Online Retail Sales Database Design – Project Report

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1. Introduction

The Online Retail Sales Database project simulates a real-world **e-commerce platform**. The database is designed to store information about customers, products, orders, payments, and inventory. The goal is to create a **normalized database (3NF)** that ensures data integrity, avoids redundancy, and allows efficient querying for business analytics.

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2. Abstract

This project demonstrates the process of designing, implementing, and querying a relational database for an online retail system. Key features include:

- Storing customer and product information.
- Tracking orders, order items, and payment transactions.
- Maintaining inventory levels.
- Writing analytical queries for revenue, best-selling products, and customer lifetime value.
- Using views to simplify reporting.

The project emphasizes **database normalization**, **SQL best practices**, and practical querying skills, making it suitable for both learning and showcasing in SQL developer interviews.

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3. Tools Used

- **MySQL Workbench**: For creating tables, relationships, and running SQL queries.
- **dbdiagram.io**: For designing the ER diagram of the database.
- **GitHub**: Version control and project sharing.
- **PDF/Word Editor**: To prepare the final report.

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4. Steps Involved in Building the Project

1. **Database Setup**: Created a dedicated database `online_retail` in MySQL.

2. **Schema Design**: Identified key entities — `customer`, `product`, `orders`, `order_item`, `payment`, `inventory` — and defined relationships.
3. **Normalization**: Ensured the schema conforms to **Third Normal Form (3NF)** to avoid redundancy and maintain data integrity.
4. **Table Creation**: Wrote DDL scripts to create tables with **primary and foreign key constraints**.
5. **Data Population**: Inserted sample data to simulate customers, products, orders, payments, and inventory.
6. **Query Development**: Developed analytical queries for:
    - Total revenue from successful payments
    - Monthly sales reports
    - Best-selling products
    - Customer lifetime value
7. **Views and Procedures**: Created views like `v_order_summary` for simplified reporting and implemented functions/procedures for reusable logic (e.g., calculating order totals).
8. **Testing & Validation**: Verified queries and views using sample data to ensure accurate results.

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5. Conclusion

The Online Retail Sales Database project provides a **comprehensive example of designing and implementing a normalized relational database**. It demonstrates the ability to model real-world scenarios, enforce data integrity, and write meaningful SQL queries for business insights. The project is **scalable** and can be extended with additional features such as discounts, multiple payments, or shipment tracking.

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GitHub: https://github.com/rbkush101-a11y/Online-Retail-Sales-Database-Design.git