Case Study Name:1 Amazon Electronics Sales Analysis

Dataset:

https://www.kaggle.com/code/mehakiftikhar/amazon-sales-dataset-eda/notebook

Objective:

To analyze electronics sales data from Amazon, focusing on user ratings, product categories, and sales trends over time to derive actionable insights.

Key Topics:

- Sales trend analysis
- Customer rating analysis
- Category performance
- Time-series analysis

Tools:

- Python (Pandas, Matplotlib, Seaborn)
- Excel
- SQL for data querying

This case study will help students understand how to handle large datasets, perform exploratory data analysis (EDA), and derive insights that can inform business decisions.

Case Study 2: Student Enrollment Analysis by Class

Dataset:
https://www.kaggle.com/code/mahendran1/enrollment-prediction

Objective:

To analyze student enrollment data by grouping them based on class, counting the number of students in each class, and generating a bar chart to visualize the distribution of students across classes.

Steps:

1. **Data Loading and Preparation:**
    - Load the student data into a Pandas DataFrame.
    - Ensure the dataset includes columns for student ID, name, and class.
2. **Grouping and Counting:**
    - Use Pandas `groupby` function to group the data by class.

    - Apply the `count` function to determine the number of students in each class.
3. **Visualization:**
    - Generate a bar chart using Matplotlib or Seaborn to visualize the distribution of students across classes.
    - Enhance the chart with appropriate labels and formatting for better understanding.
4. **Analysis and Interpretation:**
    - Interpret the bar chart to:
        - Identify the distribution of students across different classes.
        - Compare the number of students in each class.
        - Draw conclusions about class sizes or student demographics based on the data.

Case Study:3 Daily Temperature Changes Over Time in a City

Dataset:

https://www.kaggle.com/code/arnabsaha6/analyzing-rise-of-temperature-over-time/notebook

Objective:

To analyze and visualize daily temperature changes over time in a city, providing insights into seasonal variations and trends.

Steps:

1. **Data Collection:**
    - Gather daily temperature data for the city over a significant time period (e.g., months or years).
2. **Data Loading and Preparation:**
    - Load the temperature data into a Pandas DataFrame.
    - Ensure the dataset includes columns for date and temperature.
3. **Data Exploration:**
    - Explore the dataset to understand the range and distribution of temperature values.
    - Check for any missing or outlier data points that may affect analysis.
4. **Visualization:**
    - Use Matplotlib or Seaborn to create a line plot or time series plot.
    - Plot temperature values against dates to visualize daily temperature changes over time.
5. **Analysis and Interpretation:**
    - Interpret the plotted data to:
        - Identify seasonal patterns or trends in temperature changes.

        - Analyze any anomalies or significant fluctuations in temperature.
        - Draw conclusions about climate conditions and temperature variability over time in the city.

Case Study: Stock Analysis

Dataset:

Objective:

To create a line plot that visualizes the daily closing prices of a stock over a year and derive insights from the data.

Steps:

1. **Data Loading and Preparation:**
    - Obtain historical daily closing prices of the stock for the past year.
    - Load the data into a Pandas DataFrame, ensuring it includes columns for date and closing price.
2. **Data Visualization:**
    - Use Matplotlib or Seaborn to create a line plot to visualize the daily closing prices over time.
    - Enhance the plot with appropriate labels, title, and formatting for clarity.
3. **Analysis and Interpretation:**
    - Interpret the line plot to:
        - Identify trends or patterns in the stock's daily closing prices.
        - Observe periods of volatility or stability in the stock price.
        - Analyze any significant peaks or troughs that may indicate changes in investor sentiment or market conditions.

Case Study: Visualizing Monthly Expenses in Spending Categories

Dataset:

Objective:

To create a bar chart representing monthly expenses in different spending categories and derive insights from the data.

Steps:

1. **Data Loading and Preparation:**
    - Collect or generate monthly expense data categorized by spending categories (e.g., groceries, utilities, entertainment).
    - Ensure the dataset includes columns for month and expenses in each category.
2. **Data Visualization:**

- Use Matplotlib or Seaborn to create a bar chart to visualize the monthly expenses across spending categories.
- Enhance the plot with appropriate labels, title, and formatting for clarity.

3. **Analysis and Interpretation:**
    - Interpret the bar chart to:
        - Identify the distribution of expenses across different categories.
        - Compare the expenditure levels in each category.
        - Analyze any significant changes or trends in spending over time or across categories.