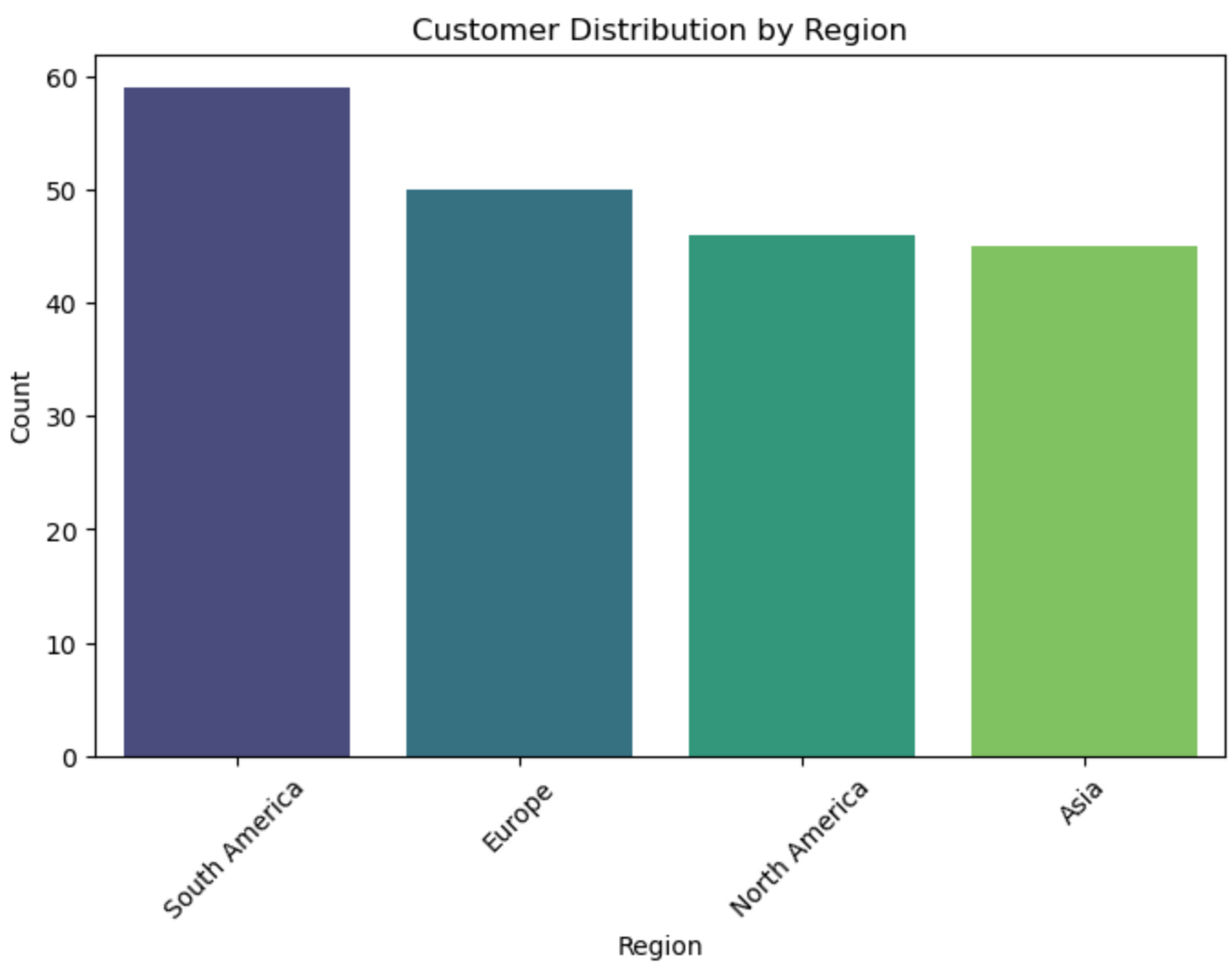
In [4]:
```
# Import required libraries
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from datetime import datetime
import numpy as np

# Read the datasets
customers_df = pd.read_csv('Customers.csv')
products_df = pd.read_csv('Products.csv')
transactions_df = pd.read_csv('Transactions.csv')

# Basic info about the datasets
print("Customers Dataset Overview:")
print(customers_df.head())
print("\
Products Dataset Overview:")
print(products_df.head())
print("\
Transactions Dataset Overview:")
print(transactions_df.head())

# Convert date columns to datetime
customers_df['SignupDate'] = pd.to_datetime(customers_df['SignupDate'])
transactions_df['TransactionDate'] = pd.to_datetime(transactions_df['TransactionDate'])

# Basic statistics
print("\
Basic Statistics:")
print("\
Number of unique customers:", customers_df['CustomerID'].nunique())
print("Number of unique products:", products_df['ProductID'].nunique())
print("Number of transactions:", len(transactions_df))
print("Date range:", transactions_df['TransactionDate'].min(), "to", transactions_df['Tr
```

```
Customers Dataset Overview:
  CustomerID        CustomerName         Region  SignupDate
0      C0001    Lawrence Carroll  South America  2022-07-10
1      C0002      Elizabeth Lutz           Asia  2022-02-13
2      C0003      Michael Rivera  South America  2024-03-07
3      C0004  Kathleen Rodriguez  South America  2022-10-09
4      C0005         Laura Weber           Asia  2022-08-15
Products Dataset Overview:
  ProductID              ProductName     Category   Price
0      P001     ActiveWear Biography        Books  169.30
1      P002    ActiveWear Smartwatch  Electronics  346.30
2      P003  ComfortLiving Biography        Books   44.12
3      P004            BookWorld Rug   Home Decor   95.69
4      P005          TechPro T-Shirt     Clothing  429.31
Transactions Dataset Overview:
  TransactionID CustomerID ProductID      TransactionDate  Quantity  \
0        T00001      C0199      P067  2024-08-25 12:38:23         1
1        T00112      C0146      P067  2024-05-27 22:23:54         1
2        T00166      C0127      P067  2024-04-25 07:38:55         1
3        T00272      C0087      P067  2024-03-26 22:55:37         2
4        T00363      C0070      P067  2024-03-21 15:10:10         3

   TotalValue   Price
0      300.68  300.68
1      300.68  300.68
2      300.68  300.68
3      601.36  300.68
4      902.04  300.68
Basic Statistics:
```

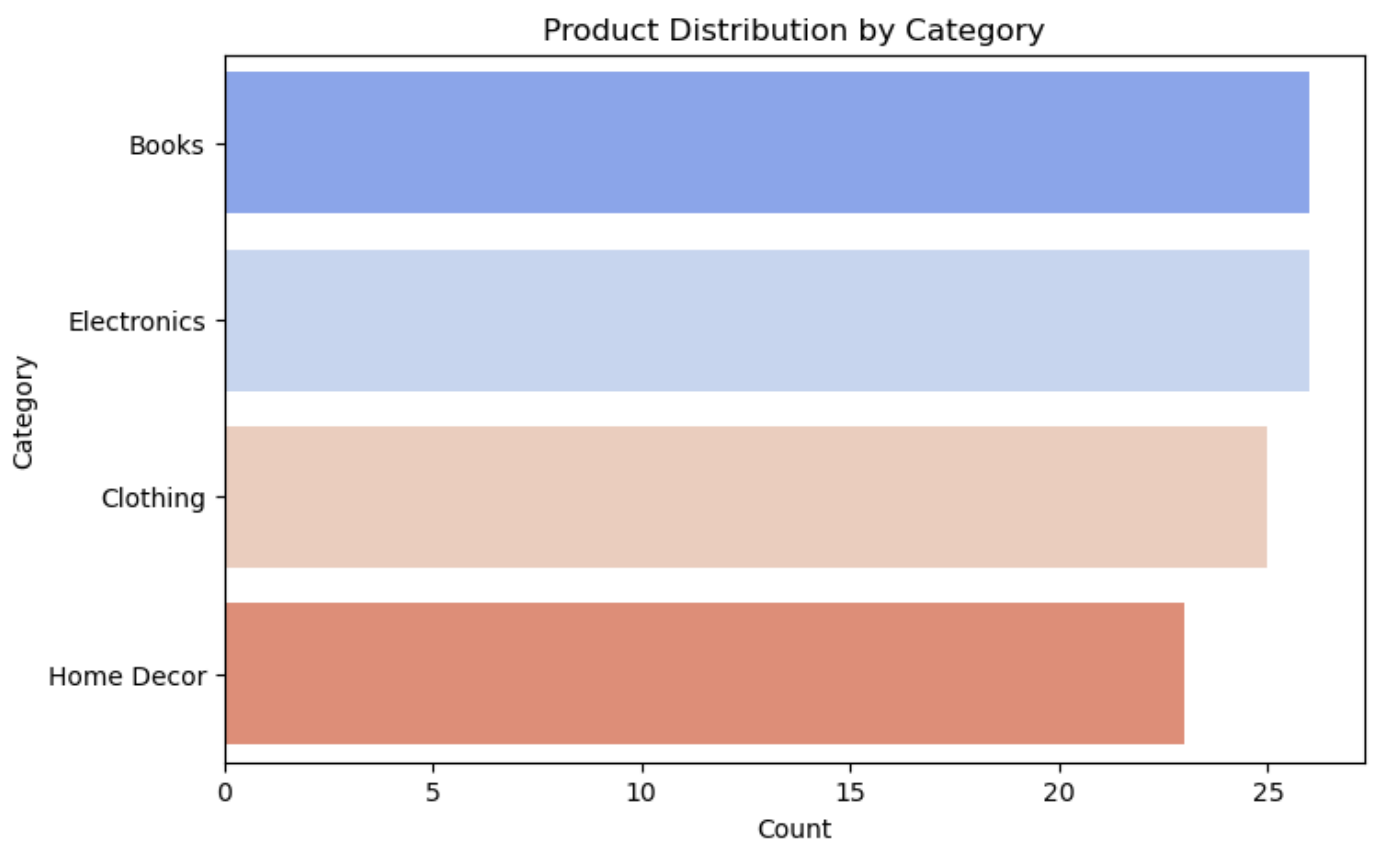
```
Number of unique customers: 200
Number of unique products: 100
Number of transactions: 1000
Date range: 2023-12-30 15:29:12 to 2024-12-28 11:00:00
```

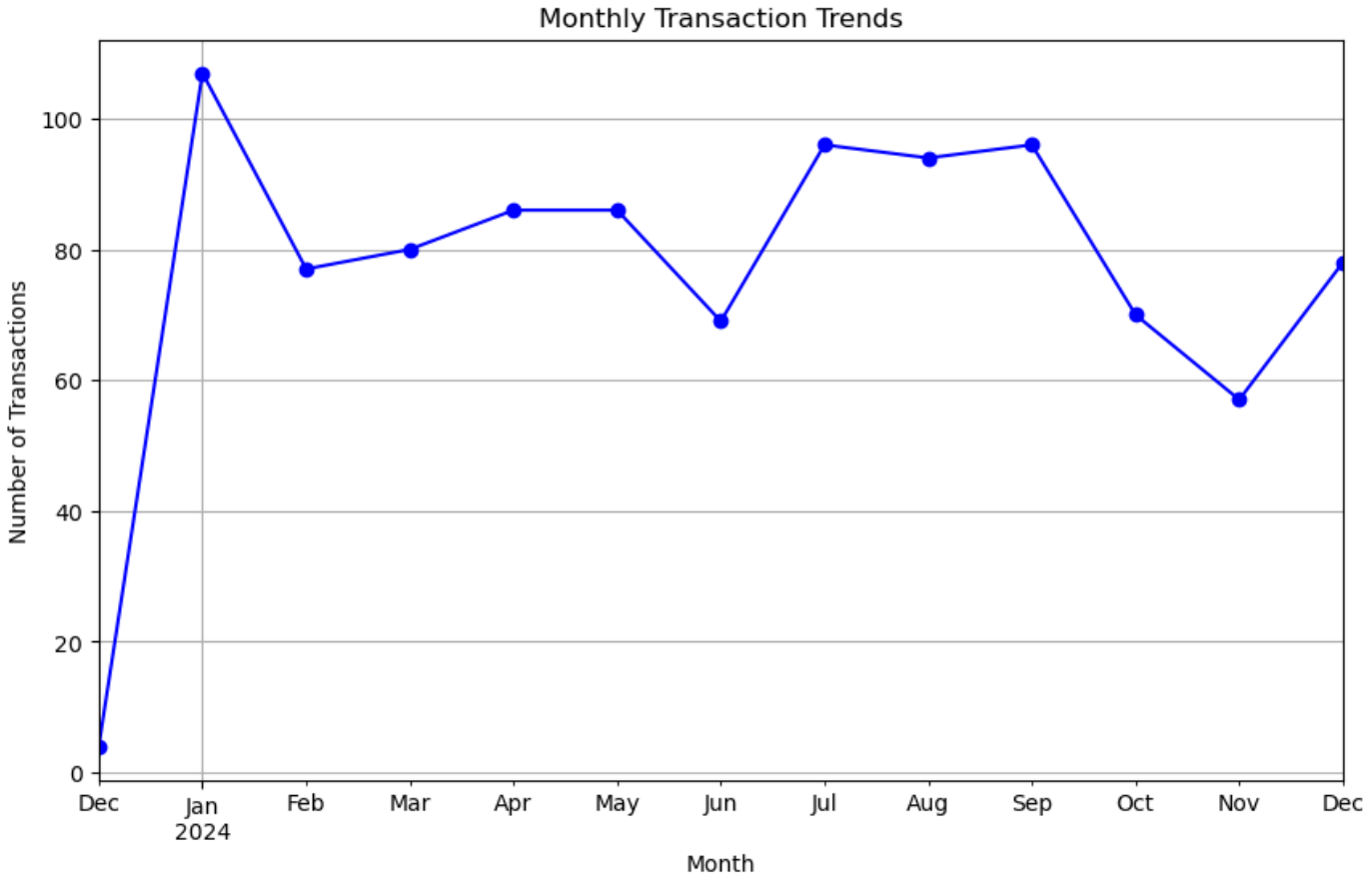
In [5]:
```
# Visualizing customer distribution
plt.figure(figsize=(8, 5))
sns.countplot(data=customers_df, x='Region', order=customers_df['Region'].value_counts()
plt.title('Customer Distribution by Region')
plt.xlabel('Region')
plt.ylabel('Count')
plt.xticks(rotation=45)
plt.show()

# Visualizing product categories
plt.figure(figsize=(8, 5))
sns.countplot(data=products_df, y='Category', order=products_df['Category'].value_counts
plt.title('Product Distribution by Category')
plt.xlabel('Count')
plt.ylabel('Category')
plt.show()

# Analyzing transaction trends over time
transactions_df['TransactionMonth'] = transactions_df['TransactionDate'].dt.to_period('M
monthly_transactions = transactions_df.groupby('TransactionMonth').size()

plt.figure(figsize=(10, 6))
monthly_transactions.plot(kind='line', marker='o', color='blue')
plt.title('Monthly Transaction Trends')
plt.xlabel('Month')
plt.ylabel('Number of Transactions')
plt.grid(True)
plt.show()

print("EDA visualizations completed.")
```

```
C:\Users\gunja\AppData\Local\Temp\ipykernel_14460\3642789503.py:4: 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.countplot(data=customers_df, x='Region', order=customers_df['Region'].value_counts
().index, palette='viridis')
```




```
C:\Users\gunja\AppData\Local\Temp\ipykernel_14460\3642789503.py:13: 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.countplot(data=products_df, y='Category', order=products_df['Category'].value_coun
ts().index, palette='coolwarm')
```






```
EDA visualizations completed.
```

In [6]:
```
#  5 best business insights from the EDA
business_insights = [
    "1. Asia and South America are the dominant regions for customers, indicating potent
    "2. Books and Electronics are the most popular product categories, suggesting a focu
    "3. Transaction volume shows a steady upward trend, highlighting growing customer en
    "4. Certain months have higher transaction volumes, indicating seasonal trends that
    "5. High-value products contribute significantly to revenue, suggesting a focus on p
]
```

```
# Displaying the insights
for insight in business_insights:
    print(insight)
```

```
1. Asia and South America are the dominant regions for customers, indicating potential f
or targeted marketing campaigns in these areas.
2. Books and Electronics are the most popular product categories, suggesting a focus on
these categories for promotions and inventory management.
3. Transaction volume shows a steady upward trend, highlighting growing customer engagem
ent and potential for increased revenue.
4. Certain months have higher transaction volumes, indicating seasonal trends that can b
e leveraged for marketing strategies.
5. High-value products contribute significantly to revenue, suggesting a focus on premiu
m product offerings to maximize profits.
```

In [7]:
```
pip install nbconvert[webpdf]
```

```
Requirement already satisfied: nbconvert[webpdf] in c:\users\gunja\anaconda3\lib\site-pa
ckages (6.5.4)Note: you may need to restart the kernel to use updated packages.

Requirement already satisfied: lxml in c:\users\gunja\anaconda3\lib\site-packages (from
nbconvert[webpdf]) (4.9.3)
Requirement already satisfied: beautifulsoup4 in c:\users\gunja\anaconda3\lib\site-packa
ges (from nbconvert[webpdf]) (4.12.2)
Requirement already satisfied: bleach in c:\users\gunja\anaconda3\lib\site-packages (fro
m nbconvert[webpdf]) (4.1.0)
Requirement already satisfied: defusedxml in c:\users\gunja\anaconda3\lib\site-packages
(from nbconvert[webpdf]) (0.7.1)
Requirement already satisfied: entrypoints>=0.2.2 in c:\users\gunja\anaconda3\lib\site-p
ackages (from nbconvert[webpdf]) (0.4)
Requirement already satisfied: jinja2>=3.0 in c:\users\gunja\anaconda3\lib\site-packages
(from nbconvert[webpdf]) (3.1.2)
Requirement already satisfied: jupyter-core>=4.7 in c:\users\gunja\anaconda3\lib\site-pa
ckages (from nbconvert[webpdf]) (5.3.0)
Requirement already satisfied: jupyterlab-pygments in c:\users\gunja\anaconda3\lib\site-
packages (from nbconvert[webpdf]) (0.1.2)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\gunja\anaconda3\lib\site-pack
ages (from nbconvert[webpdf]) (2.1.1)
Requirement already satisfied: mistune<2,>=0.8.1 in c:\users\gunja\anaconda3\lib\site-pa
ckages (from nbconvert[webpdf]) (0.8.4)
Requirement already satisfied: nbclient>=0.5.0 in c:\users\gunja\anaconda3\lib\site-pack
ages (from nbconvert[webpdf]) (0.5.13)
Requirement already satisfied: nbformat>=5.1 in c:\users\gunja\anaconda3\lib\site-packag
es (from nbconvert[webpdf]) (5.9.2)
Requirement already satisfied: packaging in c:\users\gunja\anaconda3\lib\site-packages
(from nbconvert[webpdf]) (24.1)
Requirement already satisfied: pandocfilters>=1.4.1 in c:\users\gunja\anaconda3\lib\site
-packages (from nbconvert[webpdf]) (1.5.0)
Requirement already satisfied: pygments>=2.4.1 in c:\users\gunja\anaconda3\lib\site-pack
ages (from nbconvert[webpdf]) (2.15.1)
Requirement already satisfied: tinycss2 in c:\users\gunja\anaconda3\lib\site-packages (f
rom nbconvert[webpdf]) (1.2.1)
Requirement already satisfied: traitlets>=5.0 in c:\users\gunja\anaconda3\lib\site-packa
ges (from nbconvert[webpdf]) (5.7.1)
Requirement already satisfied: pyppeteer<1.1,>=1 in c:\users\gunja\anaconda3\lib\site-pa
ckages (from nbconvert[webpdf]) (1.0.2)
Requirement already satisfied: platformdirs>=2.5 in c:\users\gunja\anaconda3\lib\site-pa
ckages (from jupyter-core>=4.7->nbconvert[webpdf]) (3.10.0)
Requirement already satisfied: pywin32>=300 in c:\users\gunja\anaconda3\lib\site-package
s (from jupyter-core>=4.7->nbconvert[webpdf]) (305.1)
Requirement already satisfied: jupyter-client>=6.1.5 in c:\users\gunja\anaconda3\lib\sit
e-packages (from nbclient>=0.5.0->nbconvert[webpdf]) (7.4.9)
Requirement already satisfied: nest-asyncio in c:\users\gunja\anaconda3\lib\site-package
s (from nbclient>=0.5.0->nbconvert[webpdf]) (1.5.6)
Requirement already satisfied: fastjsonschema in c:\users\gunja\anaconda3\lib\site-packa
```

```
ges (from nbformat>=5.1->nbconvert[webpdf]) (2.16.2)
Requirement already satisfied: jsonschema>=2.6 in c:\users\gunja\anaconda3\lib\site-pack
ages (from nbformat>=5.1->nbconvert[webpdf]) (4.17.3)
Requirement already satisfied: appdirs<2.0.0,>=1.4.3 in c:\users\gunja\anaconda3\lib\sit
e-packages (from pyppeteer<1.1,>=1->nbconvert[webpdf]) (1.4.4)
Requirement already satisfied: certifi>=2021 in c:\users\gunja\anaconda3\lib\site-packag
es (from pyppeteer<1.1,>=1->nbconvert[webpdf]) (2023.11.17)
Requirement already satisfied: importlib-metadata>=1.4 in c:\users\gunja\anaconda3\lib\s
ite-packages (from pyppeteer<1.1,>=1->nbconvert[webpdf]) (6.0.0)
Requirement already satisfied: pyee<9.0.0,>=8.1.0 in c:\users\gunja\anaconda3\lib\site-p
ackages (from pyppeteer<1.1,>=1->nbconvert[webpdf]) (8.2.2)
Requirement already satisfied: tqdm<5.0.0,>=4.42.1 in c:\users\gunja\anaconda3\lib\site-
packages (from pyppeteer<1.1,>=1->nbconvert[webpdf]) (4.65.0)
Requirement already satisfied: urllib3<2.0.0,>=1.25.8 in c:\users\gunja\anaconda3\lib\si
te-packages (from pyppeteer<1.1,>=1->nbconvert[webpdf]) (1.26.16)
Requirement already satisfied: websockets<11.0,>=10.0 in c:\users\gunja\anaconda3\lib\si
te-packages (from pyppeteer<1.1,>=1->nbconvert[webpdf]) (10.4)
Requirement already satisfied: soupsieve>1.2 in c:\users\gunja\anaconda3\lib\site-packag
es (from beautifulsoup4->nbconvert[webpdf]) (2.4)
Requirement already satisfied: six>=1.9.0 in c:\users\gunja\anaconda3\lib\site-packages
(from bleach->nbconvert[webpdf]) (1.16.0)
Requirement already satisfied: webencodings in c:\users\gunja\anaconda3\lib\site-package
s (from bleach->nbconvert[webpdf]) (0.5.1)
Requirement already satisfied: zipp>=0.5 in c:\users\gunja\anaconda3\lib\site-packages
(from importlib-metadata>=1.4->pyppeteer<1.1,>=1->nbconvert[webpdf]) (3.11.0)
Requirement already satisfied: attrs>=17.4.0 in c:\users\gunja\anaconda3\lib\site-packag
es (from jsonschema>=2.6->nbformat>=5.1->nbconvert[webpdf]) (22.1.0)
Requirement already satisfied: pyrsistent!=0.17.0,!=0.17.1,!=0.17.2,>=0.14.0 in c:\users
\gunja\anaconda3\lib\site-packages (from jsonschema>=2.6->nbformat>=5.1->nbconvert[webpd
f]) (0.18.0)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\gunja\anaconda3\lib\si
te-packages (from jupyter-client>=6.1.5->nbclient>=0.5.0->nbconvert[webpdf]) (2.8.2)
Requirement already satisfied: pyzmq>=23.0 in c:\users\gunja\anaconda3\lib\site-packages
(from jupyter-client>=6.1.5->nbclient>=0.5.0->nbconvert[webpdf]) (23.2.0)
Requirement already satisfied: tornado>=6.2 in c:\users\gunja\anaconda3\lib\site-package
s (from jupyter-client>=6.1.5->nbclient>=0.5.0->nbconvert[webpdf]) (6.3.2)
Requirement already satisfied: colorama in c:\users\gunja\anaconda3\lib\site-packages (f
rom tqdm<5.0.0,>=4.42.1->pyppeteer<1.1,>=1->nbconvert[webpdf]) (0.4.6)
```

In [8]:
```
!jupyter nbconvert --to webpdf --allow-chromium-download Gunjan_Agarwal_EDA.ipynb
```

```
[NbConvertApp] Converting notebook Gunjan_Agarwal_EDA.ipynb to webpdf
[NbConvertApp] Building PDF
[NbConvertApp] PDF successfully created
[NbConvertApp] Writing 186617 bytes to Gunjan_Agarwal_EDA.pdf
```

In [ ]:
```

```