# Project: Sales Dataset Analysis

**Objective:**

Analyze the dataset containing sales transaction information from a retail business. The goal is to perform comprehensive data analysis, extract meaningful insights, and create interactive visualizations using Microsoft Excel. Additionally, leverage advanced Excel features such as **What-If Analysis**, **Goal Seek**, **Macros**, **Power Query**, and **Power Pivot** to deepen your analysis and automate tasks.

**Instructions:**

1. **Format the Worksheet**:
    - **Format the columns** for better readability.
    - **Use Date formatting** for the "Order Date" and "Ship Date" columns to ensure proper sorting and filtering.
    - Apply **bold headers** and **freeze the top row** to keep it visible as you scroll through the data.
2. **Clean the Data**:
    - **Check for and remove any duplicate rows** or blank entries in the dataset.
    - **Use data validation** to ensure that all data entries (like sales numbers and dates) are consistent and free of errors. For example, ensure **Sales** and **Discount** are never negative.
    - Use **IF or IFERROR** to flag and handle any negative or erroneous sales data that might result from data entry mistakes.
    - **Identify and resolve any outliers or incorrect values**, especially in **Sales** and **Discount**.
3. **Analyze Sales Performance**:
    - **Calculate** the total sales for each transaction by applying discount on the sales. Create a new column titled "Adjusted Sales" to reflect this. Before doing this step, validate for any negative values.
    - **Determine** the total revenue, average order value, and total discounts across all transactions.

- **Segment** the data by product categories and calculate key metrics (e.g., total adjusted sales, total discounts) for each segment.

4. **Use Formulas to Extract Insights**:
   - Apply **COUNTIF/COUNTIFS** to count the number of orders for each **Product Category** or **Customer Segment** (if available) and group by these categories.
   - Calculate the **average discount per order** using **AVERAGEIF** based on **Customer Segment**.
5. **Time-Based Analysis**:
   - Group the data by Date (daily, monthly, quarterly) using PivotTables to assess sales trends over time.
   - Identify peak sales periods by analyzing the Adjusted Sales over different time intervals. Look for patterns that could indicate seasonal variations.
   - Use Date Functions like MONTH(), YEAR(), WEEKDAY(), and EOMONTH() to categorize and analyze sales performance over different periods.
6. **Sales Channel and Product Type Analysis**:
   - Take Sales Channel related column like "Ship Mode", create a PivotTable to calculate the total Sales, average Sales, and total Discounts for each Sales Channel.
   - Identify the best-selling products or product categories based on Quantity and Sales.
7. **What-If Analysis & Goal Seek**:
   - Use **Goal Seek** to determine the sales target needed to achieve a specific revenue or profit goal. For example, set a goal for Adjusted Sales or Profit and use Goal Seek to find out how many units of a product need to be sold to reach that target.
   - Use What-If Analysis to simulate different scenarios such as:
     - How would a 10% increase in Sales impact total revenue?
     - What would happen if the Discount rate decreased by 5%?
     - Create a Scenario Manager to compare various sales and discount scenarios and their effect on Adjusted Sales or Profit.

8. **Pivot Tables and Pivot Charts**:
    - Create **PivotTables** to aggregate data by different dimensions such as **Product Category**, **Customer Segment**, or **Ship Mode**.
    - Use **PivotCharts** to visualize sales trends and compare performance across different categories (e.g., bar charts for sales by product category, line charts for sales over time).
    - Add **Slicers** to your PivotTables and charts to allow interactive filtering by categories such as **Product Category**, **Ship Mode**, or **Customer Segment**.
9. **Create a Sales Dashboard**:
    - Design a **summary dashboard** with key performance indicators (KPIs) such as:
        - Total sales (**Sales** or **Adjusted Sales**)
        - Average sales per order
        - Total discounts
        - Top-performing products or product categories
    - Use **data validation** to allow the user to select specific **date ranges** or **product categories** to dynamically update the dashboard.
    - Include interactive features such as **slicers** for **Product Category**, **Ship Mode**, or **Customer Segment** to allow users to filter and view data by specific segments.
11. **Automate Tasks Using Macros**:

- **Record and run macros** to automate repetitive tasks, such as:
    - Formatting the worksheet (e.g., currency formatting, bolding headers, freezing panes).
    - Generating summary tables or charts for Adjusted Sales or Sales by Category.
    - Running calculations and formatting pivot tables automatically when new data is added.
- Assign the macros to buttons on the worksheet to make it easy to run them.

12. **Power Pivot & Data Modeling**:

- Create Two Separate Tables:
- **Sheet 2: Products Table**
  **Create a table with the following columns:**
    - Product ID
    - Product Name
    - Category
    - Sub-Category
    - Sales
    - Quantity
    - Discount
    - Profit
- **Sheet 3: Customers Table**
  **Create a table with the following columns:**
    - Customer ID
    - Customer Name
    - Segment
    - Country
    - City
    - State
    - Postal Code
    - Region
- Use Power Pivot to create a data model by establishing a relationship between the two tables:

- Connect the Product ID column in the Products Table with the Product ID in the Sales transactions table (or any relevant data that has product-related sales).
- Connect the Customer ID column in the Customers Table with the Customer ID in the Sales transactions table (or any relevant data).

- Create Calculated Columns in Power Pivot:
- Once the tables are connected, create calculated columns in Power Pivot to perform complex calculations, such as Profit Margin (calculated as Profit/Sales).
- **Create a Power Pivot-based PivotTable** to summarize sales performance using your data model.

13. **Insights and Recommendations**:
    - **Summarize the key insights from your analysis, such as:**
        - Which Sales Channels (e.g., Ship Mode) are driving the highest Sales.
        - Which Product Categories are performing best and worst based on Adjusted Sales and Quantity.
        - The effect of Discounts on Net Sales and Adjusted Sales.
        - Any actionable recommendations for improving Sales Performance, reducing Returns (if applicable), or optimizing Discount strategies.

**Deliverables:**

1. A cleaned and formatted Excel worksheet with the original dataset.
2. Formulas applied to calculate key metrics.
3. PivotTables and PivotCharts summarizing sales data by various dimensions.
4. An interactive dashboard showcasing key performance indicators and insights.
5. A written summary of insights, including actionable recommendations based on the analysis.
6. A presentation file that contains the details of the project (10 slides).

**Evaluation Rubric:**

| Evaluation Criteria | Marks |
|---|---|
| 1. Data Cleaning and Preparation | 10 |
| 2. Data Analysis and Use of Formulas | 15 |
| 3. Pivot Tables and Pivot Charts | 15 |
| 4. Dashboard Creation | 10 |
| 5. What-If Analysis and Goal Seek | 10 |
| 6. Macros and Automation | 10 |
| 7. Power Pivot and Data Modeling | 10 |
| 8. Presentation and Reporting | 20 |
| **Total Marks** | **100** |

**Suggested Slide Structure for the Presentation:**

**Slide 1: Title Slide**

- **Title**: Sales Dataset Analysis – Advanced Excel Project
- **Subtitle**: Student's name, date, and course & batch name information.

**Slide 2: Project Overview & Objectives**

- **Project Objective**: Briefly describe the overall purpose of the project. For example: "To analyze sales data to identify trends, understand sales performance, and provide actionable business insights."
- **Goals**: State the key goals of the analysis, such as:
    - Analyze sales trends over time.
    - Identify high-performing products and sales channels.
    - Determine the impact of returns and discounts.
    - Create a dynamic dashboard with key metrics.

**Slide 3: Data Description and Preparation**

- **Dataset Overview**: Brief description of the dataset (e.g., 20,000 rows, columns such as Order ID, Sale ID, Product Type, etc.).
- **Data Cleaning Process**: Mention the steps taken to clean the data (e.g., removal of duplicates, handling missing values, data formatting).
- **Visuals**: Include a screenshot of the dataset **before** and **after** cleaning (showing raw data vs. cleaned data).

**Slide 4: Key Metrics Calculation and Data Analysis**

- **Important Calculations**: Mention the key metrics calculated using Excel functions, such as:
    - Total sales (Gross, Net, Adjusted)
    - Average sales per order
    - Discount rates, return rates
    - Sales by channel/product type

- **Screenshots**: Show a screenshot of the Excel worksheet with formulas visible for calculating metrics (e.g., total sales, average, etc.).

**Slide 5: Pivot Tables and Pivot Charts**

- **Pivot Table Summary**: Discuss how you used PivotTables to aggregate data by dimensions like sales channel, product type, or date.
- **Pivot Chart Visualizations**: Show how PivotCharts were used to visualize sales trends over time or by product type.
- **Visuals**: Include a screenshot of one or more **PivotTables** and **PivotCharts**.

**Slide 6: Dashboard Overview**

- **Dashboard Design**: Introduce the concept of the dashboard, its components (e.g., KPIs, charts, slicers), and its purpose in making the data more accessible and interactive.
- **KPIs**: List key performance indicators displayed on the dashboard (e.g., Total Sales, Return Rate, Best Selling Products, Average Order Value).
- **Visuals**: Insert a screenshot of the **complete dashboard** with KPIs and interactive elements (like slicers and charts).

**Slide 7: What-If Analysis & Goal Seek**

- **What-If Scenarios**: Describe any **What-If Analysis** you performed (e.g., simulations to analyze how changes in sales or return rates impact total revenue).
- **Goal Seek**: Explain any goal-setting you did, such as finding the number of units required to meet a sales target.
- **Visuals**: Include screenshots of the **What-If Analysis** and **Goal Seek** results, showing the inputs and outputs.

**Slide 8: Macros and Automation**

- **Macro Recording**: Explain how you used macros to automate repetitive tasks, such as formatting, data calculations, or generating reports.
- **Automation Benefits**: Discuss how using macros saved time and improved the efficiency of the analysis.

- **Visuals**: Show a screenshot of the **Macro Code** or a screenshot of the **macro in action** (e.g., a button that runs a macro to update charts or tables).

**Slide 9: Insights and Recommendations**

- **Key Insights**: Summarize the most important insights from the analysis, such as:
  - Best-performing sales channels/products.
  - Trends in discounting and its impact on total sales.
  - Seasonal sales variations or peak performance times.
  - Recommendations for improving sales based on analysis (e.g., reduce returns, increase discounts on underperforming products).
- **Visuals**: Consider adding key visuals like **charts** or **graphs** that support these insights.

**Slide 10: Conclusion and Questions**

- **Summary**: Briefly wrap up your analysis, highlighting the key findings and actions for the business based on your analysis.
- **Next Steps**: Mention any future steps or analyses that could be done for deeper insights (e.g., forecast sales for the next quarter, improve data accuracy, etc.).
- **Questions**: Provide a slide inviting questions from the audience.
- **Visuals**: Keep this slide clean with just a concluding message and a prompt for questions.

**Tips for an Effective Presentation:**

- **Clarity and Simplicity**: Avoid too much text. Use **bullet points**, **short sentences**, and **clear visuals** (charts, tables, screenshots).
- **Screenshots**: Use **high-quality** screenshots of Excel, especially for dashboards, PivotTables, and charts. Make sure the data is legible.
- **Consistency**: Maintain a consistent color scheme and font style across all slides.
- **Practice**: Ensure that you can explain each slide concisely within the time limit (usually 5-10 minutes for presentations).

- **Engage the Audience**: Don't just read from the slides. Discuss the **insights** and **recommendations** in a way that shows your understanding of the data and its business implications.