

Database Management Systems Course: Final Project

Project Options: E-commerce Retail Store Application & Movie Streaming Service Application

Instructor: Chala Urgessa Course: Database Management Systems Textbook: Database System Concepts, Seventh Edition Semester: 2nd/Spring, 2024

Objective:

The objective of this final project is to apply advanced database management concepts including design, relational schemas, MySQL queries, normalization, transaction management, indexing, and big-data handling, to develop a comprehensive database system for one of two specific applications: an e-commerce platform or a movie streaming service.

Important Dates:

Project Proposal Due: May 1, 2024 **Mid-Project Review:** May 25, 2024 **Final Submission:** June 12, 2024 **Presentation Dates:** Wednesday, June 2024 - Thursday, June 2024

Project 1: E-commerce Retail Store Application

Overview

This project involves developing a comprehensive database system for an **e-commerce*** retail store. The focus will be on creating a robust and scalable database that can handle various aspects of an online store, including product listing, order management, user management, and transaction processing.

Key Concepts:

- **Database Design and Normalization:** Develop a highly normalized database schema to reduce redundancy and improve data integrity.
- **Relational Schema:** Create a detailed relational schema that depicts the relationships between different entities such as products, users, orders, payment details, and more.
- **MySQL Queries:** Implement complex SQL queries for CRUD operations, search functionality, and joining multiple tables.
- **Transactions:** Ensure that the database handles transactions securely, maintaining consistency and integrity of data across operations.
- **Indexing:** Use indexing to improve the performance of queries, especially for large datasets.
- **Big Data Considerations:** Plan for scalability by considering how the system might handle large volumes of data and high transaction volumes.

Project Deliverables:

- Design documentation including ER diagrams and relational schemas.
- Implementation of the database in MySQL with all required tables and relationships.

- A set of advanced SQL queries demonstrating CRUD operations, transactions, and join operations.
 - A report on indexing strategies implemented and their impact on query performance.
 - **Optional:** Prototype of a web front-end using a simple Java servlet or Python Flask or Django application to demonstrate the database.
-

Project 2: Movie Streaming Service Application

Overview

This project focuses on building a database system for a movie streaming service, similar to **Netflix** or **Hulu**. The database should manage large datasets of users, movies, subscriptions, views, and ratings efficiently.

Key Concepts:

- **Database Design:** Develop a database schema that supports the storage and retrieval of movie data, user profiles, subscription information, and viewing history.
- **Normalization:** Apply normalization rules to ensure minimal redundancy and maintain data integrity.
- **Relational Database Management:** Create a comprehensive relational database that includes tables for storing movies, users, genres, directors, and actors.
- **Transaction Management:** Handle transactions in scenarios like subscription payments and movie rentals.
- **Indexing:** Implement effective indexing to optimize searches across a potentially vast database of movies and users.
- **Big Data:** Discuss strategies for managing and querying large datasets effectively using MySQL.

Project Deliverables:

- Detailed database design documents, including ER diagrams and normalized tables.
- Implementation of the database schema in MySQL.
- Complex SQL queries that demonstrate data manipulation, complex joins, and transactional integrity.
- Analysis of the use of indexing and its effects on the performance of the system.
- **Optional:** A simple NodeJs, Java or Python application to demonstrate basic functionalities of the streaming service with a front-end website.

Submission Requirements:

Written Report: A detailed report including all aspects of the database design, implementation, and a discussion on the challenges faced and solutions implemented. **Code and Database Files:** All source code and MySQL database files used in the project. **Presentation Slides:** Slides for the final presentation.

Evaluation Criteria for Both Projects:

- Design Complexity and Practicality **(20%)**
- Implementation and Functionality **(20%)**
- Use of Advanced Database Features **(15%)**
- Performance Optimization **(15%)**
- Documentation and Presentation **(20%)**

- Innovation and Creativity **(10%)**

This project is an opportunity to demonstrate your ability to design and implement a functional database system and to apply theoretical knowledge to practical, real-world scenarios. Choose your project according to your area of interest and career goals, and make the most of this learning experience.

\$\Join\$