```
import pandas as pd
import requests
import zipfile
import io
import datetime as dt
import matplotlib.pyplot as plt
import seaborn as sns
```

Question 1

Approach 1 - Get the url and using zipfile library we can directly unzip and extract all the file in the zip folder

```
# url = 'https://files.consumerfinance.gov/ccdb/complaints.csv.zip'
# response = requests.get(url)

# # Step 2: Extract the zip file
# with zipfile.ZipFile(io.BytesIO(response.content)) as thezip:
#     thezip.extractall()
# df = pd.read_csv('complaints.csv')
```

Approach 2 - Downloading zip file and reading the csv file

```
#Read a csv File
df = pd.read_csv('complaints.csv')
```

```
C:\Users\nithishsha\AppData\Local\Temp\
ipykernel_14040\3510204512.py:2: DtypeWarning: Columns (16) have mixed
types. Specify dtype option on import or set low_memory=False.
  df = pd.read_csv('complaints.csv')
```

```
df.head()# Top 5 rows
```

```
  Date received                                         Product  \
0    2024-03-13                                     Credit card
1    2024-03-14  Credit reporting or other personal consumer re...
2    2023-10-25  Credit reporting or other personal consumer re...
3    2023-10-25                                        Mortgage
4    2024-05-02  Money transfer, virtual currency, or money ser...
```

```
                                  Sub-product  \
0  General-purpose credit card or charge card
1                            Credit reporting
2                            Credit reporting
3                                FHA mortgage
4               Domestic (US) money transfer

                                                Issue  \
0  Advertising and marketing, including promotion...
1              Incorrect information on your report
2                       Improper use of your report
3                        Struggling to pay mortgage
4             Money was not available when promised

                                             Sub-issue  \
0    Didn't receive advertised or promotional terms
1               Information belongs to someone else
2     Reporting company used your report improperly
3  An existing modification, forbearance plan, sh...
4                                                NaN

                        Consumer complaint narrative  \
0  I formally request the removal of an inaccurat...
1                                                NaN
2                                                NaN
3                                                NaN
4                                                NaN

                             Company public response  \
0                                                NaN
1                                                NaN
2  Company has responded to the consumer and the ...
3  Company has responded to the consumer and the ...
4                                                NaN

                                    Company State ZIP code Tags  \
0                           EQUIFAX, INC.    MO    631XX  NaN
1                           EQUIFAX, INC.    PA    19142  NaN
2   TRANSUNION INTERMEDIATE HOLDINGS, INC.    CA    92114  NaN
3  Specialized Loan Servicing Holdings LLC    CA    956XX  NaN
4                             Sigue Corp.    TX    78644  NaN

  Consumer consent provided? Submitted via Date sent to company  \
0          Consent provided           Web           2024-03-13
1      Consent not provided           Web           2024-03-14
2      Consent not provided           Web           2023-10-25
3                     Other           Web           2023-10-25
4                     Other           Web           2024-05-02

      Company response to consumer Timely response? Consumer disputed?
```

```
\
0  Closed with non-monetary relief                Yes                  NaN

1  Closed with non-monetary relief                Yes                  NaN

2           Closed with explanation               Yes                  NaN

3           Closed with explanation               Yes                  NaN

4                       In progress               Yes                  NaN


   Complaint ID
0       8538710
1       8551289
2       7755832
3       7753166
4       8916876
```

```
df.shape #Row and Column Count
```

```
(5243000, 18)
```

```
df.describe(include="all")#summary statistics
```

```
       Date received
Product  \
count        5243000
5243000
unique          4550
21
top       2024-04-24  Credit reporting, credit repair services, or
o...
freq            8214
2163876
mean             NaN
NaN
std              NaN
NaN
min              NaN
NaN
25%              NaN
NaN
50%              NaN
NaN
75%              NaN
NaN
max              NaN
NaN

             Sub-product                                    Issue  \
```

```
count             5007708                                    5242997
unique                 86                                        178
top     Credit reporting  Incorrect information on your report
freq              3160931                                    1534862
mean                  NaN                                        NaN
std                   NaN                                        NaN
min                   NaN                                        NaN
25%                   NaN                                        NaN
50%                   NaN                                        NaN
75%                   NaN                                        NaN
max                   NaN                                        NaN

                                    Sub-issue  \
count                                 4506836
unique                                    272
top     Information belongs to someone else
freq                                  1017156
mean                                      NaN
std                                       NaN
min                                       NaN
25%                                       NaN
50%                                       NaN
75%                                       NaN
max                                       NaN

                              Consumer complaint narrative  \
count                                                1836713
unique                                               1492267
top     In accordance with the Fair Credit Reporting a...
freq                                                    7356
mean                                                     NaN
std                                                      NaN
min                                                      NaN
25%                                                      NaN
50%                                                      NaN
75%                                                      NaN
max                                                      NaN

                                    Company public response
Company  \
count                                                2513137
5243000
unique                                                    11
7220
top     Company has responded to the consumer and the ...  EQUIFAX,
INC.
freq                                                 2262898
1094863
mean                                                     NaN
NaN
```

```
std                                                                 NaN
NaN
min                                                                 NaN
NaN
25%                                                                 NaN
NaN
50%                                                                 NaN
NaN
75%                                                                 NaN
NaN
max                                                                 NaN
NaN

           State ZIP code           Tags Consumer consent provided?  \
count    5197220  5212775         485917                     4201464
unique        63    33657              3                           4
top           FL    XXXXX  Servicemember       Consent not provided
freq      629941   120483         286553                     2099875
mean         NaN      NaN            NaN                         NaN
std          NaN      NaN            NaN                         NaN
min          NaN      NaN            NaN                         NaN
25%          NaN      NaN            NaN                         NaN
50%          NaN      NaN            NaN                         NaN
75%          NaN      NaN            NaN                         NaN
max          NaN      NaN            NaN                         NaN

        Submitted via Date sent to company Company response to consumer
\
count         5243000              5243000                       5242985

unique              7                 4499                             8

top               Web           2024-04-24      Closed with explanation

freq          4690912                 8252                       3473372

mean              NaN                  NaN                           NaN

std               NaN                  NaN                           NaN

min               NaN                  NaN                           NaN

25%               NaN                  NaN                           NaN

50%               NaN                  NaN                           NaN

75%               NaN                  NaN                           NaN

max               NaN                  NaN                           NaN
```

```
       Timely response? Consumer disputed?  Complaint ID
count           5243000              768316  5.243000e+06
unique                2                   2           NaN
top                 Yes                  No           NaN
freq            5184323              619938           NaN
mean                NaN                 NaN  5.206961e+06
std                 NaN                 NaN  2.434952e+06
min                 NaN                 NaN  1.000000e+00
25%                 NaN                 NaN  3.268433e+06
50%                 NaN                 NaN  5.465787e+06
75%                 NaN                 NaN  7.347795e+06
max                 NaN                 NaN  9.030122e+06
```

```
df.describe()#Numerical summary statistics
```

```
       Complaint ID
count  5.243000e+06
mean   5.206961e+06
std    2.434952e+06
min    1.000000e+00
25%    3.268433e+06
50%    5.465787e+06
75%    7.347795e+06
max    9.030122e+06
```

```
df.columns# Column Header
```

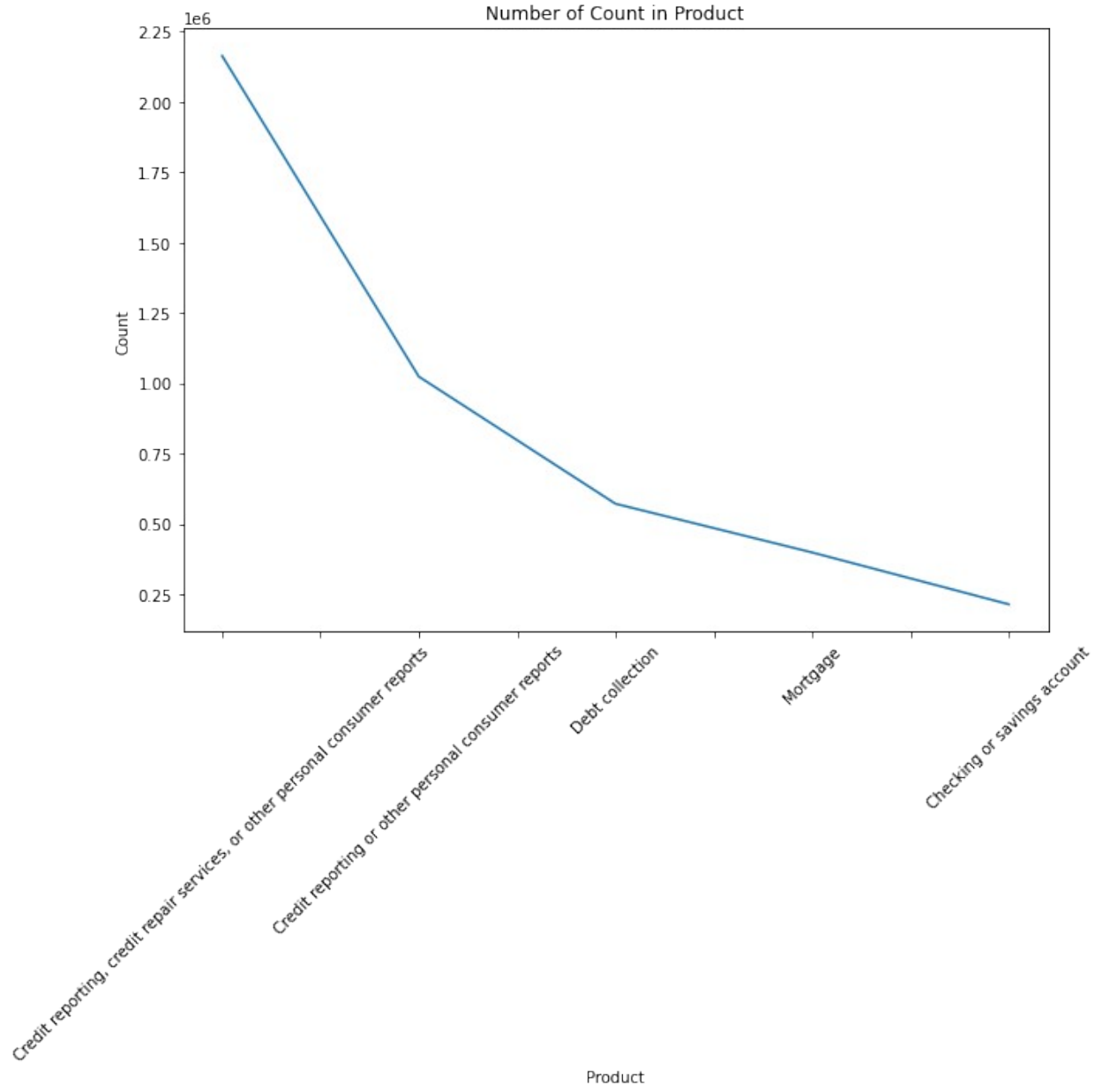
```
Index(['Date received', 'Product', 'Sub-product', 'Issue', 'Sub-
issue',
       'Consumer complaint narrative', 'Company public response',
'Company',
       'State', 'ZIP code', 'Tags', 'Consumer consent provided?',
       'Submitted via', 'Date sent to company', 'Company response to
consumer',
       'Timely response?', 'Consumer disputed?', 'Complaint ID'],
      dtype='object')
```

```
#Product Count
Product=df["Product"].value_counts()
#Sub-Product Count
Sub_Product=df["Sub-product"].value_counts()
#State Count
State=df["State"].value_counts()
```

Vizualization

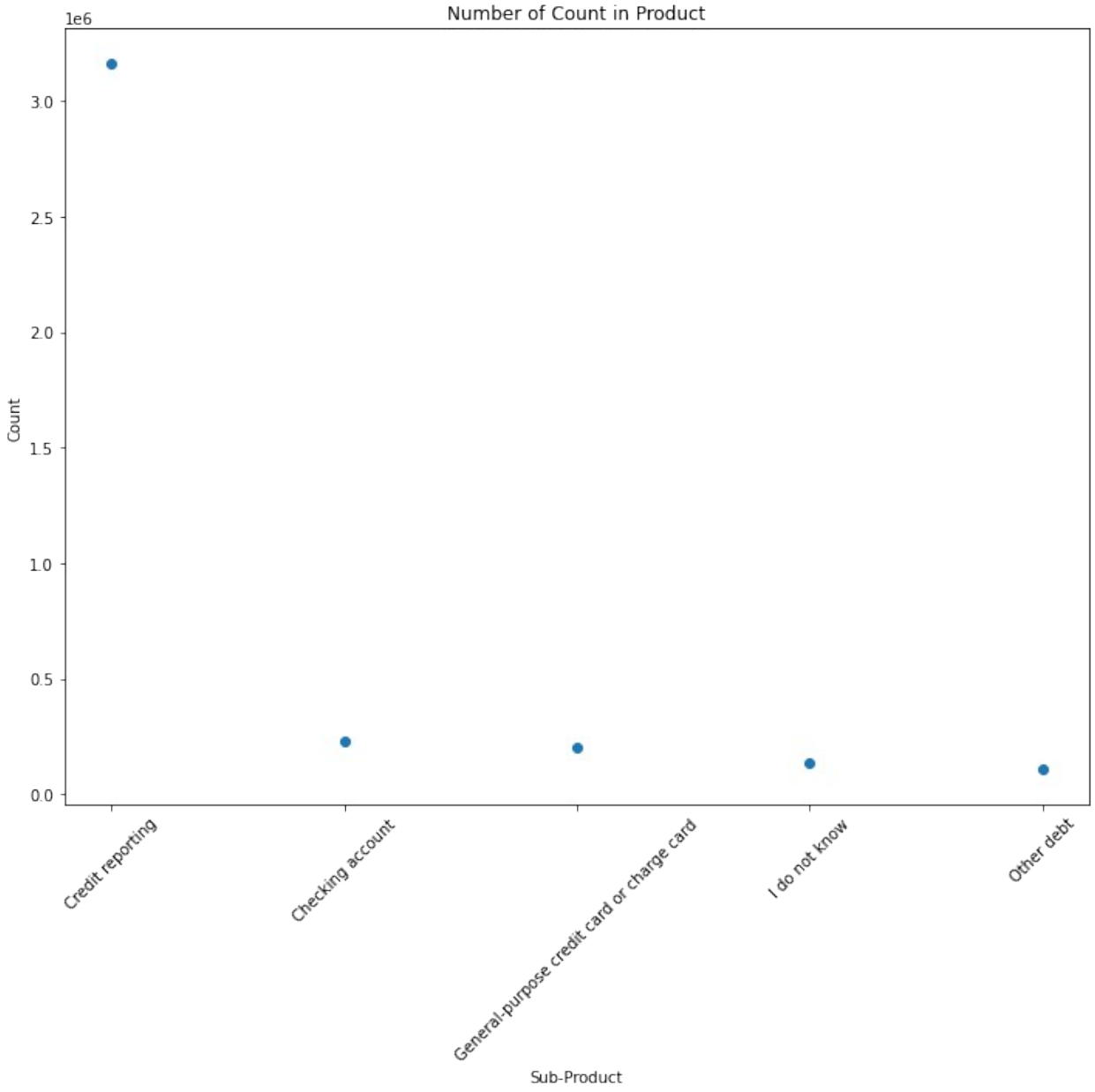
```
Product=Product.head()
# Plot the data
plt.figure(figsize=(10, 10))
```

```
Product.plot(kind='line',x='index', y='values')
plt.title('Number of Count in Product')
plt.xlabel('Product')# X-Axis
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```




```
Sub_Product=Sub_Product.head()
plt.figure(figsize=(10, 10))
plt.scatter(x=Sub_Product.index, y=Sub_Product.values)
```

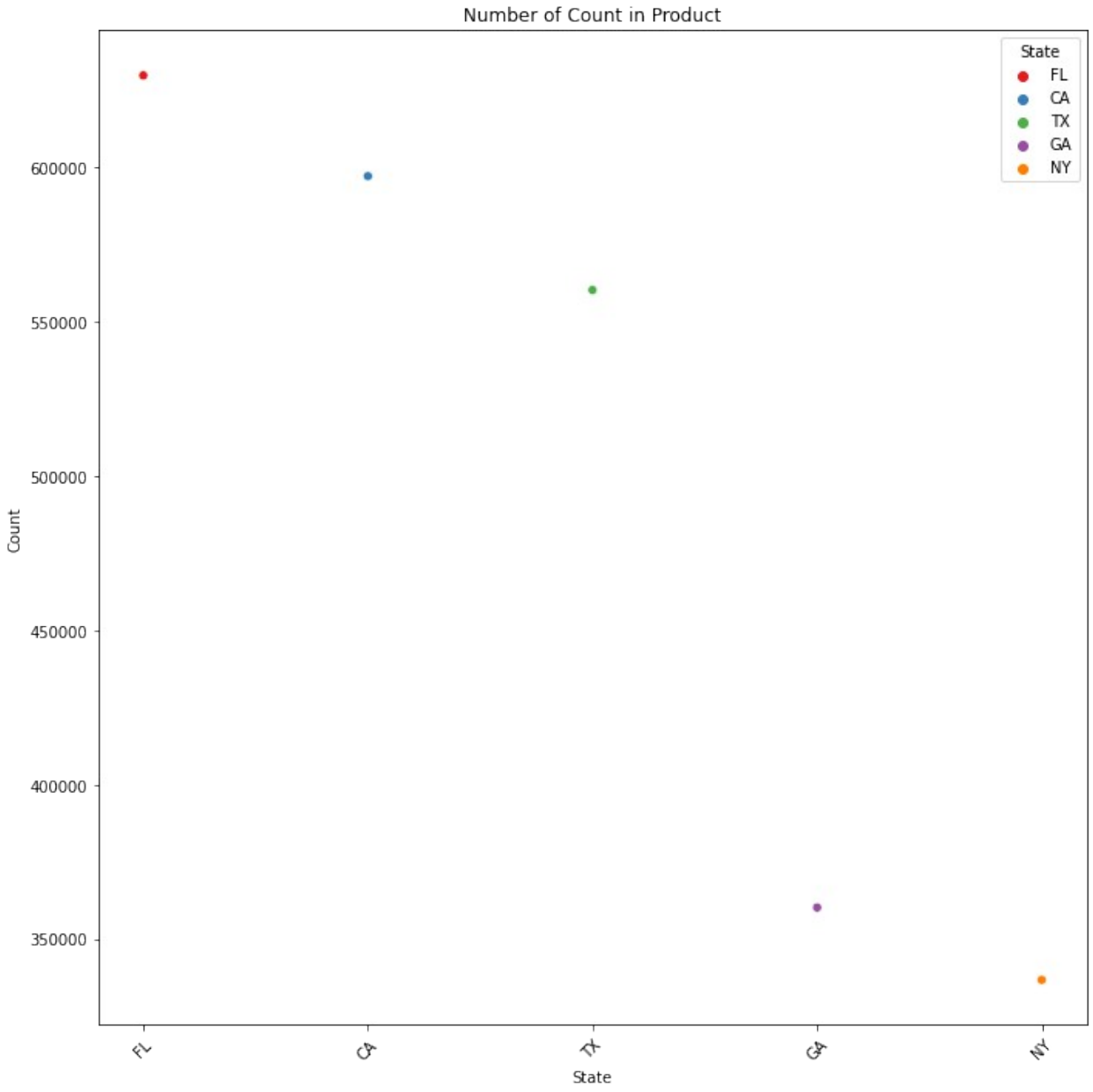
```
plt.title('Number of Count in Sub-Product')
plt.xlabel('Sub-Product')
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```




```
State=State.head()
plt.figure(figsize=(10, 10))
plt.figure(figsize=(10, 10))
sns.scatterplot(data=State, x=State.index, y=State.values,
```

```
hue='State', palette='Set1')
plt.title('Number of Count in Product')
plt.xlabel('State')
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()
```

```
<Figure size 720x720 with 0 Axes>
```




```
#Write it in a excel
with pd.ExcelWriter("Top_Compliant_on_Product_State.xlsx")as writer:
```

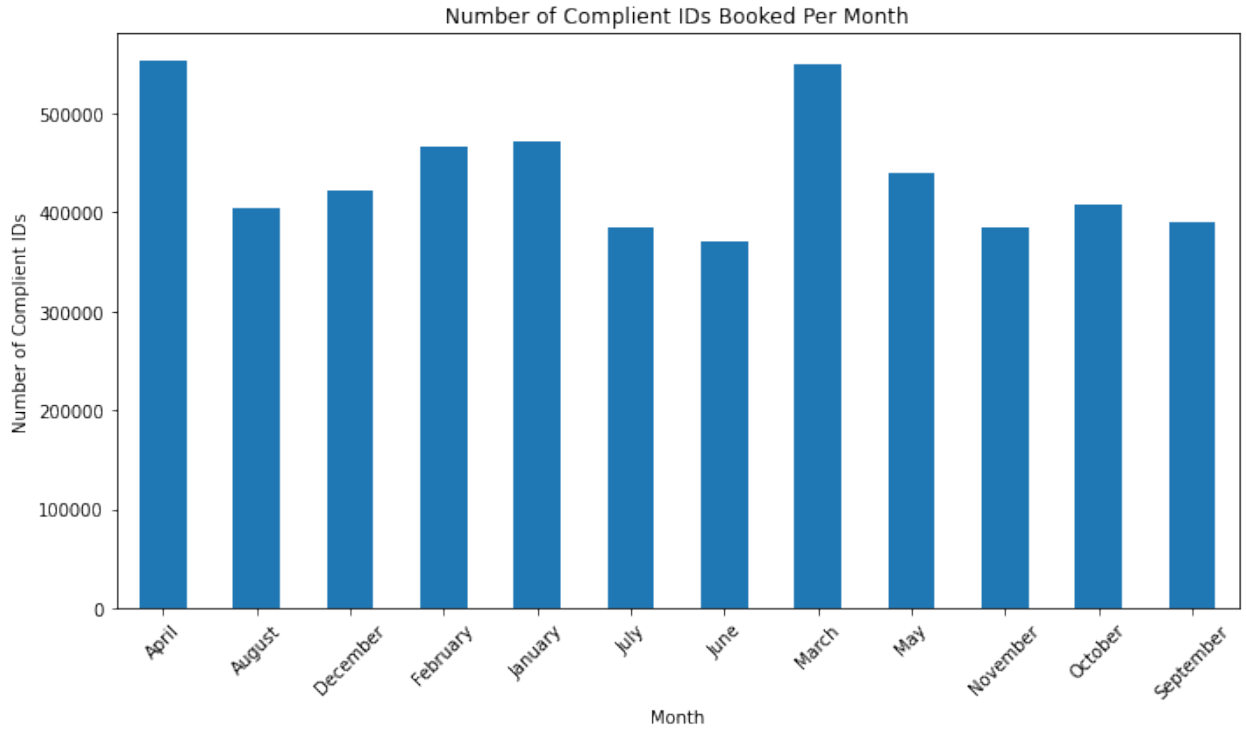
```
    Product.to_excel(writer,sheet_name="Product",index=False)
    Sub_Product.to_excel(writer,sheet_name="Sub-Product",index=False)
    State.to_excel(writer,sheet_name="State",index=False)

# We Can Analysis which month the company get the Higher Compliant
df["Month"] =pd.to_datetime(df['Date sent to
company']).dt.strftime("%B")
monthly_counts = df.groupby('Month')['Complaint ID'].count()

# Plot the data
plt.figure(figsize=(10, 6))
monthly_counts.plot(kind='bar')

# Customize the plot
plt.title('Number of Complient IDs Booked Per Month')
plt.xlabel('Month')# X-Axis
plt.ylabel('Number of Complient IDs')
plt.xticks(rotation=45)
plt.tight_layout()

# Show the plotw
plt.show()
```

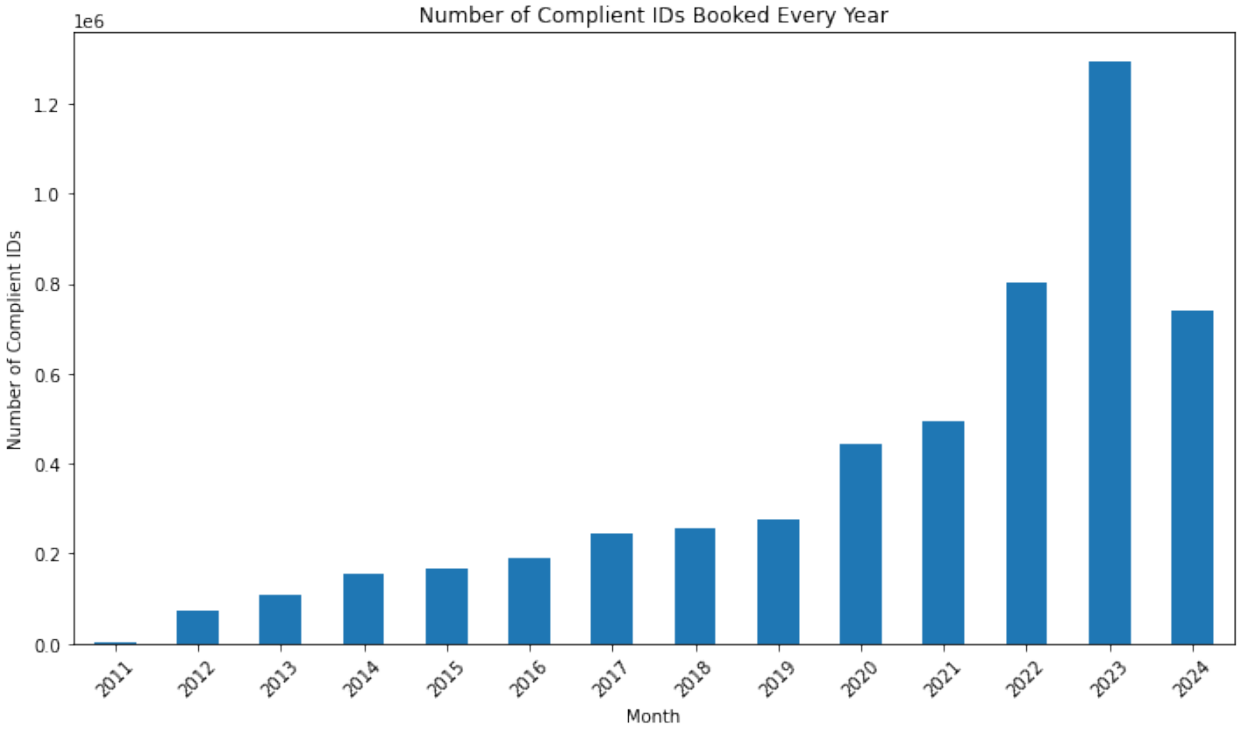



```
# We Can Also Analysis which Year the company get the Higher Compliant
df["Year"] =pd.to_datetime(df['Date sent to
company']).dt.strftime("%Y")
monthly_counts = df.groupby('Year')['Complaint ID'].count()
```

```
# Plot the data
plt.figure(figsize=(10, 6))
monthly_counts.plot(kind='bar')

# Customize the plot
plt.title('Number of Complient IDs Booked Every Year')
plt.xlabel('Month')# X-Axis
plt.ylabel('Number of Complient IDs')
plt.xticks(rotation=45)
plt.tight_layout()

# Show the plotw
plt.show()
```



Question 2

Given an unsorted array of integers, find the length of the longest continuous increasing subsequence (subarray).

```
def find_length(nums):
    if not nums:
        return 0
    max_length = 1
    current_length = 1
    for i in range(1, len(nums)):
        if nums[i] > nums[i - 1]:
            current_length += 1
        else:
            if current_length > max_length:
                max_length = current_length
            current_length = 1
    if current_length > max_length:
        max_length = current_length

    return max_length

find_length([1, 3, 5, 4, 7])# Example One
```

```
3
```

```
find_length([2, 2, 2, 2, 2])#Example Two
```

```
1
```

```
find_length([1, 2, 7, 9, 2])# Some Extra example
```

```
4
```

```
find_length([3, 5, 10, 99, 452,567,890,345])# Another Example
```

```
7
```

Question 3

Given a list of non negative integers, arrange them such that they form the largest number.

```
def largestNumber(nums):
    nums_str = list(map(str, nums))
    nums_str.sort(key=lambda x: x*10, reverse=True)
    if nums_str[0] == '0':
        return '0'
    return ''.join(nums_str)

largestNumber([10, 2])

'210'

largestNumber([3, 30, 34, 5, 983,3555,355])

'9835355535534330'

largestNumber([3, 30, 34, 5, 9])

'9534330'

largestNumber([1,2,34,55,676,88])

'88676553421'
```

Question 4

Store all the "servlet-name", and "servlet-class" to a csv file from the attached sample_json.json file using Python

```
import json
import csv

with open('DT A1 sample_json.json') as json_file:
    data = json.load(json_file)

with open('servlets.csv', mode='w', newline='') as csv_file:
    writer = csv.writer(csv_file)
```

```
    writer.writerow(["servlet-name", "servlet-class"])
    for servlet in data["web-app"]["servlet"]:
        writer.writerow([servlet["servlet-name"], servlet["servlet-
class"]])

#Reading the csv file to view the data
data=pd.read_csv("servlets.csv")
data
```

	servlet-name	servlet-class
0	cofaxCDS	org.cofax.cds.CDSServlet
1	cofaxEmail	org.cofax.cds.EmailServlet
2	cofaxAdmin	org.cofax.cds.AdminServlet
3	fileServlet	org.cofax.cds.FileServlet
4	cofaxTools	org.cofax.cms.CofaxToolsServlet