# SQL Project: E-Commerce Database Management and Analysis

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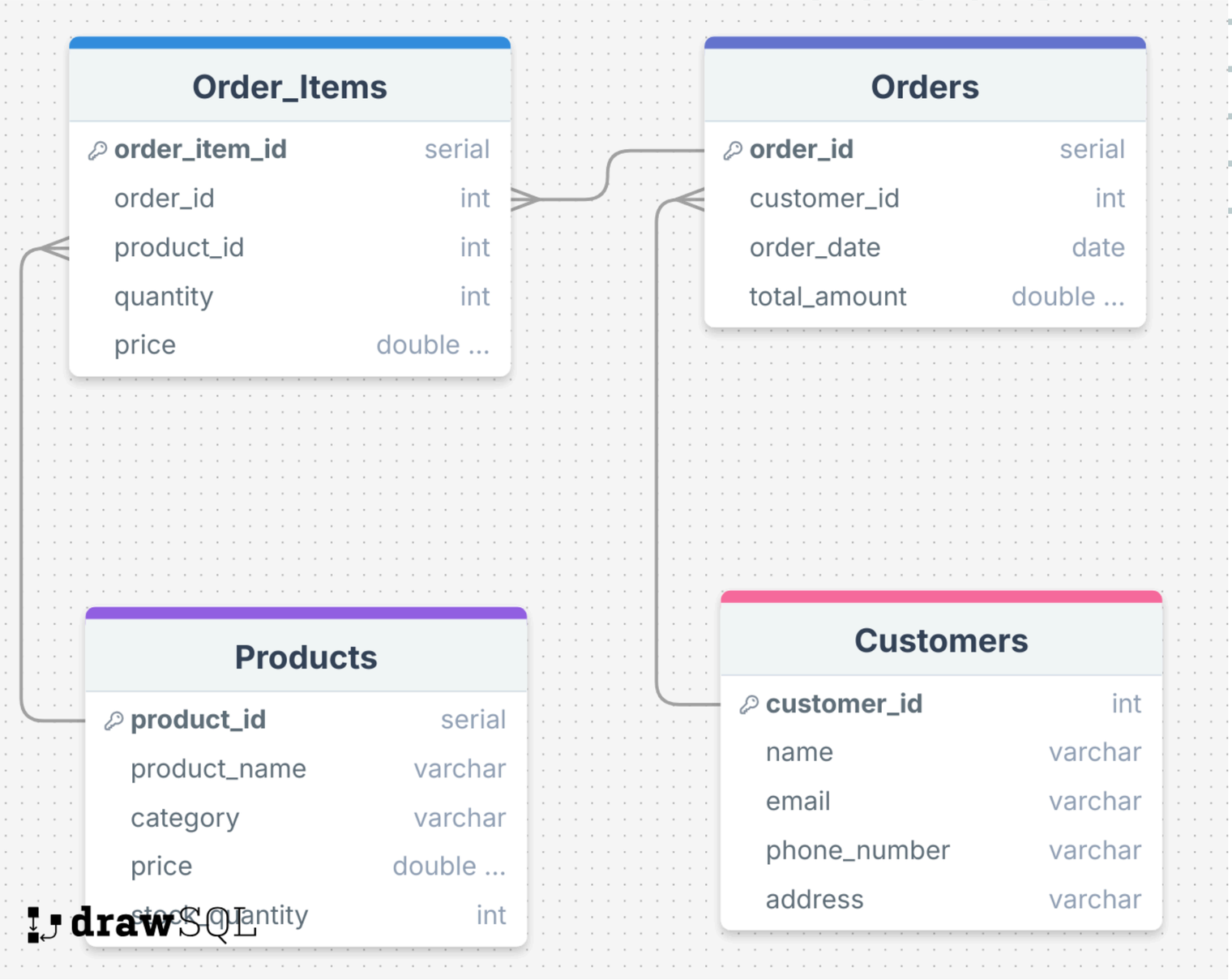
# INTRODUCTION

This project involves creating a schema for a SQL relational database system, exploring various aspects of database management, from basic CRUD operations to advanced topics like joins, aggregation, indexing, and optimization. It includes designing, implementing, and querying a relational database for a fictional e-commerce platform. This involves creating tables, performing data manipulations, and extracting meaningful insights using SQL queries.

# SCHEMA DESIGN

This database schema represents an e-commerce system with four tables: Customers, Products, Orders, and Order_Items.

- The Customers table stores customer information, including a unique customer ID, name, email, phone number, and address.
- The Products table contains product details, such as product ID, name, category, price, and available stock quantity.
- The Orders table tracks customer orders with an order ID, a reference to the customer who placed the order, the order date, and the total order amount.
- The Order_Items table links orders with products, recording each item in an order along with its quantity and price. It includes a unique order item ID and foreign keys referencing the Orders and Products tables.



01.

# CRUD OPERATIONS

# CRUD OPERATION

```sql
CREATE TABLE customers (
    customer_id serial PRIMARY KEY,
    name VARCHAR(100) NOT NULL,
    email VARCHAR(100) UNIQUE,
    phone_number VARCHAR(15),
    address TEXT
);
```

```sql
CREATE TABLE products (
    product_id serial PRIMARY KEY,
    product_name VARCHAR(100) NOT NULL,
    category VARCHAR(30),
    price NUMERIC,
    stock_quantity INTEGER
);
```

```sql
CREATE TABLE orders (
    order_id serial PRIMARY KEY,
    customer_id INTEGER REFERENCES customers (customer_id) ON DELETE CASCADE
    order_date DATE,
    total_amount NUMERIC
);
```

```sql
CREATE TABLE order_items (
    order_item_id serial PRIMARY KEY,
    order_id INTEGER REFERENCES orders (order_id) ON DELETE CASCADE, -- Wh
    product_id INTEGER REFERENCES products (product_id) ON DELETE CASCADE,
    quantity INTEGER,
    price NUMERIC
);
```

# CRUD OPERATION

```sql
-- Add a new customer to the database
INSERT INTO customers (name, email, phone_number, address)
VALUES ('Kathleen Mcdaniel', 'kathleen.mcdaniel@email.com', '104-806-3986', '733 Robert Harbors Apt. 675 Huberhaven, WI

-- Update the stock quantity of a product after a purchase
UPDATE products
SET stock_quantity = stock_quantity - 3
WHERE product_id = 5;

-- Delete an order from the database
DELETE FROM orders
WHERE order_id = 9;

-- Retrieve all orders for a specific customer
SELECT o.order_id,
       o.order_date,
       o.total_amount
FROM Orders o
JOIN Customers c ON o.customer_id = c.customer_id
WHERE c.name = 'Charles Jennings';
```

02.

# REVENUE ANALYSIS

# QUERY RESULTS
# REVENUE ANALYSIS

The total revenue generated from ORDERS table is $8,580

The total revenue generated by each products where the product Laptop generated the highest revenue followed by smartphone

| product_name | total_revenue |
|---|---|
| Laptop | 14,400 |
| Smartphone | 7,200 |
| Monitor | 5,100 |
| Tablet | 4,800 |
| Desk | 3,500 |
| Headphones | 3,200 |
| Desk Chair | 2,400 |
| Printer | 2,000 |
| Keyboard | 1,000 |
| Mouse | 390 |

The total revenue generated and the sum of price and quantity from order items may not match, as this dataset contains randomly generated sample data.

03.

# CUSTOMER INSIGHTS

# QUERY RESULTS
# CUSTOMER INSIGHTS

Diane Pugh is the customer with the highest total spending of $700, followed by Tami Peterson

Kathleen Mcdaniel is the only customer that hasn’t made any purchases

| A-Z customer_name | 123 total_spending |
|---|---|
| Diane Pugh | 700 |
| Tami Peterson | 680 |
| Benjamin Fischer | 580 |
| Chad Henry | 560 |
| Ryan Daniels | 540 |

The total revenue generated and the sum of price and quantity from order items may not match, as this dataset contains randomly generated sample data.

04.

# TREND ANALYSIS

# QUERY RESULTS
# PRODUCT TRENDS

Top 3 selling products are Laptop, Smartphone, and Monitor

No product is out of stock

| A-Z product_name | 123 total_revenue |
|---|---|
| Laptop | 14,400 |
| Smartphone | 7,200 |
| Monitor | 5,100 |

The total revenue generated and the sum of price and quantity from order items may not match, as this dataset contains randomly generated sample data.

# QUERY RESULTS
# MONTHLY TRENDS

The query calculates the number of orders and total revenue for each month. November had the recorded the highest total revenue.

| 123 monthno | A-Z month | 123 number_of_orders | 123 total_revenue |
|---|---|---|---|
| 1 | January | 1 | 150 |
| 2 | February | 2 | 420 |
| 3 | March | 3 | 920 |
| 4 | April | 2 | 570 |
| 5 | May | 2 | 690 |
| 6 | June | 2 | 440 |
| 7 | July | 3 | 1,070 |
| 8 | August | 3 | 650 |
| 9 | September | 2 | 520 |
| 10 | October | 3 | 1,150 |
| 11 | November | 3 | 1,190 |
| 12 | December | 3 | 810 |

The total revenue generated and the sum of price and quantity from order items may not match, as this dataset contains randomly generated sample data.

# QUERY RESULTS
# WINDOW FUNCTION ANALYTICS

The query results uses a CTE to find customers whose total spendings is greater than $500. Returns 6 customers that satisfies that condition

| 123 monthno | A-Z month | 123 number_of_orders | 123 total_revenue |
|---|---|---|---|
| 1 | January | 1 | 150 |
| 2 | February | 2 | 420 |
| 3 | March | 3 | 920 |
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The total revenue generated and the sum of price and quantity from order items may not match, as this dataset contains randomly generated sample data.

# SUMMARY

The analysis reveals that the total revenue generated from the orders table amounts to $8,580. Among the products, the Laptop generated the highest revenue, followed by the Smartphone, while the top three selling products overall are Laptop, Smartphone, and Monitor. Diane Pugh stands out as the customer with the highest total spending at $700, closely followed by Tami Peterson, whereas Kathleen McDaniel remains the only customer without any purchases. Additionally, all products are sufficiently stocked, with none being out of stock. A monthly analysis indicates that November recorded the highest total revenue.

# THANK YOU