Importing all the python libraries necessary to perform the tasks

In [1]:
```
import os
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import bs4
```

In [2]:
```
os.getcwd()
```

Out[2]:
```
'C:\\Users\\Preksha\\Simplilearn\\Data Science with Python\\Telecom'
```

Import data into Python environment.

In [3]:
```
dataset = pd.read_csv('Comcast_telecom_complaints_data.csv')
```

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

Out[4]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	State	Zip 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 [5]:
```
dataset.columns
```

Out[5]:
```
Index(['Ticket #', 'Customer Complaint', 'Date', 'Date_month_year', 'Time',
       'Received Via', 'City', 'State', 'Zip code', 'Status',
       'Filing on Behalf of Someone'],
      dtype='object')
```

In [6]:
```
dataset.size
```

Out[6]:
```
24464
```

In [7]:
```
dataset.shape
```

Out[7]:
```
(2224, 11)
```

In [8]:
```
dataset.dtypes
```

Out[8]:
```
Ticket #                      object
Customer Complaint            object
Date                          object
Date_month_year               object
Time                          object
Received Via                  object
City                          object
State                         object
Zip code                       int64
Status                        object
Filing on Behalf of Someone   object
dtype: object
```

In [9]:
```
dataset.describe()
```

Out[9]:

	Zip code
count	2224.000000
mean	47994.393435
std	28885.279427
min	1075.000000
25%	30056.500000
50%	37211.000000
75%	77058.750000
max	99223.000000

In [10]:
```
dataset.isna().any()
```

Out[10]:
```
Ticket #                        False
Customer Complaint              False
Date                            False
Date_month_year                 False
Time                            False
Received Via                    False
City                            False
State                           False
Zip code                        False
Status                          False
Filing on Behalf of Someone     False
dtype: bool
```

In [11]:
```
dataset.nunique()
```

Out[11]:
```
Ticket #                        2224
Customer Complaint              1841
Date                              91
Date_month_year                   91
Time                            2190
Received Via                       2
City                             928
State                             43
Zip code                        1543
Status                             4
Filing on Behalf of Someone        2
dtype: int64
```

In [12]:
```
dataset['date_index'] = dataset['Date_month_year'] + " " + dataset['Time']
```

In [13]:
```
dataset['date_index'] = pd.to_datetime(dataset['date_index'])
```

In [14]:
```
dataset['Date_month_year'] = pd.to_datetime(dataset['Date_month_year'])
```

In [15]:
```
dataset = dataset.set_index(dataset['date_index'])
```

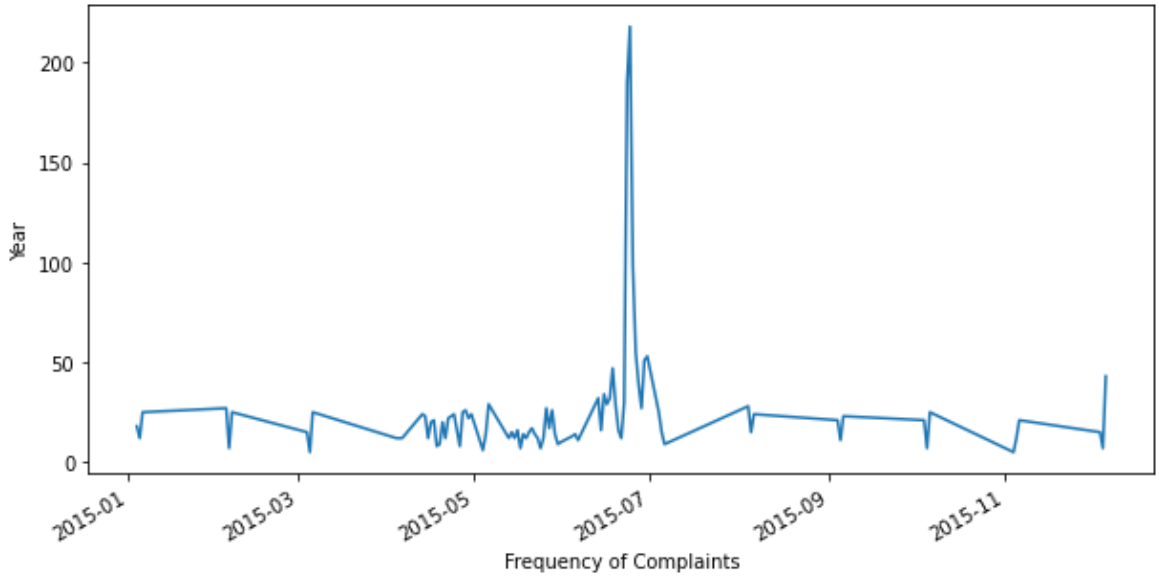
In [16]:
```
dataset.head()
```

Out[16]:

date_index	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	Sta
2015-04-22 15:53:50	250635	Comcast Cable Internet Speeds	22-04-15	2015-04-22	3:53:50 PM	Customer Care Call	Abingdon	Maryla
2015-08-04 10:22:56	223441	Payment disappear - service got disconnected	04-08-15	2015-08-04	10:22:56 AM	Internet	Acworth	Geor
2015-04-18 09:55:47	242732	Speed and Service	18-04-15	2015-04-18	9:55:47 AM	Internet	Acworth	Geor
2015-07-05 11:59:35	277946	Comcast Imposed a New Usage Cap of 300GB that ...	05-07-15	2015-07-05	11:59:35 AM	Internet	Acworth	Geor
2015-05-26 13:25:26	307175	Comcast not working and no service to boot	26-05-15	2015-05-26	1:25:26 PM	Internet	Acworth	Geor

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

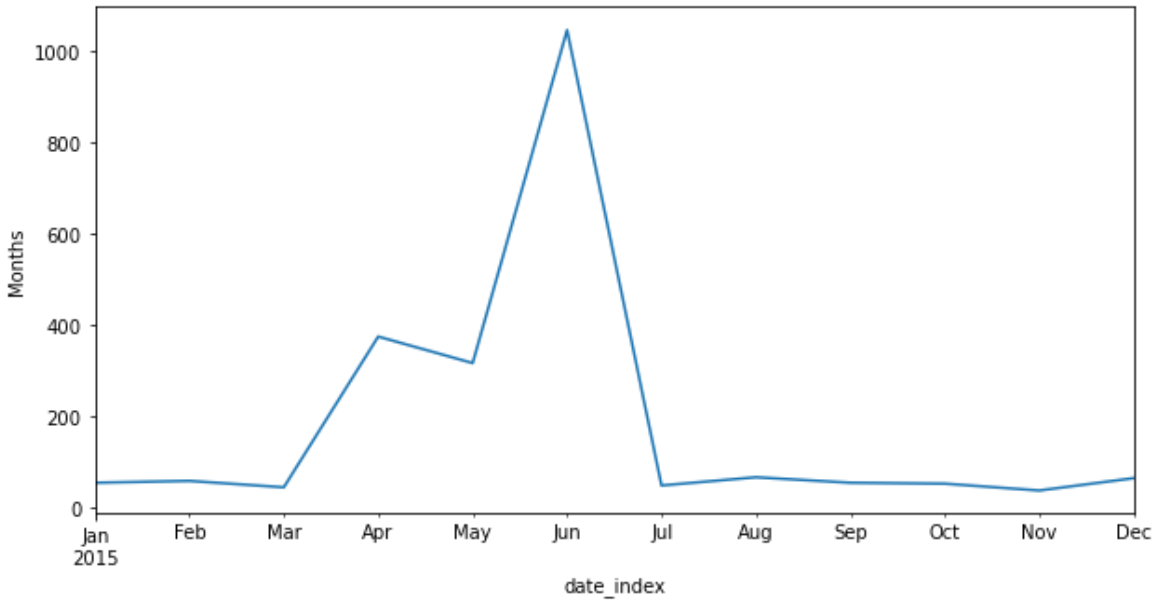
In [17]:
```
f = plt.figure()
f.set_figwidth(10)
f.set_figheight(5)
plt.xlabel('Frequency of Complaints')
plt.ylabel('Year')
dataset['Date_month_year'].value_counts().plot();
```



In [ ]:
```

```

In [18]:
```
f = plt.figure()
f.set_figwidth(10)
f.set_figheight(5)
plt.xlabel('Frequency of Complaints')
plt.ylabel('Months')
dataset.groupby(pd.Grouper(freq = 'M')).size().plot();
```



Provide a table with the frequency of complaint types.

In [19]:
```
complaints = dataset['Customer Complaint'].str.upper().value_counts()
```

In [20]:
```
complaints
```

Out[20]:
```
COMCAST                                          102
COMCAST DATA CAP                                  30
COMCAST INTERNET                                  29
COMCAST DATA CAPS                                 21
COMCAST BILLING                                   18
                                                ...
UNFAIR COMCAST BILL                                1
OVERBILLING                                        1
I NEED HELP PLEAS                                  1
COMCAST INSTALLATION DATE OF JUNE 22, 2015         1
COMCAST OVER CHARGES WITH NO NOTIFICATION          1
Name: Customer Complaint, Length: 1740, dtype: int64
```

Since the dataset has so many categories, the table will display only the top 10 and lowest 10 values individually

In [21]:
```
complaints.head(10)
```

Out[21]:
```
COMCAST                     102
COMCAST DATA CAP             30
COMCAST INTERNET             29
COMCAST DATA CAPS            21
COMCAST BILLING              18
INTERNET SPEED               15
COMCAST SERVICE              15
DATA CAPS                    13
UNFAIR BILLING PRACTICES     13
DATA CAP                     12
Name: Customer Complaint, dtype: int64
```

In [22]:
```
complaints.tail(10)
```

Out[22]:
```
COMCAST DOWNGRADED SERVICE WITH NO NOTIFICATION    1
INTERNET ISSUES WITH COMCAST                       1
COMCAST BILLING/PRICING PRACTICES                  1
DATA CAP IN OLIVE BRANCH MS WITH COMCAST           1
INSTALLATION CHARGES                               1
UNFAIR COMCAST BILL                                1
OVERBILLING                                        1
I NEED HELP PLEAS                                  1
COMCAST INSTALLATION DATE OF JUNE 22, 2015         1
COMCAST OVER CHARGES WITH NO NOTIFICATION          1
Name: Customer Complaint, dtype: int64
```

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 [23]:
```
dataset.Status.unique()
```

Out[23]:
```
array(['Closed', 'Open', 'Solved', 'Pending'], dtype=object)
```

In [24]:
```
dataset['New_Status'] = ['Open' if Status=='Open' or Status=='Pending' else '
```

In [25]:
```
dataset.head()
```

Out[25]:

	Ticket #	Customer Complaint	Date	Date_month_year	Time	Received Via	City	Sta
date_index								
2015-04-22 15:53:50	250635	Comcast Cable Internet Speeds	22-04-15	2015-04-22	3:53:50 PM	Customer Care Call	Abingdon	Maryla
2015-08-04 10:22:56	223441	Payment disappear - service got disconnected	04-08-15	2015-08-04	10:22:56 AM	Internet	Acworth	Geor
2015-04-18 09:55:47	242732	Speed and Service	18-04-15	2015-04-18	9:55:47 AM	Internet	Acworth	Geor
2015-07-05 11:59:35	277946	Comcast Imposed a New Usage Cap of 300GB that ...	05-07-15	2015-07-05	11:59:35 AM	Internet	Acworth	Geor
2015-05-26 13:25:26	307175	Comcast not working and no service to boot	26-05-15	2015-05-26	1:25:26 PM	Internet	Acworth	Geor

In [26]:
```
dataset.dtypes
```

Out[26]:
```
Ticket #                          object
Customer Complaint                object
Date                              object
Date_month_year           datetime64[ns]
Time                              object
Received Via                      object
City                              object
State                             object
Zip code                           int64
Status                            object
Filing on Behalf of Someone       object
date_index                datetime64[ns]
New_Status                        object
dtype: object
```

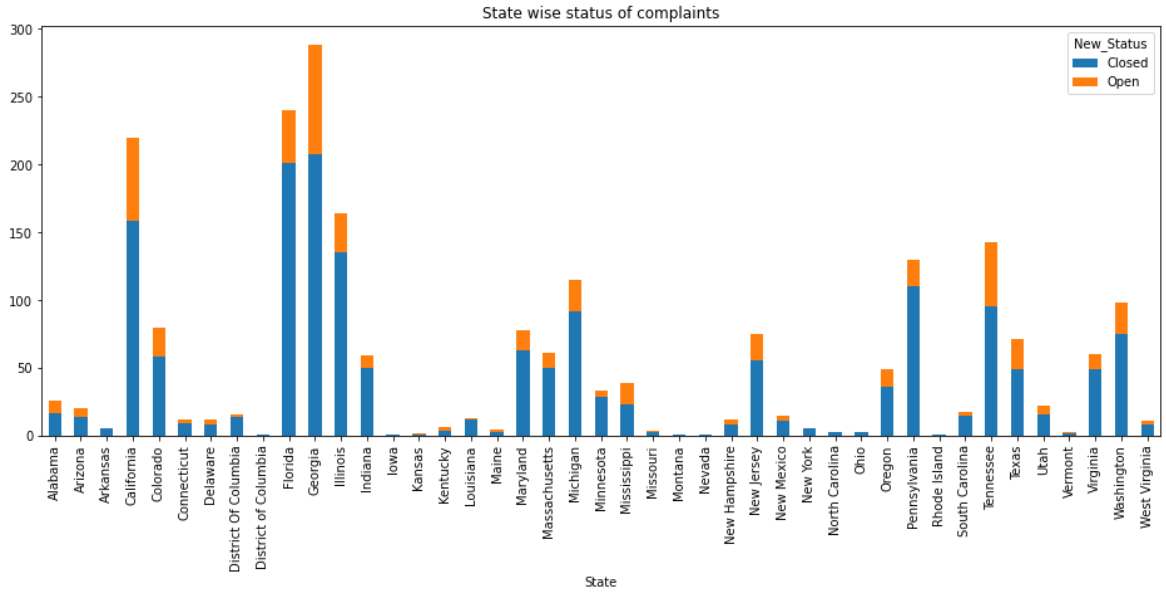
Provide state wise status of complaints in a stacked bar chart

In [27]:
```
dataset.New_Status.unique()
```

Out[27]:
```
array(['Closed', 'Open'], dtype=object)
```

Which state has the maximum complaints - Georgia

In [28]:
```
pd.crosstab(dataset.State,dataset.New_Status).plot(kind='bar',figsize=(16,6),
                                                   stacked=True,
                                                   title='State wise statu
```

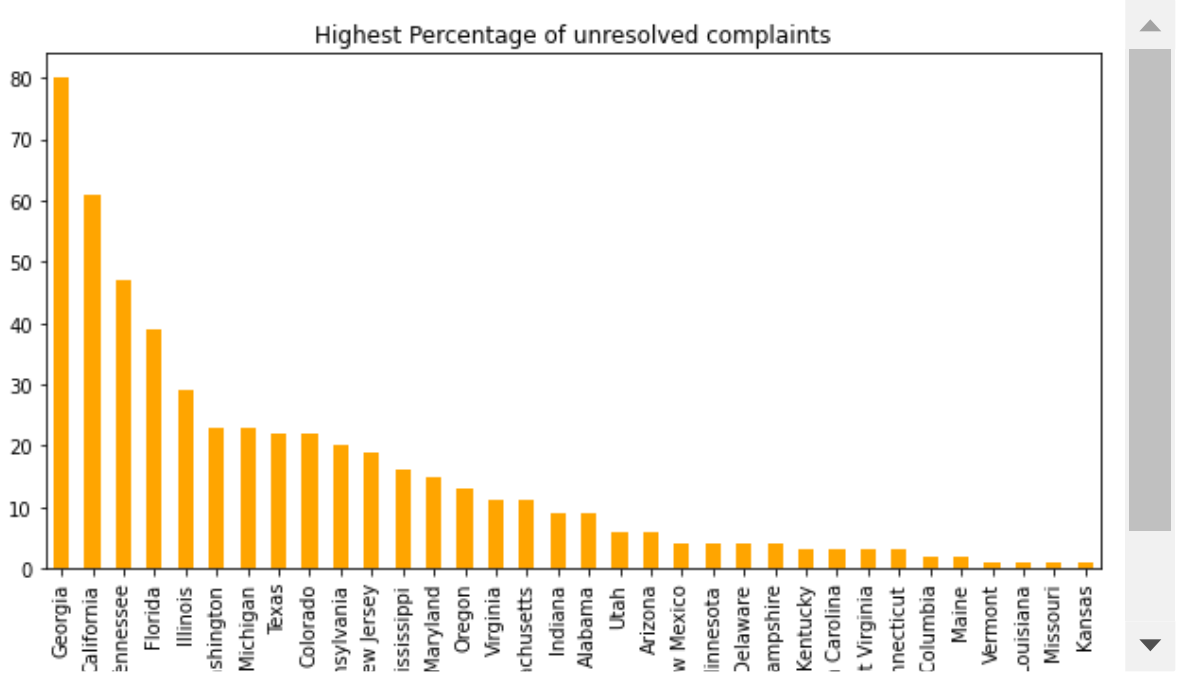


As seen in the graph, Georgia is the state with maximum number of complaints

Which state has the highest percentage of unresolved complaints - Georgia

In [29]:
```
Unresolved_complaints = dataset[dataset['New_Status']=='Open'].State.value_cc
```

In [30]:
```
Unresolved_complaints.plot(kind='bar', figsize=(10,5), color='orange')
plt.title('Highest Percentage of unresolved complaints');
```



As seen in the graph, Georgia is the state highest percentage of unresolved complaints

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

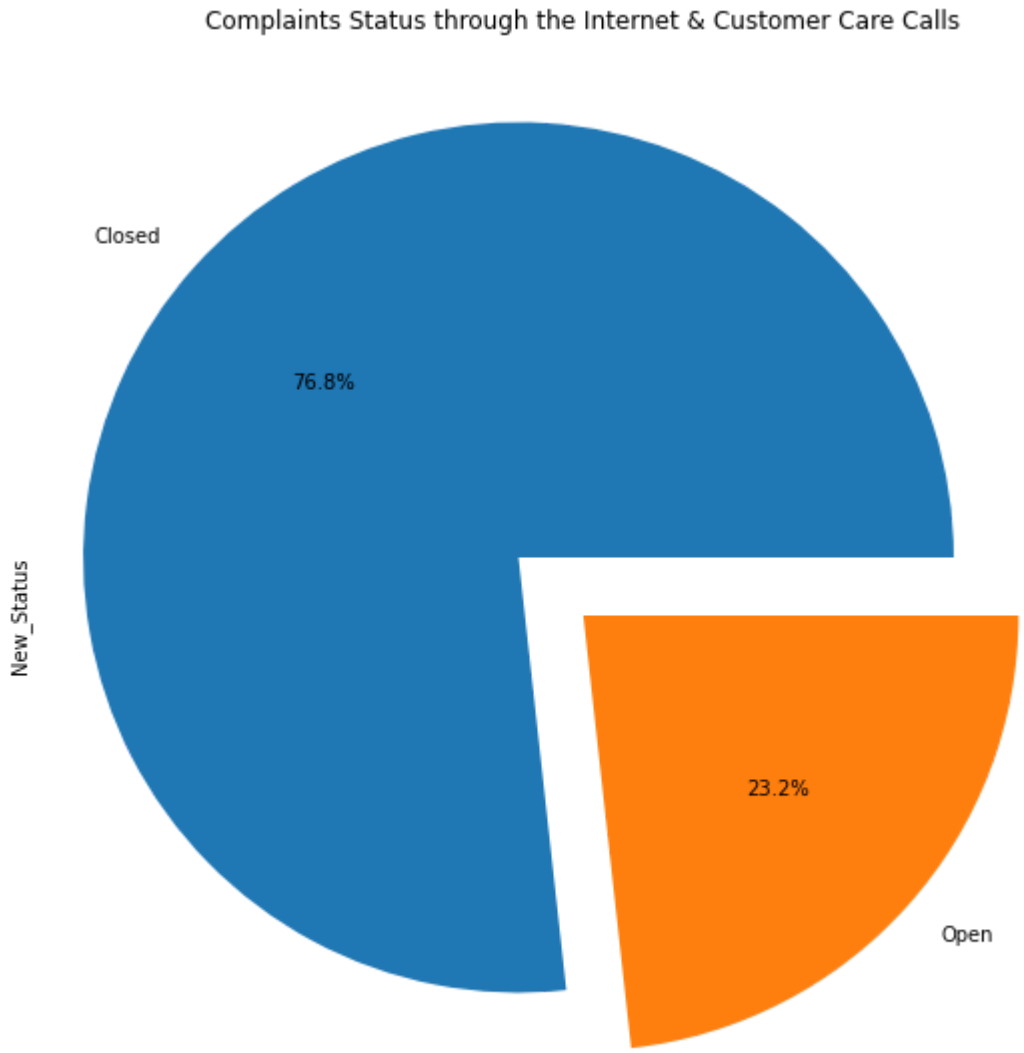
In [31]:
```
dataset['Received Via'].unique()
```

Out[31]:
```
array(['Customer Care Call', 'Internet'], dtype=object)
```

In [32]:
```
dataset.New_Status.value_counts()
```

Out[32]:
```
Closed    1707
Open       517
Name: New_Status, dtype: int64
```

In [33]:
```
myexplode = [0.2, 0]
plt.title('Complaints Status through the Internet & Customer Care Calls\n')
dataset.New_Status.value_counts().plot(kind='pie',explode = myexplode,autopct
```



The percantage of complaints closed till date is 76.5% and the ones that are still open consist 23.4% of total complaints.