Comcast Telecom Complaint Type

DESCRIPTION

Comcast is an American global telecommunication company. The firm has been providing terrible customer service. They continue to fall short despite repeated promises to improve. Only last month (October 2016) the authority fined them a $2.3 million, after receiving over 1000 consumer complaints.The existing database will serve as a repository of public customer complaints filed against Comcast.It will help to pin down what is wrong with Comcast's customer service.

Data Dictionary

- Ticket #: Ticket number assigned to each complaint
- Customer Complaint: Description of complaint
- Date: Date of complaint
- Time: Time of complaint
- Received Via: Mode of communication of the complaint
- City: Customer city
- State: Customer state
- Zipcode: Customer zip
- Status: Status of complaint
- Filing on behalf of someone

Analysis Task

To perform these tasks, you can use any of the different Python libraries such as NumPy, SciPy, Pandas, scikit-learn, matplotlib, and BeautifulSoup.

- Import data into Python environment.
- Provide the trend chart for the number of complaints at monthly and daily granularity levels.
- Provide a table with the frequency of complaint types.
- Which complaint types are maximum i.e., around internet, network issues, or across any other domains.
- Create a new categorical variable with value as Open and Closed. Open & Pending is to be categorized as Open and Closed & Solved is to be categorized as Closed.
- Provide state wise status of complaints in a stacked bar chart. Use the categorized variable from Q3.
- Provide insights on:
  - Which state has the maximum complaints
  - Which state has the highest percentage of unresolved complaints
- Provide the percentage of complaints resolved till date, which were received through the Internet and customer care calls.

In [1]:
```
# Import necessary libraries
import pandas as pd
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import warnings
```

In [2]:
```
#To ignore warnings
warnings.simplefilter('ignore')
```

Analysis Task 1

- Import data into python environment

In [3]:
```
# Importing Data using pandas
comcast = pd.read_csv("Comcast_telecom_complaints_data.csv")
comcast
```

Out[3]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Zip code	Status	Filing on Behalf of Someone
0	250635	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	9:55:47 AM	Internet	Acworth	Georgia	30101	Closed	Yes
3	277946	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	26-05-15	26-May-15	1:25:26 PM	Internet	Acworth	Georgia	30101	Solved	No
...	...	...	...	...	...	...	...	...	...	...	...
2219	213550	Service Availability	04-02-15	04-Feb-15	9:13:18 AM	Customer Care Call	Youngstown	Florida	32466	Closed	No
2220	318775	Comcast Monthly Billing for Returned Modem	06-02-15	06-Feb-15	1:24:39 PM	Customer Care Call	Ypsilanti	Michigan	48197	Solved	No
2221	331188	complaint about comcast	06-09-15	06-Sep-15	5:28:41 PM	Internet	Ypsilanti	Michigan	48197	Solved	No
2222	360489	Extremely unsatisfied Comcast customer	23-06-15	23-Jun-15	11:13:30 PM	Customer Care Call	Ypsilanti	Michigan	48197	Solved	No
2223	363614	Comcast, Ypsilanti MI Internet Speed	24-06-15	24-Jun-15	10:28:33 PM	Customer Care Call	Ypsilanti	Michigan	48198	Open	Yes

2224 rows × 11 columns

In [4]:
```
# Dataset shape
comcast.shape
```

Out[4]: (2224, 11)

In [5]:
```
# Dataset description
comcast.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 [6]:
```
# Converting column names to lowercase and removing whitespaces for easy access
comcast.columns = comcast.columns.str.lower().str.replace(" ","_")
```

In [7]:
```
# Converting date column to datetime object and retrieving month .
comcast['date'] = pd.to_datetime(comcast['date_month_year'])
comcast['month_no'] = comcast['date'].dt.month
comcast['month_name'] = comcast['date'].dt.month
```

In [8]:
```
# Converting month no. to month names
month_dict = {1:"Jan",2:"Feb",3:"Mar",4:"Apr",5:"May",6:"Jun",7:"Jul",8:"Aug",9:"Sep",10:"Oct",11:"Nov"
,12:"Dec"}
comcast['month_name'] = comcast['month_name'].apply(lambda x: month_dict[x])
comcast.insert(3,'month',comcast['month_name'])
comcast.drop(columns=['month_name'],inplace=True)
comcast
```

Out[8]:

	ticket_#	customer_complaint	date	month	date_month_year	time	received_via	city	state	zip_code	status
0	250635	Comcast Cable Internet Speeds	2015-04-22	Apr	22-Apr-15	3:53:50 PM	Customer Care Call	Abingdon	Maryland	21009	Closed
1	223441	Payment disappear - service got disconnected	2015-08-04	Aug	04-Aug-15	10:22:56 AM	Internet	Acworth	Georgia	30102	Closed
2	242732	Speed and Service	2015-04-18	Apr	18-Apr-15	9:55:47 AM	Internet	Acworth	Georgia	30101	Closed
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...	...	...	...	...	...	...	...	...	...	...	...
2219	213550	Service Availability	2015-02-04	Feb	04-Feb-15	9:13:18 AM	Customer Care Call	Youngstown	Florida	32466	Closed
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2223	363614	Comcast, Ypsilanti MI Internet Speed	2015-06-24	Jun	24-Jun-15	10:28:33 PM	Customer Care Call	Ypsilanti	Michigan	48198	Open

2224 rows × 13 columns

In [ ]:

Analysis Task 2

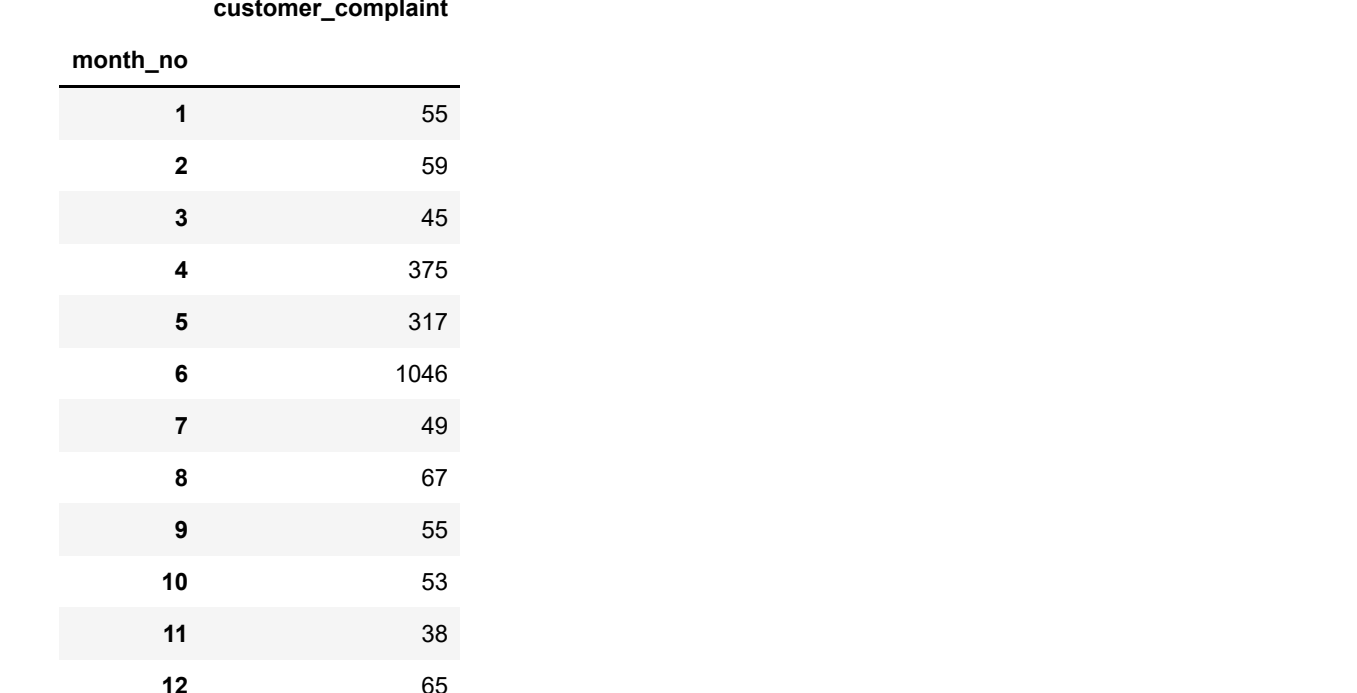
- trend chart for the number of complaints at monthly and daily granularity levels.

In [9]:
```
# Monthly complaint counts
month_complaints = comcast.groupby('month_no')['customer_complaint'].count()
month_complaints = month_complaints.to_frame()
month_complaints = month_complaints.sort_index()
month_complaints
```

Out[9]:

month_no	customer_complaint
1	55
2	59
3	45
4	375
5	317
6	1046
7	49
8	67
9	55
10	53
11	38
12	65

In [10]:
```
# Trend chart for monthly complaint counts
plt.figure(figsize=(10,5))
plt.plot(month_complaints.index,month_complaints['customer_complaint'],marker='o',color='orange',marker
facecolor = 'black')
plt.xticks([1,2,3,4,5,6,7,8,9,10,11,12],['Jan','Feb','Mar','Apr','May','Jun','Jul','Aug','Sep','Oct','N
ov','Dec'])
txt = {'weight':'bold'}
plt.title("Monthly Complaint Trend Chart",fontdict=txt)
plt.xlabel('Month',fontdict=txt,labelpad=30)
plt.ylabel('Count',fontdict=txt,labelpad=30)
plt.show()
```



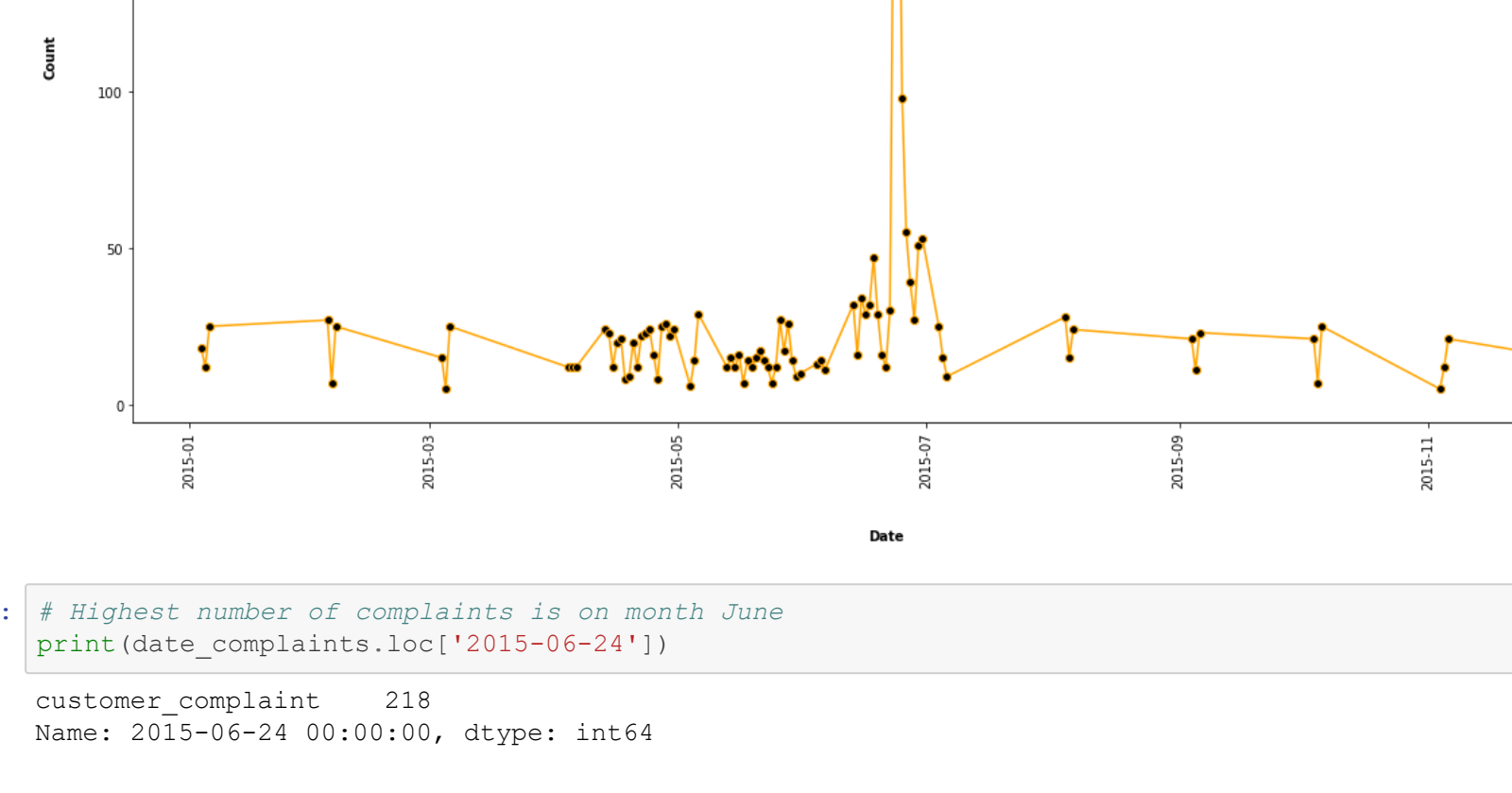
June month has the highest number of complaints from customers

In [11]:
```
# Daily complaint counts
date_complaints = comcast.groupby('date')['customer_complaint'].count()
date_complaints = date_complaints.to_frame()
date_complaints.head(10)
```

Out[11]:

date	customer_complaint
2015-01-04	18
2015-01-05	12
2015-01-06	25
2015-02-04	27
2015-02-05	7
2015-02-06	25
2015-03-04	15
2015-03-05	5
2015-03-06	25
2015-04-04	12

In [12]:
```
# Trend chart for daily complaint counts
plt.figure(figsize=(20,10))
plt.plot(date_complaints.index,date_complaints['customer_complaint'],marker='o',color='orange',markerfa
cecolor='black')
plt.xticks(rotation=90)
txt = {'weight':'bold'}
plt.title("Daily Complaint Trend Chart",fontdict=txt)
plt.xlabel('Date',fontdict=txt,labelpad=30)
plt.ylabel('Count',fontdict=txt,labelpad=30)
plt.show()
```



In [13]:
```
# Highest number of complaints is on month June
print(date_complaints.loc["2015-06-24"])
```

```
customer_complaint    218
Name: 2015-06-24 00:00:00, dtype: int64
```

June 24 th of 2015 has number of highest customer complaints

In [ ]:

Analysis Task 3

- Provide a table with the frequency of complaint types.

In [14]:
```
comcast['customer_complaint'] = comcast['customer_complaint'].str.lower()
comcast["complaint_type"] = 0
```

In [15]:
```
# Define loop to group complaints based on types
for i in comcast['customer_complaint']:
    if "data cap" in i:
        comcast['complaint_type'][comcast[comcast['customer_complaint']==i].index] = "data cap complain
t"
    elif "speed" in i:
        comcast['complaint_type'][comcast[comcast['customer_complaint']==i].index] = "internet speed co
mplaint"
    elif "bill" in i:
        comcast['complaint_type'][comcast[comcast['customer_complaint']==i].index] = "billing complain
t"
    elif "internet" in i:
        comcast['complaint_type'][comcast[comcast['customer_complaint']==i].index] = "internet complain
t"
    elif "service" in i:
        comcast['complaint_type'][comcast[comcast['customer_complaint']==i].index] = "service complain
t"
    elif "comcast" in i:
        comcast['complaint_type'][comcast[comcast['customer_complaint']==i].index] = "comcast complaint
s"
    else:
        comcast['complaint_type'][comcast[comcast['customer_complaint']==i].index] = i
```

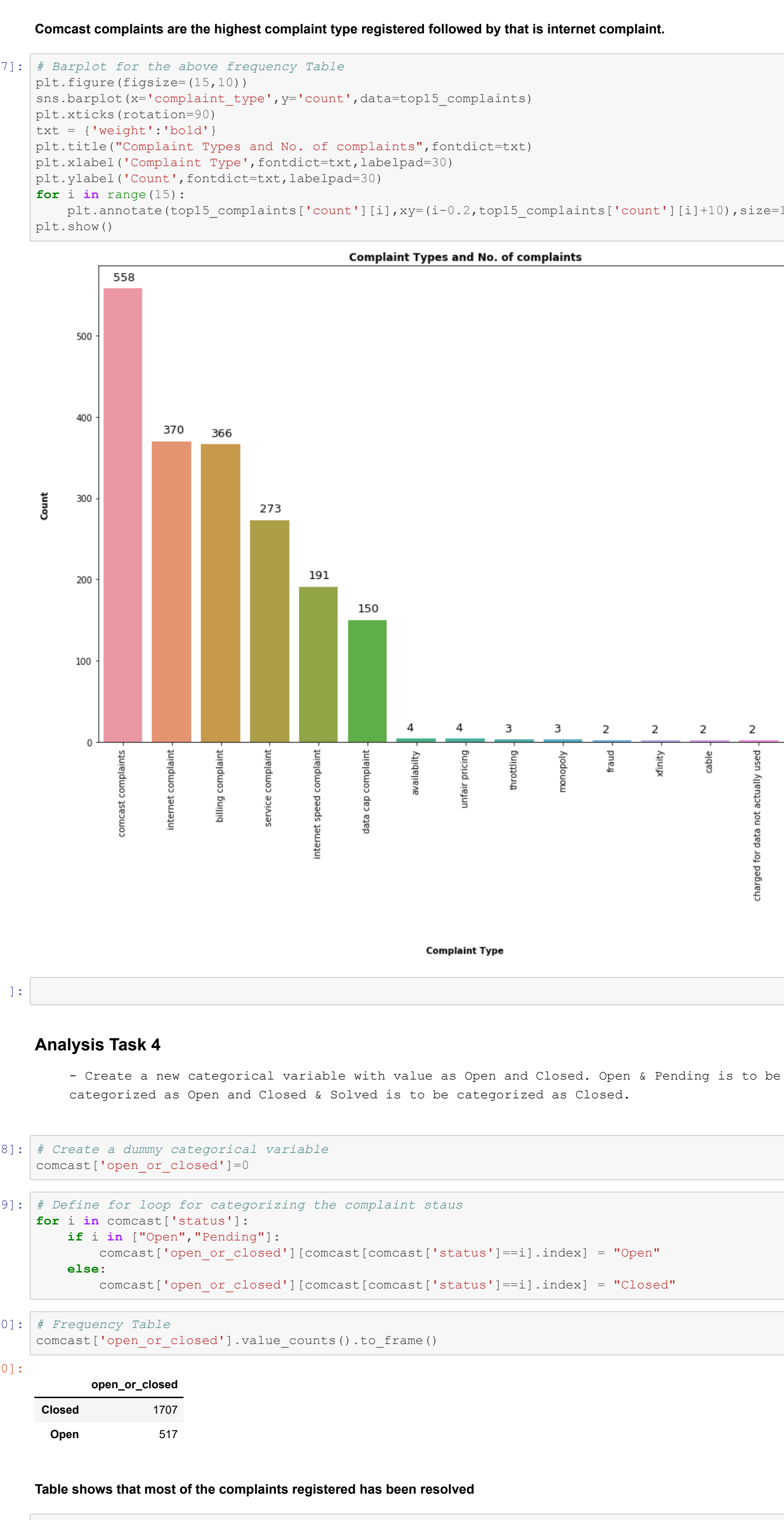
In [16]:
```
# Frequency Table for top 15 complaints
top15_complaints = comcast["complaint_type"].value_counts().head(15).to_frame()
top15_complaints["count"] = top15_complaints['complaint_type']
top15_complaints["complaint_type"] = top15_complaints.index
top15_complaints["count"].to_frame()
```

Out[16]:

	count
comcast complaints	558
internet complaint	370
billing complaint	366
service complaint	273
internet speed complaint	191
data cap complaint	150
availability	4
unfair pricing	4
throttling	3
monopoly	3
fraud	2
xfinity	2
cable	2
charged for data not actually used	2
continued slowness for almost 3 weeks	2

Comcast complaints are the highest complaint type registered followed by that is internet complaint.

In [17]:
```
# Barplot for the above frequency Table
plt.figure(figsize=(15,10))
sns.barplot(x="complaint_type",y="count",data=top15_complaints)
plt.xticks(rotation=90)
txt = {'weight':'bold'}
plt.title("Complaint Types and No. of complaints",fontdict=txt)
plt.xlabel('Complaint Type',fontdict=txt,labelpad=30)
plt.ylabel('Count',fontdict=txt,labelpad=30)
for i in range(15):
    plt.annotate(top15_complaints['count'][i],xy=(i-0.2,top15_complaints['count'][i]+10),size=13)
plt.show()
```



In [ ]:

Analysis Task 4

- Create a new categorical variable with value as Open and Closed. Open & Pending is to be categorized as Open and Closed & Solved is to be categorized as Closed.

In [18]:
```
# Create a dummy categorical variable
comcast['open_or_closed']=0
```

In [19]:
```
# Define for loop for categorising the complaint staus
for i in comcast['status']:
    if i in ["Open","Pending"]:
        comcast["open_or_closed"][comcast[comcast['status']==i].index] = "Open"
    else:
        comcast["open_or_closed"][comcast[comcast['status']==i].index] = "Closed"
```

In [20]:
```
# Frequency Table
comcast["open_or_closed"].value_counts().to_frame()
```

Out[20]:

	open_or_closed
Closed	1707
Open	517

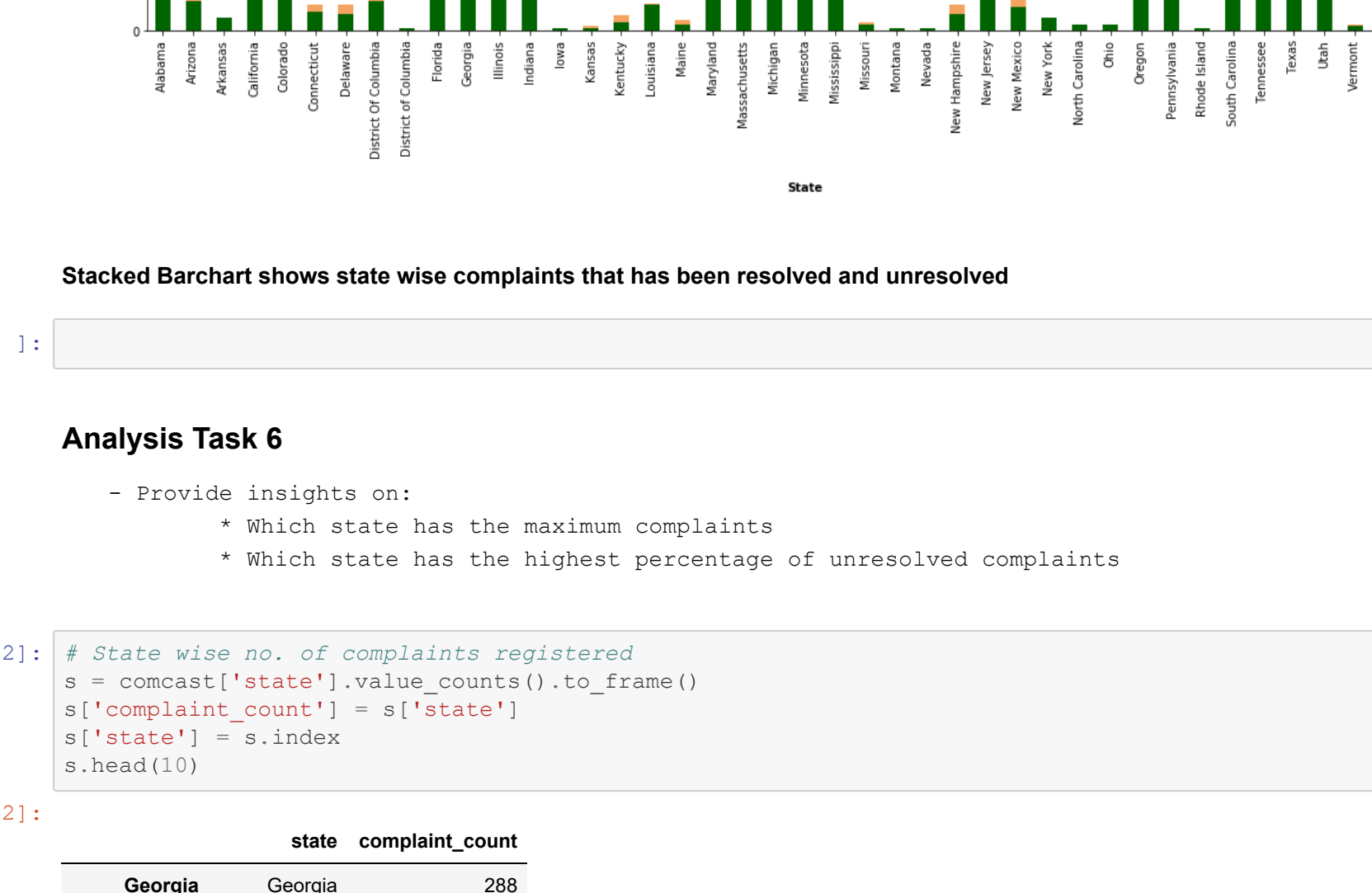
Table shows that most of the complaints registered has been resolved

In [ ]:

Analysis Task 5

- Provide state wise status of complaints in a stacked bar chart. Use the categorized variable from Q3.

In [21]:
```
# Stacked Barchart to represent state wise complaint counts and its status
comcast.groupby(['state','open_or_closed']).size().unstack().plot.bar(figsize=(20,10),stacked=True,colo
r=['darkgreen','sandybrown'])
txt = {'weight':'bold'}
plt.title("Stacked Barplot for Different States",fontdict=txt)
plt.xlabel('State',fontdict=txt,labelpad=20)
plt.ylabel('Count',fontdict=txt,labelpad=20)
plt.show()
```



Stacked Barchart shows state wise complaints that has been resolved and unresolved

In [ ]:

Analysis Task 6

- Provide insights on:
  - Which state has the maximum complaints
  - Which state has the highest percentage of unresolved complaints

In [22]:
```
# State wise no. of complaints registered
s = comcast['state'].value_counts().to_frame()
s["complaint_count"] = s['state']
s['state'] = s.index
s.head(10)
```

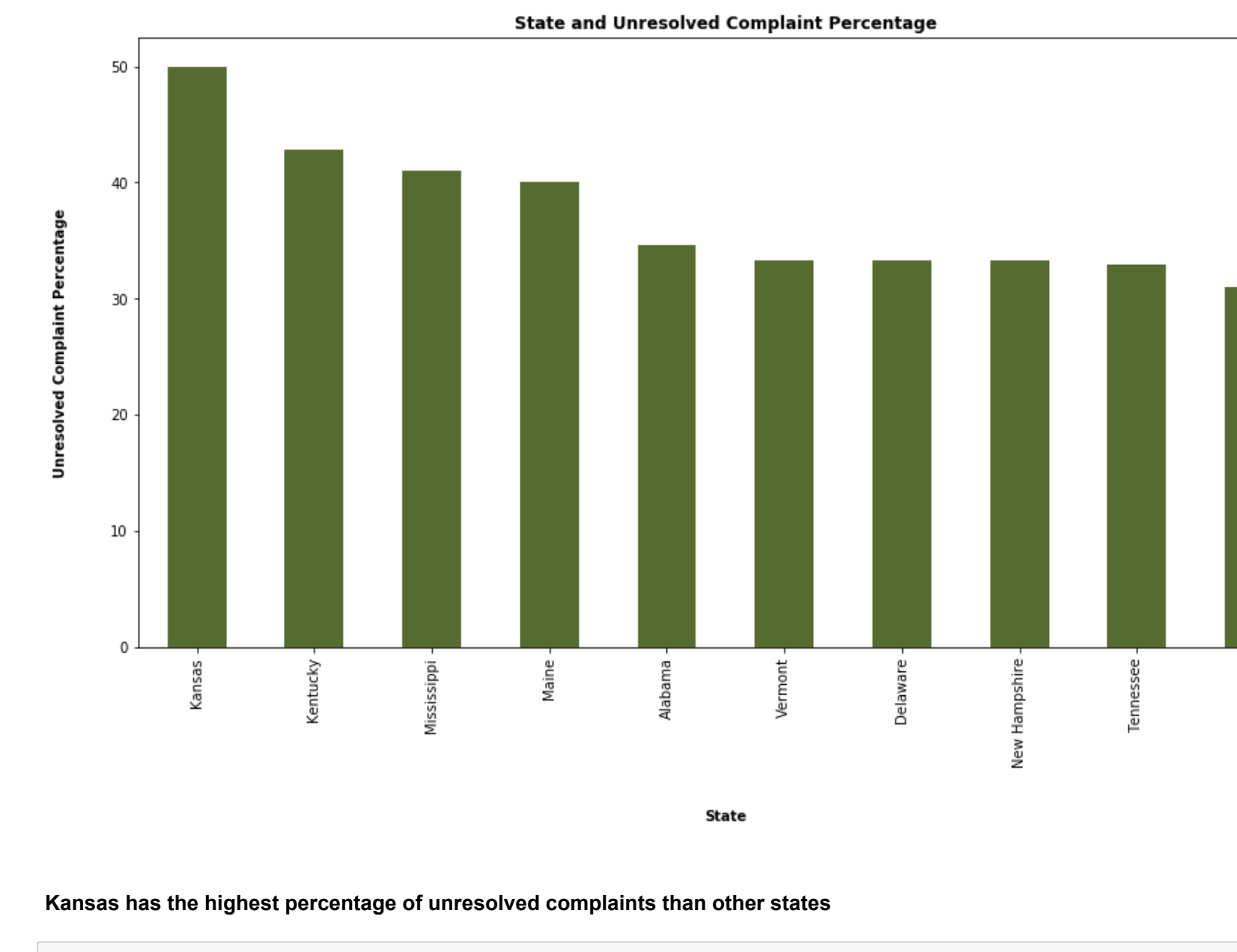
Out[22]:

	state	complaint_count
Georgia	Georgia	288
Florida	Florida	240
California	California	220
Illinois	Illinois	164
Tennessee	Tennessee	143
Pennsylvania	Pennsylvania	130
Michigan	Michigan	115
Washington	Washington	98
Colorado	Colorado	80
Maryland	Maryland	78

In [23]:
```
# Barplot for the above frequency table
plt.figure(figsize=(18,10))
sns.barplot(x='state',y='complaint_count',data=s.head(10),palette='Set2')
for i in range(10):
    plt.annotate(s['complaint_count'][i],xy=(i-0.1,s['complaint_count'][i]+3),size=15)
txt = {'weight':'bold'}
plt.title("States and No. of complaints",fontdict=txt)
plt.xlabel('State',fontdict=txt,labelpad=30)
plt.ylabel('Count',fontdict=txt,labelpad=30)
plt.xticks(rotation=90)
plt.show()
```

Georgia has the maximum number of complaints registered

In [24]:
```
# Bar Plot to represent The states with its Unresolved complaint percentage
high = comcast.groupby(['state','open_or_closed']).size().unstack()
high.fillna(0,inplace=True)
high['unresolved_percent'] = (high['Open']/(high['Open']+high['Closed']))*100
high = high.sort_values('unresolved_percent',ascending=False)
plt.figure(figsize=(15,8))
high['unresolved_percent'].head(10).plot.bar(color='darkolivegreen')
txt = {'weight':'bold'}
plt.title("State and Unresolved Complaint Percentage",fontdict=txt)
plt.xlabel('State',fontdict=txt,labelpad=30)
plt.ylabel('Unresolved Complaint Percentage',fontdict=txt,labelpad=30)
plt.show()
```



Kansas has the highest percentage of unresolved complaints than other states

In [ ]:

Analysis Task 7

- Provide the percentage of complaints resolved till date, which were received through the Internet and customer care calls.

In [25]:
```
# Finding the Resolved complaint percentage for various mediums
resolved = comcast.groupby(['received_via','open_or_closed']).size().unstack()
resolved['resolved_percentage'] = (resolved['Closed']/(resolved['Closed']+resolved['Open']))*100
resolved
```

Out[25]:

open_or_closed	Closed	Open	resolved_percentage
received_via			
Customer Care Call	864	255	77.211796
Internet	843	262	76.289593

77.2 % of Complaints recieved through Customer care calls were resolved

76.3 % of Complaints recieved through Internet were resolved

In [ ]: