```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

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

```

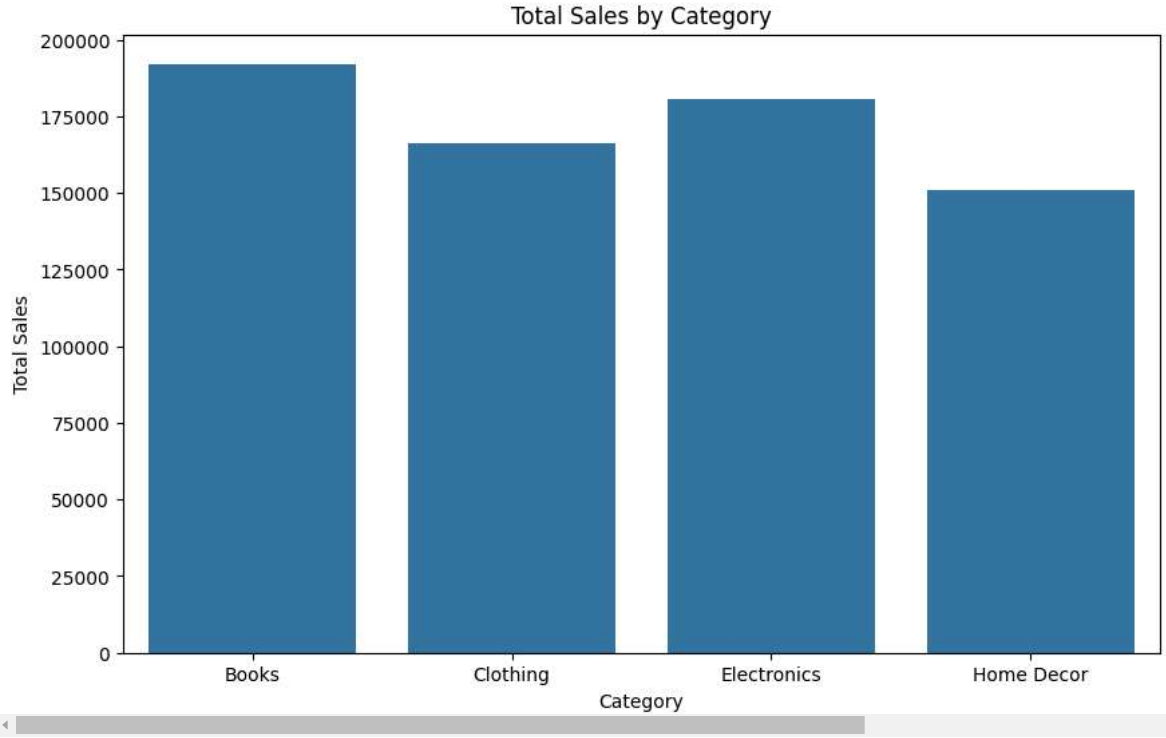
```
#merging datasets for analysis
merged_df = transactions_df.merge(products_df, on="ProductID").merge(customers_df, on="Custo

```

```
print(merged_df)
```

```
    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
..            ...        ...       ...                  ...       ...
995        T00496      C0118      P037  2024-10-24 08:30:27         1
996        T00759      C0059      P037  2024-06-04 02:15:24         3
997        T00922      C0018      P037  2024-04-05 13:05:32         4
998        T00959      C0115      P037  2024-09-29 10:16:02         2
999        T00992      C0024      P037  2024-04-21 10:52:24         1

     TotalValue  Price_x                    ProductName     Category  \
0        300.68   300.68  ComfortLiving Bluetooth Speaker  Electronics
1        300.68   300.68  ComfortLiving Bluetooth Speaker  Electronics
2        300.68   300.68  ComfortLiving Bluetooth Speaker  Electronics
3        601.36   300.68  ComfortLiving Bluetooth Speaker  Electronics
4        902.04   300.68  ComfortLiving Bluetooth Speaker  Electronics
..          ...      ...                             ...          ...
995      459.86   459.86            SoundWave Smartwatch  Electronics
996     1379.58   459.86            SoundWave Smartwatch  Electronics
997     1839.44   459.86            SoundWave Smartwatch  Electronics
998      919.72   459.86            SoundWave Smartwatch  Electronics
999      459.86   459.86            SoundWave Smartwatch  Electronics

     Price_y          CustomerName         Region  SignupDate
0     300.68        Andrea Jenkins         Europe  2022-12-03
1     300.68       Brittany Harvey           Asia  2024-09-04
2     300.68       Kathryn Stevens         Europe  2024-04-04
3     300.68       Travis Campbell  South America  2024-04-11
4     300.68         Timothy Perez         Europe  2022-03-15
..       ...                   ...            ...         ...
995   459.86            Jacob Holt  South America  2022-01-22
996   459.86  Mrs. Kimberly Wright  North America  2024-04-07
997   459.86          Tyler Haynes  North America  2024-09-21
998   459.86       Joshua Hamilton           Asia  2024-11-11
999   459.86        Michele Cooley  North America  2024-02-05

[1000 rows x 13 columns]
```

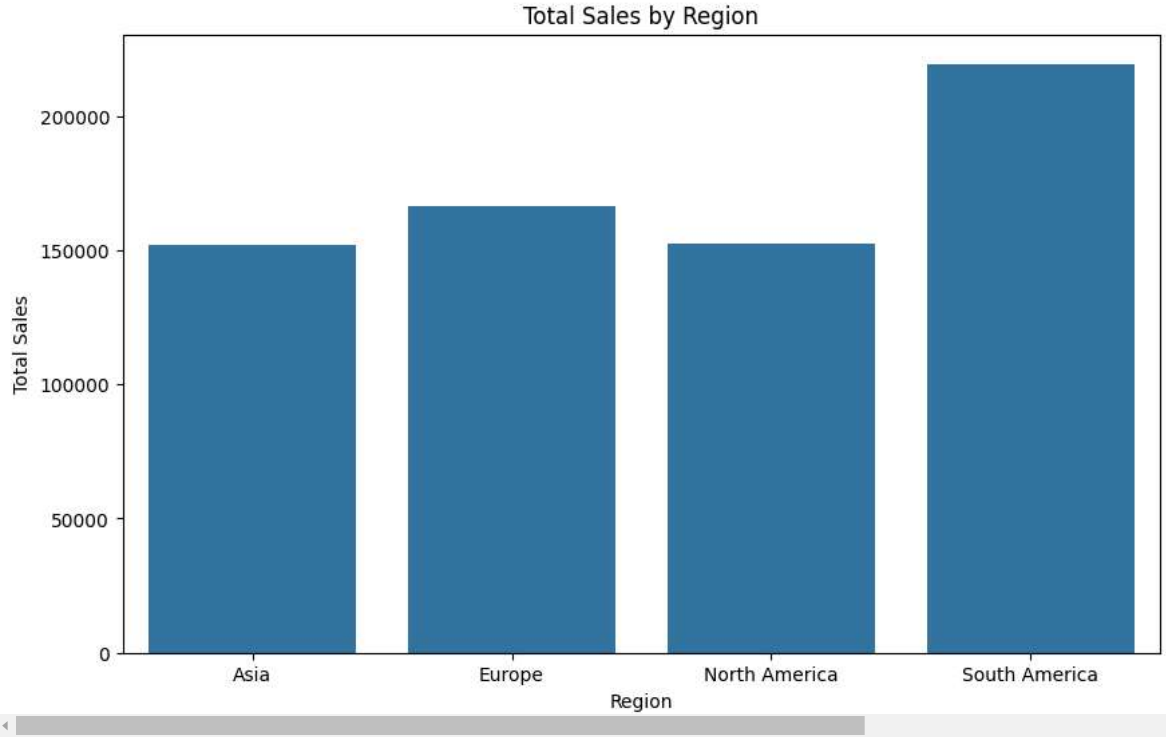
```
# Total sales per category
category_sales = merged_df.groupby("Category")["TotalValue"].sum()
print("Category Sales:\n", category_sales)
plt.figure(figsize=(10, 6))
sns.barplot(x=category_sales.index, y=category_sales.values)
plt.xlabel("Category")
plt.ylabel("Total Sales")
plt.title("Total Sales by Category")
plt.show()
```

```
Category Sales:
 Category
Books          192147.47
Clothing       166170.66
Electronics    180783.50
Home Decor     150893.93
Name: TotalValue, dtype: float64
```



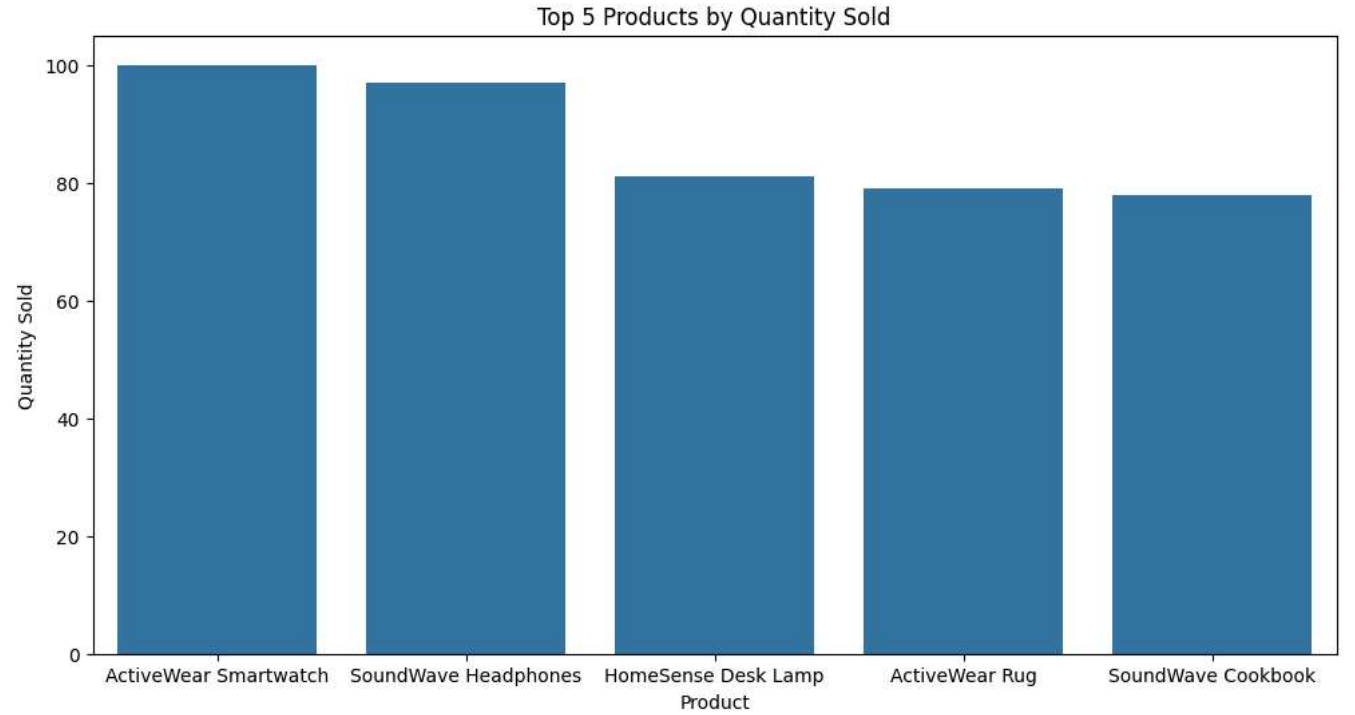

```
# Total sales by region
region_sales = merged_df.groupby("Region")["TotalValue"].sum()
print("\nRegional Sales:\n", region_sales)
plt.figure(figsize=(10, 6))
sns.barplot(x=region_sales.index, y=region_sales.values)
plt.xlabel("Region")
plt.ylabel("Total Sales")
plt.title("Total Sales by Region")
plt.show()
```

```
Regional Sales:
 Region
Asia             152074.97
Europe           166254.63
North America    152313.40
South America    219352.56
Name: TotalValue, dtype: float64
```




```
# Top 5 products by quantity sold
popular_products = merged_df.groupby("ProductName")["Quantity"].sum().sort_values(ascending=
print("\nTop 5 Products:\n", popular_products)
plt.figure(figsize=(12, 6))
sns.barplot(x=popular_products.index, y=popular_products.values)
plt.xlabel("Product")
plt.ylabel("Quantity Sold")
plt.title("Top 5 Products by Quantity Sold")
plt.show()
```

```
Top 5 Products:
 ProductName
ActiveWear Smartwatch    100
SoundWave Headphones      97
HomeSense Desk Lamp       81
ActiveWear Rug            79
SoundWave Cookbook        78
Name: Quantity, dtype: int64
```

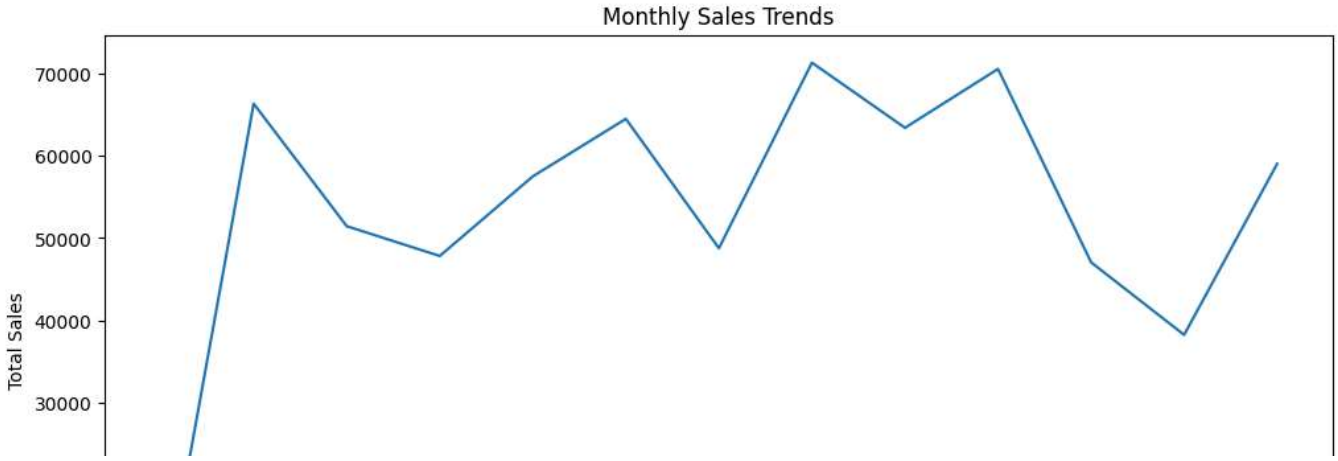



```
# Monthly sales trends
merged_df['TransactionMonth'] = pd.to_datetime(merged_df['TransactionDate']).dt.to_period('M
monthly_sales = merged_df.groupby("TransactionMonth")["TotalValue"].sum()
print("\nMonthly Sales Trends:\n", monthly_sales)
```

```
Monthly Sales Trends:
 TransactionMonth
2023-12     3769.52
2024-01    66376.39
2024-02    51459.27
2024-03    47828.73
2024-04    57519.06
2024-05    64527.74
2024-06    48771.18
2024-07    71366.39
2024-08    63436.74
2024-09    70603.75
2024-10    47063.22
2024-11    38224.37
2024-12    59049.20
Freq: M, Name: TotalValue, dtype: float64
```

```
plt.figure(figsize=(12, 6))
sns.lineplot(x=monthly_sales.index.astype(str), y=monthly_sales.values)
plt.xlabel("Month")
plt.ylabel("Total Sales")
plt.title("Monthly Sales Trends")
```

```
Text(0.5, 1.0, 'Monthly Sales Trends')
```




```
# Top 5 customers by lifetime value
customer_lifetime_value = merged_df.groupby("CustomerID")["TotalValue"].sum().
sort_values(ascending=False).head(5)
print("\nTop 5 Customers by Lifetime Value:\n", customer_lifetime_value)
plt.figure(figsize=(12, 6))
sns.barplot(x=customer_lifetime_value.index, y=customer_lifetime_value.values)
plt.xlabel("Customer ID")
plt.ylabel("Lifetime Value")
plt.title("Top 5 Customers by Lifetime Value")
plt.show()
```

```
Top 5 Customers by Lifetime Value:
 CustomerID
C0141    10673.87
C0054     8040.39
C0065     7663.70
C0156     7634.45
C0082     7572.91
Name: TotalValue, dtype: float64
```