SUPER MALL WEB APPLICATION – MANAGE SHOP'S OFFER, PRODUCTS & LOCATION

Full Stack Web Development Project Report
(Unified Mentor Internship)

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1. Title Page

Project Title: Super Mall Web Application – Manage Shop's Offer, Products & Location
Domain: Industry / E-Commerce & Retail Management
Technologies Used: HTML, CSS, JavaScript, Firebase (Authentication & Database)
Difficulty Level: Hard
Internship Organization: Unified Mentor
Intern Name: *Vaibhav Thapliyal*
Duration: *Nov 2025 – Feb 2026*
Github: *https://github.com/vai938/super_mall_webapp*

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2. Abstract

The Super Mall Web Application is a comprehensive web-based platform designed to manage shops, products, offers, categories, and floor-wise locations within a shopping mall ecosystem. The system enables administrators to create and manage shop details, offers, categories, and product listings, while end users can browse shops, compare product prices and features, filter products, and view shop-wise and floor-wise offers.

The application is developed using HTML, CSS, and JavaScript for the frontend and Firebase for authentication, real-time database, and hosting. The project aims to digitize mall operations, enhance visibility for merchants (including rural vendors), and provide consumers with a unified platform to discover, compare, and purchase products securely. The system adheres to

modular, maintainable, and testable coding standards with logging enabled for all critical actions.

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3. Introduction

With the rapid growth of e-commerce and digital marketplaces, traditional retail models are evolving toward hybrid online-offline experiences. Shopping malls can leverage digital platforms to enhance customer engagement, streamline shop management, and expand merchant reach beyond physical locations.

This project was developed as part of the Unified Mentor internship to design a scalable web application that centralizes mall-related data such as shop details, offers, product catalogs, and location mapping. The application aims to improve the discoverability of shop offerings and facilitate better decision-making for consumers through product comparison and filtering features.

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4. Problem Statement

Traditional mall information systems are fragmented, with limited digital presence for individual shops and offers. Customers often struggle to discover relevant deals, compare products, or navigate shop locations efficiently. Merchants, especially from rural or developing regions, face challenges in reaching a broader customer base.

Problem:
Design and implement a secure, web-based Super Mall platform that enables centralized management of shops, products, offers, categories, and locations, while providing consumers with intuitive tools to browse, filter, and compare offerings.

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5. Objectives

The primary objectives of the Super Mall Web Application are:

- To create a centralized platform for managing shop details, products, and offers.
- To enable administrators to manage categories and floor-wise shop locations.
- To allow users to browse shops and view shop-wise and floor-wise offers.
- To implement product comparison and filtering features.
- To ensure secure authentication and data persistence using Firebase.
- To follow modular, safe, testable, maintainable, and portable coding practices.
- To maintain a public GitHub repository with proper documentation and README.

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6. Scope of the Project

In Scope:

- Admin module for shop, offer, category, and floor management
- User module for browsing shops and offers
- Product listing and comparison features
- Category-wise and floor-wise views
- Filtering and search functionality
- Firebase-backed authentication and database
- Logging for all major actions
- Cloud deployment

Out of Scope (Future Enhancements):

- Payment gateway integration

- Order management and delivery tracking
- Recommendation engine
- Mobile app version
- Advanced analytics dashboard

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7. Literature Review (Brief)

Modern retail platforms adopt centralized product catalogs, offer management systems, and user-centric browsing experiences. Cloud backends such as Firebase are commonly used for rapid development of scalable web applications due to their real-time synchronization, authentication, and hosting capabilities. Modular frontend architectures improve maintainability and enable future extensibility in large-scale retail systems.

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8. System Architecture

High-Level Architecture:

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Client (Browser)
      ↓
HTML/CSS UI
      ↓
JavaScript Controllers
      ↓
Firebase Authentication
Firebase Firestore / Realtime Database
      ↑
Real-Time Sync & Logging
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Core Modules:

- Admin Module (Shop, Offer, Category, Floor Management)
- User Module (Browse, Filter, Compare)
- Authentication Module
- Logging & Monitoring Module

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9. Technology Stack

Layer	Technology Used
Frontend	HTML5, CSS3
Scripting	JavaScript (ES6)
Backend (BaaS)	Firebase (Auth, Firestore/DB)
Hosting	Firebase Hosting / Cloud Platform
Tools	VS Code, GitHub

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10. Functional Requirements

- The system shall allow users to log in securely.
- The system shall allow Admin to create and manage shop details.
- The system shall allow Admin to manage offers, categories, and floors.
- The system shall list shop-wise and category-wise products.
- The system shall allow users to compare product prices and features.

- The system shall provide filtering and search capabilities.
- The system shall display shop-wise and floor-wise offers.
- The system shall log all critical user actions.

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11. Non-Functional Requirements

- **Security:** Firebase authentication and role-based access control.
- **Maintainability:** Modular codebase with separation of concerns.
- **Testability:** Unit-testable components and business logic.
- **Portability:** Cross-browser compatibility across operating systems.
- **Performance:** Efficient rendering and data retrieval.
- **Scalability:** Cloud-hosted backend for growth in users and data.

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12. Implementation Details

12.1 Frontend

The frontend provides dashboards for Admin and Users. Responsive layouts ensure usability across devices. Product lists, offers, and shop details are rendered dynamically using JavaScript.

12.2 Backend (Firebase Integration)

Firebase services are utilized for:

- User authentication
- Data storage for shops, products, offers, categories, and floors
- Real-time updates
- Hosting and deployment

12.3 Logging and Code Quality

- Logging is implemented for actions such as login, shop creation, offer updates, and product comparisons.
- The code adheres to coding standards and modular design principles:
    - Safe
    - Testable
    - Maintainable
    - Portable

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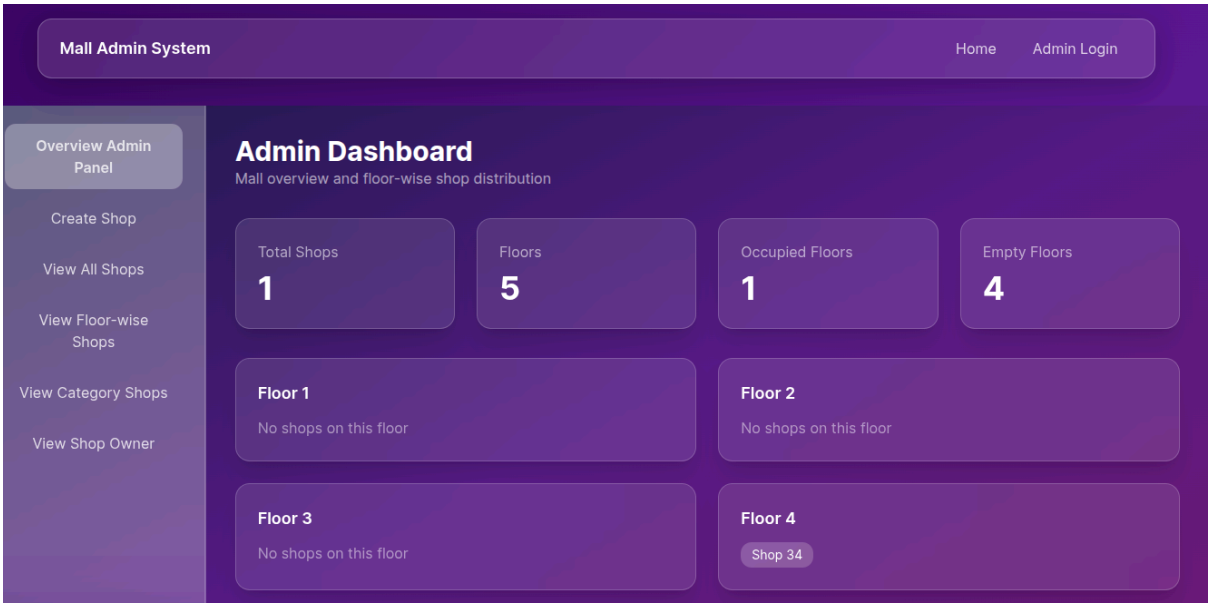
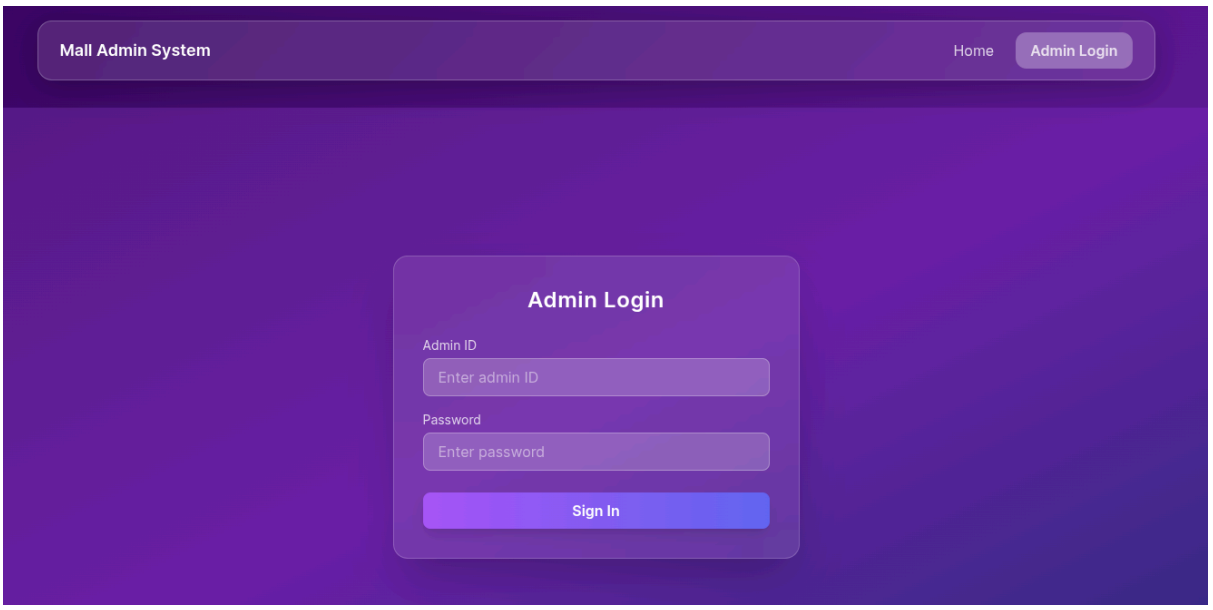
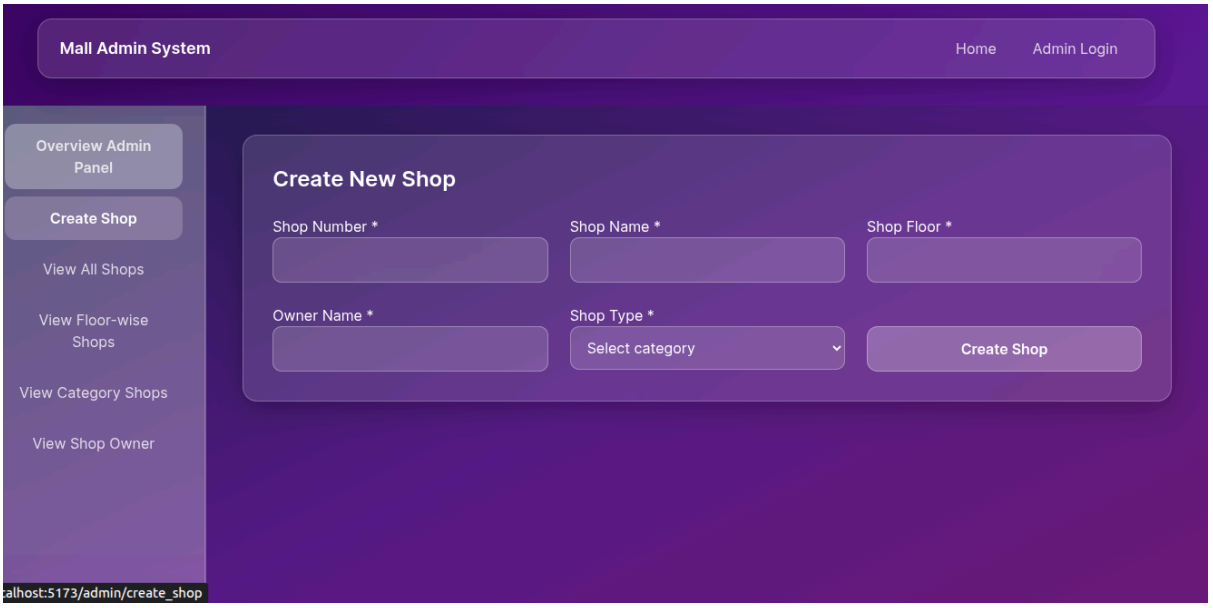
13. Output Screens (Placeholders)







- Login Screen
- Admin Dashboard (Shop & Offer Management)
- Product Listing & Comparison View
- Category-wise and Floor-wise Views

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14. Testing

Test Cases:

- Authentication and role validation
- CRUD operations for shops and offers
- Product listing and filtering
- Product comparison functionality
- Logging verification
- Firebase connectivity and performance testing

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15. Challenges Faced

- Designing a scalable data model for shops, products, and offers
- Implementing efficient product comparison logic
- Ensuring role-based access control
- Managing real-time updates with Firebase
- Maintaining modular code structure

16. Results and Outcomes

The Super Mall Web Application successfully centralizes mall operations, enabling efficient management of shops, offers, products, and locations. Users can browse, filter, and compare offerings in a unified interface. The project demonstrates strong adherence to software engineering best practices, cloud-based deployment, and modular frontend architecture.

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17. Future Enhancements

- Integrate secure payment gateway
- Add order management and delivery tracking
- Implement personalized recommendations
- Develop mobile application
- Introduce analytics and reporting dashboards

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18. Conclusion

The Super Mall Web Application addresses real-world retail management challenges by providing a digital platform for centralized shop and offer management. The project fulfills all defined requirements and establishes a scalable foundation for future enhancements, aligning with professional software development standards practiced during the Unified Mentor internship.