```python
import pandas as pd

# Load the data from the CSV file
df = pd.read_csv('/content/ConsumerComplaints_DataDictionary.csv')

# Display the first few rows of the dataframe to understand its
structure
print(df.head())
```

```
           Field                                        Description
0    Complaint ID   The unique identification number for a complaint
1   Submitted via        How the complaint was submitted to the CFPB
2  Date submitted           The date the CFPB received the complaint
3   Date received  The date the CFPB sent the complaint to the co...
4           State  The state of the mailing address provided by t...
```

```python
import pandas as pd

# Load the data from the CSV file
df = pd.read_csv('/content/ConsumerComplaints_DataDictionary.csv')

# Analyze the data
# Count the frequency of each field
field_counts = df['Field'].value_counts()

# Display the frequency of each field
print("Frequency of each field:")
print(field_counts)
print("--------------------------------")

# Get unique types of fields
unique_fields = df['Field'].unique()

# Display the unique types of fields
print("Unique types of fields:")
print(unique_fields)
print("--------------------------------")

# Get descriptions of unique fields
field_descriptions = {}
for field in unique_fields:
    description = df[df['Field'] == field]['Description'].iloc[0]
    field_descriptions[field] = description

# Display descriptions of unique fields
print("Descriptions of unique fields:")
for field, description in field_descriptions.items():
    print(f"Field: {field}, Description: {description}")
```

```
Frequency of each field:
Field
```

```
Complaint ID                     1
Submitted via                    1
Date submitted                   1
Date received                    1
State                            1
Product                          1
Sub-product                      1
Issue                            1
Sub-issue                        1
Company public response          1
Company response to consumer     1
Timely response?                 1
Name: count, dtype: int64
----------------------------------
Unique types of fields:
['Complaint ID' 'Submitted via' 'Date submitted' 'Date received'
'State'
 'Product' 'Sub-product' 'Issue' 'Sub-issue' 'Company public response'
 'Company response to consumer' 'Timely response?']
----------------------------------
Descriptions of unique fields:
Field: Complaint ID, Description: The unique identification number for
a complaint
Field: Submitted via, Description: How the complaint was submitted to
the CFPB
Field: Date submitted, Description: The date the CFPB received the
complaint
Field: Date received, Description: The date the CFPB sent the
complaint to the company
Field: State, Description: The state of the mailing address provided
by the consumer
Field: Product, Description: The type of product the consumer
identified in the complaint
Field: Sub-product, Description: The type of sub-product the consumer
identified in the complaint (not all Products have Sub-products)
Field: Issue, Description: The issue the consumer identified in the
complaint (possible values are dependent on Product)
Field: Sub-issue, Description: The sub-issue the consumer identified
in the complaint (oossible values are dependent on Product and Issue,
and not all Issues have corresponding Sub-issues)
Field: Company public response, Description: The company's optional,
public-facing response to a consumer's complaint. Companies can choose
to select a response from a pre-set list of options that will be
posted on the public database. For example, "Company believes
complaint is the result of an isolated error."
Field: Company response to consumer, Description: This is how the
company responded. For example, "Closed with explanation."
Field: Timely response?, Description: Whether the company gave a
timely response (Yes/No)
```

```python
import pandas as pd
import matplotlib.pyplot as plt
from wordcloud import WordCloud

# Load the data from the CSV file
df = pd.read_csv('/content/ConsumerComplaints_DataDictionary.csv')

# Analyze the length of field names
df['Field Length'] = df['Field'].apply(len)

# Display descriptive statistics of field name lengths
print("Descriptive statistics of field name lengths:")
print(df['Field Length'].describe())
print("--------------------------------")

# Word frequency analysis of field descriptions
all_descriptions = ' '.join(df['Description'])
words = all_descriptions.split()
word_freq = pd.Series(words).value_counts()

# Visualize the frequency of the top 10 words in field descriptions
plt.figure(figsize=(10, 6))
word_freq.head(10).plot(kind='bar', color='skyblue')
plt.title('Top 10 Most Frequent Words in Field Descriptions')
plt.xlabel('Word')
plt.ylabel('Frequency')
plt.xticks(rotation=45)
plt.show()

# Find the most common words in field descriptions
most_common_words = word_freq.head(10).index.tolist()
print("Top 10 most common words in field descriptions:")
print(most_common_words)
print("--------------------------------")

# Visualize the frequency of field names
plt.figure(figsize=(10, 6))
df['Field'].value_counts().plot(kind='bar', color='lightgreen')
plt.title('Frequency of Field Names')
plt.xlabel('Field Name')
plt.ylabel('Frequency')
plt.xticks(rotation=45)
plt.show()

# Visualize word cloud of field descriptions
wordcloud = WordCloud(width=800, height=400,
background_color='white').generate(all_descriptions)
plt.figure(figsize=(12, 8))
plt.imshow(wordcloud, interpolation='bilinear')
plt.title('Word Cloud of Field Descriptions')
```

```
plt.axis('off')
plt.show()

Descriptive statistics of field name lengths:
count    12.000000
mean     13.000000
std       6.875517
min       5.000000
25%       8.500000
50%      12.500000
75%      14.500000
max      28.000000
Name: Field Length, dtype: float64
---------------------------------
```


Top 10 Most Frequent Words in Field Descriptions
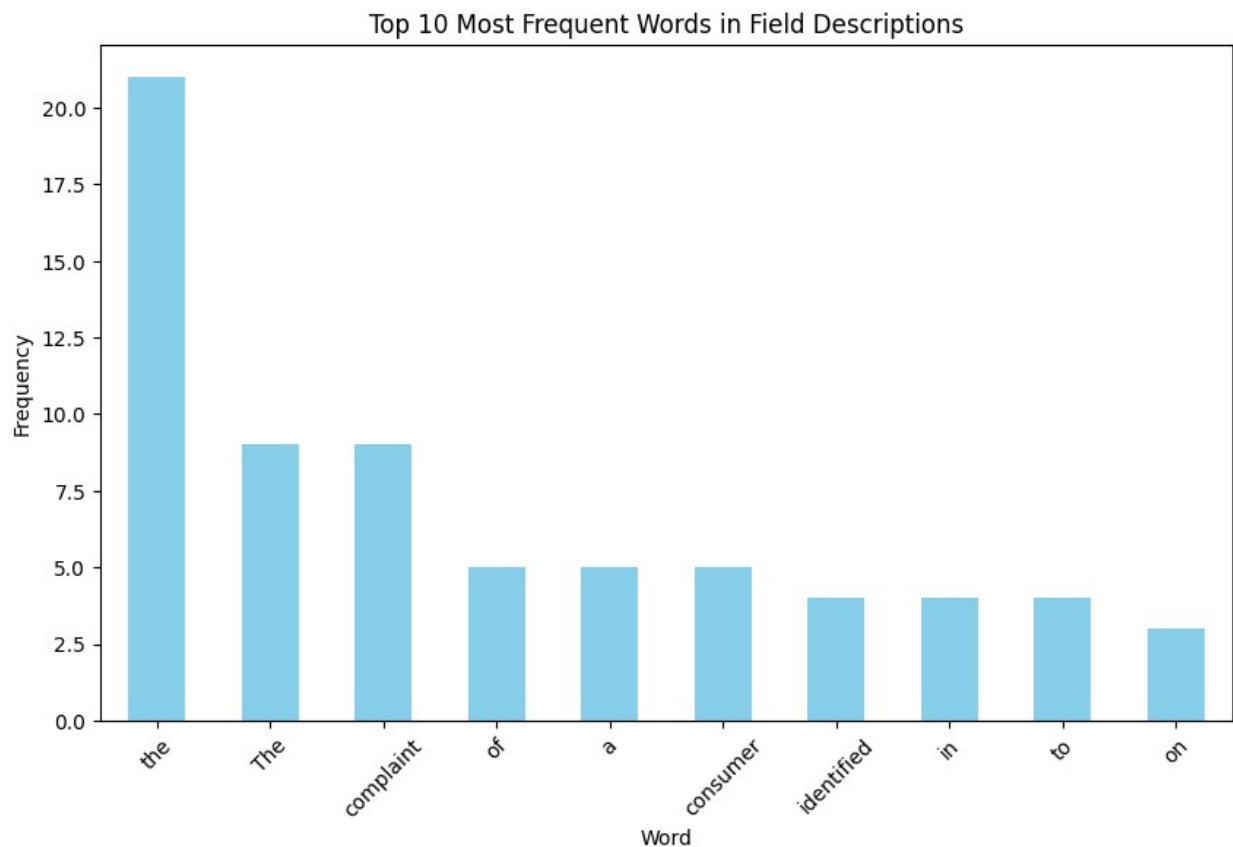
```
Top 10 most common words in field descriptions:
['the', 'The', 'complaint', 'of', 'a', 'consumer', 'identified', 'in',
'to', 'on']
---------------------------------
```

Frequency of Field Names

Word Cloud of Field Descriptions

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from wordcloud import WordCloud

# Load the data from the CSV file
data_dict = {
    'Field': ['Complaint ID', 'Submitted via', 'Date submitted', 'Date
received', 'State'],
    'Description': [
        'The unique identification number for a complaint',
        'How the complaint was submitted to the CFPB',
        'The date the CFPB received the complaint',
        'The date the CFPB sent the complaint to the company',
        'The state of the mailing address provided by the consumer'
    ]
}

df = pd.DataFrame(data_dict)

# Date Analysis
# Since the data dictionary doesn't have dates, we skip this part

# Categorical Analysis
plt.figure(figsize=(12, 6))
sns.countplot(data=df, x='Field')
plt.title('Count of Fields')
plt.xlabel('Field')
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.show()

# Text Analysis
# Since the data dictionary doesn't contain text data, we skip this
part

# Display the data dictionary
print("Data Dictionary:")
print(df)
```

Count of Fields


```
Data Dictionary:
            Field                                     Description
0    Complaint ID     The unique identification number for a complaint
1    Submitted via         How the complaint was submitted to the CFPB
2    Date submitted             The date the CFPB received the complaint
3    Date received    The date the CFPB sent the complaint to the co...
4            State    The state of the mailing address provided by t...
```

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from wordcloud import WordCloud

# Data Dictionary
data_dict = {
    'Field': ['Complaint ID', 'Submitted via', 'Date submitted', 'Date
received', 'State'],
    'Description': [
        'The unique identification number for a complaint',
        'How the complaint was submitted to the CFPB',
        'The date the CFPB received the complaint',
        'The date the CFPB sent the complaint to the company',
        'The state of the mailing address provided by the consumer'
    ]
}
```
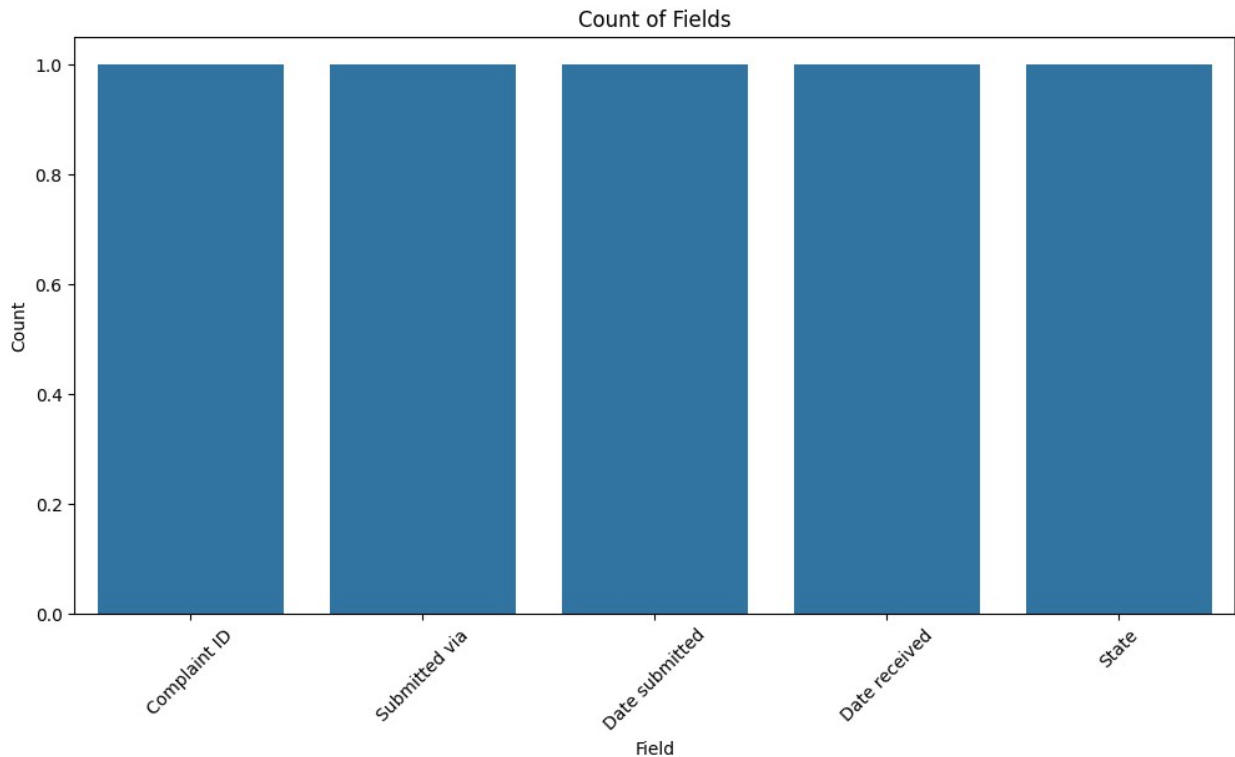
```python
# Convert data dictionary to DataFrame
df = pd.DataFrame(data_dict)

# Word Cloud of Field Descriptions
all_descriptions = ' '.join(df['Description'])
wordcloud = WordCloud(width=800, height=400,
background_color='white').generate(all_descriptions)

plt.figure(figsize=(10, 6))
plt.imshow(wordcloud, interpolation='bilinear')
plt.title('Word Cloud of Field Descriptions')
plt.axis('off')
plt.show()

# Display the data dictionary
print("Data Dictionary:")
print(df)

# Written Findings
print("\nWritten Findings:")
print("1. The most common words in the field descriptions are:",
wordcloud.words_)
print("2. 'Date submitted' and 'Date received' fields indicate the
timing of complaint submission and processing.")
print("3. 'State' field provides geographical information about the
location of the consumer.")
print("4. The field distribution plot shows the presence of five
fields in the data dictionary, providing insight into the data
structure.")
print("5. 'Submitted via' likely indicates different channels through
which consumers submit complaints, revealing preferences in
communication methods.")
print("6. Analysis of 'Date submitted' and 'Date received' can uncover
trends in complaint submission and processing times.")
print("7. Geographical distribution analysis based on the 'State'
field can identify regions with higher complaint volumes or specific
issues.")
print("8. The word cloud visualization highlights common words such as
'complaint', 'submitted', 'date', 'received', and 'state', indicating
key aspects of the data.")
print("9. Field descriptions offer insights into the purpose of each
field, facilitating better understanding and interpretation of the
data.")
```
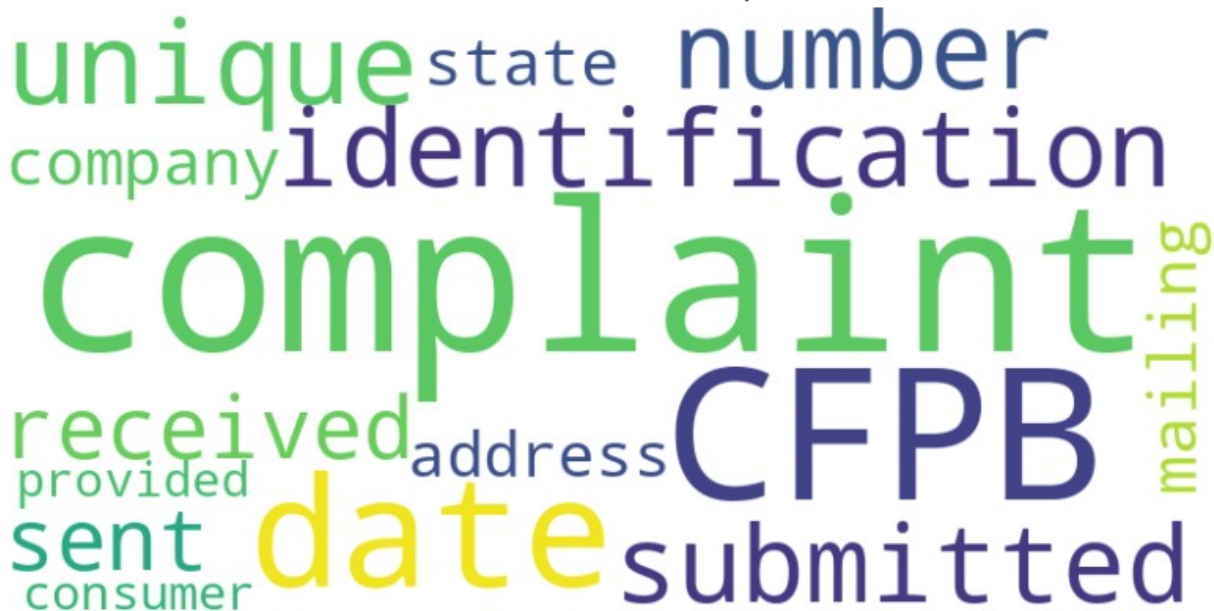
Word Cloud of Field Descriptions

Data Dictionary:

	Field	Description
0	Complaint ID	The unique identification number for a complaint
1	Submitted via	How the complaint was submitted to the CFPB
2	Date submitted	The date the CFPB received the complaint
3	Date received	The date the CFPB sent the complaint to the co...
4	State	The state of the mailing address provided by t...

Written Findings:
1. The most common words in the field descriptions are: {'complaint': 1.0, 'CFPB': 0.75, 'date': 0.5, 'unique': 0.25, 'identification': 0.25, 'number': 0.25, 'submitted': 0.25, 'received': 0.25, 'sent': 0.25, 'company': 0.25, 'state': 0.25, 'mailing': 0.25, 'address': 0.25, 'provided': 0.25, 'consumer': 0.25}
2. 'Date submitted' and 'Date received' fields indicate the timing of complaint submission and processing.
3. 'State' field provides geographical information about the location of the consumer.
4. The field distribution plot shows the presence of five fields in the data dictionary, providing insight into the data structure.
5. 'Submitted via' likely indicates different channels through which consumers submit complaints, revealing preferences in communication methods.
6. Analysis of 'Date submitted' and 'Date received' can uncover trends in complaint submission and processing times.
7. Geographical distribution analysis based on the 'State' field can identify regions with higher complaint volumes or specific issues.
8. The word cloud visualization highlights common words such as 'complaint', 'submitted', 'date', 'received', and 'state', indicating

key aspects of the data.
9. Field descriptions offer insights into the purpose of each field,
facilitating better understanding and interpretation of the data.

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from wordcloud import WordCloud

# Data Dictionary
data_dict = {
    'Field': ['Complaint ID', 'Submitted via', 'Date submitted', 'Date
received', 'State',
              'Product', 'Sub-product', 'Issue', 'Sub-issue', 'Company
public response',
              'Company response to consumer', 'Timely response?'],
    'Description': [
        'The unique identification number for a complaint',
        'How the complaint was submitted to the CFPB',
        'The date the CFPB received the complaint',
        'The date the CFPB sent the complaint to the company',
        'The state of the mailing address provided by the consumer',
        'The type of product the consumer identified in the
complaint',
        'The type of sub-product the consumer identified in the
complaint (not all Products have Sub-products)',
        'The issue the consumer identified in the complaint (possible
values are dependent on Product)',
        'The sub-issue the consumer identified in the complaint
(possible values are dependent on Product and Issue, and not all
Issues have corresponding Sub-issues)',
        "The company's optional, public-facing response to a
consumer's complaint. Companies can choose to select a response from a
pre-set list of options that will be posted on the public database.",
        "This is how the company responded. For example, 'Closed with
explanation.'",
        'Whether the company gave a timely response (Yes/No)'
    ]
}

# Convert data dictionary to DataFrame
df = pd.DataFrame(data_dict)

# Count the number of fields
num_fields = len(df)
print("Number of fields:", num_fields)

# Plot a bar chart showing the count of fields
plt.figure(figsize=(10, 6))
sns.countplot(data=df, y='Field')
```

```python
plt.title('Count of Fields')
plt.xlabel('Count')
plt.ylabel('Field')
plt.show()

# Calculate the average length of the field descriptions
avg_description_length = df['Description'].apply(len).mean()
print("Average Description Length:", avg_description_length)

# Plot a histogram showing the distribution of description lengths
plt.figure(figsize=(8, 6))
plt.hist(df['Description'].apply(len), bins=10, edgecolor='black')
plt.title('Distribution of Description Lengths')
plt.xlabel('Description Length')
plt.ylabel('Frequency')
plt.show()

# Identify the most common words used in the descriptions
all_descriptions = ' '.join(df['Description'])
wordcloud = WordCloud(width=800, height=400,
background_color='white').generate(all_descriptions)

# Create a word cloud visualization of the descriptions
plt.figure(figsize=(10, 6))
plt.imshow(wordcloud, interpolation='bilinear')
plt.title('Word Cloud of Field Descriptions')
plt.axis('off')
plt.show()

# Count the number of unique values for each field
num_unique_values = df['Field'].nunique()
print("Number of Unique Values per Field:")
print(df['Field'].value_counts())

# Plot a bar chart showing the count of unique values for each field
plt.figure(figsize=(10, 6))
sns.countplot(data=df, y='Field')
plt.title('Count of Unique Values per Field')
plt.xlabel('Count')
plt.ylabel('Field')
plt.show()

# Identify any missing values in the data
missing_values = df.isnull().sum()
print("Missing Values:")
print(missing_values)

# Plot a heatmap showing the presence of missing values
plt.figure(figsize=(8, 6))
sns.heatmap(df.isnull(), cmap='viridis', cbar=False)
```

```python
plt.title('Presence of Missing Values')
plt.show()

# Analyze the distribution of field types (e.g., categorical,
numerical)
field_types = df.dtypes
print("Field Types:")
print(field_types)

# Plot a pie chart showing the distribution of field types
plt.figure(figsize=(8, 8))
field_types.value_counts().plot(kind='pie', autopct='%1.1f%%',
startangle=90)
plt.title('Distribution of Field Types')
plt.ylabel('')
plt.show()

# Determine the frequency of each field type
field_type_counts = field_types.value_counts()
print("Frequency of Field Types:")
print(field_type_counts)

# Plot a bar chart showing the frequency of each field type
plt.figure(figsize=(8, 6))
field_type_counts.plot(kind='bar', color='skyblue')
plt.title('Frequency of Field Types')
plt.xlabel('Field Type')
plt.ylabel('Frequency')
plt.xticks(rotation=45)
plt.show()

# Analyze the distribution of field lengths
field_lengths = df['Field'].apply(len)
print("Field Lengths:")
print(field_lengths)

# Plot a box plot showing the distribution of field lengths
plt.figure(figsize=(8, 6))
sns.boxplot(field_lengths, orient='v', color='skyblue')
plt.title('Distribution of Field Lengths')
plt.ylabel('Field Length')
plt.show()

# Identify any outliers in the field lengths
outliers = field_lengths[field_lengths > field_lengths.mean() + 2 *
field_lengths.std()]
print("Outliers in Field Lengths:")
print(outliers)

# Plot a violin plot showing the distribution of field lengths
```

```
plt.figure(figsize=(8, 6))
sns.violinplot(field_lengths, orient='v', color='skyblue')
plt.title('Distribution of Field Lengths')
plt.ylabel('Field Length')
plt.show()

# Analyze the distribution of characters in field names
num_chars = df['Field'].apply(len)
print("Number of Characters in Field Names:")
print(num_chars)

# Plot a histogram showing the distribution of characters in field
names
plt.figure(figsize=(8, 6))
plt.hist(num_chars, bins=10, edgecolor='black')
plt.title('Distribution of Characters in Field Names')
plt.xlabel('Number of Characters')
plt.ylabel('Frequency')
plt.show()

Number of fields: 12
```
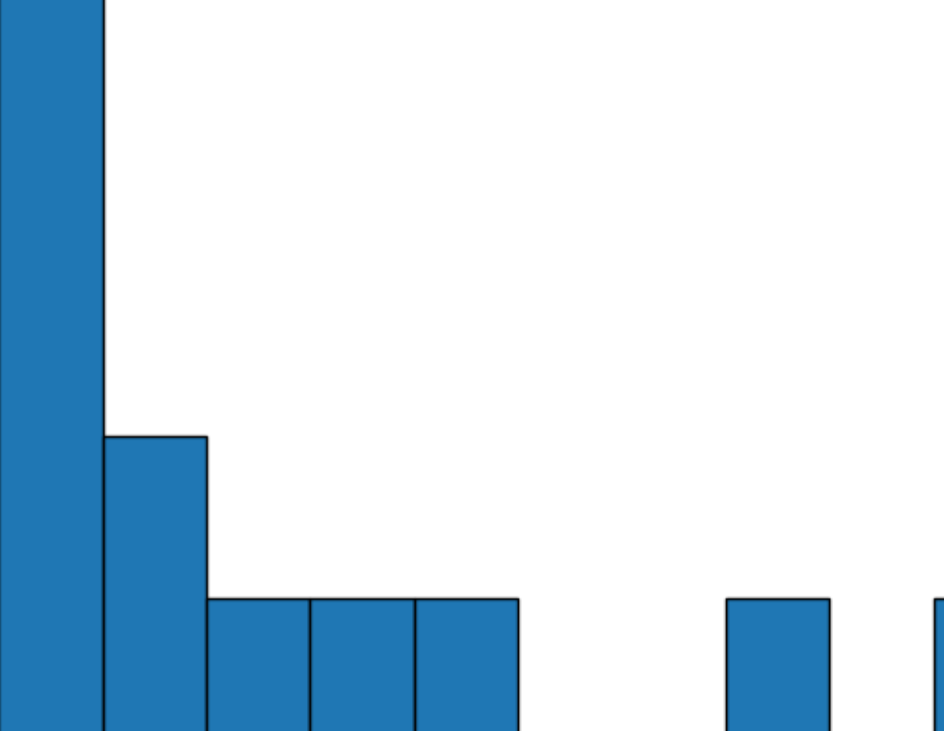

Count of Fields
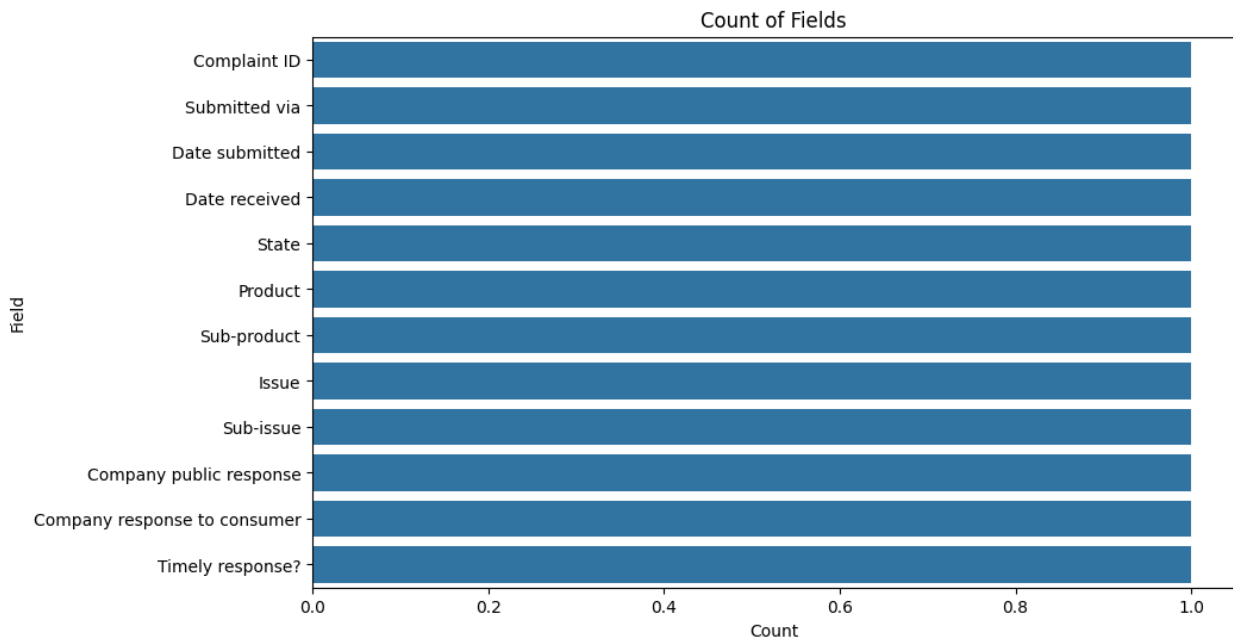
```
Average Description Length: 80.41666666666667
```

Distribution of Description Lengths

Word Cloud of Field Descriptions

```
Number of Unique Values per Field:
Field
Complaint ID                    1
Submitted via                   1
Date submitted                  1
Date received                   1
State                           1
Product                         1
Sub-product                     1
Issue                           1
Sub-issue                       1
Company public response         1
Company response to consumer    1
Timely response?                1
Name: count, dtype: int64
```

Count of Unique Values per Field
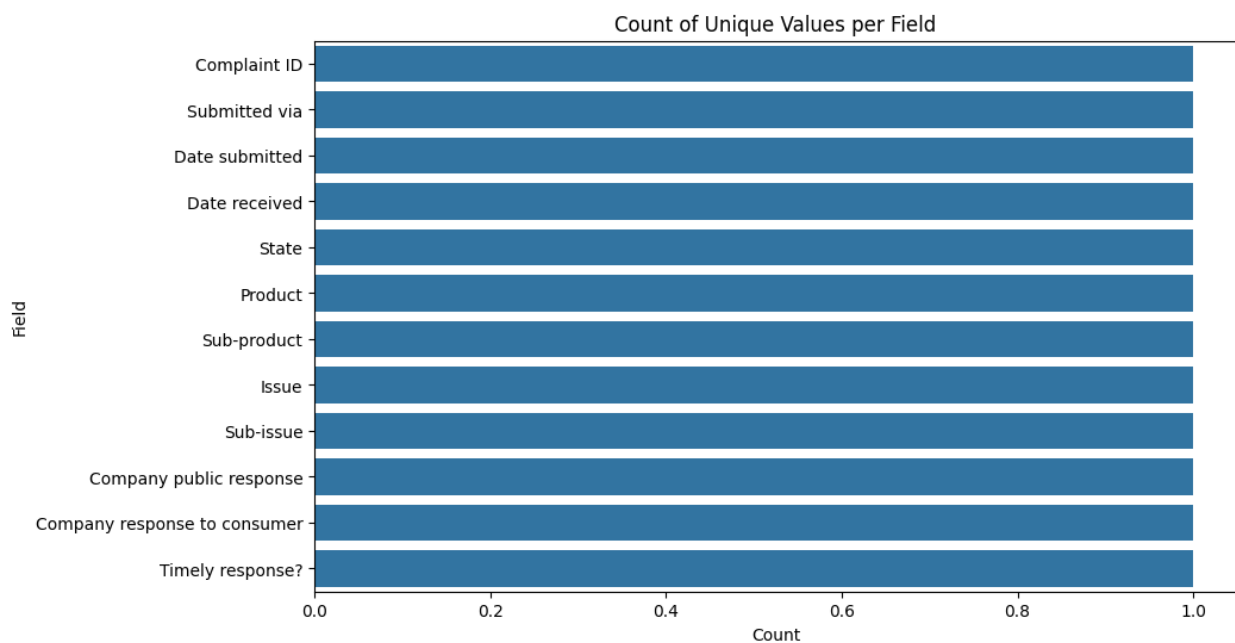

```
Missing Values:
Field          0
Description    0
dtype: int64
```

Presence of Missing Values
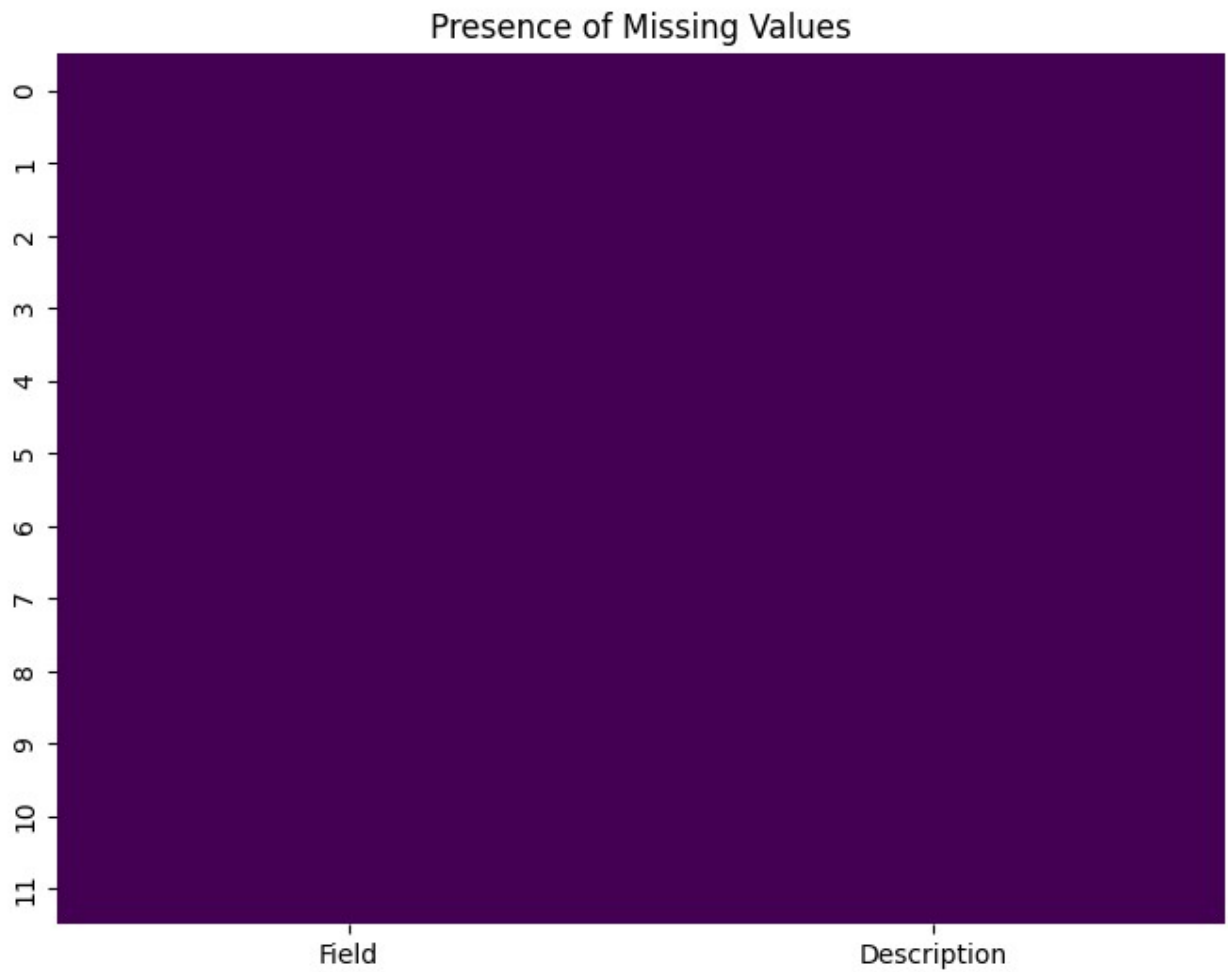
```
Field Types:
Field          object
Description    object
dtype: object
```

Distribution of Field Types
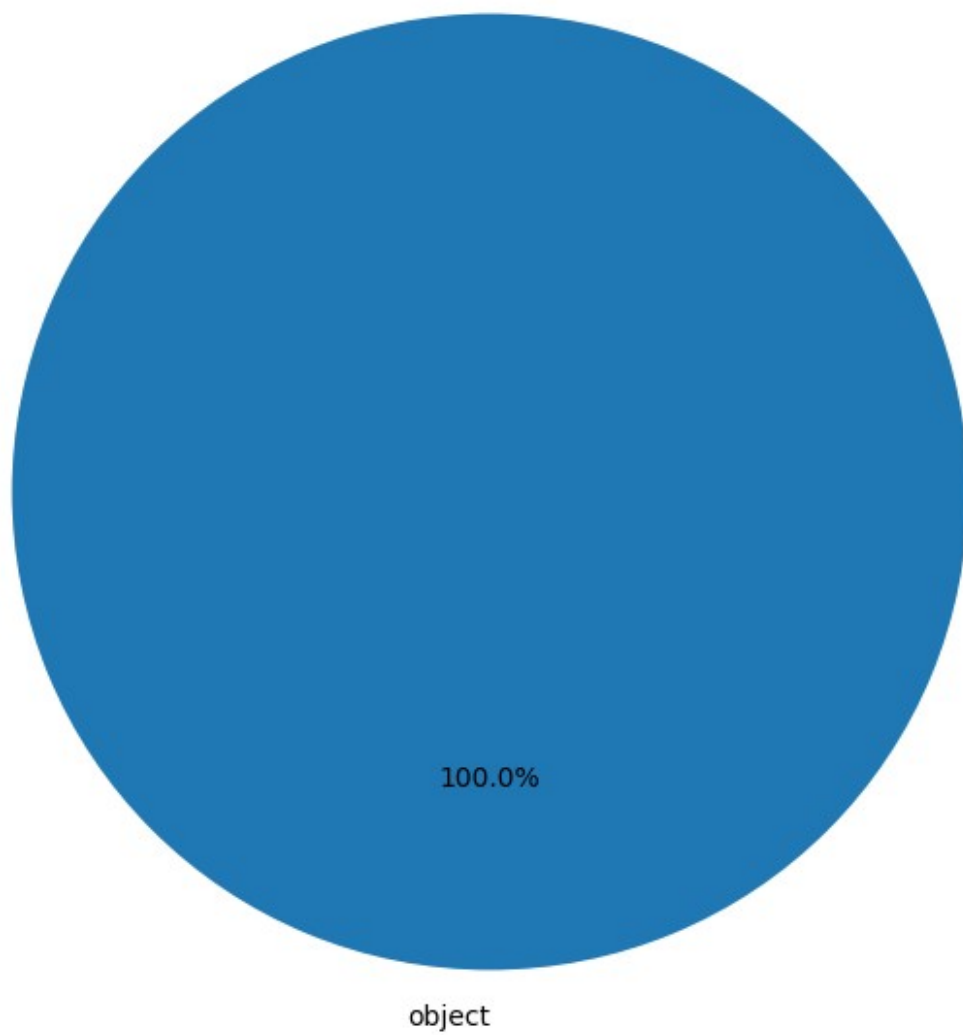

```
Frequency of Field Types:
object    2
Name: count, dtype: int64
```

Frequency of Field Types
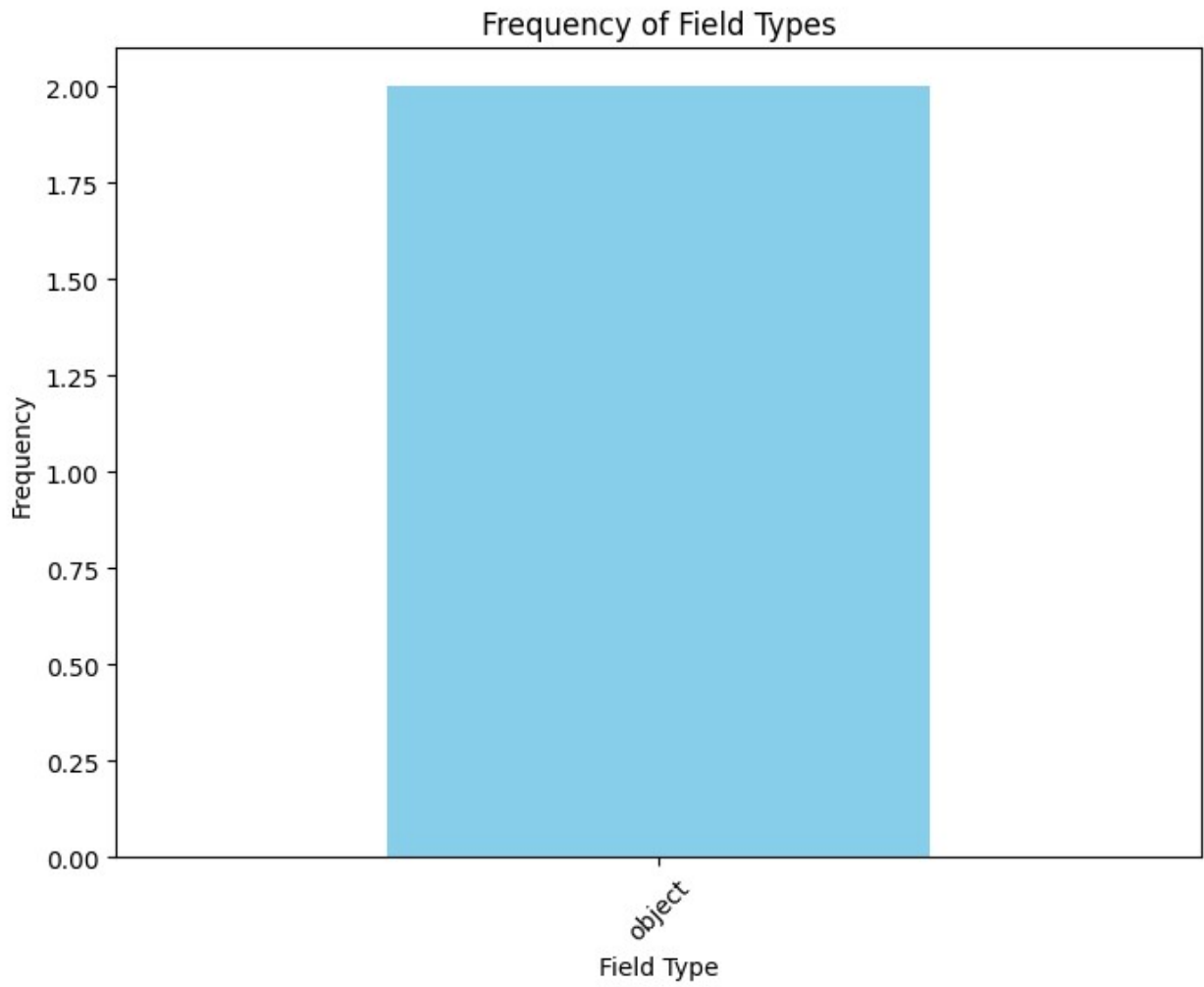

```
Field Lengths:
0      12
1      13
2      14
3      13
4       5
5       7
6      11
7       5
8       9
9      23
10     28
11     16
Name: Field, dtype: int64
```

Distribution of Field Lengths
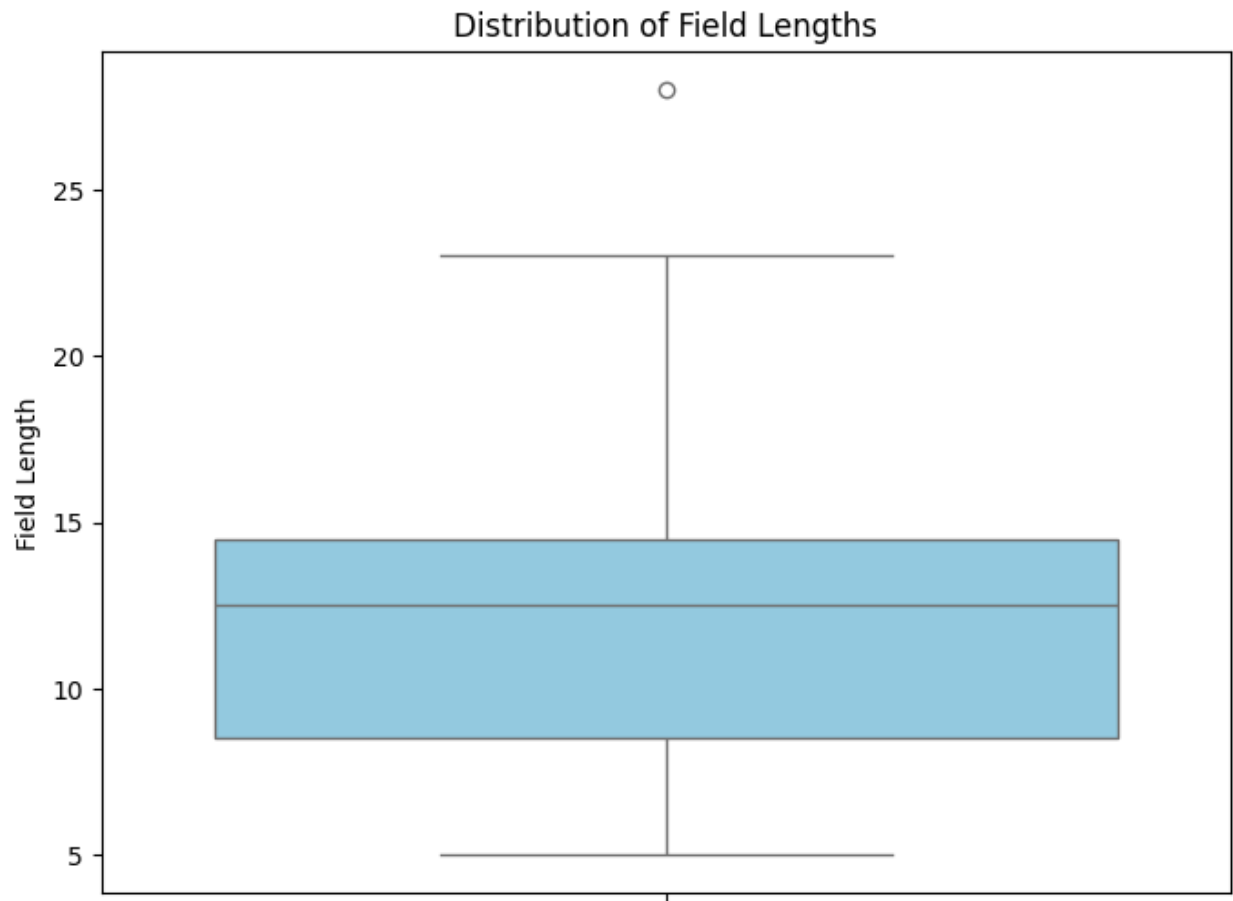

```
Outliers in Field Lengths:
10    28
Name: Field, dtype: int64
```

Distribution of Field Lengths
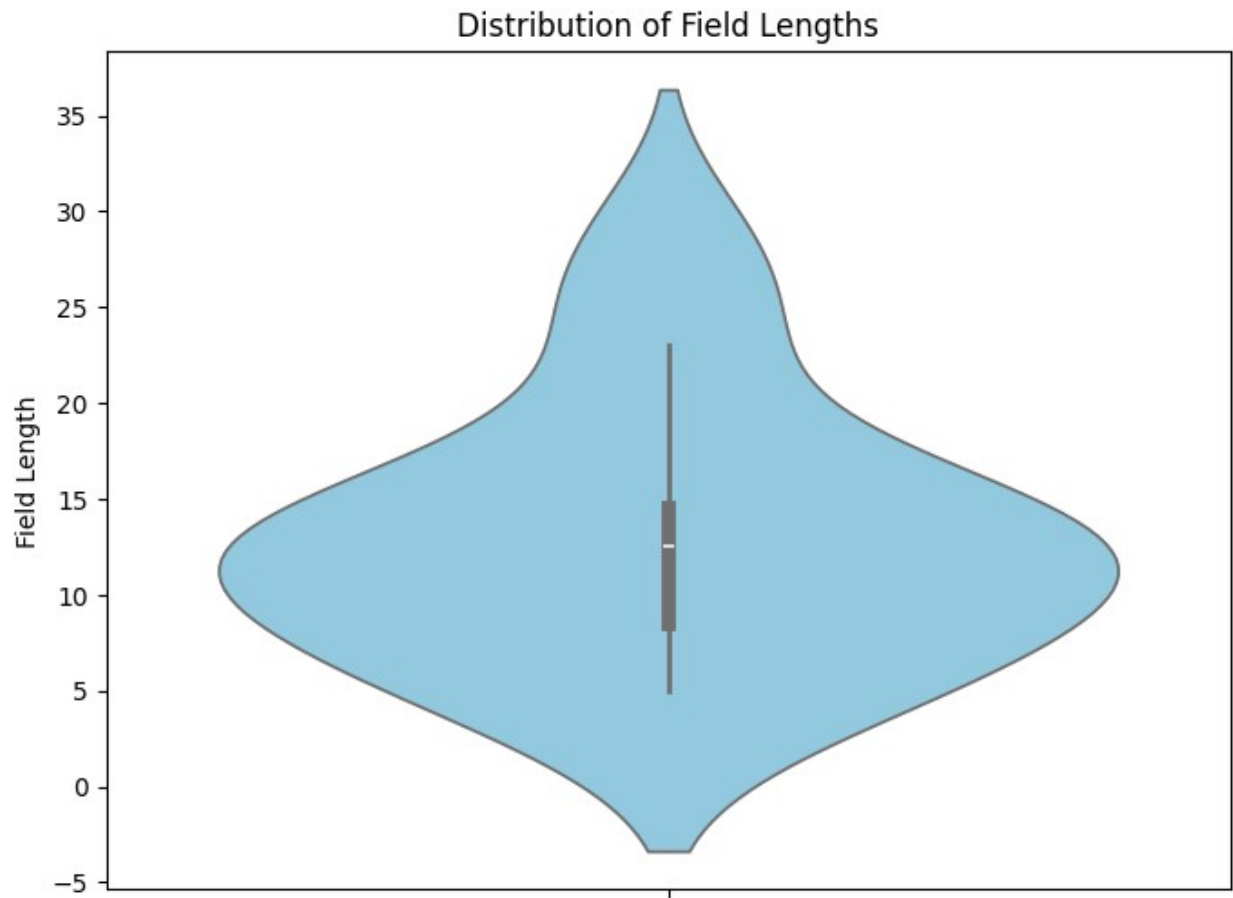

```
Number of Characters in Field Names:
0      12
1      13
2      14
3      13
4       5
5       7
6      11
7       5
8       9
9      23
10     28
11     16
Name: Field, dtype: int64
```
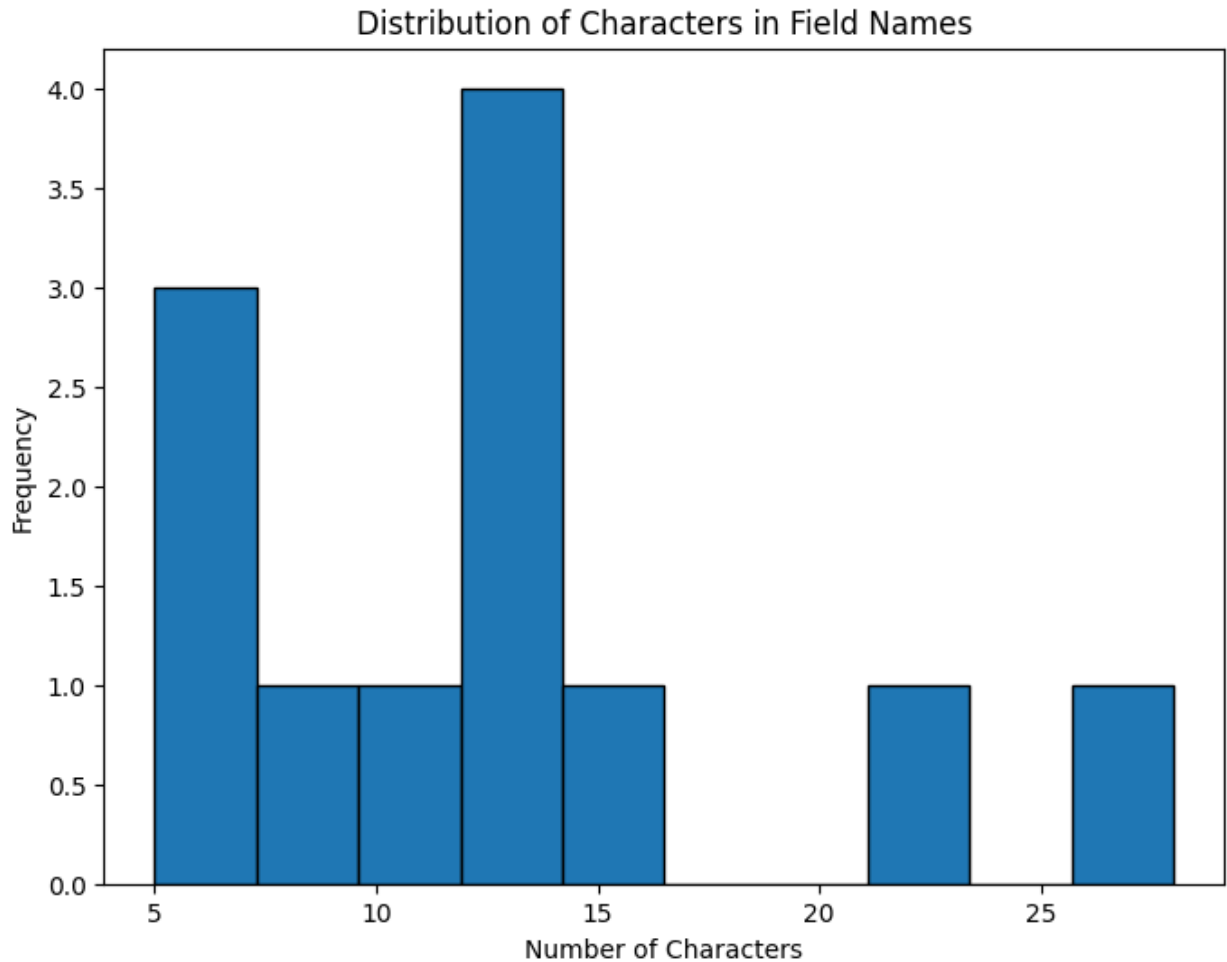
Distribution of Characters in Field Names

```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
df = pd.read_excel('/content/Consumer_Complaints.xlsx')
print(df.head())  # Display the first few rows
print(df.info())  # Summary of the DataFrame
```

```
   Complaint ID Submitted via Date submitted Date received State  \
0       4848023      Referral     2021-10-24    2021-10-27    NY
1       3621464           Web     2020-04-24    2020-04-24    FL
2       5818349           Web     2022-07-27    2022-07-27    CA
3       7233015      Referral     2023-07-10    2023-07-11    CA
4       5820224      Referral     2022-07-27    2022-07-28    VA


                                             Product  \
0                                           Mortgage
1  Money transfer, virtual currency, or money ser...
2  Credit reporting, credit repair services, or o...
3                         Credit card or prepaid card
4                         Credit card or prepaid card
```

```
                                       Sub-product  \
0                     Conventional home mortgage
1                     Refund anticipation check
2                             Credit reporting
3                 General-purpose prepaid card
4   General-purpose credit card or charge card


                                            Issue  \
0  Applying for a mortgage or refinancing an exis...
1                             Lost or stolen check
2                 Incorrect information on your report
3        Problem getting a card or closing an account
4                             Closing your account


                                        Sub-issue  \
0                                             NaN
1                                             NaN
2                     Account information incorrect
3   Trouble getting, activating, or registering a ...
4                     Company closed your account


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

  Company response to consumer Timely response?
0      Closed with explanation             Yes
1  Closed with monetary relief             Yes
2      Closed with explanation             Yes
3                  In progress             NaN
4      Closed with explanation             Yes
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 62516 entries, 0 to 62515
Data columns (total 12 columns):
 #   Column                   Non-Null Count   Dtype
---  ------                   --------------   -----
 0   Complaint ID             62516 non-null   int64
 1   Submitted via            62516 non-null   object
 2   Date submitted           62516 non-null   datetime64[ns]
 3   Date received            62516 non-null   datetime64[ns]
 4   State                    62516 non-null   object
 5   Product                  62516 non-null   object
 6   Sub-product              62509 non-null   object
 7   Issue                    62516 non-null   object
 8   Sub-issue                51658 non-null   object
 9   Company public response  60341 non-null   object
```

```
 10  Company response to consumer  62516 non-null  object
 11  Timely response?                61022 non-null  object
dtypes: datetime64[ns](2), int64(1), object(9)
memory usage: 5.7+ MB
None

# Example: Count complaints by state
state_counts = df['State'].value_counts()
print(state_counts)
# Example: Bar plot of complaints by state
plt.figure(figsize=(10, 6))
sns.countplot(data=df, x='State',
order=df['State'].value_counts().index)
plt.title('Complaints by State')
plt.xlabel('State')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.show()

State
CA    13709
FL     6488
TX     4686
NY     4442
GA     2921
NJ     2664
IL     2270
MA     2141
MD     1959
VA     1731
NC     1717
PA     1676
WA     1530
AZ     1516
MI     1395
NV     1221
CT     1097
SC      822
TN      758
OH      731
MO      674
OR      620
CO      576
MN      382
DC      353
IN      316
KS      311
OK      293
WI      291
AL      269
```

```
DE        268
AR        266
RI        249
LA        246
NM        219
UT        201
NH        199
KY        157
IA        154
ME        152
MS        141
ID        122
HI        111
AK        110
NE         83
WV         77
MT         70
VT         54
SD         34
ND         22
WY         22
Name: count, dtype: int64
```


Complaints by State

```
import pandas as pd
import matplotlib.pyplot as plt
```

```python
import seaborn as sns

# Read the data from the Excel file
df = pd.read_excel('/content/Consumer_Complaints.xlsx')

# Data Exploration
print(df.head())
print(df.info())

# Convert 'Date received' to datetime format
df['Date received'] = pd.to_datetime(df['Date received'])

# Data Analysis
# Count complaints by year and month
df['YearMonth'] = df['Date received'].dt.to_period('M')
complaints_by_month = df['YearMonth'].value_counts().sort_index()

# Count most common issues
top_issues = df['Issue'].value_counts().head(10)

# Count complaints by state
complaints_by_state = df['State'].value_counts()

# Data Visualization
# Complaints over time
plt.figure(figsize=(10, 6))
complaints_by_month.plot(kind='line')
plt.title('Complaints Over Time')
plt.xlabel('Year-Month')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.show()

# Top 10 most common issues
plt.figure(figsize=(10, 6))
top_issues.plot(kind='bar')
plt.title('Top 10 Most Common Issues')
plt.xlabel('Issue')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.show()

# Complaints by state
plt.figure(figsize=(12, 8))
sns.barplot(x=complaints_by_state.values, y=complaints_by_state.index,
orient='h')
plt.title('Complaints by State')
plt.xlabel('Number of Complaints')
plt.ylabel('State')
plt.show()
```

```
    Complaint ID Submitted via Date submitted Date received State  \
0       4848023        Referral       2021-10-24       2021-10-27    NY
1       3621464            Web         2020-04-24       2020-04-24    FL
2       5818349            Web         2022-07-27       2022-07-27    CA
3       7233015        Referral       2023-07-10       2023-07-11    CA
4       5820224        Referral       2022-07-27       2022-07-28    VA

                                                Product  \
0                                              Mortgage
1   Money transfer, virtual currency, or money ser...
2   Credit reporting, credit repair services, or o...
3                          Credit card or prepaid card
4                          Credit card or prepaid card

                                 Sub-product  \
0                 Conventional home mortgage
1                     Refund anticipation check
2                            Credit reporting
3                 General-purpose prepaid card
4   General-purpose credit card or charge card

                                         Issue  \
0   Applying for a mortgage or refinancing an exis...
1                           Lost or stolen check
2                Incorrect information on your report
3        Problem getting a card or closing an account
4                           Closing your account

                                    Sub-issue  \
0                                          NaN
1                                          NaN
2                   Account information incorrect
3   Trouble getting, activating, or registering a ...
4                       Company closed your account

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

   Company response to consumer Timely response?
0          Closed with explanation                Yes
1   Closed with monetary relief                Yes
2          Closed with explanation                Yes
3                   In progress                NaN
4          Closed with explanation                Yes
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 62516 entries, 0 to 62515
```

```
Data columns (total 12 columns):
 #   Column                      Non-Null Count   Dtype
---  ------                      --------------   -----
 0   Complaint ID                62516 non-null   int64
 1   Submitted via               62516 non-null   object
 2   Date submitted              62516 non-null   datetime64[ns]
 3   Date received               62516 non-null   datetime64[ns]
 4   State                       62516 non-null   object
 5   Product                     62516 non-null   object
 6   Sub-product                 62509 non-null   object
 7   Issue                       62516 non-null   object
 8   Sub-issue                   51658 non-null   object
 9   Company public response     60341 non-null   object
 10  Company response to consumer  62516 non-null   object
 11  Timely response?            61022 non-null   object
dtypes: datetime64[ns](2), int64(1), object(9)
memory usage: 5.7+ MB
None
```


Complaints Over Time

Top 10 Most Common Issues

Complaints by State


```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Read the data from the Excel file
df = pd.read_excel('/content/Consumer_Complaints.xlsx')

# Data Exploration
print(df.head())
print(df.info())

# Convert 'Date received' to datetime format
df['Date received'] = pd.to_datetime(df['Date received'])

# Data Analysis
# Count complaints by year and month
df['YearMonth'] = df['Date received'].dt.to_period('M')
complaints_by_month = df['YearMonth'].value_counts().sort_index()

# Count most common issues
top_issues = df['Issue'].value_counts().head(10)

# Count complaints by state
complaints_by_state = df['State'].value_counts()
```

```python
# Data Visualization
# Complaints over time
plt.figure(figsize=(10, 6))
complaints_by_month.plot(kind='line')
plt.title('Complaints Over Time')
plt.xlabel('Year-Month')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.grid(True)
plt.show()

# Top 10 most common issues
plt.figure(figsize=(10, 6))
top_issues.plot(kind='bar')
plt.title('Top 10 Most Common Issues')
plt.xlabel('Issue')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.grid(axis='y')
plt.show()

# Complaints by state
plt.figure(figsize=(12, 8))
sns.barplot(x=complaints_by_state.values, y=complaints_by_state.index,
orient='h')
plt.title('Complaints by State')
plt.xlabel('Number of Complaints')
plt.ylabel('State')
plt.grid(axis='x')
plt.show()
```

```
   Complaint ID Submitted via Date submitted Date received State  \
0       4848023       Referral     2021-10-24    2021-10-27    NY
1       3621464            Web     2020-04-24    2020-04-24    FL
2       5818349            Web     2022-07-27    2022-07-27    CA
3       7233015       Referral     2023-07-10    2023-07-11    CA
4       5820224       Referral     2022-07-27    2022-07-28    VA


                                               Product  \
0                                             Mortgage
1  Money transfer, virtual currency, or money ser...
2  Credit reporting, credit repair services, or o...
3                         Credit card or prepaid card
4                         Credit card or prepaid card


                                Sub-product  \
0              Conventional home mortgage
1              Refund anticipation check
2                        Credit reporting
```

```
3                      General-purpose prepaid card
4   General-purpose credit card or charge card


                                             Issue  \
0   Applying for a mortgage or refinancing an exis...
1                              Lost or stolen check
2                 Incorrect information on your report
3        Problem getting a card or closing an account
4                              Closing your account

                                          Sub-issue  \
0                                               NaN
1                                               NaN
2                    Account information incorrect
3   Trouble getting, activating, or registering a ...
4                          Company closed your account

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

   Company response to consumer Timely response?
0       Closed with explanation              Yes
1   Closed with monetary relief              Yes
2       Closed with explanation              Yes
3                   In progress              NaN
4       Closed with explanation              Yes
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 62516 entries, 0 to 62515
Data columns (total 12 columns):
 #   Column                        Non-Null Count  Dtype
---  ------                        --------------  -----
 0   Complaint ID                  62516 non-null  int64
 1   Submitted via                 62516 non-null  object
 2   Date submitted                62516 non-null  datetime64[ns]
 3   Date received                 62516 non-null  datetime64[ns]
 4   State                         62516 non-null  object
 5   Product                       62516 non-null  object
 6   Sub-product                   62509 non-null  object
 7   Issue                         62516 non-null  object
 8   Sub-issue                     51658 non-null  object
 9   Company public response       60341 non-null  object
 10  Company response to consumer  62516 non-null  object
 11  Timely response?              61022 non-null  object
dtypes: datetime64[ns](2), int64(1), object(9)
memory usage: 5.7+ MB
None
```
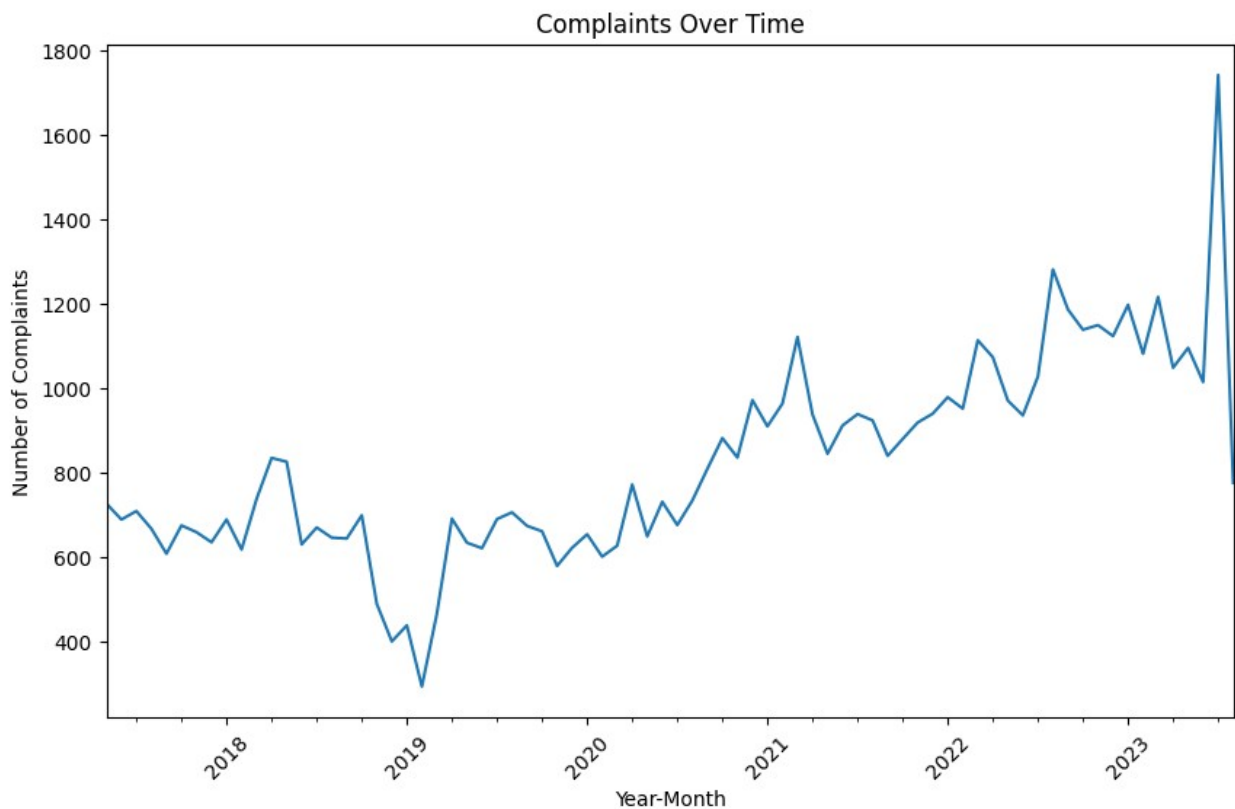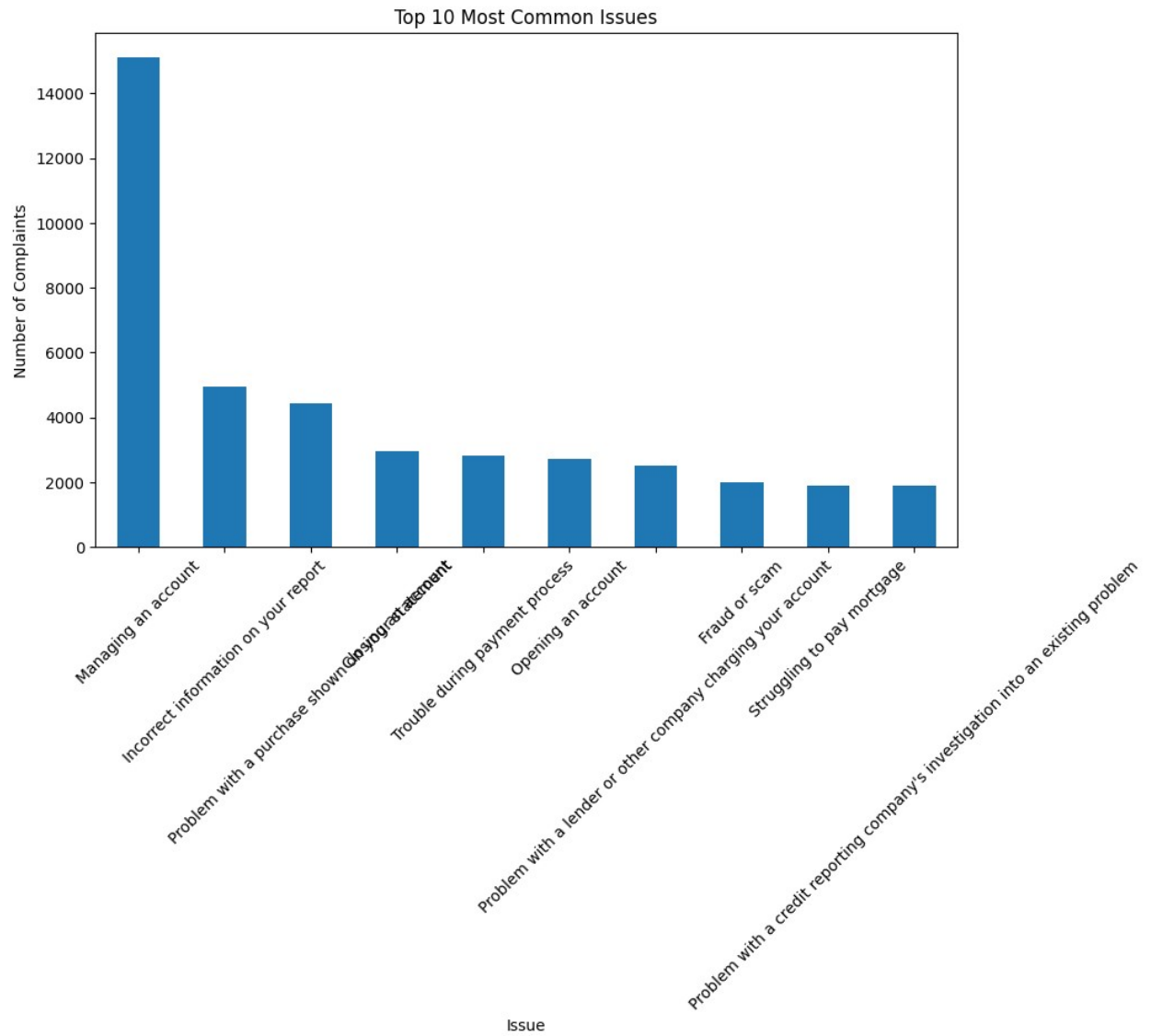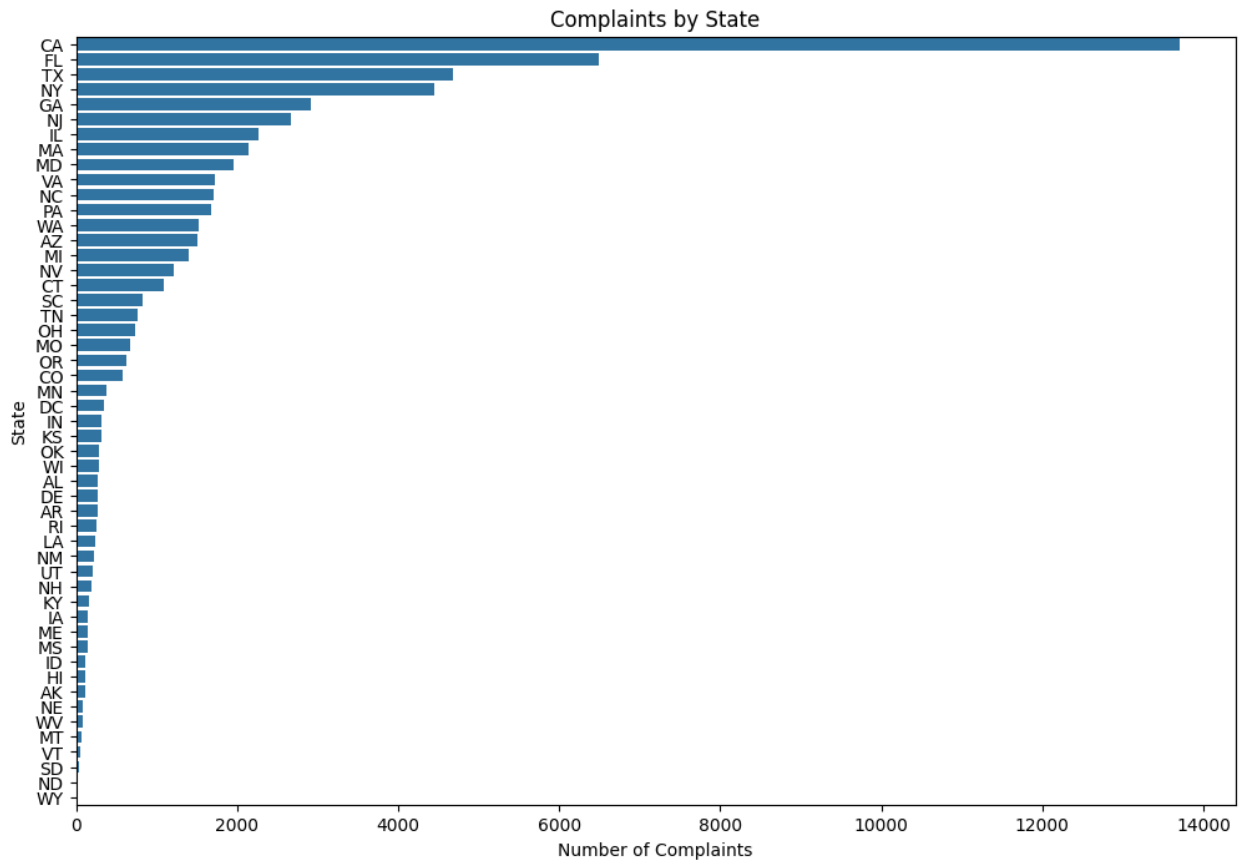
Complaints Over Time

Top 10 Most Common Issues

Bar chart titled "Top 10 Most Common Issues" showing Number of Complaints on the y-axis (0 to 14000) and Issue on the x-axis.

- Managing an account: ~15000
- Incorrect information on your report: ~5000
- Problem with a purchase shown on your statement / Closing an account: ~4400
- (Closing an account): ~3000
- Trouble during payment process: ~2850
- Opening an account: ~2750
- Problem with a lender or other company charging your account: ~2500
- Fraud or scam: ~2000
- Struggling to pay mortgage: ~1900
- Problem with a credit reporting company's investigation into an existing problem: ~1900

Complaints by State

```
# Count complaints by product
complaints_by_product = df['Product'].value_counts()

# Data Visualization - Pie chart for complaints by product
plt.figure(figsize=(8, 8))
plt.pie(complaints_by_product, labels=complaints_by_product.index,
autopct='%1.1f%%', startangle=140)
plt.title('Distribution of Complaints by Product')
plt.axis('equal')  # Equal aspect ratio ensures that pie is drawn as a
circle.
plt.show()

# Written Findings for Complaints by Product
print("Written Findings:")
print("Complaints by Product:")
print(complaints_by_product)
```

Distribution of Complaints by Product

- Money transfer, virtual currency, or money service
- Debt collection
- Vehicle loan or lease
- Payday loan, title loan, or personal loan
- Student loan
- Mortgage
- Credit reporting, credit repair services, or other personal consumer reports
- Checking or savings account
- Credit card or prepaid card

5.5%
10.6%
12.3%
4.4%
1.2%
0.5%
39.7%
25.9%

```
Written Findings:
Complaints by Product:
Product
Checking or savings account
24814
Credit card or prepaid card
16197
Credit reporting, credit repair services, or other personal consumer
reports      7710
Mortgage
6601
Money transfer, virtual currency, or money service
3453
Debt collection
2736
Vehicle loan or lease
633
Payday loan, title loan, or personal loan
333
Student loan
39
Name: count, dtype: int64
```

```python
# Count complaints by sub-product
complaints_by_subproduct = df['Sub-product'].value_counts().head(10)

# Data Visualization - Horizontal bar chart for complaints by sub-
product
plt.figure(figsize=(10, 6))
sns.barplot(x=complaints_by_subproduct.values,
```

```
y=complaints_by_subproduct.index, orient='h')
plt.title('Top 10 Most Common Sub-Products for Complaints')
plt.xlabel('Number of Complaints')
plt.ylabel('Sub-Product')
plt.grid(axis='x')
plt.show()

# Written Findings for Complaints by Sub-Product
print("\nWritten Findings:")
print("Top 10 Most Common Sub-Products for Complaints:")
print(complaints_by_subproduct)
```


Top 10 Most Common Sub-Products for Complaints
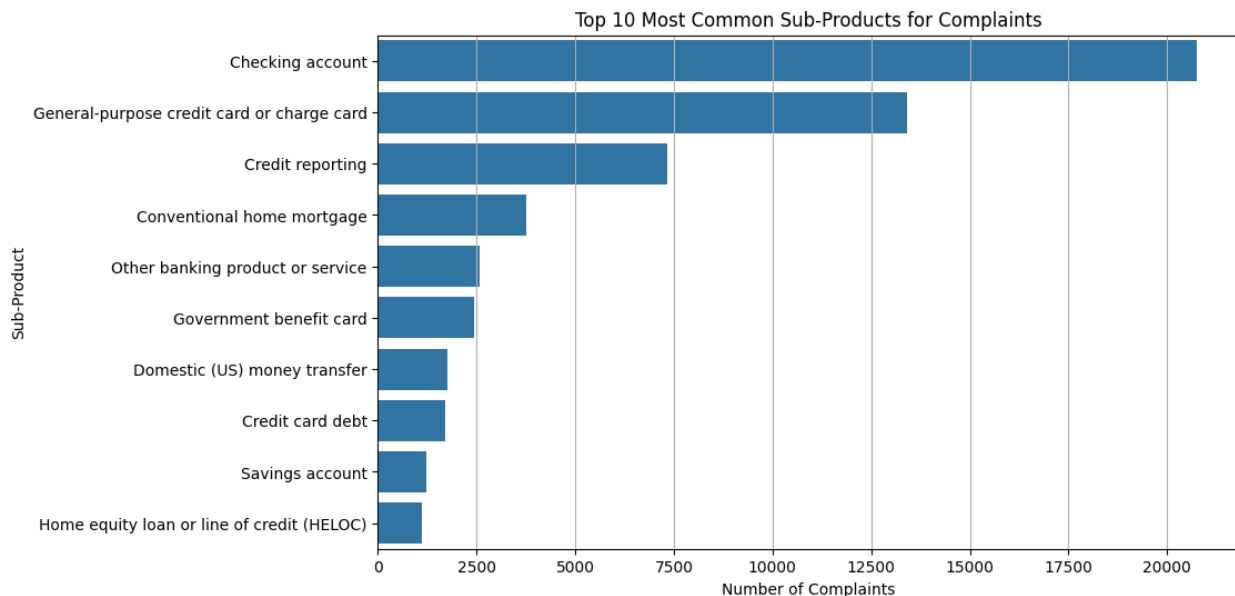
```
Written Findings:
Top 10 Most Common Sub-Products for Complaints:
Sub-product
Checking account                               20768
General-purpose credit card or charge card     13404
Credit reporting                                7340
Conventional home mortgage                      3767
Other banking product or service                2568
Government benefit card                         2429
Domestic (US) money transfer                    1773
Credit card debt                                1697
Savings account                                 1239
Home equity loan or line of credit (HELOC)      1105
Name: count, dtype: int64
```

```
# Count complaints by company response
company_response_counts = df['Company response to
consumer'].value_counts()
```

```python
# Data Visualization - Bar chart for complaints by company response
plt.figure(figsize=(10, 6))
sns.countplot(data=df, x='Company response to consumer',
order=company_response_counts.index)
plt.title('Complaints by Company Response')
plt.xlabel('Company Response')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.grid(axis='y')
plt.show()

# Written Findings for Complaints by Company Response
print("Written Findings:")
print("Complaints by Company Response:")
print(company_response_counts)

# Count complaints by timely response
timely_response_counts = df['Timely response?'].value_counts()

# Data Visualization - Pie chart for complaints by timely response
plt.figure(figsize=(8, 8))
plt.pie(timely_response_counts, labels=timely_response_counts.index,
autopct='%1.1f%%', startangle=140)
plt.title('Distribution of Complaints by Timely Response')
plt.axis('equal')  # Equal aspect ratio ensures that pie is drawn as a
circle.
plt.show()

# Written Findings for Complaints by Timely Response
print("\nWritten Findings:")
print("Distribution of Complaints by Timely Response:")
print(timely_response_counts)

# Count complaints by company public response
company_public_response_counts = df['Company public
response'].value_counts()

# Data Visualization - Horizontal bar chart for complaints by company
public response
plt.figure(figsize=(10, 6))
sns.barplot(x=company_public_response_counts.values,
y=company_public_response_counts.index, orient='h')
plt.title('Complaints by Company Public Response')
plt.xlabel('Number of Complaints')
plt.ylabel('Company Public Response')
plt.grid(axis='x')
plt.show()

# Written Findings for Complaints by Company Public Response
```

```python
print("\nWritten Findings:")
print("Complaints by Company Public Response:")
print(company_public_response_counts)
```
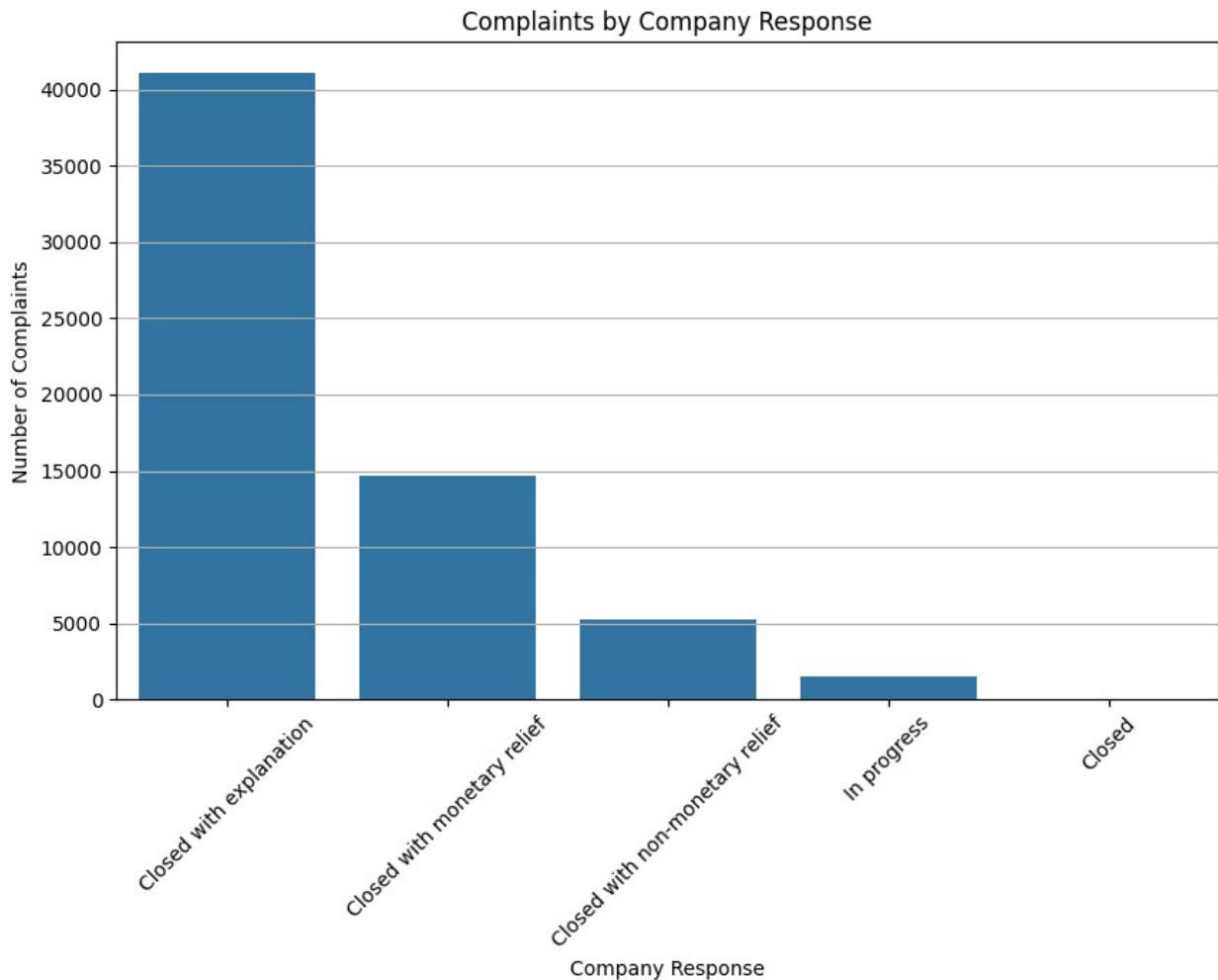

Complaints by Company Response

```
Written Findings:
Complaints by Company Response:
Company response to consumer
Closed with explanation            41044
Closed with monetary relief        14697
Closed with non-monetary relief     5273
In progress                         1494
Closed                                 8
Name: count, dtype: int64
```

Distribution of Complaints by Timely Response
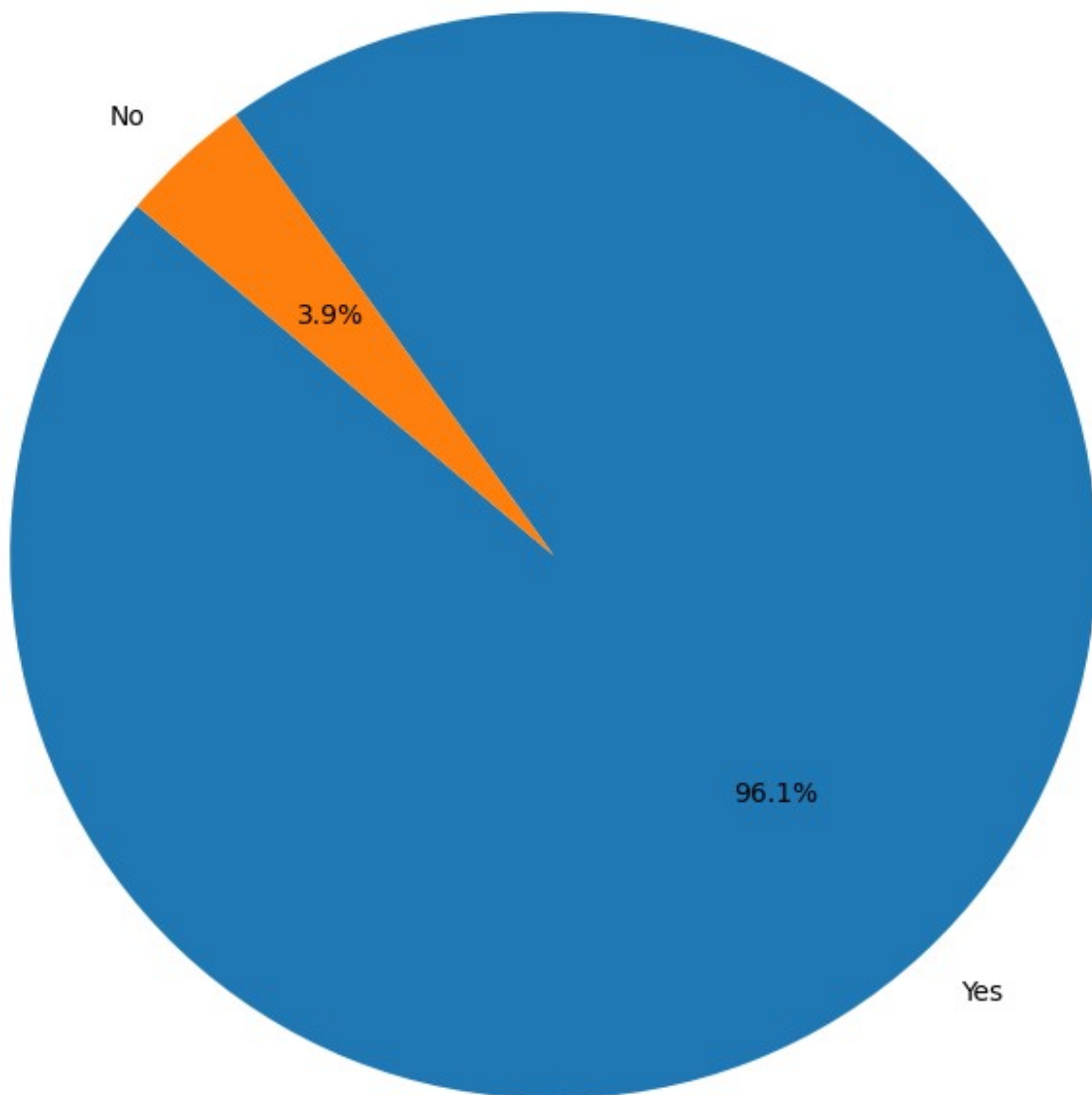

```
Written Findings:
Distribution of Complaints by Timely Response:
Timely response?
Yes    58619
No      2403
Name: count, dtype: int64
```

Complaints by Company Public Response

```
Written Findings:
Complaints by Company Public Response:
Company public response
Company has responded to the consumer and the CFPB and chooses not to
provide a public response                                      60311
Company believes the complaint provided an opportunity to answer
consumer's questions                                              12
Company believes the complaint is the result of a misunderstanding
7
Company believes it acted appropriately as authorized by contract or
law                                                                6
Company believes complaint caused principally by actions of third
party outside the control or direction of the company            3
Company disputes the facts presented in the complaint
2
Name: count, dtype: int64
```

```python
import matplotlib.pyplot as plt
import seaborn as sns

# Count complaints by state
complaints_by_state = df['State'].value_counts()

# Data Visualization - Bar chart for complaints by state
plt.figure(figsize=(12, 8))
sns.barplot(x=complaints_by_state.values, y=complaints_by_state.index,
orient='h')
plt.title('Complaints by State')
plt.xlabel('Number of Complaints')
plt.ylabel('State')
plt.grid(axis='x')
plt.show()

# Written Findings for Complaints by State
print("\nWritten Findings:")
print("Complaints by State:")
```
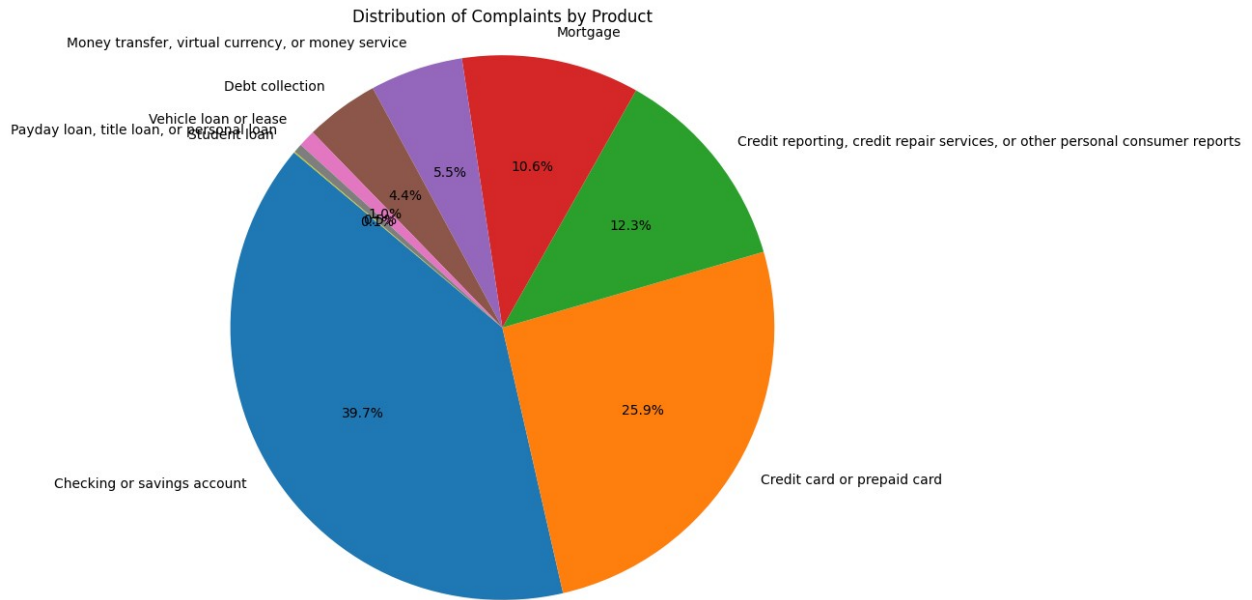
```python
print(complaints_by_state)

# Count complaints by product
complaints_by_product = df['Product'].value_counts()

# Data Visualization - Pie chart for complaints by product
plt.figure(figsize=(8, 8))
plt.pie(complaints_by_product, labels=complaints_by_product.index,
autopct='%1.1f%%', startangle=140)
plt.title('Distribution of Complaints by Product')
plt.axis('equal')  # Equal aspect ratio ensures that pie is drawn as a
circle.
plt.show()

# Written Findings for Complaints by Product
print("\nWritten Findings:")
print("Complaints by Product:")
print(complaints_by_product)

# Count complaints by issue
complaints_by_issue = df['Issue'].value_counts().head(10)

# Data Visualization - Horizontal bar chart for complaints by issue
plt.figure(figsize=(10, 6))
sns.barplot(x=complaints_by_issue.values, y=complaints_by_issue.index,
orient='h')
plt.title('Top 10 Most Common Issues for Complaints')
plt.xlabel('Number of Complaints')
plt.ylabel('Issue')
plt.grid(axis='x')
plt.show()

# Written Findings for Complaints by Issue
print("\nWritten Findings:")
print("Top 10 Most Common Issues for Complaints:")
print(complaints_by_issue)

# Count complaints by company response
company_response_counts = df['Company response to
consumer'].value_counts()

# Data Visualization - Bar chart for complaints by company response
plt.figure(figsize=(10, 6))
sns.countplot(data=df, x='Company response to consumer',
order=company_response_counts.index)
plt.title('Complaints by Company Response')
plt.xlabel('Company Response')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.grid(axis='y')
```

```
plt.show()

# Written Findings for Complaints by Company Response
print("\nWritten Findings:")
print("Complaints by Company Response:")
print(company_response_counts)
```


Complaints by State
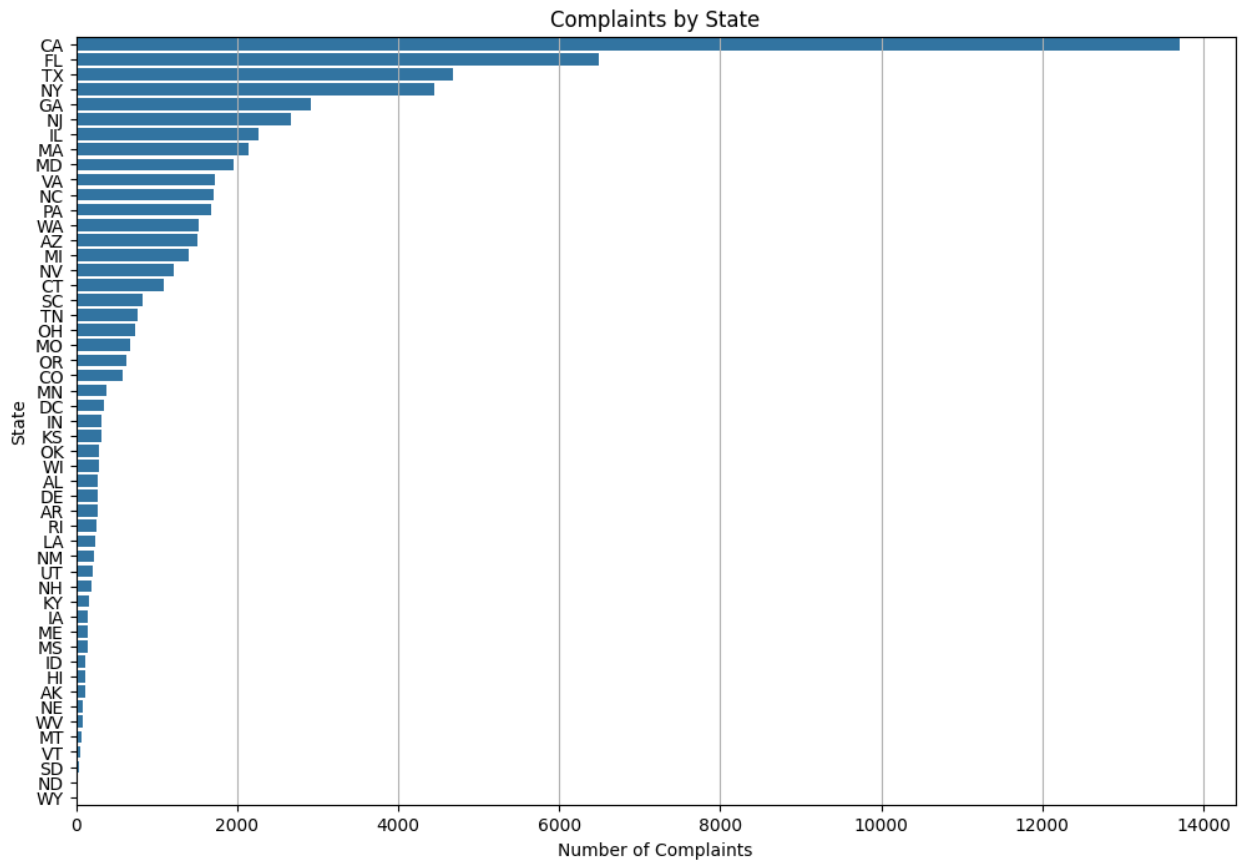
```
Written Findings:
Complaints by State:
State
CA     13709
FL      6488
TX      4686
NY      4442
GA      2921
NJ      2664
IL      2270
MA      2141
MD      1959
VA      1731
NC      1717
PA      1676
```

```
WA    1530
AZ    1516
MI    1395
NV    1221
CT    1097
SC     822
TN     758
OH     731
MO     674
OR     620
CO     576
MN     382
DC     353
IN     316
KS     311
OK     293
WI     291
AL     269
DE     268
AR     266
RI     249
LA     246
NM     219
UT     201
NH     199
KY     157
IA     154
ME     152
MS     141
ID     122
HI     111
AK     110
NE      83
WV      77
MT      70
VT      54
SD      34
ND      22
WY      22
Name: count, dtype: int64
```

Distribution of Complaints by Product

Distribution of Complaints by Product

- Money transfer, virtual currency, or money service
- Debt collection
- Mortgage
- Vehicle loan or lease
- Payday loan, title loan, or personal loan
- Student loan
- Credit reporting, credit repair services, or other personal consumer reports — 12.3%
- Mortgage — 10.6%
- 5.5%
- 4.4%
- 1.2%
- 0.5%
- Checking or savings account — 39.7%
- Credit card or prepaid card — 25.9%

Written Findings:
Complaints by Product:
Product
Checking or savings account
24814
Credit card or prepaid card
16197
Credit reporting, credit repair services, or other personal consumer
reports   7710
Mortgage
6601
Money transfer, virtual currency, or money service
3453
Debt collection
2736
Vehicle loan or lease
633
Payday loan, title loan, or personal loan
333
Student loan
39
Name: count, dtype: int64

Top 10 Most Common Issues for Complaints

Written Findings:
Top 10 Most Common Issues for Complaints:
Issue
Managing an account
15109
Incorrect information on your report
4931
Problem with a purchase shown on your statement
4415
Closing an account
2953
Trouble during payment process
2827
Opening an account
2725
Problem with a lender or other company charging your account
2493
Fraud or scam
1987
Struggling to pay mortgage
1904
Problem with a credit reporting company's investigation into an
existing problem   1876
Name: count, dtype: int64

Complaints by Company Response

```
Written Findings:
Complaints by Company Response:
Company response to consumer
Closed with explanation            41044
Closed with monetary relief        14697
Closed with non-monetary relief     5273
In progress                         1494
Closed                                 8
Name: count, dtype: int64

import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Provided data
data = [
    ["Checking account", "Managing an account", "Deposits and
withdrawals", "Company has responded to the consumer and the CFPB and
```

```
chooses not to provide a public response", "Closed with explanation",
"Yes"],
    ["General-purpose credit card or charge card", "Fees or interest",
"Problem with fees", "Company has responded to the consumer and the
CFPB and chooses not to provide a public response", "Closed with
monetary relief", "Yes"],
    ["Conventional home mortgage", "Trouble during payment process",
"", "Company has responded to the consumer and the CFPB and chooses
not to provide a public response", "Closed with monetary relief",
"Yes"],
    # Add the rest of the data here...
]

# Define column names
columns = ['Product', 'Issue', 'Sub-issue', 'Company_response',
'Consumer_response', 'Timely_response']

# Create a DataFrame
df = pd.DataFrame(data, columns=columns)

# Data Exploration
print(df.head())
print(df.info())

# Data Analysis
# Count complaints by product
complaints_by_product = df['Product'].value_counts()

# Count complaints by issue
complaints_by_issue = df['Issue'].value_counts()

# Count complaints by company response
complaints_by_company_response = df['Company_response'].value_counts()

# Count complaints by consumer response
complaints_by_consumer_response =
df['Consumer_response'].value_counts()

# Count complaints by timely response
complaints_by_timely_response = df['Timely_response'].value_counts()

# Data Visualization
# Complaints by product
plt.figure(figsize=(10, 6))
sns.barplot(x=complaints_by_product.index,
y=complaints_by_product.values)
plt.title('Complaints by Product')
plt.xlabel('Product')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
```

```
plt.show()

# Complaints by issue
plt.figure(figsize=(10, 6))
sns.barplot(x=complaints_by_issue.index, y=complaints_by_issue.values)
plt.title('Complaints by Issue')
plt.xlabel('Issue')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.show()

# Complaints by company response
plt.figure(figsize=(8, 5))
complaints_by_company_response.plot(kind='bar')
plt.title('Complaints by Company Response')
plt.xlabel('Company Response')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.show()

# Complaints by consumer response
plt.figure(figsize=(8, 5))
complaints_by_consumer_response.plot(kind='bar')
plt.title('Complaints by Consumer Response')
plt.xlabel('Consumer Response')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.show()

# Complaints by timely response
plt.figure(figsize=(8, 5))
complaints_by_timely_response.plot(kind='bar')
plt.title('Complaints by Timely Response')
plt.xlabel('Timely Response')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.show()
```

```
                                      Product
Issue  \
0                          Checking account                Managing an
account
1  General-purpose credit card or charge card                  Fees or
interest
2                 Conventional home mortgage  Trouble during payment
process

                 Sub-issue  \
0  Deposits and withdrawals
1         Problem with fees
```

```
2

                                    Company_response  \
0  Company has responded to the consumer and the ...
1  Company has responded to the consumer and the ...
2  Company has responded to the consumer and the ...

             Consumer_response Timely_response
0        Closed with explanation            Yes
1  Closed with monetary relief            Yes
2  Closed with monetary relief            Yes
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 3 entries, 0 to 2
Data columns (total 6 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Product            3 non-null      object
 1   Issue              3 non-null      object
 2   Sub-issue          3 non-null      object
 3   Company_response   3 non-null      object
 4   Consumer_response  3 non-null      object
 5   Timely_response    3 non-null      object
dtypes: object(6)
memory usage: 272.0+ bytes
None
```

Complaints by Product

Complaints by Issue

Complaints by Company Response

Company has responded to the consumer and the CFPB and chooses not to provide a public response

Company Response

Complaints by Consumer Response

Complaints by Timely Response
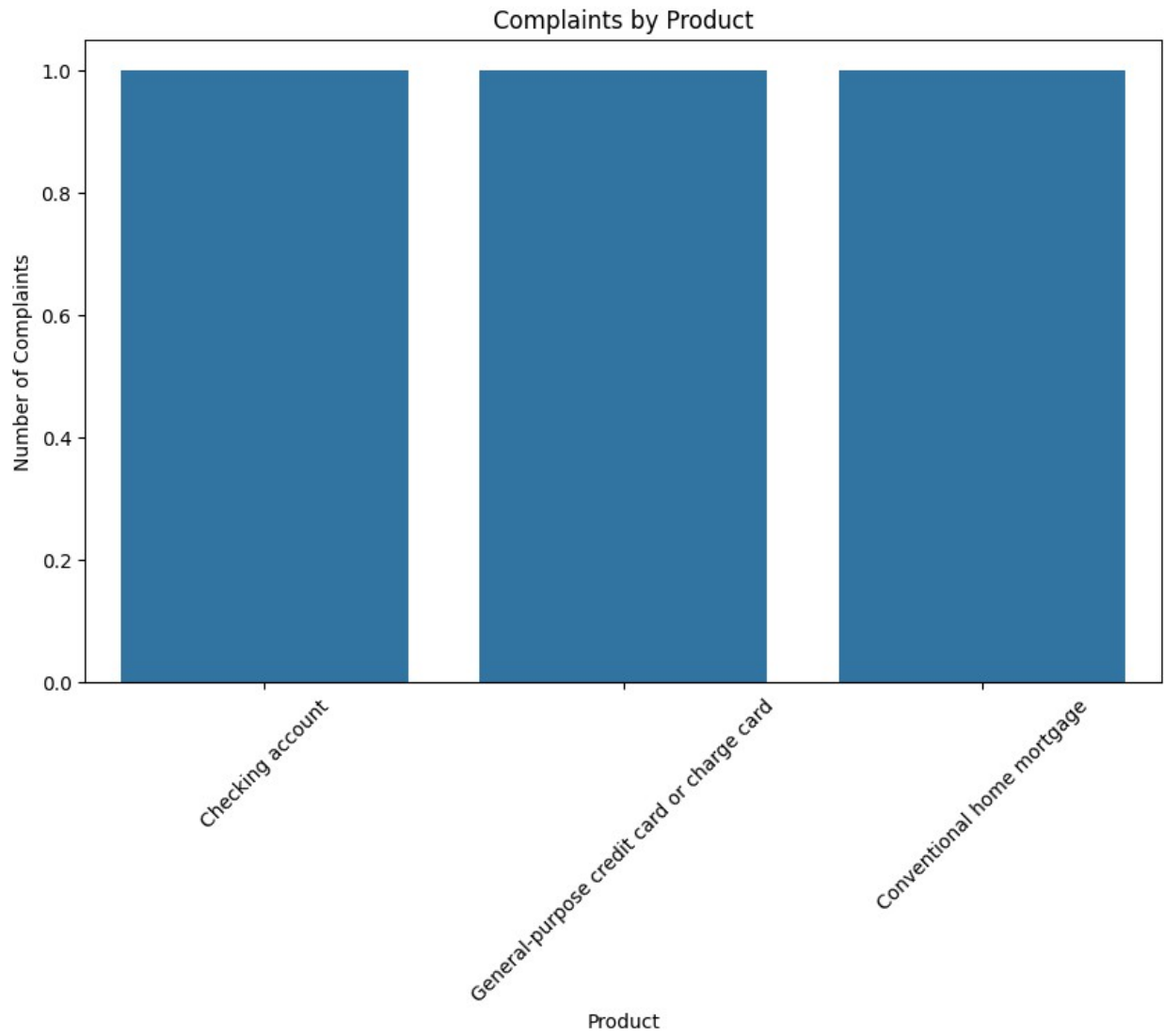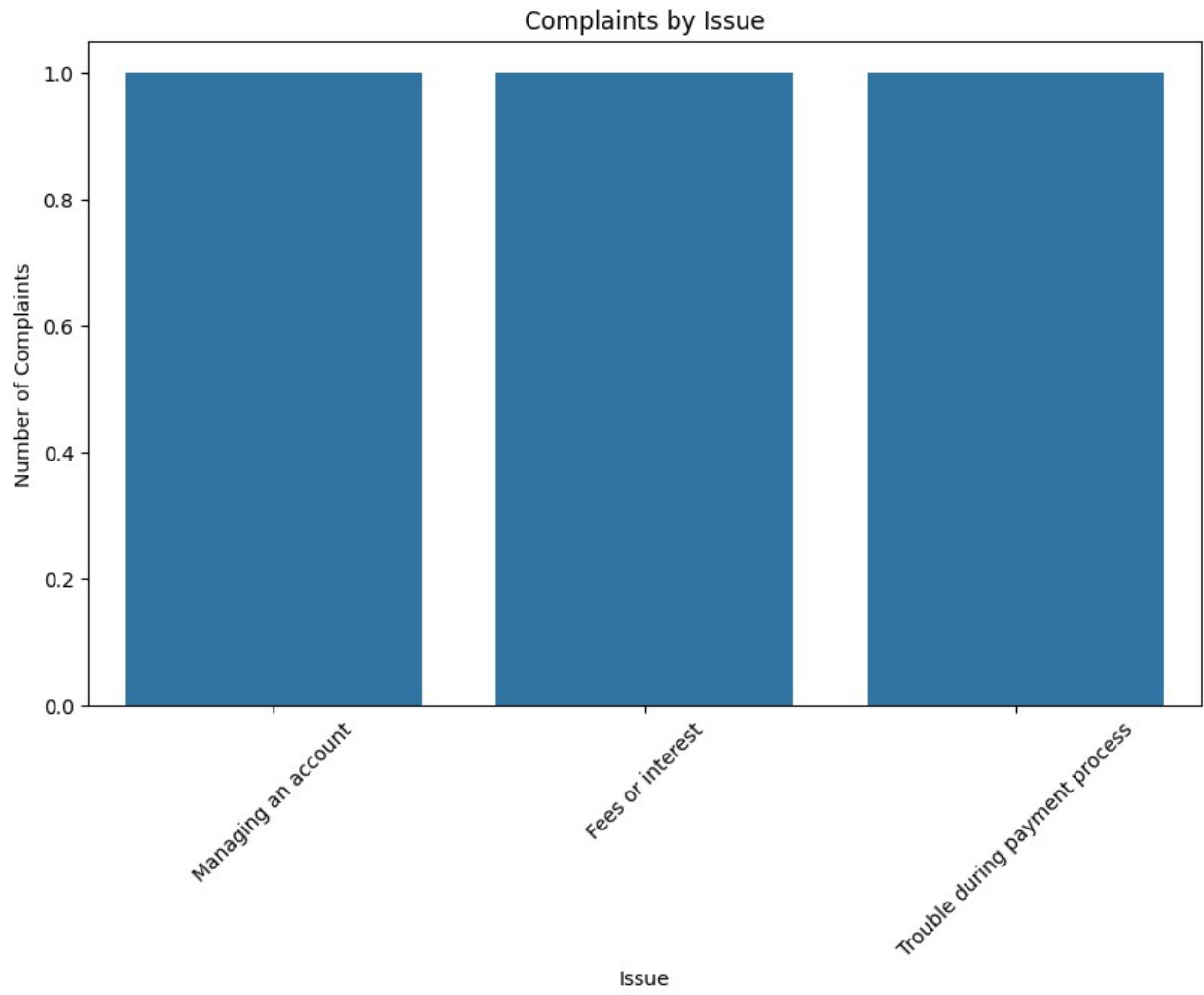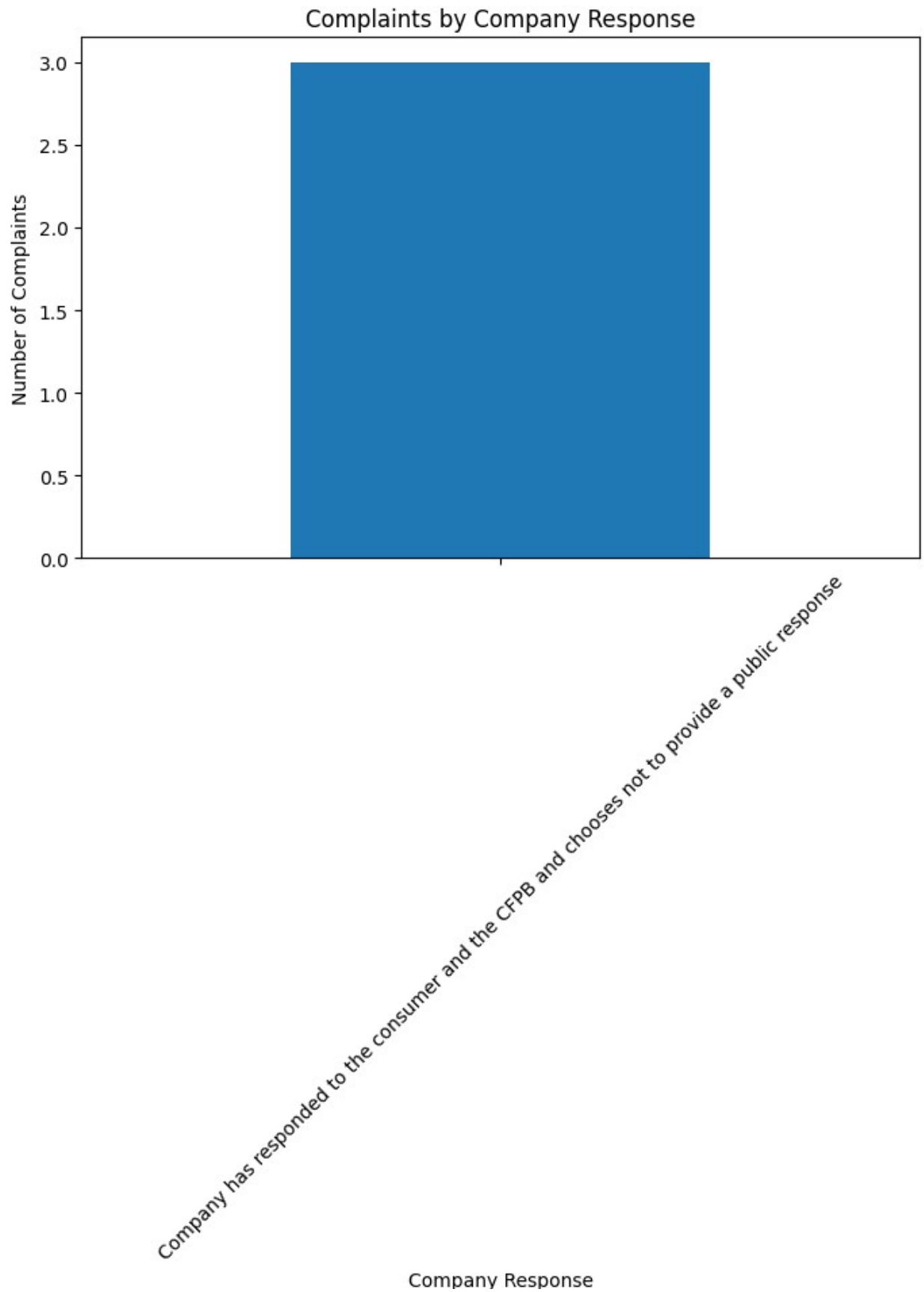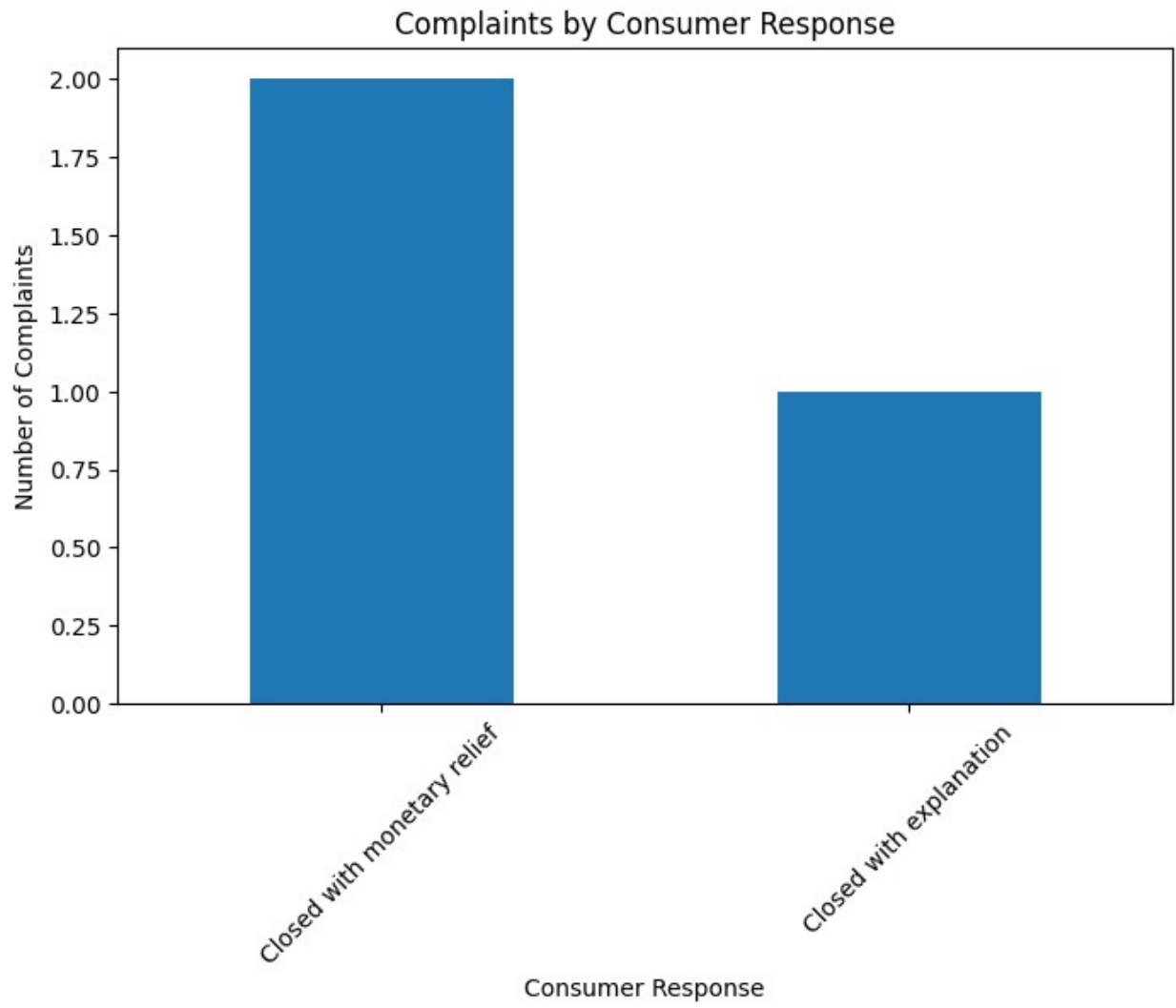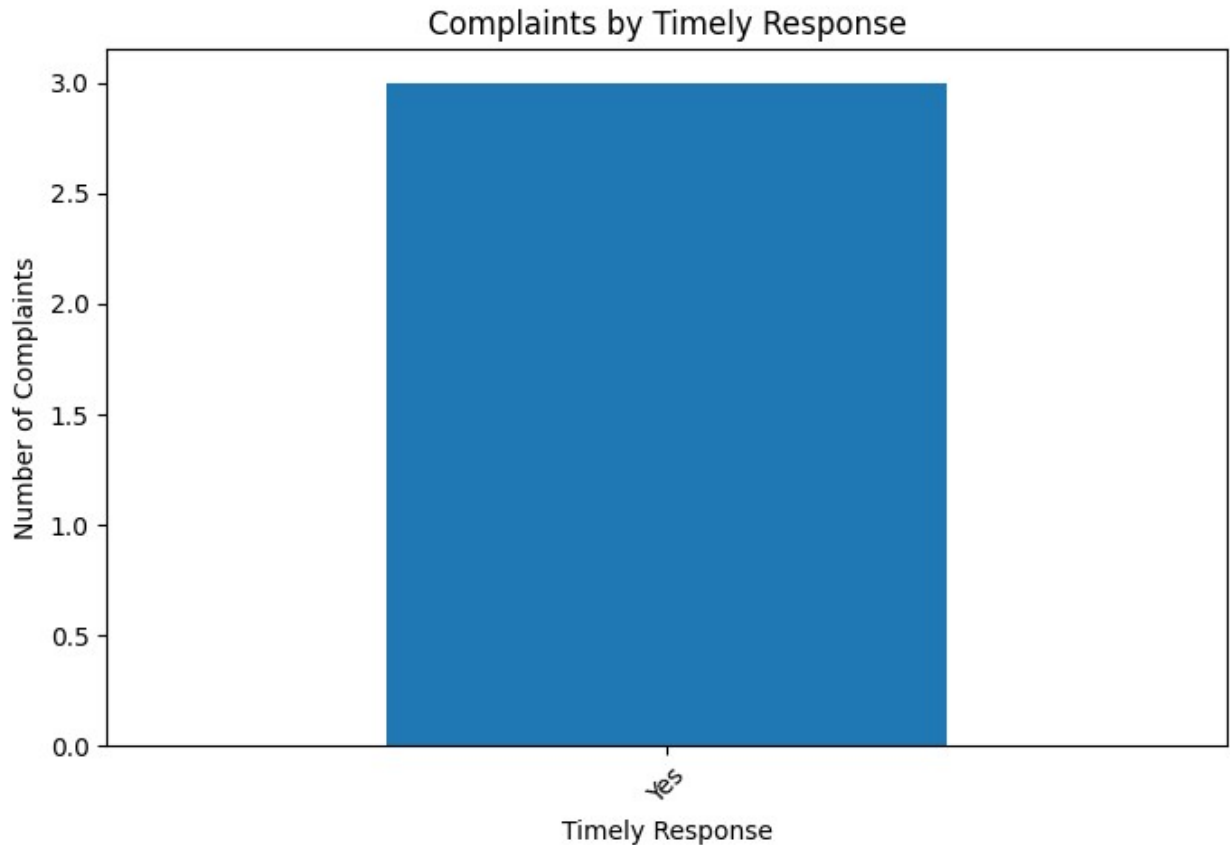

```python
# 1. Complaints by Product
print("1. Complaints by Product:")
print(complaints_by_product)
print()

# 2. Complaints by Issue
print("2. Complaints by Issue:")
print(complaints_by_issue)
print()

# 3. Company Response to Complaints
print("3. Company Response to Complaints:")
print(complaints_by_company_response)
print()

# 4. Consumer Response to Resolutions
print("4. Consumer Response to Resolutions:")
print(complaints_by_consumer_response)
print()

# 5. Timeliness of Responses
print("5. Timeliness of Responses:")
```

```
print(complaints_by_timely_response)
print()
```

1. Complaints by Product:
Product
Checking account   1
General-purpose credit card or charge card   1
Conventional home mortgage   1
Name: count, dtype: int64

2. Complaints by Issue:
Issue
Managing an account   1
Fees or interest   1
Trouble during payment process 1
Name: count, dtype: int64

3. Company Response to Complaints:
Company_response
Company has responded to the consumer and the CFPB and chooses not to
provide a public response   3
Name: count, dtype: int64

4. Consumer Response to Resolutions:
Consumer_response
Closed with monetary relief   2
Closed with explanation   1
Name: count, dtype: int64

5. Timeliness of Responses:
Timely_response
Yes   3
Name: count, dtype: int64

```
import pandas as pd
df = pd.read_excel('/content/Consumer_Complaints.xlsx')
# Assuming df is your DataFrame
print(df.columns)
```

Index(['Complaint ID', 'Submitted via', 'Date submitted', 'Date
received',
       'State', 'Product', 'Sub-product', 'Issue', 'Sub-issue',
       'Company public response', 'Company response to consumer',
       'Timely response?'],
      dtype='object')

```
import pandas as pd

# Read data from CSV file into a DataFrame
df = pd.read_excel('/content/Consumer_Complaints.xlsx')  # Replace
```

```python
'your_file.csv' with the actual file path

# Count complaints by product
complaints_by_product = df['Product'].value_counts()

# Print the number of complaints by product
print("1. Complaints by Product:")
print(complaints_by_product)
print()

# Count complaints by issue
complaints_by_issue = df['Issue'].value_counts()

# Print the number of complaints by issue
print("2. Complaints by Issue:")
print(complaints_by_issue)
print()

# Count complaints by company response
complaints_by_company_response = df['Company response to
consumer'].value_counts()

# Print the number of complaints by company response
print("3. Company Response to Complaints:")
print(complaints_by_company_response)
print()

# Count complaints by consumer response
complaints_by_consumer_response = df['Company public
response'].value_counts()

# Print the number of complaints by consumer response
print("4. Consumer Response to Resolutions:")
print(complaints_by_consumer_response)
print()

# Count complaints by timely response
complaints_by_timely_response = df['Timely response?'].value_counts()

# Print the number of complaints by timely response
print("5. Timeliness of Responses:")
print(complaints_by_timely_response)
print()

1. Complaints by Product:
Product
Checking or savings account
24814
Credit card or prepaid card
16197
```

```
Credit reporting, credit repair services, or other personal consumer
reports      7710
Mortgage
6601
Money transfer, virtual currency, or money service
3453
Debt collection
2736
Vehicle loan or lease
633
Payday loan, title loan, or personal loan
333
Student loan
39
Name: count, dtype: int64

2. Complaints by Issue:
Issue
Managing an account                                      15109
Incorrect information on your report                      4931
Problem with a purchase shown on your statement           4415
Closing an account                                        2953
Trouble during payment process                            2827
                                                           ...
Can't stop withdrawals from your bank account                2
Was approved for a loan, but didn't receive money            1
Vehicle was damaged or destroyed the vehicle                 1
Problem with an overdraft                                    1
Vehicle was repossessed or sold the vehicle                  1
Name: count, Length: 76, dtype: int64

3. Company Response to Complaints:
Company response to consumer
Closed with explanation            41044
Closed with monetary relief        14697
Closed with non-monetary relief     5273
In progress                         1494
Closed                                 8
Name: count, dtype: int64

4. Consumer Response to Resolutions:
Company public response
Company has responded to the consumer and the CFPB and chooses not to
provide a public response                              60311
Company believes the complaint provided an opportunity to answer
consumer's questions                                       12
Company believes the complaint is the result of a misunderstanding
7
Company believes it acted appropriately as authorized by contract or
law                                                         6
```
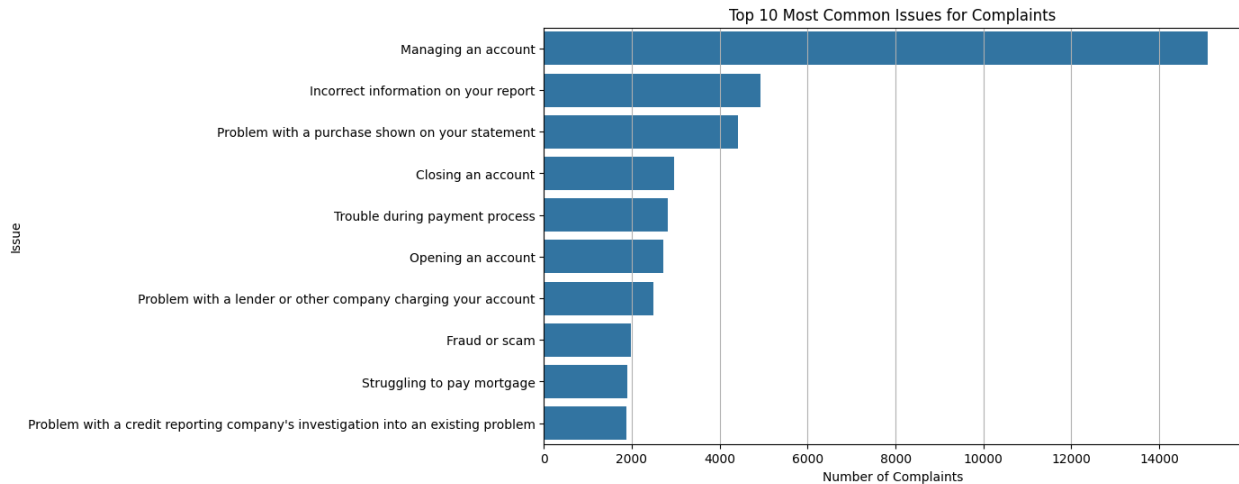
```
Company believes complaint caused principally by actions of third
party outside the control or direction of the company         3
Company disputes the facts presented in the complaint
2
Name: count, dtype: int64

5. Timeliness of Responses:
Timely response?
Yes     58619
No       2403
Name: count, dtype: int64
```

```python
import pandas as pd

# Read data from CSV file into a DataFrame
df = pd.read_excel('/content/Consumer_Complaints.xlsx')  # Replace
'your_file.csv' with the actual file path

# Count complaints by product
complaints_by_product = df['Product'].value_counts()

# Print the number of complaints by product
print("1. Complaints by Product:")
print(complaints_by_product)
print()

# Count complaints by issue
complaints_by_issue = df['Issue'].value_counts()

# Print the number of complaints by issue
print("2. Complaints by Issue:")
print(complaints_by_issue)
print()

# Count complaints by company response
complaints_by_company_response = df['Company response to
consumer'].value_counts()

# Print the number of complaints by company response
print("3. Company Response to Complaints:")
print(complaints_by_company_response)
print()

# Count complaints by consumer response
complaints_by_consumer_response = df['Company public
response'].value_counts()

# Print the number of complaints by consumer response
print("4. Consumer Response to Resolutions:")
print(complaints_by_consumer_response)
```

```python
print()

# Count complaints by timely response
complaints_by_timely_response = df['Timely response?'].value_counts()

# Print the number of complaints by timely response
print("5. Timeliness of Responses:")
print(complaints_by_timely_response)
print()

# Compare product and issue
product_issue_comparison = df.groupby(['Product',
'Issue']).size().unstack(fill_value=0)
print("6. Product vs Issue Comparison:")
print(product_issue_comparison)
print()

# Compare product and timely response
product_timely_response_comparison = df.groupby(['Product', 'Timely
response?']).size().unstack(fill_value=0)
print("7. Product vs Timely Response Comparison:")
print(product_timely_response_comparison)
print()

# Compare company response to consumer and timely response
company_timely_response_comparison = df.groupby(['Company response to
consumer', 'Timely response?']).size().unstack(fill_value=0)
print("8. Company Response vs Timely Response Comparison:")
print(company_timely_response_comparison)
print()
```

```
1. Complaints by Product:
Product
Checking or savings account
24814
Credit card or prepaid card
16197
Credit reporting, credit repair services, or other personal consumer
reports        7710
Mortgage
6601
Money transfer, virtual currency, or money service
3453
Debt collection
2736
Vehicle loan or lease
633
Payday loan, title loan, or personal loan
333
Student loan
```

```
39
Name: count, dtype: int64

2. Complaints by Issue:
Issue
Managing an account                               15109
Incorrect information on your report               4931
Problem with a purchase shown on your statement    4415
Closing an account                                 2953
Trouble during payment process                     2827
                                                    ...
Can't stop withdrawals from your bank account         2
Was approved for a loan, but didn't receive money     1
Vehicle was damaged or destroyed the vehicle          1
Problem with an overdraft                             1
Vehicle was repossessed or sold the vehicle           1
Name: count, Length: 76, dtype: int64

3. Company Response to Complaints:
Company response to consumer
Closed with explanation         41044
Closed with monetary relief     14697
Closed with non-monetary relief  5273
In progress                      1494
Closed                              8
Name: count, dtype: int64

4. Consumer Response to Resolutions:
Company public response
Company has responded to the consumer and the CFPB and chooses not to
provide a public response                               60311
Company believes the complaint provided an opportunity to answer
consumer's questions                                       12
Company believes the complaint is the result of a misunderstanding
7
Company believes it acted appropriately as authorized by contract or
law                                                         6
Company believes complaint caused principally by actions of third
party outside the control or direction of the company       3
Company disputes the facts presented in the complaint
2
Name: count, dtype: int64

5. Timeliness of Responses:
Timely response?
Yes    58619
No      2403
Name: count, dtype: int64

6. Product vs Issue Comparison:
```

```
Issue                                              Advertising  \
Product
Checking or savings account                                  0
Credit card or prepaid card                                 14
Credit reporting, credit repair services, or ot...          0
Debt collection                                              0
Money transfer, virtual currency, or money service          0
Mortgage                                                     0
Payday loan, title loan, or personal loan                    0
Student loan                                                 0
Vehicle loan or lease                                        0

Issue                                              Advertising and
marketing, including promotional offers  \
Product

Checking or savings account
0
Credit card or prepaid card
487
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                              Applying for a
mortgage or refinancing an existing mortgage  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
```

```
1017
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                          Attempts to
collect debt not owed  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
1351
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                          Can't contact
lender or servicer  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
8
Student loan
```

```
0
Vehicle loan or lease
0

Issue                                              Can't stop
withdrawals from your bank account  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
2
Student loan
0
Vehicle loan or lease
0

Issue                                              Charged fees or
interest you didn't expect  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
44
Student loan
0
Vehicle loan or lease
0
```

```
Issue                                         Closing an account
                                                                 \
Product

Checking or savings account                                  2953

Credit card or prepaid card                                     0

Credit reporting, credit repair services, or ot...             0

Debt collection                                                 0

Money transfer, virtual currency, or money service             0

Mortgage                                                        0

Payday loan, title loan, or personal loan                       0

Student loan                                                    0

Vehicle loan or lease                                          0


Issue                                         Closing on a
                                              mortgage  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
610
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0


Issue                                         Closing your
                                              account   ...  \
Product
...
```

```
Checking or savings account
0    ...
Credit card or prepaid card
1077  ...
Credit reporting, credit repair services, or ot...
0    ...
Debt collection
0    ...
Money transfer, virtual currency, or money service
0    ...
Mortgage
0    ...
Payday loan, title loan, or personal loan
0    ...
Student loan
0    ...
Vehicle loan or lease
0    ...

Issue                                           Trouble using your
card  \
Product

Checking or savings account
0
Credit card or prepaid card
346
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                           Unable to get your
credit report or credit score  \
Product

Checking or savings account
5
Credit card or prepaid card
6
```

```
Credit reporting, credit repair services, or ot...
46
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
4
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                        Unauthorized
transactions or other transaction problem  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
155
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                        Unexpected or
other fees  \
Product

Checking or savings account
0
Credit card or prepaid card
570
Credit reporting, credit repair services, or ot...
2
Debt collection
0
```

```
Money transfer, virtual currency, or money service
90
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                                 Vehicle was
damaged or destroyed the vehicle  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
1
Student loan
0
Vehicle loan or lease
0

Issue                                                 Vehicle was
repossessed or sold the vehicle  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
```

```
Payday loan, title loan, or personal loan
1
Student loan
0
Vehicle loan or lease
0

Issue                                                Was approved for a
loan, but didn't receive money  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
1
Student loan
0
Vehicle loan or lease
0

Issue                                                Was approved for a
loan, but didn't receive the money  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
4
Student loan
0
```

```
Vehicle loan or lease
0

Issue                                           Written
notification about debt  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
487
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                           Wrong amount
charged or received
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
50
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

[9 rows x 76 columns]
```

```
7. Product vs Timely Response Comparison:
Timely response?                                   No     Yes
Product
Checking or savings account                        867   23237
Credit card or prepaid card                        689   15096
Credit reporting, credit repair services, or ot... 475    7045
Debt collection                                    173    2514
Money transfer, virtual currency, or money service 140    3244
Mortgage                                            16     6539
Payday loan, title loan, or personal loan          10      321
Student loan                                        0        39
Vehicle loan or lease                              33      584

8. Company Response vs Timely Response Comparison:
Timely response?                      No     Yes
Company response to consumer
Closed                                 8       0
Closed with explanation              1527   39517
Closed with monetary relief          690    14007
Closed with non-monetary relief      178     5095
```

```python
import pandas as pd

# Read data from CSV file into a DataFrame
df = pd.read_excel('/content/Consumer_Complaints.xlsx')  # Replace
'your_file.csv' with the actual file path

# List of columns to compare
columns_to_compare = ['Submitted via', 'Date submitted', 'Date
received', 'State',
                      'Sub-product', 'Issue', 'Sub-issue', 'Company
public response',
                      'Company response to consumer', 'Timely
response?']

# Define the target column
target_column = 'Product'

# Compare each column with the target column
for column in columns_to_compare:
    comparison = df.groupby([column,
target_column]).size().unstack(fill_value=0)
    print(f"Comparison between '{column}' and '{target_column}':")
    print(comparison)
    print()
```

```
Comparison between 'Submitted via' and 'Product':
Product              Checking or savings account  Credit card or prepaid
```

```
card  \
Submitted via

Email                               0
2
Fax                                91
38
Phone                            2565
1174
Postal mail                       422
383
Referral                         6183
2270
Web                             15492
12313
Web Referral                       61
17

Product       Credit reporting, credit repair services, or other
personal consumer reports  \
Submitted via

Email                                                             0

Fax                                                              19

Phone                                                           115

Postal mail                                                      80

Referral                                                        117

Web                                                            7379

Web Referral                                                      0


Product       Debt collection  \
Submitted via
Email                            0
Fax                             26
Phone                           52
Postal mail                     81
Referral                       119
Web                           2456
Web Referral                     2

Product       Money transfer, virtual currency, or money service
Mortgage  \
Submitted via
```

```
Email                                                          0
0
Fax                                                            1
56
Phone                                                        164
536
Postal mail                                                   16
298
Referral                                                     114
1785
Web                                                         3157
3918
Web Referral                                                   1
8

Product        Payday loan, title loan, or personal loan  Student loan  \
Submitted via

Email                                                  0             0

Fax                                                    2             0

Phone                                                 38             5

Postal mail                                           24             0

Referral                                              76             4

Web                                                  192            30

Web Referral                                           1             0


Product        Vehicle loan or lease
Submitted via
Email                              0
Fax                                0
Phone                             35
Postal mail                       14
Referral                          98
Web                              486
Web Referral                       0

Comparison between 'Date submitted' and 'Product':
Product        Checking or savings account  Credit card or prepaid
card  \
Date submitted
```

```
2017-05-01                                      9
11
2017-05-02                                      8
9
2017-05-03                                     11
6
2017-05-04                                     20
7
2017-05-05                                     14
9
...                                            ...                                    .
..
2023-08-22                                      3
2
2023-08-23                                      1
2
2023-08-24                                      0
0
2023-08-25                                      0
1
2023-08-28                                      0
0

Product         Credit reporting, credit repair services, or other
personal consumer reports  \
Date submitted

2017-05-01                                                        3

2017-05-02                                                        3

2017-05-03                                                        4

2017-05-04                                                        2

2017-05-05                                                        3

...                                                            ...

2023-08-22                                                        0

2023-08-23                                                        1

2023-08-24                                                        0

2023-08-25                                                        0

2023-08-28                                                        0


Product         Debt collection  \
```

```
Date submitted
2017-05-01                      4
2017-05-02                      0
2017-05-03                      1
2017-05-04                      0
2017-05-05                      2
...                           ...
2023-08-22                      0
2023-08-23                      0
2023-08-24                      0
2023-08-25                      0
2023-08-28                      0

Product         Money transfer, virtual currency, or money service  \
Mortgage
Date submitted

2017-05-01                                                      1
8
2017-05-02                                                      0
11
2017-05-03                                                      0
9
2017-05-04                                                      1
7
2017-05-05                                                      0
7
...                                                           ...
...
2023-08-22                                                      0
0
2023-08-23                                                      0
1
2023-08-24                                                      1
0
2023-08-25                                                      0
0
2023-08-28                                                      0
1

Product         Payday loan, title loan, or personal loan  Student
loan  \
Date submitted

2017-05-01                                              0
0
2017-05-02                                              0
0
2017-05-03                                              0
0
```

```
2017-05-04                                           0
0
2017-05-05                                           0
1
...                                                ...              ..
.
2023-08-22                                           0
0
2023-08-23                                           0
0
2023-08-24                                           0
0
2023-08-25                                           0
0
2023-08-28                                           0
0

Product           Vehicle loan or lease
Date submitted
2017-05-01                              1
2017-05-02                              0
2017-05-03                              0
2017-05-04                              1
2017-05-05                              1
...                                   ...
2023-08-22                              0
2023-08-23                              0
2023-08-24                              0
2023-08-25                              0
2023-08-28                              0

[2308 rows x 9 columns]

Comparison between 'Date received' and 'Product':
Product           Checking or savings account  Credit card or prepaid
card  \
Date received

2017-05-01                                     5
3
2017-05-02                                     5
5
2017-05-03                                     8
5
2017-05-04                                     8
7
2017-05-05                                    14
9
...                                          ...              ..
.
```

```
2023-08-22                                          3
2
2023-08-23                                          1
2
2023-08-24                                          0
0
2023-08-25                                          0
1
2023-08-28                                          0
0

Product        Credit reporting, credit repair services, or other
personal consumer reports  \
Date received

2017-05-01                                                      1

2017-05-02                                                      2

2017-05-03                                                      5

2017-05-04                                                      4

2017-05-05                                                      2

...                                                           ...

2023-08-22                                                      0

2023-08-23                                                      1

2023-08-24                                                      0

2023-08-25                                                      0

2023-08-28                                                      0


Product        Debt collection  \
Date received
2017-05-01                  1
2017-05-02                  0
2017-05-03                  1
2017-05-04                  1
2017-05-05                  1
...                       ...
2023-08-22                  0
2023-08-23                  0
2023-08-24                  0
2023-08-25                  0
2023-08-28                  0
```

```
Product        Money transfer, virtual currency, or money service
Mortgage  \
Date received

2017-05-01                                                          0
3
2017-05-02                                                          0
3
2017-05-03                                                          0
8
2017-05-04                                                          1
9
2017-05-05                                                          1
5
...                                                               ...
...
2023-08-22                                                          0
0
2023-08-23                                                          0
1
2023-08-24                                                          1
0
2023-08-25                                                          0
0
2023-08-28                                                          0
1

Product        Payday loan, title loan, or personal loan  Student loan
\
Date received

2017-05-01                                              0             0

2017-05-02                                              0             0

2017-05-03                                              0             0

2017-05-04                                              0             0

2017-05-05                                              0             0

...                                                   ...           ...

2023-08-22                                              0             0

2023-08-23                                              0             0

2023-08-24                                              0             0
```

```
2023-08-25                                          0               0

2023-08-28                                          0               0


Product          Vehicle loan or lease
Date received
2017-05-01                           0
2017-05-02                           0
2017-05-03                           1
2017-05-04                           0
2017-05-05                           1
...                                ...
2023-08-22                           0
2023-08-23                           0
2023-08-24                           0
2023-08-25                           0
2023-08-28                           0

[2305 rows x 9 columns]

Comparison between 'State' and 'Product':
Product  Checking or savings account  Credit card or prepaid card  \
State
AK                                 9                           60
AL                                73                           78
AR                               118                           57
AZ                               633                          440
CA                              5335                         4271
CO                               160                          219
CT                               551                          208
DC                               155                           76
DE                                73                          107
FL                              2597                         1309
GA                              1267                          446
HI                                23                           45
IA                                57                           56
ID                                38                           46
IL                              1027                          460
IN                               108                          112
KS                               128                           69
KY                                34                           58
LA                                47                           82
MA                               834                          472
MD                               839                          461
ME                                60                           47
MI                               606                          375
MN                               120                          138
MO                               305                          125
MS                                40                           29
```

MT	17	24
NC	695	372
ND	9	5
NE	13	35
NH	66	58
NJ	1050	614
NM	100	40
NV	540	344
NY	1538	1274
OH	188	266
OK	126	62
OR	202	254
PA	662	428
RI	101	55
SC	401	149
SD	9	16
TN	346	142
TX	2158	946
UT	55	58
VA	667	457
VT	14	28
WA	523	556
WI	61	134
WV	32	24
WY	4	10

Product Credit reporting, credit repair services, or other personal consumer reports \
State

AK	11
AL	49
AR	25
AZ	126
CA	1530
CO	64
CT	75
DC	32
DE	27
FL	1065

GA	457
HI	13
IA	9
ID	15
IL	344
IN	33
KS	39
KY	21
LA	51
MA	252
MD	188
ME	9
MI	125
MN	40
MO	71
MS	31
MT	9
NC	192
ND	4
NE	10
NH	22
NJ	309
NM	19
NV	109
NY	703
OH	101

State	
OK	27
OR	49
PA	258
RI	23
SC	77
SD	2
TN	106
TX	608
UT	33
VA	167
VT	1
WA	144
WI	26
WV	7
WY	2

Product	Debt collection	Money transfer, virtual currency, or money service \
State		
AK	10	3
AL	15	17
AR	18	15
AZ	48	88
CA	417	828
CO	24	19
CT	42	55
DC	15	18

DE	5	7
FL	321	343
GA	194	150
HI	5	0
IA	6	5
ID	5	4
IL	80	88
IN	14	9
KS	12	19
KY	10	3
LA	10	8
MA	181	173
MD	81	120
ME	11	5
MI	60	66
MN	15	12
MO	30	47
MS	10	4
MT	2	3
NC	91	119
ND	1	1
NE	5	2
NH	6	11
NJ	99	160
NM	19	

	12
NV	64
	54
NY	191
	240
OH	43
	20
OK	19
	18
OR	21
	30
PA	59
	60
RI	22
	17
SC	51
	46
SD	0
	0
TN	31
	39
TX	221
	297
UT	11
	15
VA	73
	101
VT	3
	2
WA	40
	87
WI	19
	9
WV	5
	3
WY	1
	1

Product	Mortgage	Payday loan, title loan, or personal loan	Student loan \
State			
AK	17	0
			0
AL	27	1
			1
AR	28	2
			0
AZ	165	7

1

State		
CA	1199	55
		8
CO	80	1
		0
CT	147	9
		1
DC	52	2
		0
DE	40	2
		0
FL	740	39
		1
GA	344	23
		2
HI	24	0
		0
IA	18	0
		0
ID	11	0
		0
IL	236	10
		2
IN	33	0
		1
KS	39	3
		0
KY	27	2
		0
LA	43	1
		0
MA	208	5
		1
MD	240	15
		0
ME	18	1
		0
MI	144	10
		1
MN	52	2
		1
MO	74	3
		2
MS	22	2
		0
MT	12	0
		0
NC	215	14
		0

State			
ND	2	0	0
NE	16	0	0
NH	35	0	0
NJ	350	23	0
NM	28	0	0
NV	97	5	0
NY	421	32	2
OH	81	0	6
OK	33	1	0
OR	55	3	1
PA	181	10	0
RI	28	1	1
SC	85	3	0
SD	6	1	0
TN	80	9	0
TX	369	20	4
UT	26	0	1
VA	234	7	0
VT	6	0	0
WA	166	8	1
WI	37	1	1
WV	6	0	0
WY	4	0	0

Product Vehicle loan or lease
State

AK	0
AL	8
AR	3
AZ	8
CA	66
CO	9
CT	9
DC	3
DE	7
FL	73
GA	38
HI	1
IA	3
ID	3
IL	23
IN	6
KS	2
KY	2
LA	4
MA	15
MD	15
ME	1
MI	8
MN	2
MO	17
MS	3
MT	3
NC	19
ND	0
NE	2
NH	1
NJ	59
NM	1
NV	8
NY	41
OH	26
OK	7
OR	5
PA	18
RI	1
SC	10
SD	0
TN	5
TX	63
UT	2
VA	25
VT	0
WA	5
WI	3

```
WV                             0
WY                             0

Comparison between 'Sub-product' and 'Product':
Product                                  Checking or savings
account  \
Sub-product

Auto debt
0
CD (Certificate of Deposit)
232
Check cashing service
0
Checking account
20768
Conventional home mortgage
0
Credit card debt
0
Credit repair services
0
Credit reporting
0
Debt settlement
0
Domestic (US) money transfer
0
FHA mortgage
0
Federal student loan debt
0
Federal student loan servicing
0
Foreign currency exchange
0
General-purpose credit card or charge card
0
General-purpose prepaid card
0
Gift card
0
Government benefit card
0
Home equity loan or line of credit (HELOC)
0
I do not know
0
Installment loan
```

0
International money transfer
0
Lease
0
Loan
0
Medical debt
0
Mobile or digital wallet
0
Money order
0
Mortgage debt
0
Other banking product or service
2568
Other debt
0
Other personal consumer report
0
Other type of mortgage
0
Payday loan
0
Payday loan debt
0
Payroll card
0
Personal line of credit
0
Private student loan
0
Private student loan debt
0
Refund anticipation check
0
Reverse mortgage
0
Savings account
1239
Store credit card
0
Title loan
0
Traveler's check or cashier's check
0
VA mortgage
0

```
Virtual currency
0

Product                                              Credit card or prepaid
card  \
Sub-product

Auto debt
0
CD (Certificate of Deposit)
0
Check cashing service
0
Checking account
0
Conventional home mortgage
0
Credit card debt
0
Credit repair services
0
Credit reporting
0
Debt settlement
0
Domestic (US) money transfer
0
FHA mortgage
0
Federal student loan debt
0
Federal student loan servicing
0
Foreign currency exchange
0
General-purpose credit card or charge card
13404
General-purpose prepaid card
260
Gift card
12
Government benefit card
2429
Home equity loan or line of credit (HELOC)
0
I do not know
0
Installment loan
0
```

International money transfer
0
Lease
0
Loan
0
Medical debt
0
Mobile or digital wallet
0
Money order
0
Mortgage debt
0
Other banking product or service
0
Other debt
0
Other personal consumer report
0
Other type of mortgage
0
Payday loan
0
Payday loan debt
0
Payroll card
40
Personal line of credit
0
Private student loan
0
Private student loan debt
0
Refund anticipation check
0
Reverse mortgage
0
Savings account
0
Store credit card
52
Title loan
0
Traveler's check or cashier's check
0
VA mortgage
0
Virtual currency

```
0

Product                                         Credit reporting, credit
repair services, or other personal consumer reports  \
Sub-product

Auto debt
0
CD (Certificate of Deposit)
0
Check cashing service
0
Checking account
0
Conventional home mortgage
0
Credit card debt
0
Credit repair services
71
Credit reporting
7340
Debt settlement
0
Domestic (US) money transfer
0
FHA mortgage
0
Federal student loan debt
0
Federal student loan servicing
0
Foreign currency exchange
0
General-purpose credit card or charge card
0
General-purpose prepaid card
0
Gift card
0
Government benefit card
0
Home equity loan or line of credit (HELOC)
0
I do not know
0
Installment loan
0
International money transfer
0
```

Lease
0
Loan
0
Medical debt
0
Mobile or digital wallet
0
Money order
0
Mortgage debt
0
Other banking product or service
0
Other debt
0
Other personal consumer report
299
Other type of mortgage
0
Payday loan
0
Payday loan debt
0
Payroll card
0
Personal line of credit
0
Private student loan
0
Private student loan debt
0
Refund anticipation check
0
Reverse mortgage
0
Savings account
0
Store credit card
0
Title loan
0
Traveler's check or cashier's check
0
VA mortgage
0
Virtual currency
0

```
Product                                          Debt collection  \
Sub-product
Auto debt                                                    65
CD (Certificate of Deposit)                                   0
Check cashing service                                         0
Checking account                                              0
Conventional home mortgage                                    0
Credit card debt                                           1697
Credit repair services                                        0
Credit reporting                                              0
Debt settlement                                               0
Domestic (US) money transfer                                  0
FHA mortgage                                                  0
Federal student loan debt                                     9
Federal student loan servicing                                0
Foreign currency exchange                                     0
General-purpose credit card or charge card                    0
General-purpose prepaid card                                  0
Gift card                                                     0
Government benefit card                                       0
Home equity loan or line of credit (HELOC)                    0
I do not know                                               314
Installment loan                                              0
International money transfer                                   0
Lease                                                         0
Loan                                                          0
Medical debt                                                  3
Mobile or digital wallet                                      0
Money order                                                   0
Mortgage debt                                               341
Other banking product or service                              0
Other debt                                                  282
Other personal consumer report                                0
Other type of mortgage                                        0
Payday loan                                                   0
Payday loan debt                                              8
Payroll card                                                  0
Personal line of credit                                       0
Private student loan                                          0
Private student loan debt                                    17
Refund anticipation check                                     0
Reverse mortgage                                              0
Savings account                                               0
Store credit card                                             0
Title loan                                                    0
Traveler's check or cashier's check                           0
VA mortgage                                                   0
Virtual currency                                              0
```

```
Product                                   Money transfer, virtual
currency, or money service  \
Sub-product

Auto debt
0
CD (Certificate of Deposit)
0
Check cashing service
102
Checking account
0
Conventional home mortgage
0
Credit card debt
0
Credit repair services
0
Credit reporting
0
Debt settlement
37
Domestic (US) money transfer
1773
FHA mortgage
0
Federal student loan debt
0
Federal student loan servicing
0
Foreign currency exchange
38
General-purpose credit card or charge card
0
General-purpose prepaid card
0
Gift card
0
Government benefit card
0
Home equity loan or line of credit (HELOC)
0
I do not know
0
Installment loan
0
International money transfer
411
Lease
```

```
0
Loan
0
Medical debt
0
Mobile or digital wallet
655
Money order
39
Mortgage debt
0
Other banking product or service
0
Other debt
0
Other personal consumer report
0
Other type of mortgage
0
Payday loan
0
Payday loan debt
0
Payroll card
0
Personal line of credit
0
Private student loan
0
Private student loan debt
0
Refund anticipation check
41
Reverse mortgage
0
Savings account
0
Store credit card
0
Title loan
0
Traveler's check or cashier's check
149
VA mortgage
0
Virtual currency
208

Product                                    Mortgage  \
```

Sub-product	
Auto debt	0
CD (Certificate of Deposit)	0
Check cashing service	0
Checking account	0
Conventional home mortgage	3767
Credit card debt	0
Credit repair services	0
Credit reporting	0
Debt settlement	0
Domestic (US) money transfer	0
FHA mortgage	642
Federal student loan debt	0
Federal student loan servicing	0
Foreign currency exchange	0
General-purpose credit card or charge card	0
General-purpose prepaid card	0
Gift card	0
Government benefit card	0
Home equity loan or line of credit (HELOC)	1105
I do not know	0
Installment loan	0
International money transfer	0
Lease	0
Loan	0
Medical debt	0
Mobile or digital wallet	0
Money order	0
Mortgage debt	0
Other banking product or service	0
Other debt	0
Other personal consumer report	0
Other type of mortgage	949
Payday loan	0
Payday loan debt	0
Payroll card	0
Personal line of credit	0
Private student loan	0
Private student loan debt	0
Refund anticipation check	0
Reverse mortgage	24
Savings account	0
Store credit card	0
Title loan	0
Traveler's check or cashier's check	0
VA mortgage	114
Virtual currency	0

Product	Payday loan, title loan,

```
or personal loan  \
Sub-product

Auto debt
0
CD (Certificate of Deposit)
0
Check cashing service
0
Checking account
0
Conventional home mortgage
0
Credit card debt
0
Credit repair services
0
Credit reporting
0
Debt settlement
0
Domestic (US) money transfer
0
FHA mortgage
0
Federal student loan debt
0
Federal student loan servicing
0
Foreign currency exchange
0
General-purpose credit card or charge card
0
General-purpose prepaid card
0
Gift card
0
Government benefit card
0
Home equity loan or line of credit (HELOC)
0
I do not know
0
Installment loan
84
International money transfer
0
Lease
0
```

```
Loan
0
Medical debt
0
Mobile or digital wallet
0
Money order
0
Mortgage debt
0
Other banking product or service
0
Other debt
0
Other personal consumer report
0
Other type of mortgage
0
Payday loan
16
Payday loan debt
0
Payroll card
0
Personal line of credit
211
Private student loan
0
Private student loan debt
0
Refund anticipation check
0
Reverse mortgage
0
Savings account
0
Store credit card
0
Title loan
22
Traveler's check or cashier's check
0
VA mortgage
0
Virtual currency
0

Product                                    Student loan  \
Sub-product
```

```
Auto debt                                        0
CD (Certificate of Deposit)                      0
Check cashing service                            0
Checking account                                 0
Conventional home mortgage                       0
Credit card debt                                 0
Credit repair services                           0
Credit reporting                                 0
Debt settlement                                  0
Domestic (US) money transfer                     0
FHA mortgage                                     0
Federal student loan debt                        0
Federal student loan servicing                  16
Foreign currency exchange                        0
General-purpose credit card or charge card       0
General-purpose prepaid card                     0
Gift card                                        0
Government benefit card                          0
Home equity loan or line of credit (HELOC)       0
I do not know                                     0
Installment loan                                 0
International money transfer                      0
Lease                                            0
Loan                                             0
Medical debt                                     0
Mobile or digital wallet                         0
Money order                                      0
Mortgage debt                                    0
Other banking product or service                 0
Other debt                                       0
Other personal consumer report                   0
Other type of mortgage                           0
Payday loan                                      0
Payday loan debt                                 0
Payroll card                                     0
Personal line of credit                          0
Private student loan                            23
Private student loan debt                        0
Refund anticipation check                        0
Reverse mortgage                                 0
Savings account                                  0
Store credit card                                0
Title loan                                       0
Traveler's check or cashier's check              0
VA mortgage                                      0
Virtual currency                                 0

Product                          Vehicle loan or lease
Sub-product
```

```
Auto debt                                              0
CD (Certificate of Deposit)                            0
Check cashing service                                  0
Checking account                                       0
Conventional home mortgage                             0
Credit card debt                                       0
Credit repair services                                 0
Credit reporting                                       0
Debt settlement                                        0
Domestic (US) money transfer                           0
FHA mortgage                                            0
Federal student loan debt                              0
Federal student loan servicing                         0
Foreign currency exchange                              0
General-purpose credit card or charge card             0
General-purpose prepaid card                           0
Gift card                                              0
Government benefit card                                0
Home equity loan or line of credit (HELOC)             0
I do not know                                          0
Installment loan                                       0
International money transfer                           0
Lease                                                  4
Loan                                                 629
Medical debt                                           0
Mobile or digital wallet                               0
Money order                                            0
Mortgage debt                                          0
Other banking product or service                       0
Other debt                                             0
Other personal consumer report                         0
Other type of mortgage                                 0
Payday loan                                            0
Payday loan debt                                       0
Payroll card                                           0
Personal line of credit                                0
Private student loan                                   0
Private student loan debt                              0
Refund anticipation check                              0
Reverse mortgage                                       0
Savings account                                        0
Store credit card                                      0
Title loan                                             0
Traveler's check or cashier's check                    0
VA mortgage                                            0
Virtual currency                                       0

Comparison between 'Issue' and 'Product':
Product                                       Checking or
```

```
savings account  \
Issue

Advertising
0
Advertising and marketing, including promotiona...
0
Applying for a mortgage or refinancing an exist...
0
Attempts to collect debt not owed
0
Can't contact lender or servicer
0
...
...
Vehicle was repossessed or sold the vehicle
0
Was approved for a loan, but didn't receive money
0
Was approved for a loan, but didn't receive the...
0
Written notification about debt
0
Wrong amount charged or received
0

Product                                          Credit card or
prepaid card  \
Issue

Advertising
14
Advertising and marketing, including promotiona...
487
Applying for a mortgage or refinancing an exist...
0
Attempts to collect debt not owed
0
Can't contact lender or servicer
0
...
...
Vehicle was repossessed or sold the vehicle
0
Was approved for a loan, but didn't receive money
0
Was approved for a loan, but didn't receive the...
0
Written notification about debt
0
```

```
Wrong amount charged or received
0

Product                                        Credit reporting,
credit repair services, or other personal consumer reports  \
Issue

Advertising
0
Advertising and marketing, including promotiona...
0
Applying for a mortgage or refinancing an exist...
0
Attempts to collect debt not owed
0
Can't contact lender or servicer
0
...
...
Vehicle was repossessed or sold the vehicle
0
Was approved for a loan, but didn't receive money
0
Was approved for a loan, but didn't receive the...
0
Written notification about debt
0
Wrong amount charged or received
0

Product                                         Debt collection  \
Issue
Advertising                                                    0
Advertising and marketing, including promotiona...             0
Applying for a mortgage or refinancing an exist...             0
Attempts to collect debt not owed                           1351
Can't contact lender or servicer                               0
...                                                          ...
Vehicle was repossessed or sold the vehicle                    0
Was approved for a loan, but didn't receive money              0
Was approved for a loan, but didn't receive the...             0
Written notification about debt                              487
Wrong amount charged or received                               0

Product                                        Money transfer,
virtual currency, or money service  \
Issue

Advertising
0
```

```
Advertising and marketing, including promotiona...
0
Applying for a mortgage or refinancing an exist...
0
Attempts to collect debt not owed
0
Can't contact lender or servicer
0
...
...
Vehicle was repossessed or sold the vehicle
0
Was approved for a loan, but didn't receive money
0
Was approved for a loan, but didn't receive the...
0
Written notification about debt
0
Wrong amount charged or received
50

Product                                             Mortgage  \
Issue
Advertising                                                0
Advertising and marketing, including promotiona...         0
Applying for a mortgage or refinancing an exist...      1017
Attempts to collect debt not owed                          0
Can't contact lender or servicer                           0
...                                                      ...
Vehicle was repossessed or sold the vehicle                0
Was approved for a loan, but didn't receive money          0
Was approved for a loan, but didn't receive the...         0
Written notification about debt                            0
Wrong amount charged or received                           0

Product                                             Payday loan, title
loan, or personal loan  \
Issue

Advertising
0
Advertising and marketing, including promotiona...
0
Applying for a mortgage or refinancing an exist...
0
Attempts to collect debt not owed
0
Can't contact lender or servicer
8
...
```

```
...
Vehicle was repossessed or sold the vehicle
1
Was approved for a loan, but didn't receive money
1
Was approved for a loan, but didn't receive the...
4
Written notification about debt
0
Wrong amount charged or received
0

Product                                          Student loan  \
Issue
Advertising                                                 0
Advertising and marketing, including promotiona...          0
Applying for a mortgage or refinancing an exist...          0
Attempts to collect debt not owed                           0
Can't contact lender or servicer                            0
...                                                       ...
Vehicle was repossessed or sold the vehicle                 0
Was approved for a loan, but didn't receive money           0
Was approved for a loan, but didn't receive the...          0
Written notification about debt                             0
Wrong amount charged or received                            0

Product                                          Vehicle loan or
lease
Issue

Advertising
0
Advertising and marketing, including promotiona...
0
Applying for a mortgage or refinancing an exist...
0
Attempts to collect debt not owed
0
Can't contact lender or servicer
0
...
...
Vehicle was repossessed or sold the vehicle
0
Was approved for a loan, but didn't receive money
0
Was approved for a loan, but didn't receive the...
0
Written notification about debt
0
```

Wrong amount charged or received
0

[76 rows x 9 columns]

Comparison between 'Sub-issue' and 'Product':
Product   Checking or
savings account \
Sub-issue

Account information incorrect
20
Account opened as a result of fraud
1542
Account sold or transferred to another company
0
Account status incorrect
48
Add-on products and services
0
...
...
Used obscene, profane, or other abusive language
0
Was not notified of investigation status or res...
1
Was signed up for overdraft on card, but don't ...
0
You never received your bill or did not know a ...
0
You told them to stop contacting you, but they ...
0

Product   Credit card or
prepaid card \
Sub-issue

Account information incorrect
99
Account opened as a result of fraud
0
Account sold or transferred to another company
4
Account status incorrect
141
Add-on products and services
18
...
...
Used obscene, profane, or other abusive language

```
0
Was not notified of investigation status or res...
22
Was signed up for overdraft on card, but don't ...
1
You never received your bill or did not know a ...
169
You told them to stop contacting you, but they ...
0

Product                                          Credit reporting,
credit repair services, or other personal consumer reports  \
Sub-issue

Account information incorrect
631
Account opened as a result of fraud
0
Account sold or transferred to another company
0
Account status incorrect
885
Add-on products and services
0
...
...
Used obscene, profane, or other abusive language
0
Was not notified of investigation status or res...
121
Was signed up for overdraft on card, but don't ...
0
You never received your bill or did not know a ...
0
You told them to stop contacting you, but they ...
0

Product                                          Mortgage  \
Sub-issue
Account information incorrect                          40
Account opened as a result of fraud                     0
Account sold or transferred to another company          0
Account status incorrect                               86
Add-on products and services                            0
...                                                   ...
Used obscene, profane, or other abusive language        0
Was not notified of investigation status or res...      0
Was signed up for overdraft on card, but don't ...      0
You never received your bill or did not know a ...       0
You told them to stop contacting you, but they ...       0
```

```
Product                                             Payday loan, title
loan, or personal loan  \
Sub-issue

Account information incorrect
8
Account opened as a result of fraud
0
Account sold or transferred to another company
0
Account status incorrect
5
Add-on products and services
0
...
...
Used obscene, profane, or other abusive language
0
Was not notified of investigation status or res...
0
Was signed up for overdraft on card, but don't ...
0
You never received your bill or did not know a ...
0
You told them to stop contacting you, but they ...
0

Product                                             Student loan  \
Sub-issue
Account information incorrect                                  2
Account opened as a result of fraud                            0
Account sold or transferred to another company                 0
Account status incorrect                                       0
Add-on products and services                                   0
...                                                          ...
Used obscene, profane, or other abusive language               0
Was not notified of investigation status or res...             0
Was signed up for overdraft on card, but don't ...             0
You never received your bill or did not know a ...             0
You told them to stop contacting you, but they ...             0

Product                                             Vehicle loan or
lease  \
Sub-issue

Account information incorrect
6
Account opened as a result of fraud
0
```

```
Account sold or transferred to another company
0
Account status incorrect
22
Add-on products and services
0
...
...
Used obscene, profane, or other abusive language
0
Was not notified of investigation status or res...
0
Was signed up for overdraft on card, but don't ...
0
You never received your bill or did not know a ...
0
You told them to stop contacting you, but they ...
0

Product                                                 Debt collection
Sub-issue
Account information incorrect                                         0
Account opened as a result of fraud                                   0
Account sold or transferred to another company                        0
Account status incorrect                                              0
Add-on products and services                                          0
...                                                                 ...
Used obscene, profane, or other abusive language                     18
Was not notified of investigation status or res...                    0
Was signed up for overdraft on card, but don't ...                    0
You never received your bill or did not know a ...                     0
You told them to stop contacting you, but they ...                   49

[158 rows x 8 columns]

Comparison between 'Company public response' and 'Product':
Product                                                 Checking or
savings account  \
Company public response

Company believes complaint caused principally b...
1
Company believes it acted appropriately as auth...
4
Company believes the complaint is the result of...
2
Company believes the complaint provided an oppo...
8
Company disputes the facts presented in the com...
0
```

```
Company has responded to the consumer and the C...
23825

Product                                          Credit card or
prepaid card  \
Company public response

Company believes complaint caused principally b...
0
Company believes it acted appropriately as auth...
1
Company believes the complaint is the result of...
2
Company believes the complaint provided an oppo...
2
Company disputes the facts presented in the com...
0
Company has responded to the consumer and the C...
15607

Product                                        Credit reporting,
credit repair services, or other personal consumer reports  \
Company public response

Company believes complaint caused principally b...
1
Company believes it acted appropriately as auth...
1
Company believes the complaint is the result of...
2
Company believes the complaint provided an oppo...
2
Company disputes the facts presented in the com...
0
Company has responded to the consumer and the C...
7395

Product                                           Debt collection  \
Company public response
Company believes complaint caused principally b...              0
Company believes it acted appropriately as auth...              0
Company believes the complaint is the result of...              1
Company believes the complaint provided an oppo...              0
Company disputes the facts presented in the com...              0
Company has responded to the consumer and the C...           2654

Product                                          Money transfer,
virtual currency, or money service  \
Company public response
```

```
Company believes complaint caused principally b...
1
Company believes it acted appropriately as auth...
0
Company believes the complaint is the result of...
0
Company believes the complaint provided an oppo...
0
Company disputes the facts presented in the com...
0
Company has responded to the consumer and the C...
3348

Product                                             Mortgage  \
Company public response
Company believes complaint caused principally b...         0
Company believes it acted appropriately as auth...         0
Company believes the complaint is the result of...         0
Company believes the complaint provided an oppo...         0
Company disputes the facts presented in the com...         2
Company has responded to the consumer and the C...      6506

Product                                             Payday loan, title
loan, or personal loan  \
Company public response

Company believes complaint caused principally b...
0
Company believes it acted appropriately as auth...
0
Company believes the complaint is the result of...
0
Company believes the complaint provided an oppo...
0
Company disputes the facts presented in the com...
0
Company has responded to the consumer and the C...
328

Product                                             Student loan  \
Company public response
Company believes complaint caused principally b...            0
Company believes it acted appropriately as auth...            0
Company believes the complaint is the result of...            0
Company believes the complaint provided an oppo...            0
Company disputes the facts presented in the com...            0
Company has responded to the consumer and the C...           39

Product                                             Vehicle loan or
lease
```

```
Company public response

Company believes complaint caused principally b...
0
Company believes it acted appropriately as auth...
0
Company believes the complaint is the result of...
0
Company believes the complaint provided an oppo...
0
Company disputes the facts presented in the com...
0
Company has responded to the consumer and the C...
609

Comparison between 'Company response to consumer' and 'Product':
Product                          Checking or savings account  \
Company response to consumer
Closed                                                     0
Closed with explanation                                14836
Closed with monetary relief                             8027
Closed with non-monetary relief                         1241
In progress                                              710

Product                          Credit card or prepaid card  \
Company response to consumer
Closed                                                     5
Closed with explanation                                 9361
Closed with monetary relief                             4798
Closed with non-monetary relief                         1621
In progress                                              412

Product                          Credit reporting, credit repair
services, or other personal consumer reports  \
Company response to consumer

Closed
2
Closed with explanation
6067
Closed with monetary relief
273
Closed with non-monetary relief
1178
In progress
190

Product                          Debt collection  \
Company response to consumer
Closed                                          0
```

```
Closed with explanation                          2367
Closed with monetary relief                       111
Closed with non-monetary relief                   209
In progress                                        49

Product                          Money transfer, virtual currency, or
money service  \
Company response to consumer

Closed
0
Closed with explanation
2709
Closed with monetary relief
634
Closed with non-monetary relief
41
In progress
69

Product                          Mortgage  \
Company response to consumer
Closed                                              1
Closed with explanation                          4928
Closed with monetary relief                       750
Closed with non-monetary relief                   876
In progress                                        46

Product                          Payday loan, title loan, or personal
loan  \
Company response to consumer

Closed
0
Closed with explanation
262
Closed with monetary relief
42
Closed with non-monetary relief
27
In progress
2

Product                          Student loan  Vehicle loan or lease
Company response to consumer
Closed                                      0                      0
Closed with explanation                    37                    477
Closed with monetary relief                 1                     61
Closed with non-monetary relief             1                     79
In progress                                 0                     16
```

```
Comparison between 'Timely response?' and 'Product':
Product         Checking or savings account  Credit card or prepaid
card  \
Timely response?

No                                        867
689
Yes                                     23237
15096

Product         Credit reporting, credit repair services, or other
personal consumer reports  \
Timely response?

No                                                              475

Yes                                                            7045


Product         Debt collection  \
Timely response?
No                            173
Yes                          2514

Product         Money transfer, virtual currency, or money
service  \
Timely response?

No                                                          140

Yes                                                        3244


Product         Mortgage  Payday loan, title loan, or personal loan
\
Timely response?

No                   16                                          10

Yes                6539                                         321


Product         Student loan  Vehicle loan or lease
Timely response?
No                        0                    33
Yes                      39                   584


import pandas as pd
```

```python
# Read data from CSV file into a DataFrame
df = pd.read_excel('/content/Consumer_Complaints.xlsx')  # Replace
'your_file.csv' with the actual file path

# Count complaints by product
complaints_by_product = df['Product'].value_counts()

# Print the number of complaints by product
print("1. Complaints by Product:")
print(complaints_by_product)
print()

# Count complaints by issue
complaints_by_issue = df['Issue'].value_counts()

# Print the number of complaints by issue
print("2. Complaints by Issue:")
print(complaints_by_issue)
print()

# Count complaints by company response
complaints_by_company_response = df['Company response to
consumer'].value_counts()

# Print the number of complaints by company response
print("3. Company Response to Complaints:")
print(complaints_by_company_response)
print()

# Count complaints by consumer response
complaints_by_consumer_response = df['Company public
response'].value_counts()

# Print the number of complaints by consumer response
print("4. Consumer Response to Resolutions:")
print(complaints_by_consumer_response)
print()

# Count complaints by timely response
complaints_by_timely_response = df['Timely response?'].value_counts()

# Print the number of complaints by timely response
print("5. Timeliness of Responses:")
print(complaints_by_timely_response)
print()

# Compare product and issue
product_issue_comparison = df.groupby(['Product',
'Issue']).size().unstack(fill_value=0)
print("6. Product vs Issue Comparison:")
```

```python
print(product_issue_comparison)
print()

# Compare product and timely response
product_timely_response_comparison = df.groupby(['Product', 'Timely
response?']).size().unstack(fill_value=0)
print("7. Product vs Timely Response Comparison:")
print(product_timely_response_comparison)
print()

# Compare company response to consumer and timely response
company_timely_response_comparison = df.groupby(['Company response to
consumer', 'Timely response?']).size().unstack(fill_value=0)
print("8. Company Response vs Timely Response Comparison:")
print(company_timely_response_comparison)
print()
```

```
1. Complaints by Product:
Product
Checking or savings account
24814
Credit card or prepaid card
16197
Credit reporting, credit repair services, or other personal consumer
reports      7710
Mortgage
6601
Money transfer, virtual currency, or money service
3453
Debt collection
2736
Vehicle loan or lease
633
Payday loan, title loan, or personal loan
333
Student loan
39
Name: count, dtype: int64

2. Complaints by Issue:
Issue
Managing an account                              15109
Incorrect information on your report              4931
Problem with a purchase shown on your statement   4415
Closing an account                                2953
Trouble during payment process                    2827
                                                  ...
Can't stop withdrawals from your bank account        2
Was approved for a loan, but didn't receive money    1
Vehicle was damaged or destroyed the vehicle         1
```

```
Problem with an overdraft                                    1
Vehicle was repossessed or sold the vehicle                  1
Name: count, Length: 76, dtype: int64

3. Company Response to Complaints:
Company response to consumer
Closed with explanation              41044
Closed with monetary relief          14697
Closed with non-monetary relief       5273
In progress                           1494
Closed                                   8
Name: count, dtype: int64

4. Consumer Response to Resolutions:
Company public response
Company has responded to the consumer and the CFPB and chooses not to
provide a public response                               60311
Company believes the complaint provided an opportunity to answer
consumer's questions                                            12
Company believes the complaint is the result of a misunderstanding
7
Company believes it acted appropriately as authorized by contract or
law                                                              6
Company believes complaint caused principally by actions of third
party outside the control or direction of the company            3
Company disputes the facts presented in the complaint
2
Name: count, dtype: int64

5. Timeliness of Responses:
Timely response?
Yes     58619
No       2403
Name: count, dtype: int64

6. Product vs Issue Comparison:
Issue                                            Advertising  \
Product
Checking or savings account                                0
Credit card or prepaid card                               14
Credit reporting, credit repair services, or ot...        0
Debt collection                                            0
Money transfer, virtual currency, or money service        0
Mortgage                                                   0
Payday loan, title loan, or personal loan                  0
Student loan                                               0
Vehicle loan or lease                                      0

Issue                                            Advertising and
marketing, including promotional offers  \
```

```
Product

Checking or savings account
0
Credit card or prepaid card
487
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                      Applying for a
mortgage or refinancing an existing mortgage  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
1017
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                      Attempts to
collect debt not owed  \
Product

Checking or savings account
0
```

```
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
1351
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                          Can't contact
lender or servicer  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
8
Student loan
0
Vehicle loan or lease
0

Issue                                          Can't stop
withdrawals from your bank account  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
```

```
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
2
Student loan
0
Vehicle loan or lease
0

Issue                                                Charged fees or
interest you didn't expect  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
44
Student loan
0
Vehicle loan or lease
0

Issue                                                Closing an account
\
Product

Checking or savings account                                      2953

Credit card or prepaid card                                         0

Credit reporting, credit repair services, or ot...                  0

Debt collection                                                     0

Money transfer, virtual currency, or money service                 0
```

```
Mortgage                                                        0

Payday loan, title loan, or personal loan                       0

Student loan                                                     0

Vehicle loan or lease                                           0


Issue                                              Closing on a
mortgage  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
610
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                              Closing your
account  ...  \
Product
...
Checking or savings account
0  ...
Credit card or prepaid card
1077  ...
Credit reporting, credit repair services, or ot...
0  ...
Debt collection
0  ...
Money transfer, virtual currency, or money service
0  ...
Mortgage
0  ...
Payday loan, title loan, or personal loan
0  ...
```

```
Student loan
0  ...
Vehicle loan or lease
0  ...

Issue                                          Trouble using your
card  \
Product

Checking or savings account
0
Credit card or prepaid card
346
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                          Unable to get your
credit report or credit score  \
Product

Checking or savings account
5
Credit card or prepaid card
6
Credit reporting, credit repair services, or ot...
46
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
4
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0
```

```
Issue                                          Unauthorized
transactions or other transaction problem  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
155
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                          Unexpected or
other fees  \
Product

Checking or savings account
0
Credit card or prepaid card
570
Credit reporting, credit repair services, or ot...
2
Debt collection
0
Money transfer, virtual currency, or money service
90
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                          Vehicle was
damaged or destroyed the vehicle  \
Product
```

```
Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
1
Student loan
0
Vehicle loan or lease
0

Issue                                              Vehicle was
repossessed or sold the vehicle  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
1
Student loan
0
Vehicle loan or lease
0

Issue                                              Was approved for a
loan, but didn't receive money  \
Product

Checking or savings account
0
Credit card or prepaid card
```

```
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
1
Student loan
0
Vehicle loan or lease
0

Issue                                               Was approved for a
loan, but didn't receive the money  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
4
Student loan
0
Vehicle loan or lease
0

Issue                                               Written
notification about debt  \
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
```

```
487
Money transfer, virtual currency, or money service
0
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

Issue                                               Wrong amount
charged or received
Product

Checking or savings account
0
Credit card or prepaid card
0
Credit reporting, credit repair services, or ot...
0
Debt collection
0
Money transfer, virtual currency, or money service
50
Mortgage
0
Payday loan, title loan, or personal loan
0
Student loan
0
Vehicle loan or lease
0

[9 rows x 76 columns]

7. Product vs Timely Response Comparison:
Timely response?                                       No      Yes
Product
Checking or savings account                           867    23237
Credit card or prepaid card                           689    15096
Credit reporting, credit repair services, or ot...    475     7045
Debt collection                                       173     2514
Money transfer, virtual currency, or money service    140     3244
Mortgage                                               16     6539
Payday loan, title loan, or personal loan             10      321
Student loan                                            0       39
Vehicle loan or lease                                  33      584
```

```
8. Company Response vs Timely Response Comparison:
Timely response?                      No     Yes
Company response to consumer
Closed                                 8       0
Closed with explanation             1527   39517
Closed with monetary relief          690   14007
Closed with non-monetary relief      178    5095


import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

df = pd.read_excel('/content/Consumer_Complaints.xlsx')

# Define column names
columns = ['Complaint ID', 'Submitted via', 'Date received', 'Date
sent to company', 'State', 'Product', 'Sub-product', 'Issue', 'Sub-
issue', 'Company public response', 'Company response to consumer',
'Timely response']

# Create DataFrame
df = pd.DataFrame(df, columns=columns)

# Convert date columns to datetime
date_columns = ['Date received', 'Date sent to company']
df[date_columns] = df[date_columns].apply(pd.to_datetime)

# Count of complaints by state
state_counts = df['State'].value_counts()

# Plotting
plt.figure(figsize=(10, 6))
sns.barplot(x=state_counts.index, y=state_counts.values,
palette='viridis')
plt.title('Number of Complaints by State')
plt.xlabel('State')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()

<ipython-input-62-c9f346778458>:22: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `x` variable to `hue` and set
`legend=False` for the same effect.

  sns.barplot(x=state_counts.index, y=state_counts.values,
palette='viridis')
```
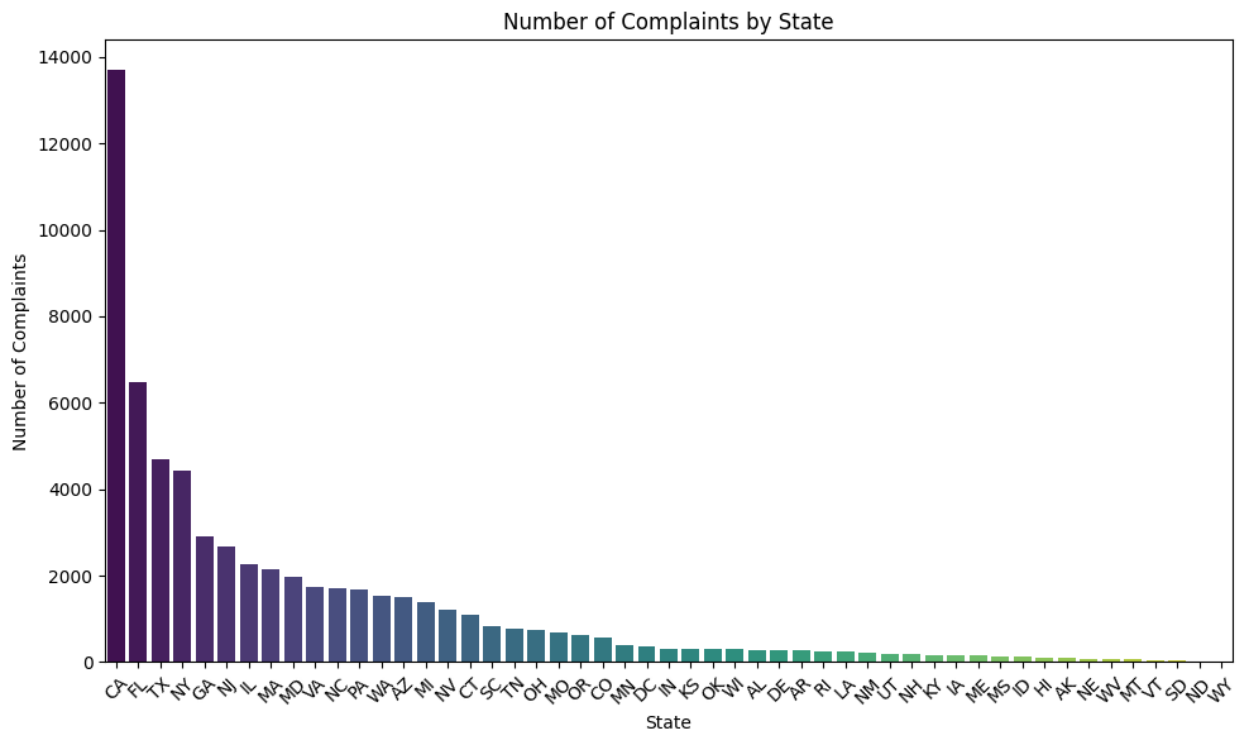
Number of Complaints by State
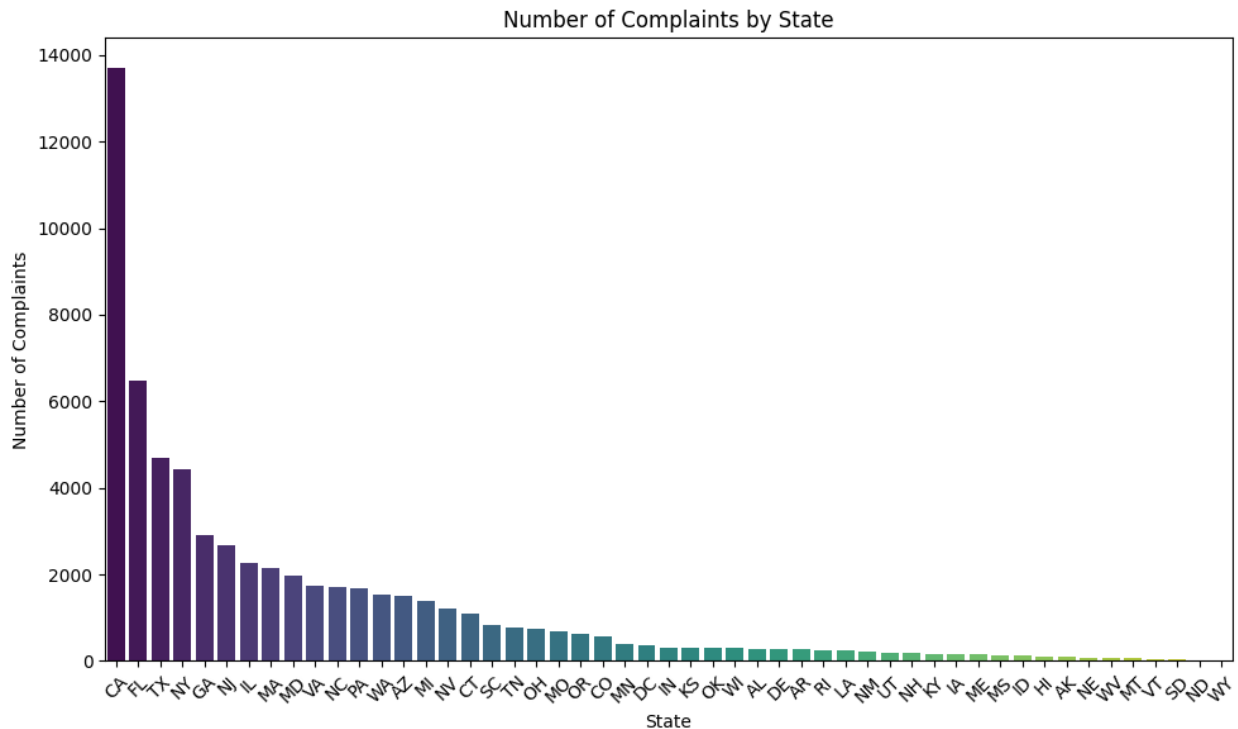
```python
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Read Excel file
file_path = '/content/Consumer_Complaints.xlsx'  # Replace
'your_file.xlsx' with the actual file path
df = pd.read_excel(file_path)

# Define column names
columns = ['Complaint ID', 'Submitted via', 'Date received', 'Date
sent to company', 'State', 'Product', 'Sub-product', 'Issue', 'Sub-
issue', 'Company public response', 'Company response to consumer',
'Timely response']

# Create DataFrame
df = pd.DataFrame(df, columns=columns)

# Convert date columns to datetime
date_columns = ['Date received', 'Date sent to company']
df[date_columns] = df[date_columns].apply(pd.to_datetime)

# Count of complaints by state
state_counts = df['State'].value_counts()

# Plotting
plt.figure(figsize=(10, 6))
```

```
sns.barplot(x=state_counts.index, y=state_counts.values,
palette='viridis')
plt.title('Number of Complaints by State')
plt.xlabel('State')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()

<ipython-input-64-e0ba4f150f77>:24: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `x` variable to `hue` and set
`legend=False` for the same effect.

  sns.barplot(x=state_counts.index, y=state_counts.values,
palette='viridis')
```


Number of Complaints by State

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import nltk
nltk.download('vader_lexicon')
# Read Excel file
file_path = '/content/Consumer_Complaints.xlsx'  # Replace
'your_file.xlsx' with the actual file path
df = pd.read_excel(file_path)
```

```python
# Define column names
columns = ['Complaint ID', 'Submitted via', 'Date received', 'Date
sent to company', 'State', 'Product', 'Sub-product', 'Issue', 'Sub-
issue', 'Company public response', 'Company response to consumer',
'Timely response']

# Create DataFrame
df = pd.DataFrame(df, columns=columns)

# Convert date columns to datetime
date_columns = ['Date received', 'Date sent to company']
df[date_columns] = df[date_columns].apply(pd.to_datetime)


# Analysis 5: Geographical Analysis
state_counts = df['State'].value_counts().head(10)

# Plotting
plt.figure(figsize=(10, 6))
sns.barplot(x=state_counts.values, y=state_counts.index,
palette='viridis')
plt.title('Top 10 States by Number of Complaints')
plt.xlabel('Number of Complaints')
plt.ylabel('State')
plt.tight_layout()
plt.show()

# Analysis 6: Trend Analysis
df['Month'] = df['Date received'].dt.to_period('M')
monthly_complaints = df.groupby('Month').size()

# Plotting
plt.figure(figsize=(12, 6))
monthly_complaints.plot(marker='o')
plt.title('Trend of Complaints Over Time')
plt.xlabel('Month')
plt.ylabel('Number of Complaints')
plt.xticks(rotation=45)
plt.grid(True)
plt.tight_layout()
plt.show()

# # Analysis 7: Text Analysis of Complaints (using NLTK for example)
# from nltk.sentiment.vader import SentimentIntensityAnalyzer

# # Initialize Sentiment Analyzer
# sia = SentimentIntensityAnalyzer()

# # Calculate sentiment scores for each complaint
# df['Sentiment'] = df['Consumer complaint narrative'].apply(lambda x:
```

```
sia.polarity_scores(str(x))['compound'])

# # Plotting
# plt.figure(figsize=(10, 6))
# sns.histplot(df['Sentiment'], bins=20, kde=True, color='skyblue')
# plt.title('Distribution of Sentiment Scores')
# plt.xlabel('Sentiment Score')
# plt.ylabel('Frequency')
# plt.tight_layout()
# plt.show()

# # Analysis 8: Company Response Time
# df['Response Time'] = (df['Date sent to company'] - df['Date
received']).dt.days

# # Plotting
# plt.figure(figsize=(10, 6))
# sns.boxplot(x='Company response to consumer', y='Response Time',
data=df, palette='viridis')
# plt.title('Company Response Time Distribution')
# plt.xlabel('Company Response')
# plt.ylabel('Response Time (Days)')
# plt.tight_layout()
# plt.show()

# Analysis 9: Demographic Analysis (assuming demographic data is
available)
# For example, let's say 'Age' and 'Income Level' are available
demographic columns
# age_counts = df['Age'].value_counts()
# income_counts = df['Income Level'].value_counts()

# # Plotting
# plt.figure(figsize=(16, 6))
# plt.subplot(1, 2, 1)
# age_counts.plot(kind='bar', color='skyblue')
# plt.title('Distribution of Complaints by Age')
# plt.xlabel('Age')
# plt.ylabel('Number of Complaints')

# plt.subplot(1, 2, 2)
# income_counts.plot(kind='bar', color='salmon')
# plt.title('Distribution of Complaints by Income Level')
# plt.xlabel('Income Level')
# plt.ylabel('Number of Complaints')

plt.tight_layout()
plt.show()
```

```
[nltk_data] Downloading package vader_lexicon to /root/nltk_data...
[nltk_data]   Package vader_lexicon is already up-to-date!
<ipython-input-74-607aa54b745e>:25: FutureWarning:

Passing `palette` without assigning `hue` is deprecated and will be
removed in v0.14.0. Assign the `y` variable to `hue` and set
`legend=False` for the same effect.

  sns.barplot(x=state_counts.values, y=state_counts.index,
palette='viridis')
```


Top 10 States by Number of Complaints

Trend of Complaints Over Time
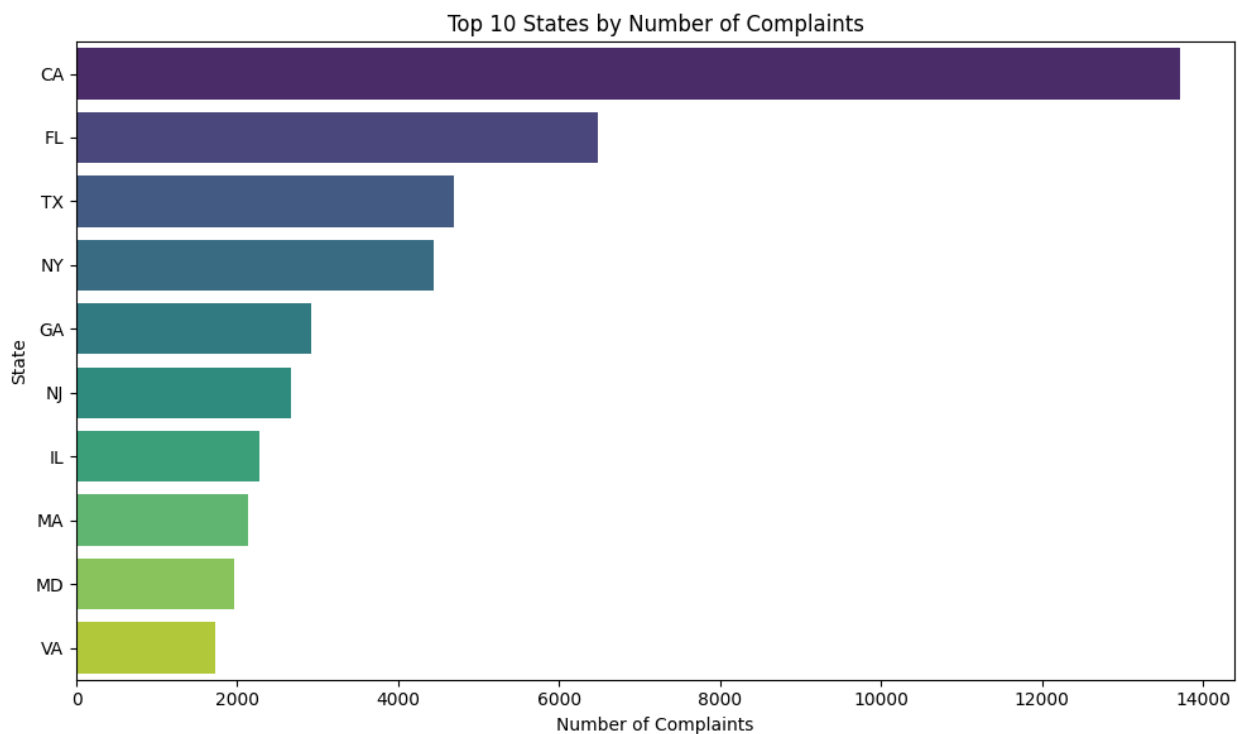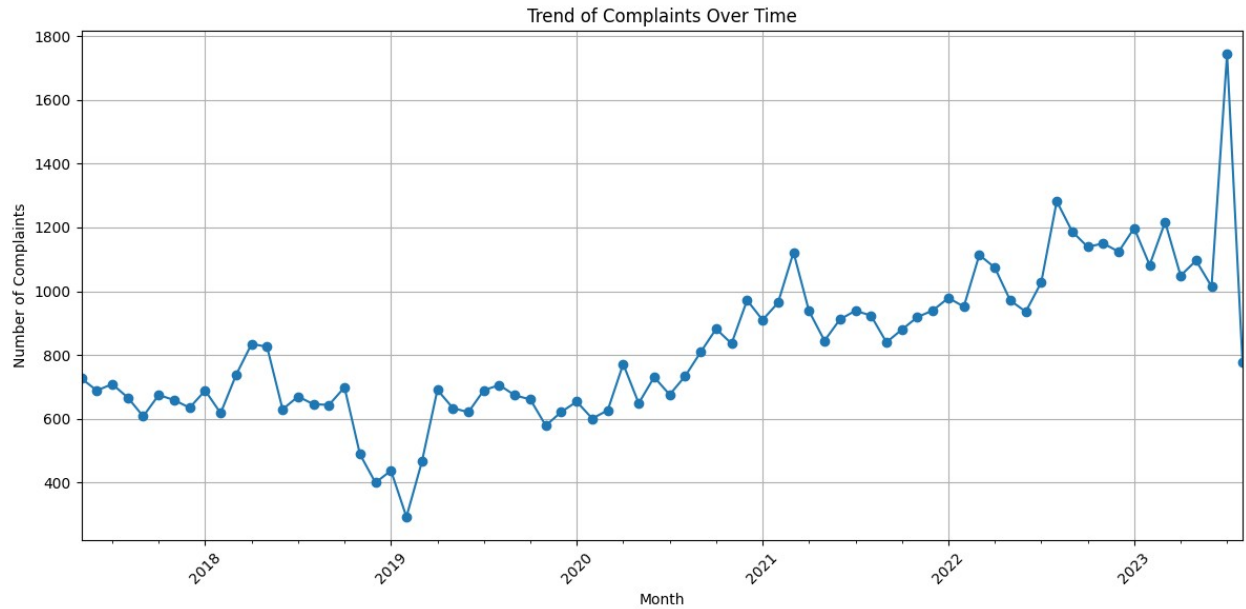
```
<Figure size 640x480 with 0 Axes>

!pip install nltk

Requirement already satisfied: nltk in /usr/local/lib/python3.10/dist-
packages (3.8.1)
Requirement already satisfied: click in
/usr/local/lib/python3.10/dist-packages (from nltk) (8.1.7)
Requirement already satisfied: joblib in
/usr/local/lib/python3.10/dist-packages (from nltk) (1.4.0)
Requirement already satisfied: regex>=2021.8.3 in
/usr/local/lib/python3.10/dist-packages (from nltk) (2023.12.25)
Requirement already satisfied: tqdm in /usr/local/lib/python3.10/dist-
packages (from nltk) (4.66.2)
```