.0	29.0
Indiana	50.0	9.0
Iowa	1.0	0.0
Kansas	1.0	1.0
Kentucky	4.0	3.0
Louisiana	12.0	1.0
Maine	3.0	2.0
Maryland	63.0	15.0
Massachusetts	50.0	11.0
Michigan	92.0	23.0
Minnesota	29.0	4.0
Mississippi	23.0	16.0
Missouri	3.0	1.0
Montana	1.0	0.0
Nevada	1.0	0.0
New Hampshire	8.0	4.0
New Jersey	56.0	19.0
New Mexico	11.0	4.0
New York	6.0	0.0
North Carolina	3.0	0.0
Ohio	3.0	0.0
Oregon	36.0	13.0
Pennsylvania	110.0	20.0

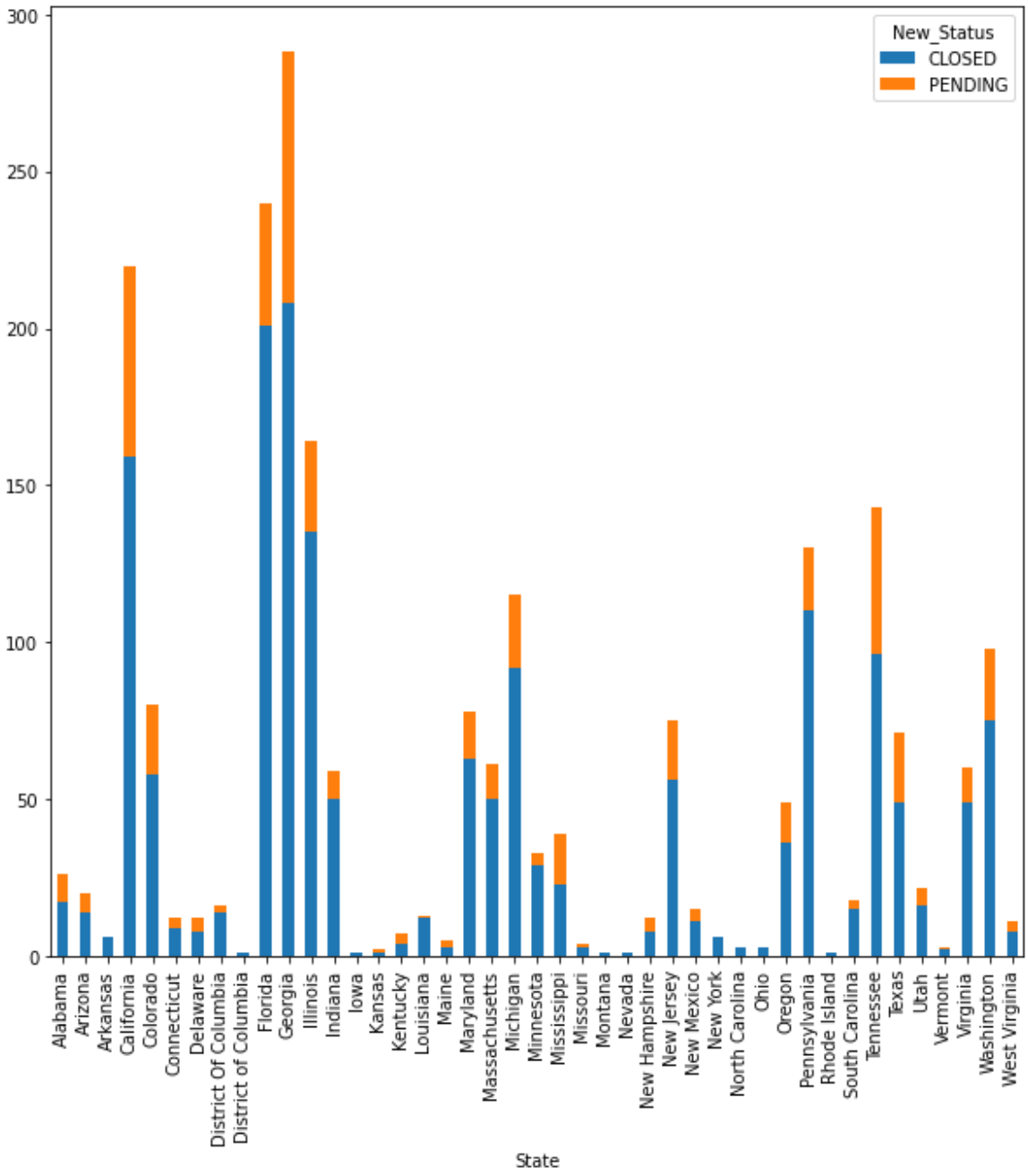
New_Status	CLOSED	PENDING
State		
Rhode Island	1.0	0.0
South Carolina	15.0	3.0
Tennessee	96.0	47.0
Texas	49.0	22.0
Utah	16.0	6.0
Vermont	2.0	1.0
Virginia	49.0	11.0
Washington	75.0	23.0
West Virginia	8.0	3.0

In [25]:

```
State_complaints.plot.bar(stacked=True, figsize= (10,10) )
```

Out[25]:

<AxesSubplot:xlabel='State'>



In [26]:

```
#Which state has the maximum complaints
"From above graph georgia has the highest number of complains"
df.groupby(["State"]).size().sort_values(ascending=False)
```

Out[26]:

```
State
Georgia                 288
Florida                 240
California              220
Illinois                164
Tennessee               143
Pennsylvania            130
Michigan                115
Washington               98
Colorado                 80
Maryland                 78
New Jersey               75
Texas                    71
Massachusetts            61
Virginia                 60
Indiana                  59
Oregon                   49
Mississippi              39
Minnesota                33
Alabama                  26
Utah                     22
Arizona                  20
South Carolina           18
District Of Columbia     16
New Mexico               15
Louisiana                13
Connecticut              12
New Hampshire            12
Delaware                 12
West Virginia            11
Kentucky                  7
Arkansas                  6
New York                  6
Maine                     5
Missouri                  4
North Carolina            3
Vermont                   3
Ohio                      3
Kansas                    2
District of Columbia      1
Rhode Island              1
Iowa                      1
Nevada                    1
Montana                   1
dtype: int64
```

In [165]:

```
# Which state has the highest percentage of unresolved complaints
unresolved=df.groupby(["State", "New_Status"]).size().unstack().fillna(0).sort_valu
unresolved
```

Out[165]:

New_Status	Closed	Open
State		
Georgia	208.0	80.0
California	159.0	61.0
Tennessee	96.0	47.0
Florida	201.0	39.0
Illinois	135.0	29.0
Washington	75.0	23.0
Michigan	92.0	23.0
Colorado	58.0	22.0
Texas	49.0	22.0
Pennsylvania	110.0	20.0
New Jersey	56.0	19.0
Mississippi	23.0	16.0
Maryland	63.0	15.0
Oregon	36.0	13.0
Virginia	49.0	11.0
Massachusetts	50.0	11.0
Alabama	17.0	9.0
Indiana	50.0	9.0
Utah	16.0	6.0
Arizona	14.0	6.0
New Hampshire	8.0	4.0
New Mexico	11.0	4.0
Minnesota	29.0	4.0
Delaware	8.0	4.0
West Virginia	8.0	3.0
Connecticut	9.0	3.0
Kentucky	4.0	3.0
South Carolina	15.0	3.0
Maine	3.0	2.0
District Of Columbia	14.0	2.0
Kansas	1.0	1.0
Vermont	2.0	1.0
Missouri	3.0	1.0

New_Status	Closed	Open
State		
Louisiana	12.0	1.0
Montana	1.0	0.0
Rhode Island	1.0	0.0
Ohio	3.0	0.0
District of Columbia	1.0	0.0
North Carolina	3.0	0.0
New York	6.0	0.0
Nevada	1.0	0.0
Arkansas	6.0	0.0
Iowa	1.0	0.0

unresolved["unresolved_data_pct"]=unresolved["Open"]/(unresolved["Open"]+unresolved["Closed"])*100
unresolved

In [215]:

```
# Provide the percentage of complaints resolved till date, which were received thro
total=df.groupby(["Received Via", "New_Status"]).size().unstack()

total["TOTAL"]=(total.iat[0,0]+total.iat[0,1], total.iat[1,0]+ total.iat[1,1])
total["TOT_PERCENTAGE"]= (total.iat[0,2]/total["TOTAL"].sum()*100, total.iat[1,2]/t

total["resolved_pct"]=total["Closed"]/total["TOTAL"]*100
total["total_resolved"]= total["Closed"].sum()/total["TOTAL"].sum()*100

total
```

Out[215]:

New_Status	Closed	Open	TOTAL	TOT_PERCENTAGE	resolved_pct	total_resolved
Received Via						
Customer Care Call	864	255	1119	50.314748	77.211796	76.753597
Internet	843	262	1105	49.685252	76.289593	76.753597

In [ ]:

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