Requirement Document for Sales Data Analysis

1. Overview

The purpose of this document is to define the requirements for analyzing the sales data in the given table. This table contains various data points, such as product sales, pricing, and discounts, to help in understanding sales performance and profitability. The analysis will assist in making informed business decisions related to pricing, discounts, manufacturing costs, and profit margins.

2. Data Description

The table consists of the following columns:

1. **Segment**: Defines the market segment to which the product belongs (e.g., "Consumer", "Corporate", "Home Office").
2. **Country**: The geographical location where the sale occurred.
3. **Product**: The name or ID of the product sold.
4. **Discount Band**: The category of discount applied to the product (e.g., "Low", "Medium", "High").
5. **Units Sold**: The number of units sold for each transaction.
6. **Manufacturing Price**: The cost of manufacturing the product.
7. **Sale Price**: The price at which the product was sold to the customer.
8. **Gross Sales**: The total sales amount before applying any discounts. It is calculated as:
9. **Discounts**: The total discount value applied to the gross sales. It is calculated as:
10. **Sales**: The actual revenue after applying the discounts.
11. **COGS (Cost of Goods Sold)**: The direct cost of producing the goods sold, typically the manufacturing price.
12. **Profit**: The profit from the sale after deducting the COGS and discounts.
13. **Date**: The date of the sale.
14. **Month Number**: The numerical representation of the month of the sale (1-12).
15. **Month Name**: The name of the month
16. **Year**: The year in which the sale took place.

3. Functional Requirements

3.1 Data Analysis and Reporting

- The system should be able to generate a report summarizing the total **Gross Sales**, **Sales**, **COGS**, and **Profit** by different categories such as **Country**, **Segment**, **Product**, and **Discount Band**.
- The report should allow for filtering based on the **Date**, **Month Name**, **Year**, or **Month Number**.
- The system should be able to calculate the **Average Sale Price**, **Average Manufacturing Price**, **Average Profit Margin**, and **Discount Percentage** for each product and segment over a specified time period.

3.2 Data Aggregation

- The system should support the aggregation of data at various levels:
    - By **Product**: Showing total sales, total units sold, total profit, and total discounts for each product.
    - By **Country**: Providing an overview of sales performance by country, including gross sales, profit, and units sold.
    - By **Month**: Allowing the user to view sales and profit trends over time, by selecting specific months or a date range.
    - By **Discount Band**: Aggregating sales data based on the discount category (e.g., low, medium, high discounts).

3.3 Discount Analysis

- The system should analyze how the **Discount Band** affects sales and profitability. For example, it should provide insights into:
    - Which **Discount Band** has the highest total sales.
    - The impact of different discount levels on **Profit** margins.
    - Comparing **Sales** and **Profit** across different discount bands to identify optimal discount strategies.

3.4 Profitability Analysis

- The system should provide a profitability analysis based on the **Profit** column. This can be done at different levels:
    - By **Product**: Determining the most and least profitable products.
    - By **Segment**: Evaluating which customer segments contribute the most to profitability.
    - By **Country**: Understanding which countries are the most profitable.

4. Non-Functional Requirements

4.1 Performance

- The system must be able to process large datasets with thousands of records and generate reports without significant delays.
- The report generation process should be efficient, with results delivered within 5 seconds for small queries and within 15 seconds for larger queries.

4.2 Scalability

- The system should be scalable to handle future data growth (i.e., additional products, sales records, and regions) without affecting performance.

4.3 Usability

- The system should provide an easy-to-use interface for accessing the data and generating reports.
- Reports should be exportable in multiple formats (e.g., Excel, CSV, PDF) for easy sharing and further analysis.

4.4 Security

- The data should be protected with proper user authentication and authorization to prevent unauthorized access.
- Sensitive data, such as sales figures and manufacturing prices, should be encrypted in storage.

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5. Use Cases

5.1 Use Case 1: Sales Performance Analysis by Product

Goal: Analyze the sales performance of products over a given time period.

- **Preconditions**: User has access to the data and is logged into the system.
- **Steps**:
    1. User selects the **Product** and defines the **Date Range**.
    2. System aggregates the sales data for the selected product, showing **Gross Sales**, **Sales**, **COGS**, and **Profit**.
    3. System provides visualizations (e.g., bar charts, line graphs) to display the trends.
- **Postconditions**: User receives a report showing the sales performance of the selected product.

5.2 Use Case 2: Discount Effectiveness Analysis

Goal: Evaluate how discounts affect sales and profitability.

- **Preconditions**: User has access to sales data and is logged into the system.
- **Steps**:
    1. User selects the **Discount Band** and defines the **Date Range**.
    2. System calculates total **Gross Sales**, **Sales**, **Profit**, and **Discounts** for each discount band.
    3. User can compare results to determine which discount band is most effective.
- **Postconditions**: User receives a report comparing the effectiveness of different discount bands.

5.3 Use Case 3: Profitability Analysis by Segment

Goal: Analyze the profitability of different customer segments.

- **Preconditions**: User has access to data and is logged into the system.
- **Steps**:

1. User selects the **Segment** and defines the **Date Range**.
2. System aggregates the **Profit** for each segment.
3. System provides insights on which segments are most profitable.

- **Postconditions**: User receives a report detailing the profitability by segment.

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6. Data Validation and Accuracy

6.1 Data Integrity

- Ensure that all data in the table is correct and up-to-date.
- The system must validate that **Units Sold**, **Manufacturing Price**, and **Sale Price** are non-negative values.
- The system should flag any inconsistencies, such as when the **Sale Price** is less than the **Manufacturing Price** (indicating a loss).

6.2 Consistency Checks

- Ensure that the **Gross Sales**, **Sales**, and **Profit** are correctly calculated based on the given formulas.

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7. Conclusion

This document provides a comprehensive overview of the functional and non-functional requirements for analyzing sales data. The system must support detailed reporting, data aggregation, and profitability analysis, helping stakeholders make informed decisions based on accurate and actionable insights.