Retail Business Performance & Profitability Analysis Insights:

1. **Overall Sales and Profit:** The dashboard in "Project_1.pdf" indicates that the total sales are 12.57 million, and the total profit is 3.53 million, with 55,000 units sold. This gives us a general overview of the business's performance.
2. **Profit Margins by Category and Subcategory:**
    - The Python notebook ("Project_1.ipynb") calculates profit margins. For instance, it shows that "Clothing - Kids" has a profit margin of 27.96%, "Electronics - Smartphones" has 28.74%, and "Home - Appliances" has 27.67%.
    - The SQL script ("Project_1.sql") also calculates profit margins by category and subcategory, confirming these variations. This detailed breakdown helps in identifying the most and least profitable segments.
3. **Data Cleaning:** The SQL script ("Project_1.sql") explicitly cleans the data by removing records with NULL values in Category, Sub_Category, Total_Sales, Profit, Quantity_Sold, and Cost_per_Unit. This ensures that the subsequent analysis is based on complete and accurate data. The Python notebook also handles missing values.
4. **Correlation between Inventory Days and Profit:** The Python notebook calculates the correlation between Inventory_Days and Profit to be -0.007185. This very weak negative correlation suggests that there is no significant linear relationship between how long a product stays in inventory and the profit it generates.
5. **Inventory Distribution:** The Python notebook provides visualizations of Inventory_Days and Inventory_Stock distributions. These visualizations help understand the range and frequency of inventory holding times and stock levels.
6. **Regional Profit Analysis:** The SQL script ("Project_1.sql") performs a regional profit analysis, providing a breakdown of Total_Sales and Total_Profit by Region, Category, and Sub_Category. This allows for a detailed comparison of performance across different regions.
7. **Sub-Category Profit Contribution:**
    - The "Project_1.pdf" dashboard shows that "Smartphones" contribute the highest profit among the displayed sub-categories (313.45K), while "Appliances" contribute a lower profit (271.07K).
    - This highlights the variability in profit contribution across sub-categories.
8. **Quantity Sold by Sub-Category:** The dashboard also indicates the quantity sold by sub-category, with several sub-categories showing sales around the 5K mark, suggesting a relatively even distribution in sales volume across these sub-categories.
9. **Time-Based Analysis:** The dashboard in "Project_1.pdf" includes elements like "Year," "Quarter," and "Month," which implies that the data can be used for time-based analysis to identify sales and profit trends, including seasonal patterns.
10. **Product Type Segmentation:** The Python notebook shows that the data includes "Product_Type" (e.g., "Budget," "Premium," "Standard"), which allows for segmenting sales and profitability by product type. This segmentation can inform pricing and marketing strategies tailored to different product tiers.