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

customers = pd.read_csv(r'C:\Users\kandu\Desktop\Downloads\
Customers.csv')
products = pd.read_csv(r'C:\Users\kandu\Desktop\Downloads\
Products.csv')
transactions = pd.read_csv(r'C:\Users\kandu\Desktop\Downloads\
Transactions.csv')
print("Customers Data:")
print(customers.head())
print("\nProducts Data:")

print(products.head())
print("\nTransactions Data:")
print(transactions.head())

print("\nMissing Values:")
print("Customers:")
print(customers.isnull().sum())
print("Products:")
print(products.isnull().sum())
print("Transactions:")
print(transactions.isnull().sum())

merged_data = transactions.merge(customers,
on='CustomerID').merge(products, on='ProductID')

print("\nMerged Data:")
print(merged_data.head())

revenue_per_product = merged_data.groupby('ProductName')
['TotalValue'].sum().sort_values(ascending=False)
print("\nRevenue per Product:")
print(revenue_per_product)

plt.figure(figsize=(10, 6))
revenue_per_product.head(10).plot(kind='bar', color='skyblue')
plt.title('Top 10 Products by Revenue')
plt.ylabel('Total Revenue')
plt.xlabel('Product Name')
plt.xticks(rotation=45)
plt.tight_layout()

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plt.show()

transactions_by_region = merged_data['Region'].value_counts()
print("\nTransactions by Region:")
print(transactions_by_region)

plt.figure(figsize=(8, 5))
transactions_by_region.plot(kind='bar', color='coral')
plt.title('Transactions by Region')
plt.ylabel('Number of Transactions')
plt.xlabel('Region')
plt.xticks(rotation=0)
plt.tight_layout()
plt.show()

merged_data['TransactionDate'] =
pd.to_datetime(merged_data['TransactionDate'])
merged_data['Month'] =
merged_data['TransactionDate'].dt.to_period('M')
monthly_revenue = merged_data.groupby('Month')['TotalValue'].sum()

print("\nMonthly Revenue:")
print(monthly_revenue)

plt.figure(figsize=(12, 6))
monthly_revenue.plot(color='green')
plt.title('Monthly Revenue Trend')
plt.ylabel('Total Revenue')
plt.xlabel('Month')
plt.xticks(rotation=45)
plt.tight_layout()
plt.show()

revenue_per_customer = merged_data.groupby('CustomerName')
['TotalValue'].sum().sort_values(ascending=False)
print("\nRevenue per Customer:")
print(revenue_per_customer.head(10))

plt.figure(figsize=(10, 6))
revenue_per_customer.head(10).plot(kind='bar', color='purple')
plt.title('Top 10 Customers by Revenue')
plt.ylabel('Total Revenue')
plt.xlabel('Customer Name')
plt.xticks(rotation=45)

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plt.tight_layout()
plt.show()

correlation = merged_data[['Price_y', 'Quantity']].corr()
print("\nPrice vs Quantity Correlation:")
print(correlation)

plt.figure(figsize=(6, 4))
sns.heatmap(correlation, annot=True, cmap='coolwarm')
plt.title('Price vs Quantity Correlation')
plt.tight_layout()
plt.show()
```

Customers Data:

	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 Data:

	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 Data:

	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

Missing Values:

Customers:

CustomerID	0
CustomerName	0

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Region          0
SignupDate      0
dtype: int64
Products:
ProductID       0
ProductName      0
Category        0
Price           0
dtype: int64
Transactions:
TransactionID    0
CustomerID       0
ProductID        0
TransactionDate  0
Quantity         0
TotalValue       0
Price            0
dtype: int64
```

Merged Data:

	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_x	CustomerName	Region	SignupDate	\
0	300.68	300.68	Andrea Jenkins	Europe	2022-12-03	
1	300.68	300.68	Brittany Harvey	Asia	2024-09-04	
2	300.68	300.68	Kathryn Stevens	Europe	2024-04-04	
3	601.36	300.68	Travis Campbell	South America	2024-04-11	
4	902.04	300.68	Timothy Perez	Europe	2022-03-15	

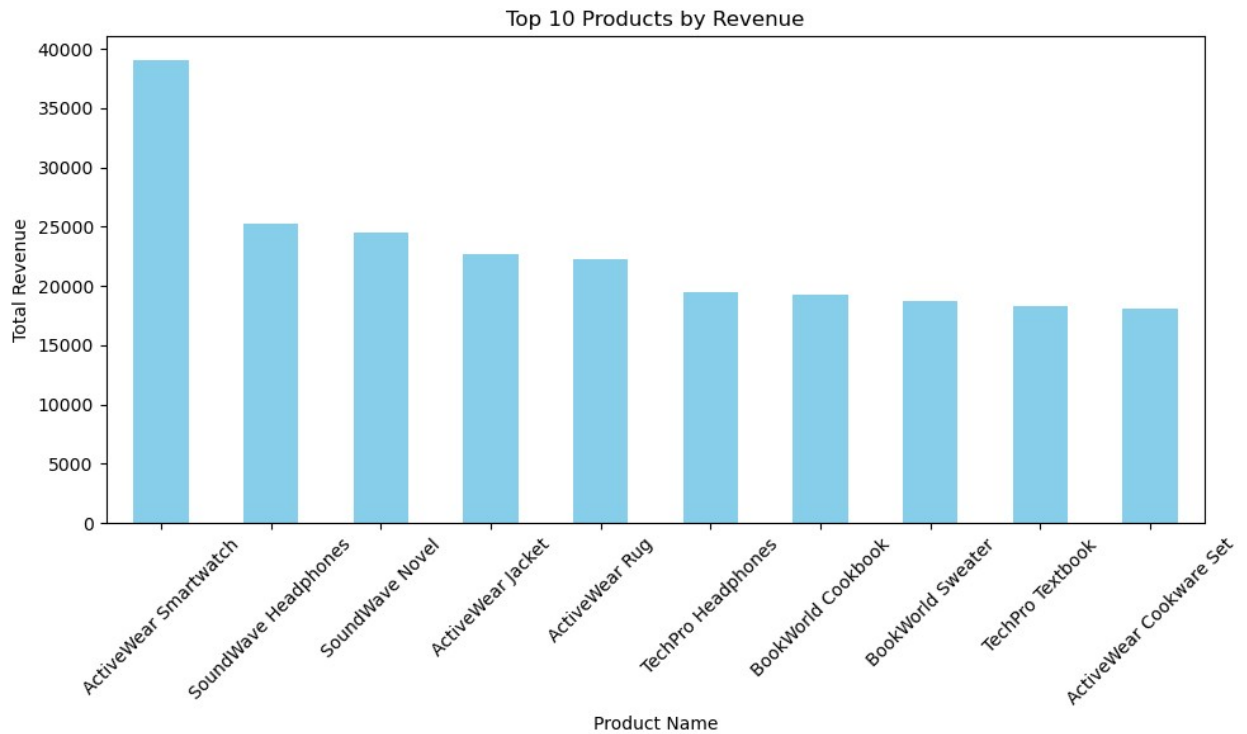
	ProductName	Category	Price_y
0	ComfortLiving Bluetooth Speaker	Electronics	300.68
1	ComfortLiving Bluetooth Speaker	Electronics	300.68
2	ComfortLiving Bluetooth Speaker	Electronics	300.68
3	ComfortLiving Bluetooth Speaker	Electronics	300.68
4	ComfortLiving Bluetooth Speaker	Electronics	300.68

Revenue per Product:

ProductName	
ActiveWear Smartwatch	39096.97
SoundWave Headphones	25211.64
SoundWave Novel	24507.90
ActiveWear Jacket	22712.56
ActiveWear Rug	22314.43
...	
ComfortLiving Desk Lamp	1694.16

SoundWave Bluetooth Speaker	1223.22
ComfortLiving Rug	1063.81
ActiveWear T-Shirt	795.34
ComfortLiving Laptop	647.76

Name: TotalValue, Length: 66, dtype: float64



Transactions by Region:

Region	
South America	304
North America	244
Europe	234
Asia	218

Name: count, dtype: int64

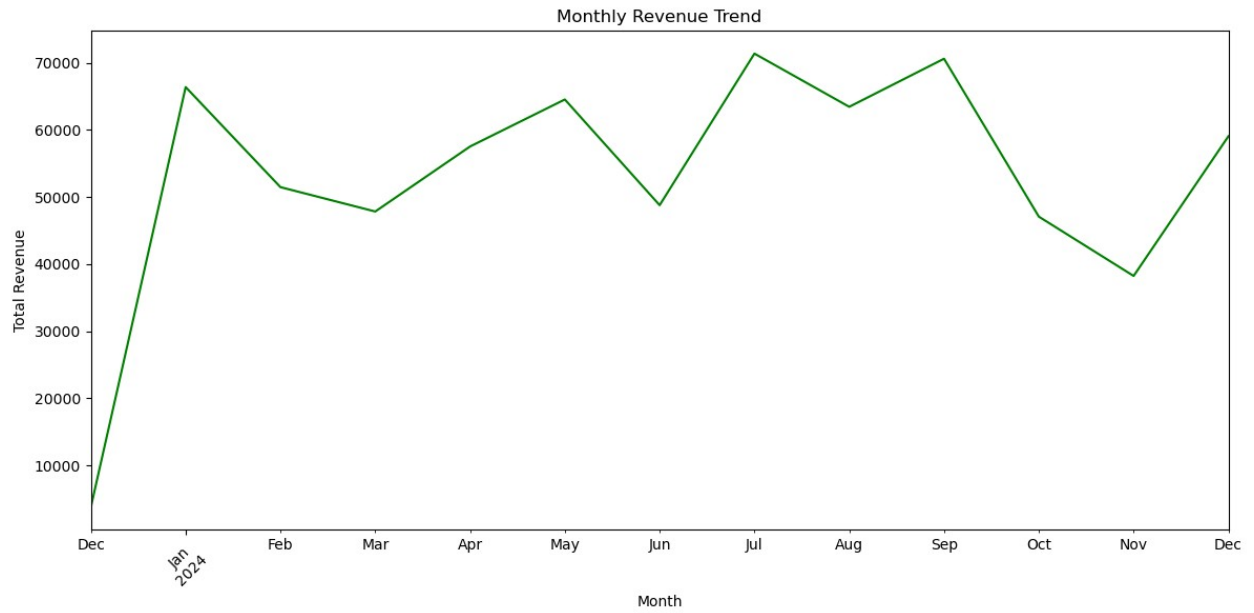


Monthly Revenue:

Month

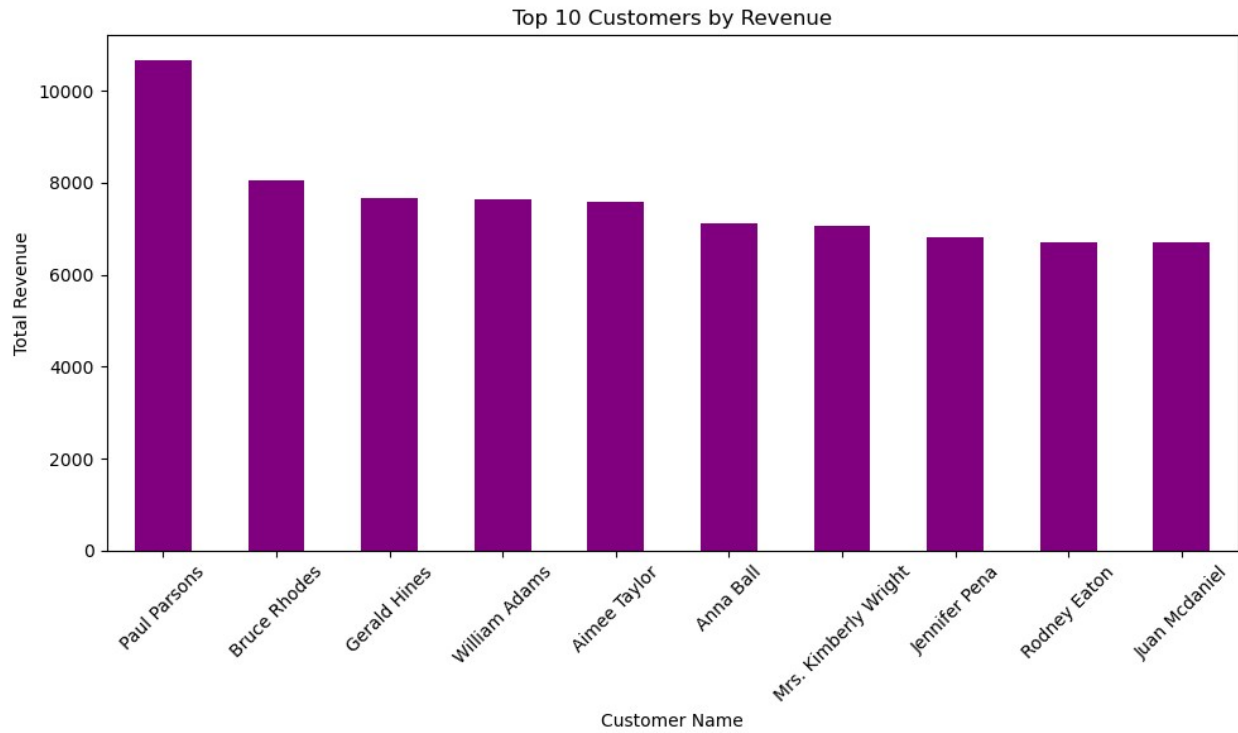
2023-12	3769.52
2024-01	66376.39
2024-02	51459.27
2024-03	47828.73
2024-04	57519.06
2024-05	64527.74
2024-06	48771.18
2024-07	71366.39
2024-08	63436.74
2024-09	70603.75
2024-10	47063.22
2024-11	38224.37
2024-12	59049.20

Freq: M, Name: TotalValue, dtype: float64



Revenue per Customer:

CustomerName	
Paul Parsons	10673.87
Bruce Rhodes	8040.39
Gerald Hines	7663.70
William Adams	7634.45
Aimee Taylor	7572.91
Anna Ball	7111.32
Mrs. Kimberly Wright	7073.28
Jennifer Pena	6819.57
Rodney Eaton	6715.72
Juan Mcdaniel	6708.10
Name: TotalValue, dtype: float64	



Price vs Quantity Correlation:

	Price_y	Quantity
Price_y	1.000000	-0.009378
Quantity	-0.009378	1.000000

