Semester Project: E-Commerce Website Database Implementation

Instructions

- Submission Deadline: 23rd May 2025, 14:00 via Inspera.
- The candidates must create the groups themselves in Inspera. (instructions will be on the front of the test in Inspera)
- Mention individual contribution of group members in the report.
- Cover page of report should have names and student numbers of all group members.

Project Description:

New electronics selling company ElectroMart has hired you as their new database engineer. They offer wide range of electronic products, including smartphones, laptops, tablets, cameras, home appliances, and accessories. The company aims to provide an efficient and user-friendly online shopping experience to it customers.

As a database engineer, you are tasked with designing and implementing a fully functional relational database driven e-commerce website (as a reference you can also visit popular ecommerce websites like Power, Elkjop, Komplett, Zalando, etc). The project involves creating both the basic frontend and backend components of the website, as well as implementing the necessary database structures to support its functionality.

The goal is not to check your frontend or backend skills, but to check your database knowledge; however, you should support your database with proper frontend and backend development support.

In this project, you can make assumptions at all stages, document your assumptions in the final report. There are some suggested entities for this type of database (you can think or add more, they are just for suggestion to give you an idea) given below:

Entities:

- **Product**: Represents the electronic products available for sale on the website. Attributes may include ProductID, Name, Description, Price, StockQuantity, BrandID, CategoryID, and other specifications.

- **Category**: Represents different categories of electronic products. Attributes may include CategoryID, Name, and Description.

- **Brand**: Represents the brands or manufacturers of electronic products. Attributes may include BrandID ,Name, and Description.

- **User**: Represents users of the website. Attributes may include UserID, Username, Password, Email, FirstName, LastName, Address, and other contact details.

- **Order**: Represents individual orders placed by users. Attributes may include OrderID, UserID, OrderDate, TotalAmount, Status, and other relevant information.

- **OrderItem**: Represents the items included in each order. Attributes may include OrderItemID ,OrderID ,ProductID ,Quantity, and Subtotal.

- **Payment**: Represents payments made for orders. Attributes may include PaymentID, OrderID, PaymentMethod, Amount, PaymentDate, and Status.

Project Goals:

Database Design: Design a relational database schema to store information about products, users, orders, payments, and any other relevant entities for the e-commerce website. Create an EER diagram, logical diagram, also create sample tables in 1NF,2NF, 3NF and BCNF for every relation.

Backend Development: Implement the backend of the website using a suitable programming language and framework (e.g., Python with Django or Flask, Node.js with Express.js, or any of your choice) to handle user authentication, product management, order processing, and other server-side functionalities. You can use programming language/ framework of your choice.

Frontend Development: Develop the frontend of the website using HTML, CSS, and JavaScript (with frameworks like React, Angular, Vue.js, or any technology of your choice) to create an intuitive user interface for browsing products, adding them to the cart, and completing orders.

Database Implementation: Implement the designed database schema using a relational database management system (such as MySQL, PostgreSQL, or SQLite) to store and retrieve data efficiently. Implement the concepts learned in the course including primary/foreign/compositive keys, integrity/referential constraints, and others.

Documentation: Provide comprehensive documentation covering the database schema, backend APIs, frontend components, and instructions for running and testing the website (with screenshots). Choose the primary and foreign keys and mention your assumptions in the report.

Project Deliverables:

You should upload two files:

1. Detailed project report (single file in pdf) containing:

    - Project documentation covering all aspects of the implementation and usage instructions (also listing any assumptions).

- Database schema design document (EER diagrams, logical model, sample table data in 1NF, 2NF, 3NF and in BCNF, .sql file of schema).
- Report should have screenshots of working e-commerce website showing database functionality.
- Describe in your project if you've addressed/implemented any security measures and indexing.
- Structure your report properly.

2. Database project source files (as single .zip) including:
   - Backend and Frontend source code.
   - SQL scripts for database creation, population, and sample queries.

Evaluation Criteria:

- Grades: A - F
- We follow the guidelines for bachelor theses in Engineering for grading the submissions/project reports.
- All group members will get a same grade, irrespective of the contribution in the project.

Following points will be evaluated:

- **Database Design (30%):** Clarity, normalization, and efficiency of the database schema.
- **Database Implementation (30%):** Correctness and efficiency of database operations and queries.
- **Backend/Frontend Development (10%):** Functionality, robustness, and adherence to best practices in backend coding. User interface design, responsiveness, and smooth user experience.
- **Documentation and Presentation (30%):** Clarity, completeness, and professionalism of project documentation and presentation.

Additional Notes:

- You are encouraged to use version control systems like Git for collaborative development.
- Plagiarism and unauthorized use of external code or resources will result in severe penalties.
- More grading will be on your database knowledge, not on frontend or backend programming skills

Good luck with your project, and don't hesitate to reach out if you have any questions or need assistance throughout the semester!

Note: This project description might be updated incase of any clarification required. However, the project and task will remain the same.