Online Retail Sales Database Design

Report

Introduction

This project focuses on the design and implementation of a normalized SQL schema for an e-commerce platform. The goal is to create a robust and scalable database structure that supports key operations such as product management, order processing, customer management, and payment handling.

Abstract

E-commerce platforms rely heavily on well-structured databases for efficient operations. This project entails designing an online retail sales database by identifying key entities and relationships, normalizing the schema to the Third Normal Form (3NF), and implementing it using SQL. The project also involves generating sample data and writing queries to extract meaningful insights, such as sales reports.

Tools Used

- Database Systems: MySQL / PostgreSQL
- ERD Tool: dbdiagram.io
- SQL Environment: MySQL Workbench / pgAdmin / CLI

Steps Involved in Building the Project

1. Entity Identification

   Recognized core entities:

   - Products: Product ID, name, category, price, stock
   - Customers: Customer ID, name, email, address
   - Orders: Order ID, customer ID, order date, status
   - Payments: Payment ID, order ID, payment method, payment date, amount

2. ER Diagram Design

   Used dbdiagram.io to visually map the entities, their attributes, and relationships.

3. Schema Normalization (3NF)

   Ensured no redundancy and maintained referential integrity by eliminating partial and transitive dependencies.

4. DDL Script Writing

Created SQL scripts with proper data types, primary keys, foreign keys, and constraints.

5. Sample Data Insertion

Populated tables with realistic sample data for testing and demonstration.

6. JOIN Queries and Views

Developed SQL JOINs and views for generating sales reports, e.g., customer-wise purchase summary, total revenue by date, etc.

Conclusion

This project provided hands-on experience in designing and normalizing relational databases for real-world applications. It emphasized the importance of a well-structured schema for supporting business operations and analytics in e-commerce. The deliverables, including the ER diagram, SQL scripts, sample data, and query reports, demonstrate a functional and scalable retail sales database system.