SQL Joins Exercises

This assignment is designed to help students practice SQL joins using a set of retail database tables. The exercises will cover basic and advanced join scenarios, as well as aggregate functions and query optimization.

Database Setup

Instructions:

1. Create a new database named `db_retail`.
2. Create the following tables based on the given characteristics and insert the provided data.

Table Definitions

1. `customers` Table:

- **Characteristics:**
    - `customer_id`: INT, UNSIGNED, AUTO_INCREMENT, PRIMARY KEY
    - `first_name`: VARCHAR(20), NOT NULL
    - `last_name`: VARCHAR(20), NOT NULL
    - `email`: VARCHAR(50), NOT NULL
    - `phone`: CHAR(13)

2. `orders` Table:

- **Characteristics:**
    - `order_id`: INT, UNSIGNED, AUTO_INCREMENT, PRIMARY KEY
    - `order_date`: DATE, NOT NULL
    - `customer_id`: INT, UNSIGNED, FOREIGN KEY references `customers(customer_id)`
    - `total_amount`: DECIMAL(10, 2), UNSIGNED

3. `products` Table:

- **Characteristics:**
    - `product_id`: INT, UNSIGNED, AUTO_INCREMENT, PRIMARY KEY
    - `product_name`: VARCHAR(50), NOT NULL
    - `price`: DECIMAL(8, 2), UNSIGNED

4. `order_items` Table:

- **Characteristics:**

o `order_id`: INT, UNSIGNED, FOREIGN KEY references `orders(order_id)`
o `product_id`: INT, UNSIGNED, FOREIGN KEY references `products(product_id)`
o `quantity`: INT, UNSIGNED, NOT NULL

Data Insertion

`customers` Data:

```
INSERT INTO customers (first_name, last_name, email, phone) VALUES
('John', 'Doe', 'john.doe@example.com', '(555)555-1234'),
('Jane', 'Smith', 'jane.smith@example.com', '(555)555-5678'),
('Alice', 'Johnson', 'alice.johnson@example.com', '(555)555-8765');
```

`orders` Data:

```
INSERT INTO orders (order_date, customer_id, total_amount) VALUES
('2024-08-01', 1, 150.00),
('2024-08-02', 2, 200.00),
('2024-08-03', 3, 300.00);
```

`products` Data:

```
INSERT INTO products (product_name, price) VALUES
('Laptop', 1000.00),
('Mouse', 20.00),
('Keyboard', 30.00);
```

`order_items` Data:

```
INSERT INTO order_items (order_id, product_id, quantity) VALUES
(1, 1, 1), -- Order 1 contains 1 Laptop
(1, 2, 2), -- Order 1 contains 2 Mice
(2, 2, 1), -- Order 2 contains 1 Mouse
(2, 3, 1), -- Order 2 contains 1 Keyboard
(3, 1, 2); -- Order 3 contains 2 Laptops
```

Exercise Questions

Task 1: Basic Join Queries

1. **Customer Orders:**
   o Write a query to list the full name and total amount of all orders placed by customers.
2. **Order Details:**
   o Write a query to find the product name, quantity, and order date for each item in the order items table.

Task 2: Advanced Joins

1. **Customers Without Orders:**
   - o Write a query to find the full name of customers who have not placed any orders.
2. **Products Not Ordered:**
   - o Write a query to find all product names that have never been ordered.

Task 3: Aggregate Functions and Joins

1. **Total Sales per Product:**
   - o Write a query to calculate the total sales amount for each product.
2. **Top Customer by Total Spend:**
   - o Write a query to find the customer who has spent the most money.