Project Title: Retail Sales and Customer Insights Analysis

Project Overview

Students will analyze sales, customer, and product data for a fictional retail company. They will use advanced SQL techniques to uncover insights such as sales trends, customer segmentation, product profitability, and inventory management efficiency.

Dataset Description

1. Customers Table

- **customer_id** (Primary Key)
- **first_name**
- **last_name**
- **email**
- **gender**
- **date_of_birth**
- **registration_date**
- **last_purchase_date**

2. Products Table

- **product_id** (Primary Key)
- **product_name**
- **category**
- **price**
- **stock_quantity** (How many items are left in inventory)
- **date_added**

3. Sales Table

- **sale_id** (Primary Key)
- **customer_id** (Foreign Key)
- **product_id** (Foreign Key)
- **quantity_sold**
- **sale_date**
- **discount_applied** (Percentage Discount)
- **total_amount** (Price * quantity_sold * discount_applied)

4. Inventory Movements Table

- **movement_id** (Primary Key)
- **product_id** (Foreign Key)
- **movement_type** ('IN' for restock, 'OUT' for sales)
- **quantity_moved**
- **movement_date**

Key Objectives and Questions

Module 1: Sales Performance Analysis

1. **Total Sales per Month**:
   - Calculate the total sales amount per month, including the number of units sold and the total revenue generated.
2. **Average Discount per Month**:
   - Calculate the average discount applied to sales in each month and assess how discounting strategies impact total sales.

Module 2: Customer Behavior and Insights

3. **Identify high-value customers:**
   - Which customers have spent the most on their purchases? Show their details
4. **Identify the oldest Customer:**
   - Find the details of customers born in the 1990s, including their total spending and specific order details.
5. **Customer Segmentation**:
   - Use SQL to create customer segments based on their total spending (e.g., Low Spenders, High Spenders).

Module 3: Inventory and Product Management

6. **Stock Management**:
   - Write a query to find products that are running low in stock (below a threshold like 10 units) and recommend restocking amounts based on past sales performance.
7. **Inventory Movements Overview**:
   - Create a report showing the daily inventory movements (restock vs. sales) for each product over a given period.
8. **Rank Products:**:
   - Rank products in each category by their prices.

Module 4: Advanced Analytics

9. **Average order size:**
    - What is the average order size in terms of quantity sold for each product?
10. **Recent Restock Product:**
    - Which products have seen the most recent restocks

Advanced Features to Challenge Students

- **Dynamic Pricing Simulation**: Challenge students to analyze how price changes for products impact sales volume, revenue, and customer behavior.
- **Customer Purchase Patterns**: Analyze purchase patterns using time-series data and window functions to find high-frequency buying behavior.
- **Predictive Analytics**: Use past data to predict which customers are most likely to churn and recommend strategies to retain them.

Final Project Deliverable

- Students will deliver a comprehensive report that answers the key business questions. They should use advanced SQL features such as:
    - **CTEs**
    - **Window Functions**
    - **Subqueries**
    - **JOINs**
    - **Aggregation** (SUM, AVG, COUNT)
    - **GROUP BY** and **HAVING**