EXPT NO: 6	
	EXPERIMENT: DATA VISUALIZATION USING POWER BI

AIM

To learn data visualization using **Power BI** by connecting to various data sources, creating visualizations (bar charts, line charts, pie charts), calculated columns and measures, and building interactive dashboards.

ALGORITHM

1. **Start Power BI Desktop** and familiarize yourself with the **Power BI Interface**.

2. **Connect to data sources** (Excel, CSV, SQL, etc.) using *Home → Get Data*.

3. **Load dataset** into Power BI workspace.

4. **Data Preparation**:

   o Use **Transform Data** (Power Query) for cleaning, filtering, renaming columns.

   o Create **Calculated Columns** and **Measures** using DAX.

      ▪ Example (Calculated Column):

      ▪ Profit = Sales[Revenue] - Sales[Cost]

      ▪ Example (Measure):

      ▪ Total Sales = SUM(Sales[Revenue])

5. **Create Visualizations**:

   o Bar Chart (Sales by Category)

   o Line Chart (Sales Trend Over Time)

   o Pie Chart (Market Share by Region)

6. **Build Dashboard**:

   o Drag and arrange visuals into a report page.

   o Add slicers/filters for interactivity.

7. **Publish Dashboard** (optional): Publish to **Power BI Service** for sharing.

CODE / IMPLEMENTATION

```python
# DATA VISUALIZATION SIMULATION OF POWER BI & TABLEAU
# USING PYTHON (Pandas, Matplotlib, Seaborn, Plotly)
# --------------------------------------------------

import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import sqlite3


# --------------------------------------------------
# STEP 1: CONNECT TO DATA SOURCES
# --------------------------------------------------

# Example: CSV/Excel file
csv_data = pd.DataFrame({
    "Category": ["Electronics", "Clothing", "Furniture", "Electronics",
"Clothing", "Furniture"],
    "Region": ["North", "South", "East", "West", "North", "South"],
    "Revenue": [20000, 15000, 18000, 25000, 12000, 16000],
    "Cost": [12000, 7000, 9000, 14000, 6000, 8000],
    "Discount": [5, 10, 7, 6, 8, 9]
})
csv_data.to_csv("sales_data.csv", index=False)

# Load dataset from CSV
df_csv = pd.read_csv("sales_data.csv")

# Example: SQL Database
conn = sqlite3.connect(":memory:")
df_csv.to_sql("Sales", conn, index=False, if_exists="replace")
df_sql = pd.read_sql("SELECT * FROM Sales", conn)

print("\n☑ Data Loaded from CSV and SQL Database")
print(df_sql.head())

# --------------------------------------------------
# STEP 2: CREATE CALCULATED COLUMNS / MEASURES
# --------------------------------------------------

df_csv["Profit"] = df_csv["Revenue"] - df_csv["Cost"]  # Calculated Column
total_sales = df_csv["Revenue"].sum()                  # Measure
avg_discount = df_csv["Discount"].mean()               # Measure

print("\n☑ After Adding Calculations:")
print(df_csv)
```

```python
# -------------------------------------------------
# STEP 3: BASIC VISUALIZATIONS
# -------------------------------------------------

# Bar Chart - Revenue by Category
plt.figure(figsize=(6,4))
sns.barplot(x="Category", y="Revenue", data=df_csv, estimator=sum)
plt.title("Revenue by Category")
plt.show()

# Line Chart - Revenue Trend (Index as Time)
plt.figure(figsize=(6,4))
plt.plot(df_csv.index, df_csv["Revenue"], marker='o', label="Revenue")
plt.plot(df_csv.index, df_csv["Profit"], marker='x', label="Profit")
plt.title("Revenue & Profit Trend")
plt.xlabel("Transaction Index")
plt.ylabel("Amount")
plt.legend()
plt.show()

# Pie Chart - Market Share by Region
region_share = df_csv.groupby("Region")["Revenue"].sum()
plt.figure(figsize=(6,6))
plt.pie(region_share, labels=region_share.index, autopct="%1.1f%%",
startangle=140)
plt.title("Revenue Share by Region")
plt.show()

# STEP 4: INTERACTIVE DASHBOARD (Plotly)
# -------------------------------------------------

fig1 = px.bar(df_csv, x="Category", y="Revenue", color="Region",
title="Revenue by Category and Region")
fig2 = px.line(df_csv, x=df_csv.index, y="Revenue", markers=True,
title="Revenue Trend")
fig3 = px.pie(df_csv, values="Revenue", names="Region", title="Revenue Share
by Region")

fig1.show()
fig2.show()
fig3.show()

# STEP 5: RESULTS
# -------------------------------------------------
print("\n🔨 RESULTS:")
print(f"Total Sales: {total_sales}")
print(f"Average Discount: {avg_discount:.2f}%")
```
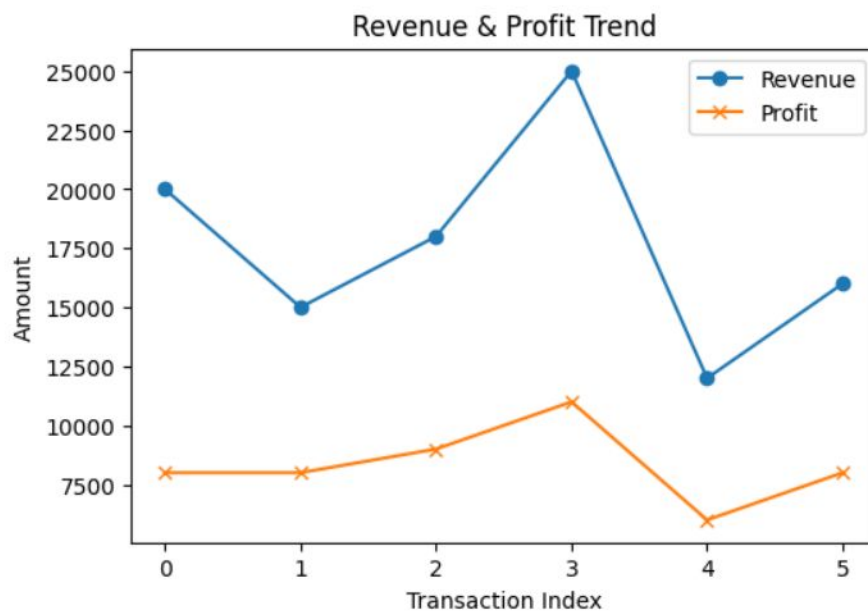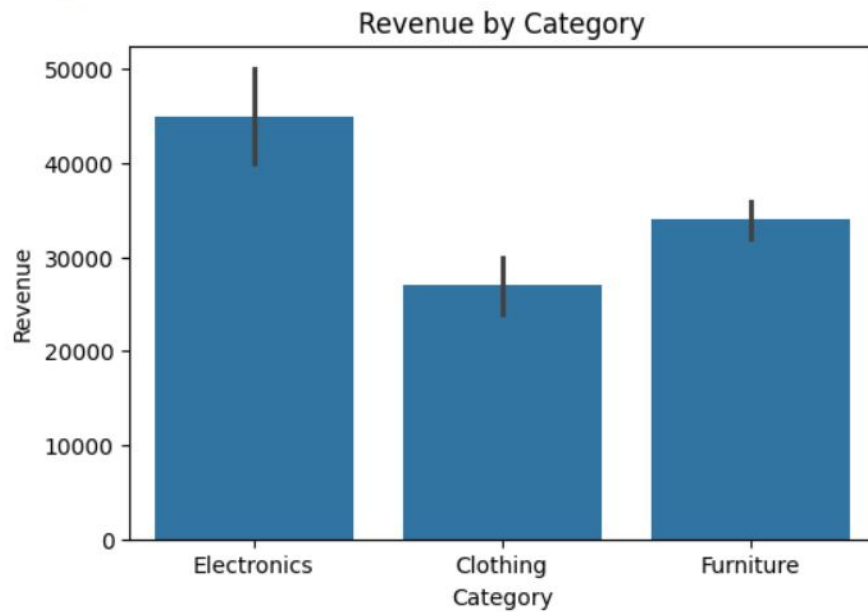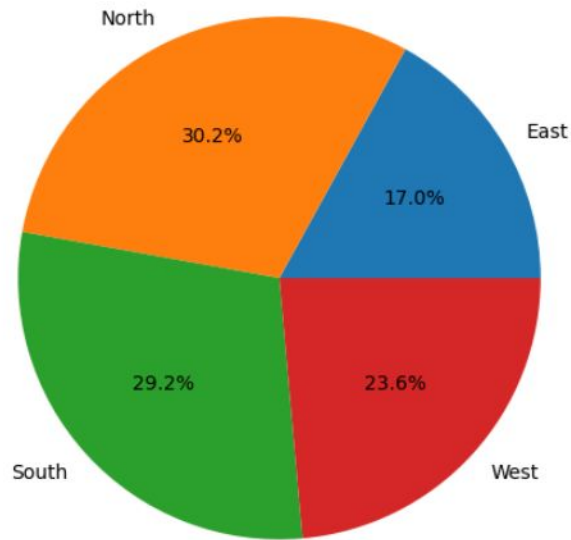
OUTPUT

```
=== Power BI Simulation Results ===
Total Sales: 106000
Average Discount: 7.5
```
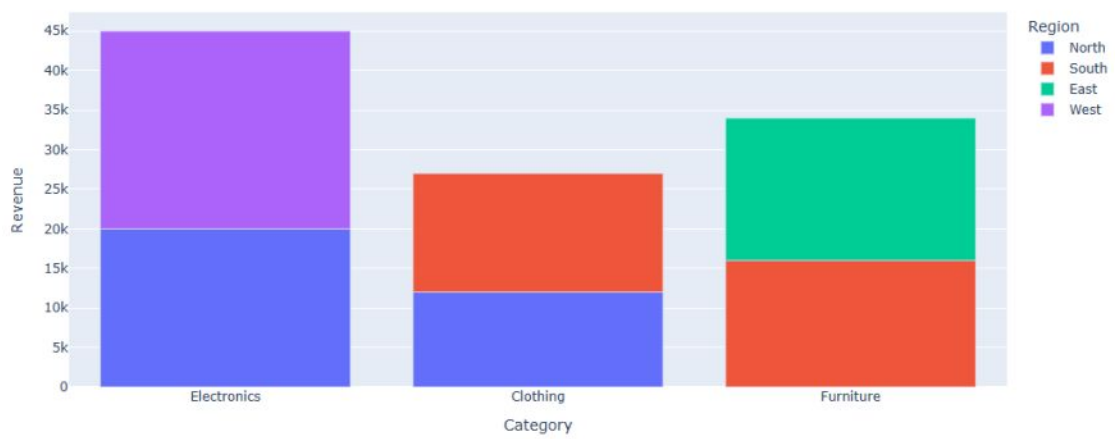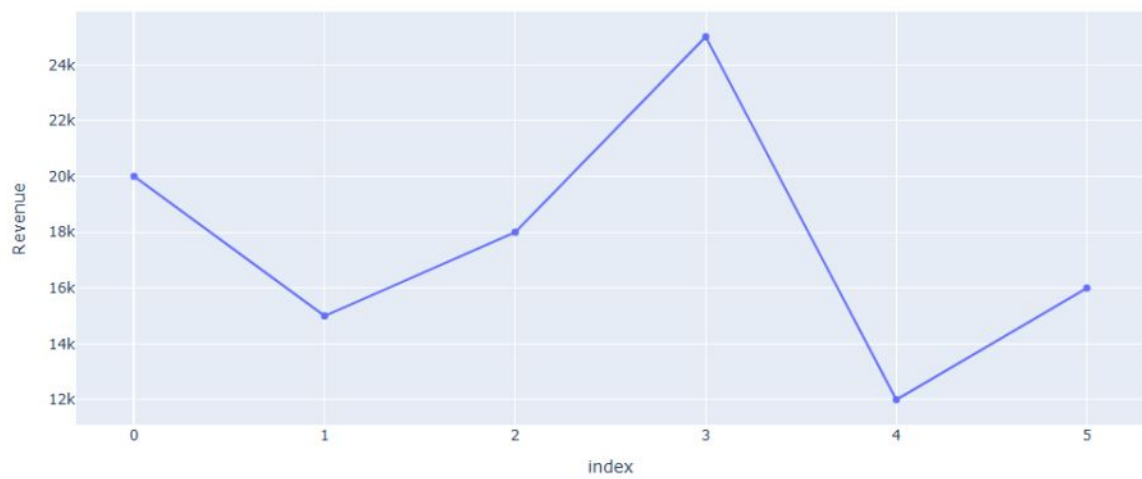
Revenue by Category

Revenue & Profit Trend
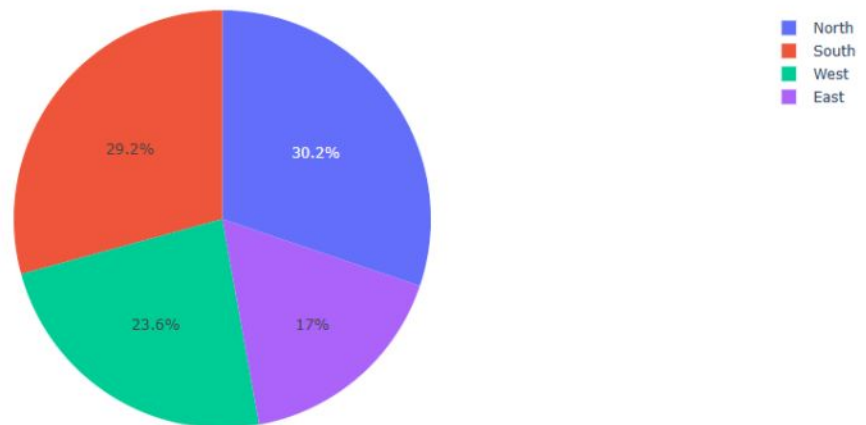

Revenue Share by Region

Revenue by Category and Region

Revenue Trend

Revenue Share by Region

RESULT:

A dashboard was successfully created in **Power BI** with multiple charts (bar, line, pie) displaying insights such as **sales trends, category distribution, and regional performance**. Calculated columns and measures enhanced the analytical capabilities of the dashboard.