task2

June 3, 2025

[5]:
```
import pandas as pd

# Load the CSV file
df = pd.read_csv("train.csv")

# Display column names
print("Columns in dataset:", df.columns)

# Show basic info
print(df.info())
```

```
Columns in dataset: Index(['Row ID', 'Order ID', 'Order Date', 'Ship Date',
'Ship Mode',
       'Customer ID', 'Customer Name', 'Segment', 'Country', 'City', 'State',
       'Postal Code', 'Region', 'Product ID', 'Category', 'Sub-Category',
       'Product Name', 'Sales'],
      dtype='object')
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 9800 entries, 0 to 9799
Data columns (total 18 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Row ID         9800 non-null   int64
 1   Order ID       9800 non-null   object
 2   Order Date     9800 non-null   object
 3   Ship Date      9800 non-null   object
 4   Ship Mode      9800 non-null   object
 5   Customer ID    9800 non-null   object
 6   Customer Name  9800 non-null   object
 7   Segment        9800 non-null   object
 8   Country        9800 non-null   object
 9   City           9800 non-null   object
 10  State          9800 non-null   object
 11  Postal Code    9789 non-null   float64
 12  Region         9800 non-null   object
 13  Product ID     9800 non-null   object
 14  Category       9800 non-null   object
 15  Sub-Category   9800 non-null   object
```

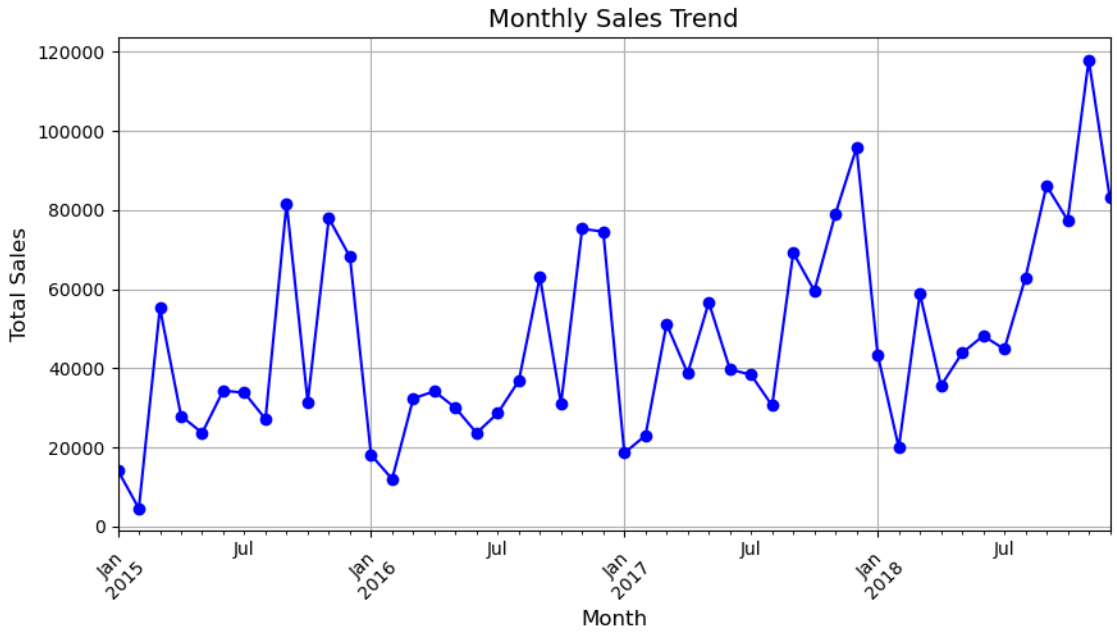
```
 16  Product Name   9800 non-null   object
 17  Sales          9800 non-null   float64
dtypes: float64(2), int64(1), object(15)
memory usage: 1.3+ MB
None
```

[10]:
```
# Check for missing values
print("Missing values:\n", df.isnull().sum())

# Fill missing postal codes with 0 (or any other logical value)
df["Postal Code"] = df["Postal Code"].fillna(0)
# Convert Order Date & Ship Date to datetime format
df["Order Date"] = pd.to_datetime(df["Order Date"], format="%d/%m/%Y",␣
 ↪errors="coerce")
df["Ship Date"] = pd.to_datetime(df["Ship Date"], format="%d/%m/%Y",␣
 ↪errors="coerce")

# Check basic statistics
print(df.describe())
```

```
Missing values:
 Row ID           0
Order ID          0
Order Date        0
Ship Date         0
Ship Mode         0
Customer ID       0
Customer Name     0
Segment           0
Country           0
City              0
State             0
Postal Code       0
Region            0
Product ID        0
Category          0
Sub-Category      0
Product Name      0
Sales             0
dtype: int64
             Row ID                      Order Date  \
count   9800.000000                            9800
mean    4900.500000  2017-05-01 05:13:51.673469440
min        1.000000             2015-01-03 00:00:00
25%     2450.750000             2016-05-24 00:00:00
50%     4900.500000             2017-06-26 00:00:00
75%     7350.250000             2018-05-15 00:00:00
max     9800.000000             2018-12-30 00:00:00
```

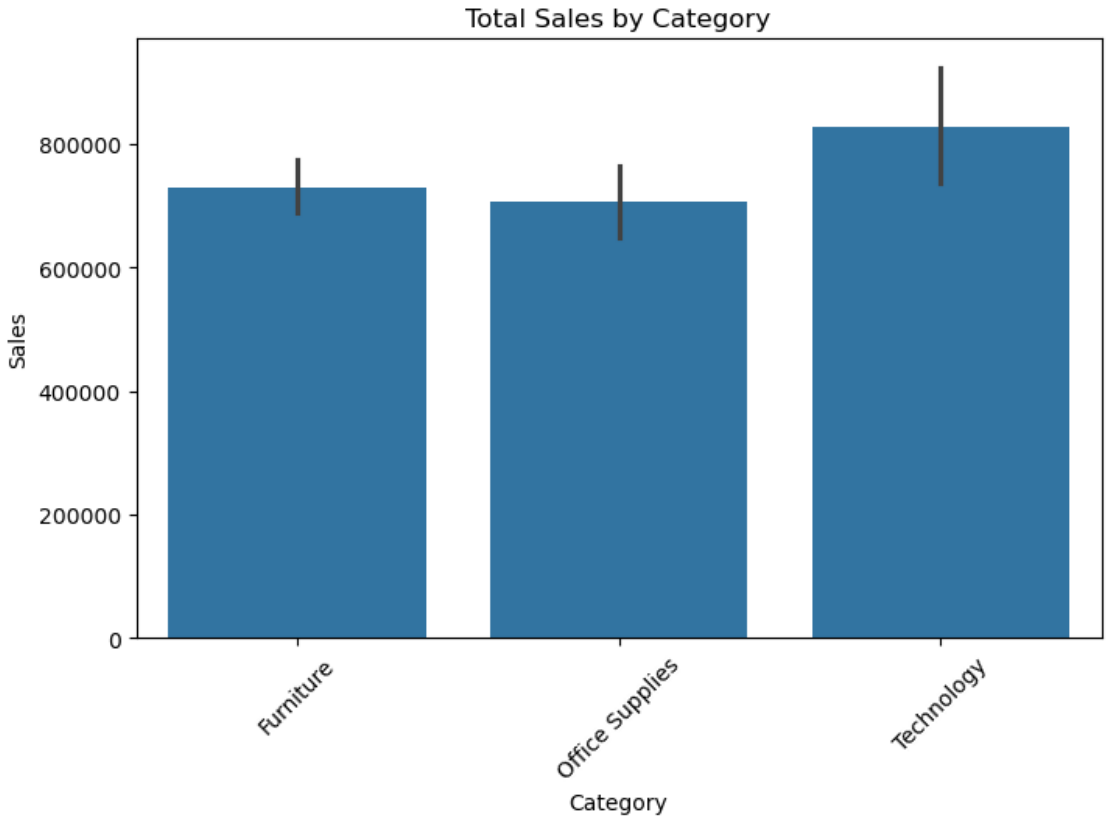
```
std     2829.160653                           NaN

                           Ship Date   Postal Code         Sales
count                           9800   9800.000000   9800.000000
mean   2017-05-05 04:17:52.653061120  55211.280918    230.769059
min              2015-01-07 00:00:00      0.000000      0.444000
25%              2016-05-27 18:00:00  23223.000000     17.248000
50%              2017-06-29 00:00:00  57551.000000     54.490000
75%              2018-05-19 00:00:00  90008.000000    210.605000
max              2019-01-05 00:00:00  99301.000000  22638.480000
std                              NaN  32076.677954    626.651875
```

[13]:
```
monthly_sales = df.groupby("Month")["Sales"].sum()

plt.figure(figsize=(10, 5))
monthly_sales.plot(kind="line", marker="o", linestyle="-", color="blue")

plt.title("Monthly Sales Trend", fontsize=14)
plt.xlabel("Month", fontsize=12)
plt.ylabel("Total Sales", fontsize=12)
plt.xticks(rotation=45)
plt.grid()
plt.show()
```

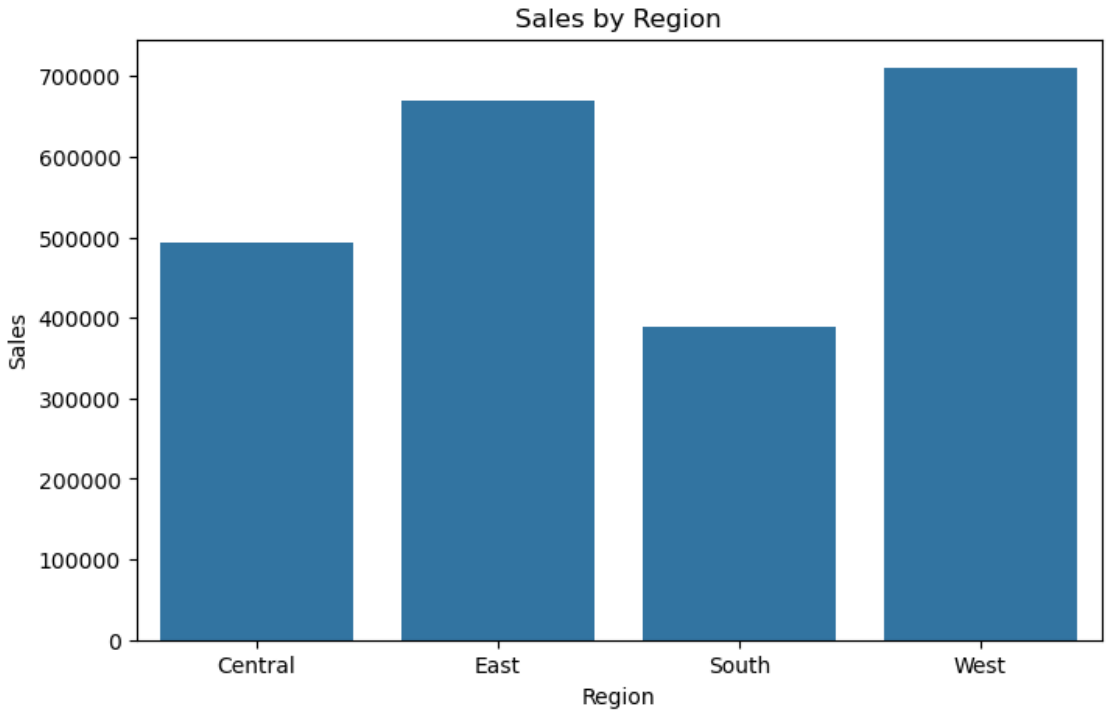


[14]:
```
import seaborn as sns
```

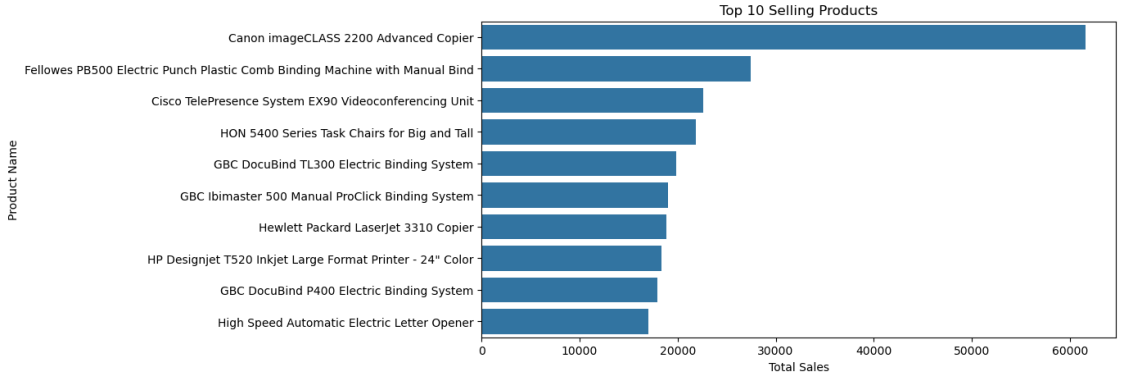
```
plt.figure(figsize=(8,5))
sns.barplot(x="Category", y="Sales", data=df, estimator=sum)
plt.title("Total Sales by Category")
plt.xticks(rotation=45)
plt.show()
```



[15]:
```
region_sales = df.groupby("Region")["Sales"].sum().reset_index()

plt.figure(figsize=(8,5))
sns.barplot(x="Region", y="Sales", data=region_sales)
plt.title("Sales by Region")
plt.show()
```



[16]:
```
top_products = df.groupby("Product Name")["Sales"].sum().nlargest(10).
↪reset_index()

plt.figure(figsize=(10, 5))
sns.barplot(y="Product Name", x="Sales", data=top_products)
plt.title("Top 10 Selling Products")
plt.xlabel("Total Sales")
plt.ylabel("Product Name")
plt.show()
```



[17]:
```
customer_segments = df.groupby("Segment")["Sales"].sum()

plt.figure(figsize=(7,7))
customer_segments.plot(kind="pie", autopct="%1.1f%%", colors=["lightblue",␣
↪"lightcoral", "lightgreen"])
plt.title("Sales Distribution Across Customer Segments")
plt.ylabel("")  # Hides default y-axis label
plt.show()
```