Project Proposal Statement
Course: CSE 214 Advanced Application Development
Project Title: Full-Stack E-Commerce Web Application Development

Objective:
The objective of this project is to design and develop a full-stack e-commerce web application using Angular for the front-end and Spring Boot for the back-end. The application will include seamless communication between the front-end and back-end through a REST API, providing full CRUD (Create, Read, Update, Delete) functionality for managing database operations. Students will also implement advanced features such as secure user authentication and authorization, dependency injection, and advanced entity mappings using Hibernate/JPA.

Scope:
The project will focus on building an integrated e-commerce platform with the following features:

Front-End (Angular)

1. **Data Binding:** Effective data exchange between templates and components.
2. **Component Lifecycle Hooks:** Lifecycle management for Angular components.
3. **Routing:** Efficient navigation between application views.
4. **Angular Forms:** Form handling and validation.
5. **Dependency Injection:** Modular and testable architecture.
6. **RxJS:** Reactive programming for asynchronous operations.

Back-End (Spring Boot)

1. **Hibernate/JPA:** Data persistence and ORM (Object-Relational Mapping).
2. **REST API Development:** Secure and scalable APIs for CRUD operations.

3. **Spring MVC:** Clear separation of concerns using Model-View-Controller architecture.
4. **Advanced JPA Mappings:** Efficient representation of complex data relationships.
5. **Security:** Authentication and authorization using Spring Boot REST API Security.

Database:

A relational database (MySQL) will be used to store all application data, with support for advanced relationships and queries.

Deliverables:

1. **Application Architecture Diagram**
    - Depicting the interaction between the front-end, back-end, and database.
2. **Entity Relationship Diagram (ERD):** Visualizing database schema and relationships.
3. **Class Diagram:** Illustrating the structure of key back-end components.
4. **Source Code:**
    - Angular front-end code.
    - Spring Boot back-end code.
    - Database scripts for creating and populating the database.

Environment Setup:

1. **Backend Environment:**
    - Install Java Development Kit (JDK).
    - Generate and set up the Spring Boot project using Spring Initializr.
    - Configure MySQL for database management.

2. **Frontend Environment:**
    - Install Node.js and Angular CLI.
    - Create and configure the Angular application.
3. **Tools and IDEs:**
    - IntelliJ IDEA for Spring Boot development.
    - Visual Studio Code for Angular development.
    - Tomcat server for deployment.
4. **Integration:**
    - The Angular application will run on port 4200, while Spring Boot will run on port 8080. The two components will communicate via REST APIs.

Submission Requirements:

1. Database scripts for schema and data initialization.
2. Complete Angular project source code.
3. Complete Spring Boot project source code.
4. Project report

Expected Outcome:
This project will provide hands-on experience in full-stack development using modern technologies and best practices. Students will gain practical knowledge of designing and implementing an end-to-end application, addressing both client-side and server-side requirements, while ensuring secure, efficient, and scalable solutions.