Project Description

This project focuses on analyzing the sales and operational data of an **Electronics, Laptops, and Hardware Store** to uncover valuable insights that drive profitability and business growth. The database includes detailed records of **products, orders, customers, and sales transactions**, allowing for a comprehensive analysis of performance across different product categories and time periods.

Through advanced **data analysis techniques**, the project identifies top-selling products, peak sales periods, and customer purchasing patterns. These insights enable smarter decisions in **inventory management, pricing strategies, and marketing campaigns**, leading to **higher profit margins and reduced operational costs**.

By leveraging data-driven insights, the store can:

- Focus marketing efforts on high-demand and high-profit products.
- Improve customer satisfaction by understanding buying behaviors.
- Enhance decision-making with clear, visual performance dashboards.

Overall, this project transforms raw data into actionable intelligence, helping the store **maximize revenue, minimize costs, and strengthen its competitive position in the market**. The outcome is a smarter, more efficient, and more profitable business powered by data.

Team Members

- **Maged Magdy Nageeb Elias** "Team Leader"
  -> Oversaw project progress, led quality control, combined and integrated teammates outputs into the final product, and made the greatest contributions in the dashboard development phase, ensuring accuracy and professional details according to the instructor's guidance, also made the database design & mapping schema and managed the transformation to data warehouse process.

- **Shehab Mohamed Khairy Mohamed**
  -> Had the greatest effort in implementing ideas for DAX measures and calculated columns, ensuring data accuracy and analytical readiness for dashboard development and had the greatest effort in predicting and implementation of business questions and insights ideas.

- **Ali Ahmed Ali Ali**
  -> Assisted in generating and validating data during the collection phase and conducted first-level revisions across several project stages to ensure accuracy and consistency.

- **Marly Sherif Nashed Bakhit**
  ->Had the greatest effort in the data cleaning phase using SQL, ensuring all datasets were accurate, consistent, and ready for analysis in addition, she consistently provided important technical notes and feedback throughout each task, improving the overall quality, performance, and presentation of the final project.

- **Ibrahim Ali Mohamed Ali**
  ->Had the greatest effort in the Exploratory Data Analysis (EDA) and Advanced Analysis phases, uncovering key trends and generating meaningful insights. He played a major role in extracting actionable findings that improved understanding of profit patterns and business performance, adding strong analytical depth to the project's outcomes.

- **Ahmed Ismail Ahmed Mohamed**
  -> Played the leading role in the data collection and validation process, ensuring high data accuracy and reliability. He was responsible for maintaining data validation standards across all stages and also made strong contributions in later phases, including analysis and visualization, supporting the project's overall quality and success.

Important!

Each team member participated in all stages of the data analysis project, including data collection, cleaning, modeling, and visualization.
Every member performed the complete workflow individually to enhance learning and understading of the full data analysis process.
The team then collaboratively compared, discussed, and merged the individual outputs to produce the final optimized version of each project component.

Team Leader

- Maged Magdy Nageeb
- Email: magedelias53@gmail.com

Objectives

The main objective of this project is to analyze the data of the Electronics, Laptops, and Hardware Store to uncover insights that drive **higher profit, better decision-making, and more efficient operations**.
The project transforms raw sales and product data into actionable information that helps the store **save time, reduce losses, and strengthen overall business performance**.

Specific Objectives

1. **Data Preparation and Cleaning:**
   To collect, clean, and structure the store's data to ensure accuracy, completeness, and readiness for analysis.
2. **Exploratory Data Analysis (EDA):**
   To explore sales trends, product performance, and customer behavior in order to identify key patterns and relationships.
3. **Sales and Profit Analysis:**
   To identify the most profitable products, categories, and time periods, helping the business focus on high-return areas and increase overall profit.
4. **Loss and Problem Detection:**
   To detect sources of loss, underperforming products, or business inefficiencies, and understand the reasons behind them.
5. **Operational Efficiency:**
   To provide insights that help in saving time through automation, better stock control, and reduced manual effort.
6. **Management Support:**
   To improve higher management performance by providing clear, data-driven reports and dashboards that support smarter, faster decision-making.
7. **Visualization and Communication:**
   To present results through interactive dashboards and visual tools that make analysis accessible and easy to understand.
8. **Team Collaboration and Skill Development:**
   To enhance teamwork, problem-solving, and analytical skills by allowing every team member to complete full analytical workflows and then merge the best outcomes into the final project.

Tools & Technologies

- SQL Server Studio (Data Cleaning)
- Microsoft Excel (Data Source Sheets)
- Microsoft Power Bi (Dashboard & Reports Creation)
- Power Query Editor (For Advanced Data Cleaning)
- Draw.io (for Erd design)
- drawsql.app (Website for Mapping Schema)
- Tableau
- Python (Pandas, Numpy, Matplotlib)

Milestones & Deadlines

Week 1: Data Collection

Description: Gathered all raw data related to products, orders, and customers from available sources. Ensured completeness and initial understanding of the dataset.

Week 2: Data Cleaning Phase 1, Preparation, Database Design, Modelling, Data Warehouse Concept applied

Description: Cleaned and organized the collected data to ensure accuracy and consistency. Designed the Entity Relationship Diagram (ERD) and database schema, then converted the database into a data warehouse structure by dividing it into fact and dimension tables to support analytical queries and performance optimization.

Week 3: Exploratory Data Analysis (EDA), Advanced Analysis & Insights Extraction

Description: Conducted exploratory and advanced analysis to uncover deep insights about product sales, customer segments, and profitability patterns. Applied advanced analytical techniques such as correlation analysis and performance comparison to identify key business drivers and opportunities for profit growth.

Week 4: Visualization and Dashboard Development (Phase 1)

Description: After making a revision on the cleaned data and managed to complete the cleaning process on “Power Query Editor” , we made a chart for each question to answer it (story telling technique) by making a measure for each insight and use these measures in the charts to show important data and answer the questions, also we planned the ideas of the structure of pages of the dashboard layout and implement the overall dashboard design.

Week 5: Visualization Refinement and Report Writing (Phase 2)

Description: Finalized all dashboards and visualizations, documented detailed findings, and prepared a comprehensive report summarizing insights and business recommendations.

Week 6: Final Presentation and project Delivery

Description: Presented the final project, including all analytical outputs, dashboards, and insights, SQL Queries Report Sheets, demonstrating how the analysis supports higher profit, efficiency, and smarter business decisions.

Deadlines:

Each phase of the project was allocated a one-week duration, with clear internal deadlines to ensure continuous progress. The **deadline for each phase was set on Monday of the following week**, allowing the team a full seven days to complete every task, review results, and prepare for the next stage. This structure maintained steady workflow pacing and ensured that all deliverables were completed on time with adequate quality checks before moving to the next phase.

KPIs & Project Requirements

Following the completion of the planned milestones, the project team defined a set of Key Performance Indicators (KPIs) to evaluate the quality, effectiveness, and overall success of each stage of the Electronics and Hardware Store Data Analysis Project. These KPIs ensure that the project outcomes align with the main objectives of improving profitability, enhancing business decision-making, and supporting higher management performance.

1. **Data Cleaning & Processing**
   - About 95% of missing and duplicate data handled: Target = 100%
   - About 80% Accuracy of data integration into the warehouse: Target = ≥ 98%
   - About 80% Consistency of product and order data across all sources: Target = ≥ 95%

2. **Analysis & Insights**
   - Percentage of agreed business questions answered: Target = ≥ 90%
   - Number of actionable insights generated: Target = ≥ 5
   - Accuracy of identified loss or low-profit causes: Target = ≥ 95%

3. **Visualization & Reporting**
   - Dashboard load time: Target = < 3 seconds
   - Dashboard usability (users navigate without help): Target = ≥ 80%
   - Data refresh success rate: Target = 100%

4. **Final Documentation & Presentation**
   - Final report completeness: Target = 100%

- Number of actionable recommendations for management: Target = ≥ 3
- Presentation clarity and engagement (based on feedback): Target = ≥ 90%