NATIONAL INSTITUTE OF BUSINESS MANAGEMENT

School of Computing and Engineering

“School Management System”

Final Year Diploma Project Report

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Date: 2024/12/20

Place: NIBM Colombo School of Computing and Engineering

Diploma in Software Engineering

Declaration

I/We hereby declare that this project report is my/our own work and has not been submitted previously for any academic qualification. All sources of information have been acknowledged.

Signatures:

_____

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Abstract

The School Management System is a comprehensive software solution designed to address the growing needs of modern educational institutions. This project implements a robust platform that integrates various aspects of school administration, academic management, and communication into a unified system. The system employs cutting-edge technologies including biometric authentication, role-based access control, and real-time data processing to provide an efficient and secure environment for all stakeholders.

The implementation demonstrates significant improvements in administrative efficiency, reducing manual workload through automation of routine tasks and streamlining communication channels, thereby enhancing the overall educational experience. The system's modular architecture ensures scalability and maintainability, while its intuitive interface promotes rapid adoption among users of varying technical proficiency.

The project's significance lies in its potential to transform traditional educational management practices, particularly in government schools where resources are often limited. By digitizing core processes and providing real-time access to information, the system enables better decision-making and more effective resource utilization, ultimately contributing to improved educational outcomes.

Keywords: School Management, Education Technology, Academic Administration, Database Management, Web Application

Acknowledgement

We would like to express our sincere gratitude to our project guide, Dr. Thisara Weerasinghe, and the faculty of the School of Computing and Engineering for their invaluable support and guidance throughout this project.

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1 Introduction

1.1 Background

The digital revolution has transformed virtually every sector of society, yet many educational institutions, particularly government schools, continue to operate using traditional manual systems. This technological gap not only impacts administrative efficiency but also affects the quality of education and student engagement. In an era where students are increasingly tech-savvy and parents expect real-time updates about their children's progress, the need for a comprehensive digital solution has become paramount.

1.2 Project Context

This School Management System project emerges from a critical need to modernize educational institution operations, specifically targeting provincial schools such as Susamayawardhana College in Colombo 08. This school, which educates students from primary grades through to Advanced Level (A/L), represents a common scenario in the local education landscape where a comprehensive digital solution can make a significant impact. The initiative was conceived after extensive consultation with educators, administrators, and education technology experts, who identified significant opportunities for improving educational outcomes through digital transformation in such environments.

1.3 Project Objectives

- Modernization of Educational Operations
- Improvement of Stakeholder Engagement

1.4 Scope and Significance

The project encompasses a complete overhaul of school management processes, from daily administrative tasks to long-term strategic planning. Its significance lies in its potential to:

- Reduce administrative burden through automation
- Enhance student performance tracking accuracy with digital records

2 Methodology

2.1 Introduction

The methodology for this project follows a structured software development lifecycle, including requirements gathering, system analysis, design, implementation, and testing. To ensure the solution was tailored to the specific needs of Susamayawardhana College, a variety of data collection techniques were employed. These included structured interviews with the school principal and administrative staff, questionnaires distributed to teachers to understand their daily challenges, and a thorough review of existing administrative documents, such as student registration forms and attendance logs. This multi-faceted approach ensured a holistic understanding of the operational environment.

2.2 Development Approach

A phased development approach was used:

- **Phase 1: Foundation** – User authentication, profile management, database setup
- **Phase 2: Core Functionality** – Academic management, attendance tracking, and assessment features
- **Phase 3: Advanced Features** – Reporting, communication platform, analytics dashboard

2.3 Chapter Summary

This chapter outlined the methodology and development approach used to ensure the system meets stakeholder requirements and is delivered on time.

3 Analysis

3.1 Current Environment Assessment

Susamayawardhana College, a provincial school in Colombo 08, operates with limited resources and relies heavily on manual processes, leading to significant inefficiencies and data management challenges. As a school that accommodates students from primary to Advanced Level (A/L), the administrative workload is substantial. The current environment was assessed through stakeholder interviews and process mapping, revealing a need for a digital system to manage student records, academic performance, and parent-teacher communication effectively.

3.2 Feasibility Study

A feasibility study was conducted to evaluate the technical, operational, and economic viability of implementing a school management system at Susamayawardhana College. The results indicated strong potential for improvement through digital transformation, despite the school's resource constraints.

3.3 Problem Statement

At Susamayawardhana College, teachers spend a considerable amount of time on manual administrative tasks, such as marking attendance on paper registers, calculating term-end results, and preparing student reports. This administrative burden detracts from their primary focus on teaching and student development. Meanwhile, parents and guardians struggle to stay informed about their children's academic progress and attendance, often having to wait for parent-teacher meetings for updates. The lack of standardized digital processes results in data inconsistencies and makes it difficult to

track long-term student performance data, hindering effective educational planning and intervention.

3.4 Chapter Summary

This chapter analyzed the current system, identified limitations, and established the need for a comprehensive school management solution.

4 Solution Design

4.1 System Architecture

The system is designed with a modular architecture, ensuring scalability and maintainability. Key modules include authentication, academic management, attendance, assessment, reporting, and communication.

Table 4.1: Technologies Used

Category	Technology
Frontend	HTML, CSS, JavaScript
Backend	Node.js, Express.js
Database	MySQL
Version Control	Git

4.2 Design Patterns and Principles

The design follows best practices such as separation of concerns, robust error handling, and secure data flow. Standardized API interfaces and middleware facilitate integration between modules.

4.3 System Modeling and Documentation

4.3.1 Entity-Relationship Diagram

4.3.2 Class Diagram

4.3.3 Use Case Diagram

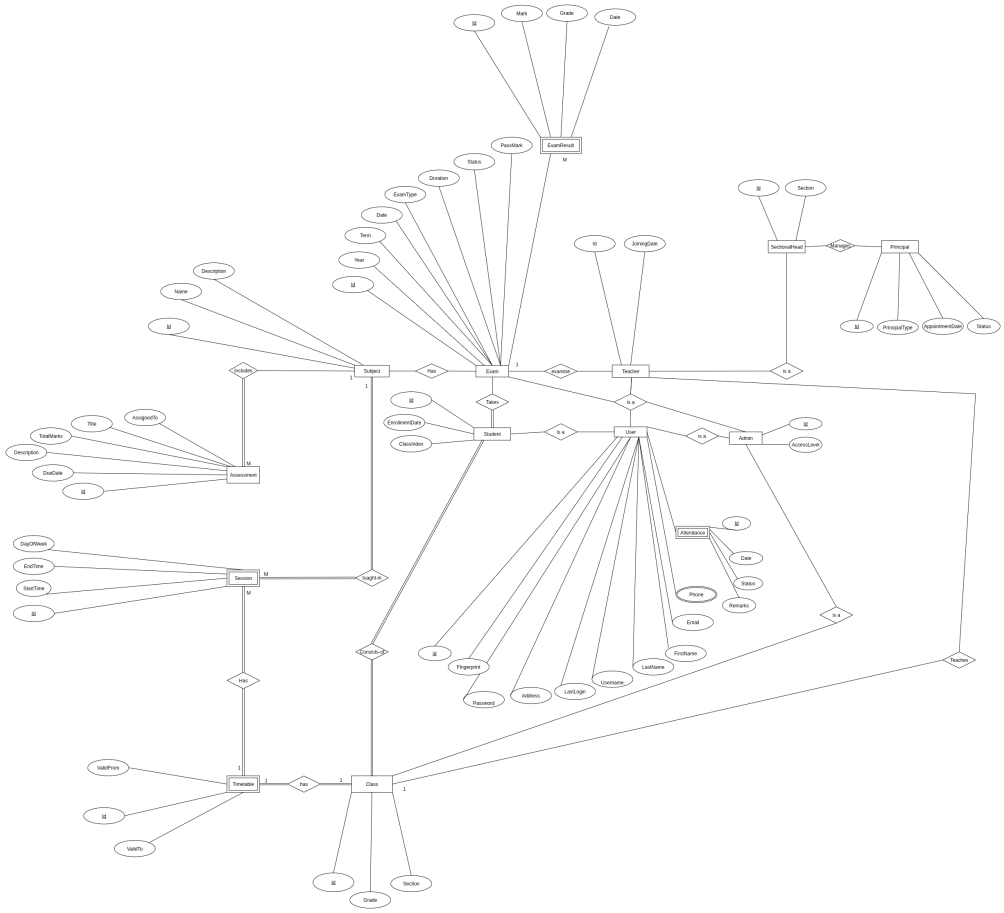


Figure 4.1: Entity-Relationship Diagram

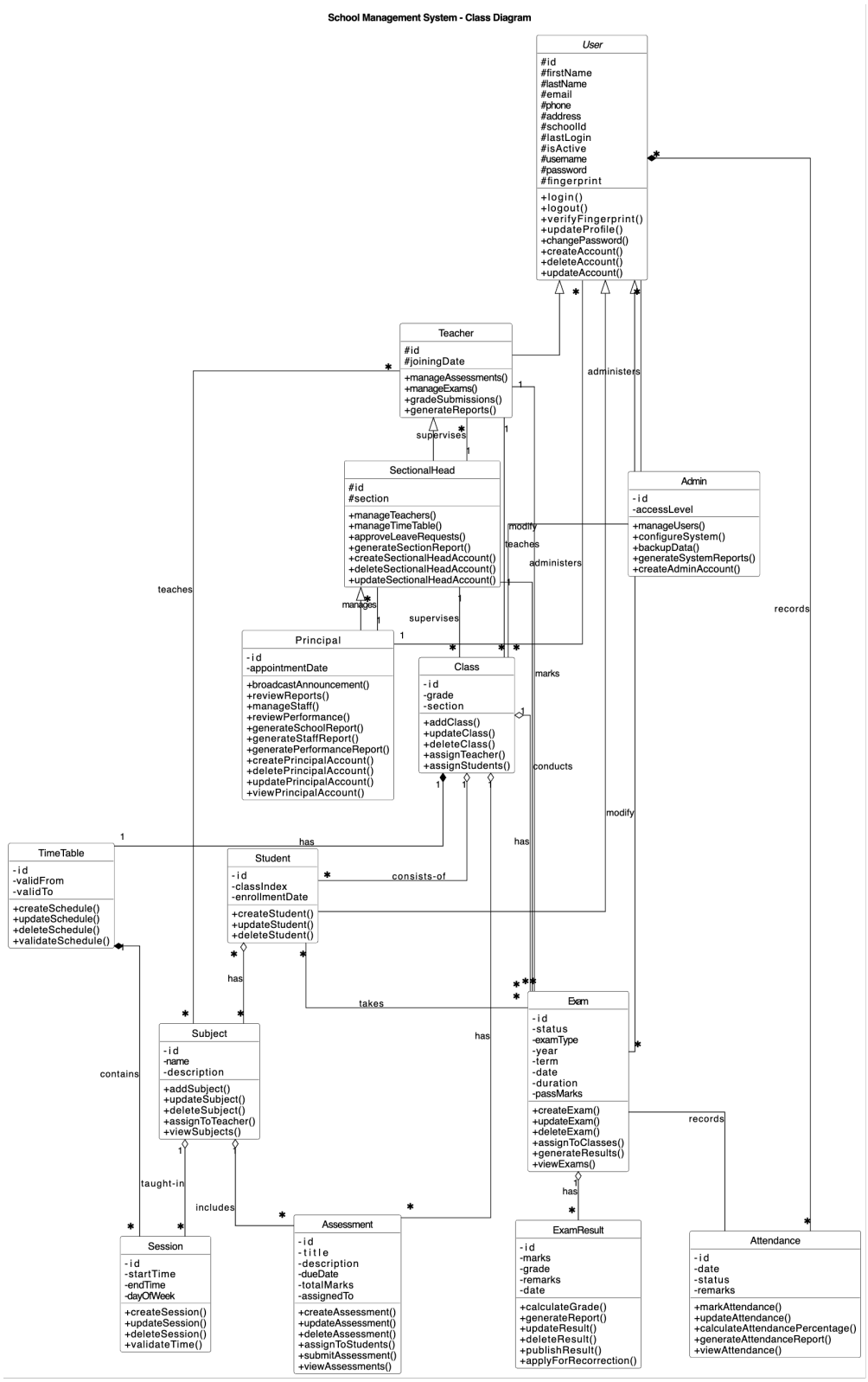


Figure 4.2: Class Diagram

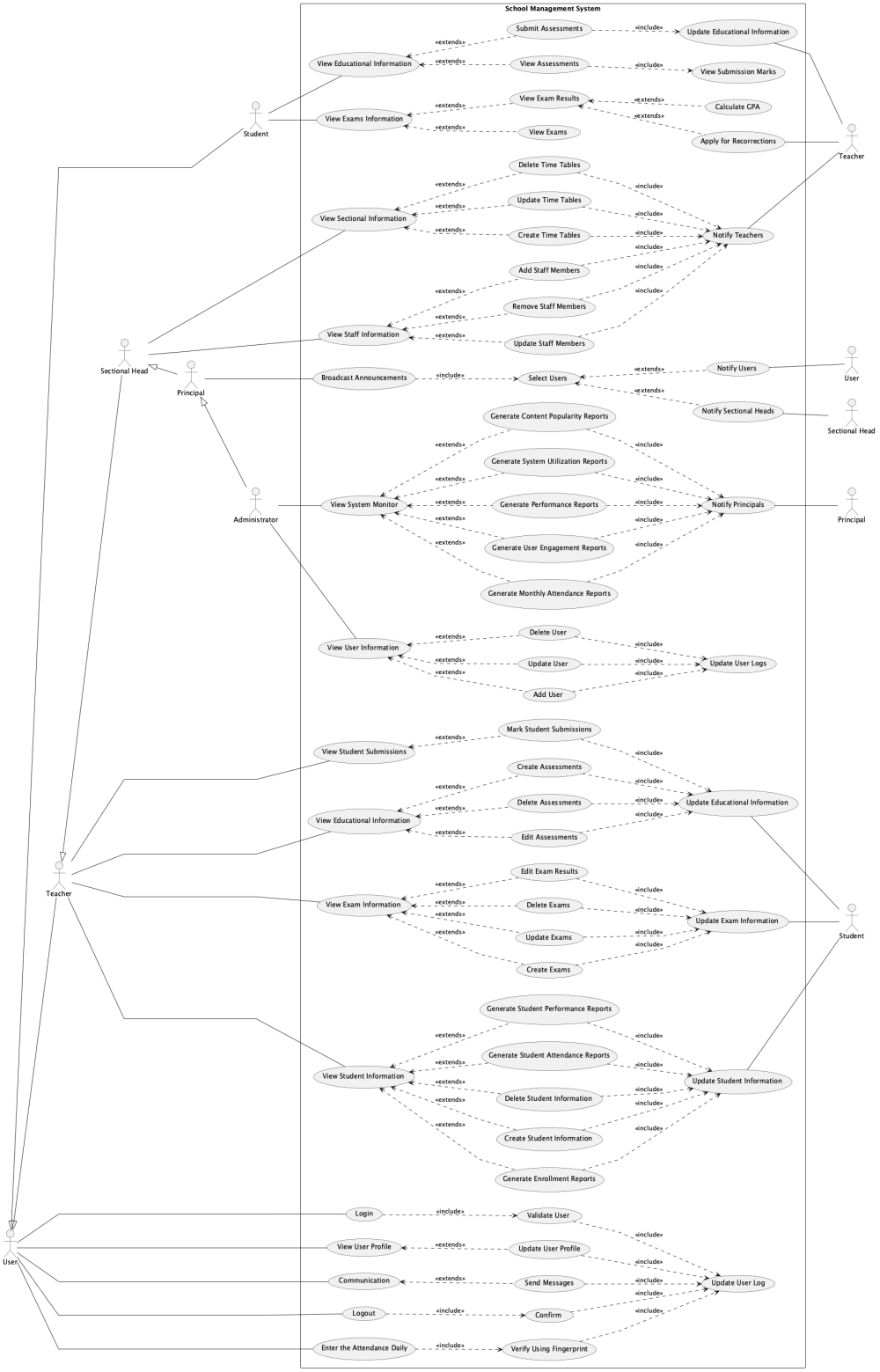


Figure 4.3: Use Case Diagram

5 User Interface Design

5.1 Login Page

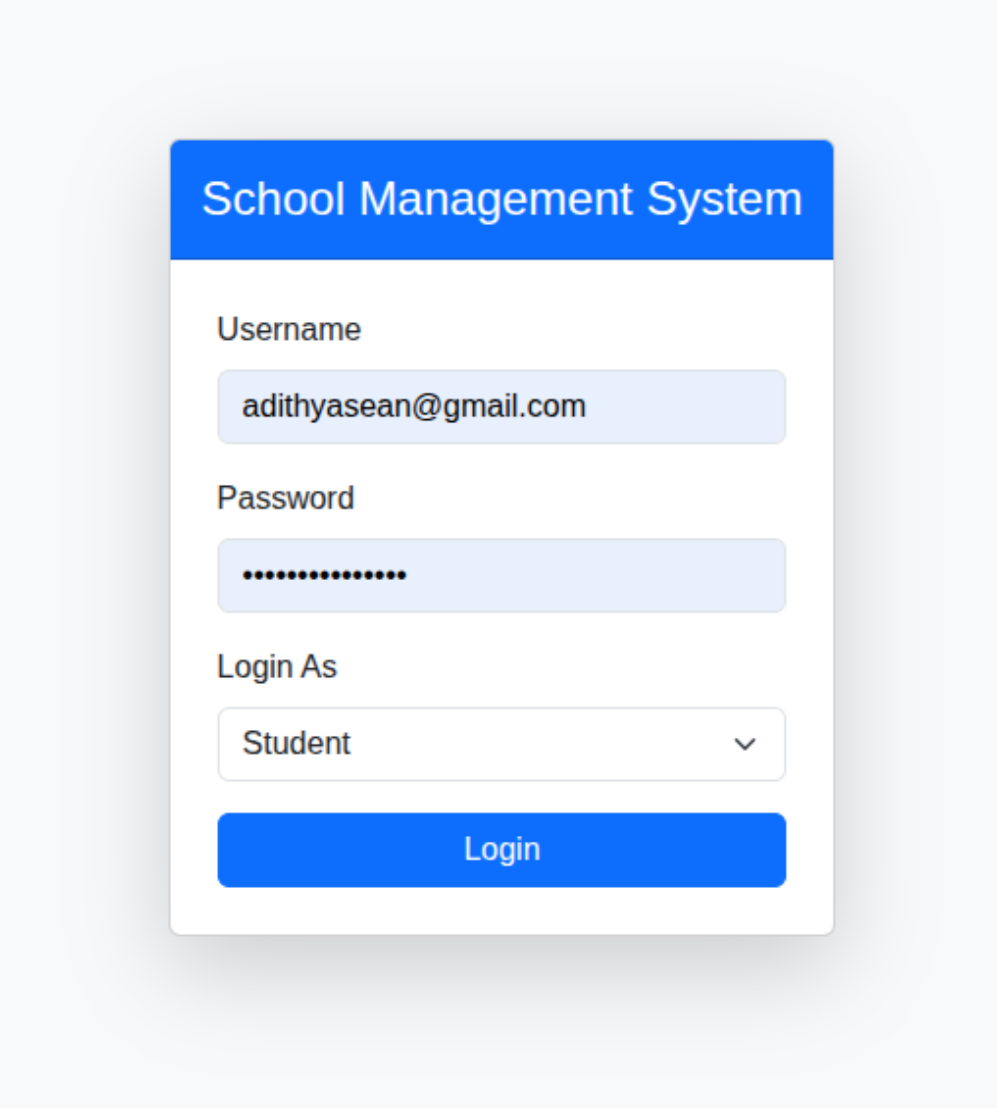


Figure 5.1: Login Page

5.2 Admin Dashboard

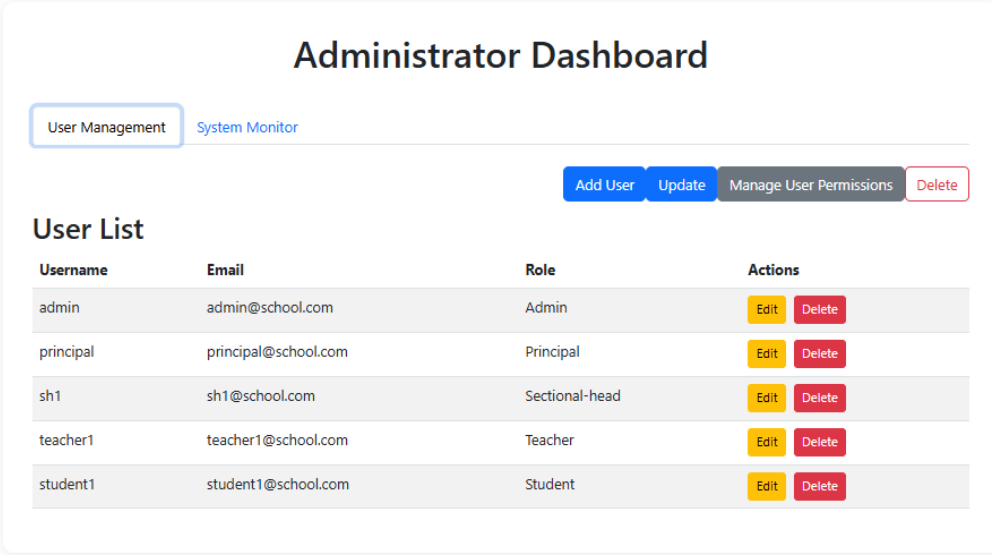


Figure 5.2: Admin Dashboard Page

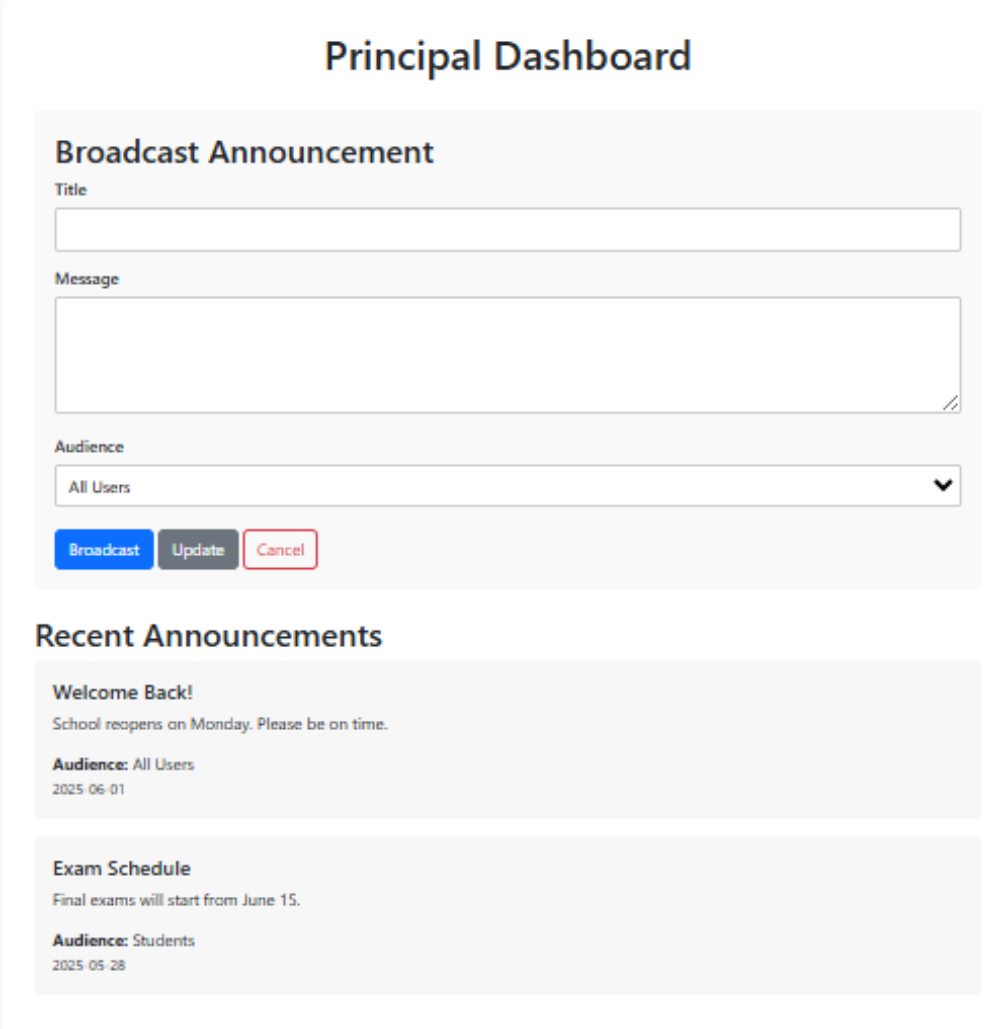


Figure 5.3: Principal Dashboard Page

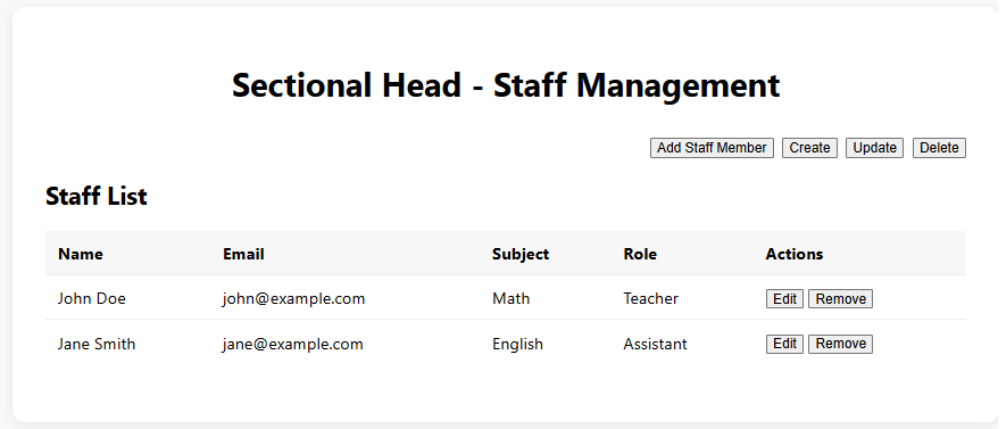


Figure 5.4: Sectional Head Staff Management Page

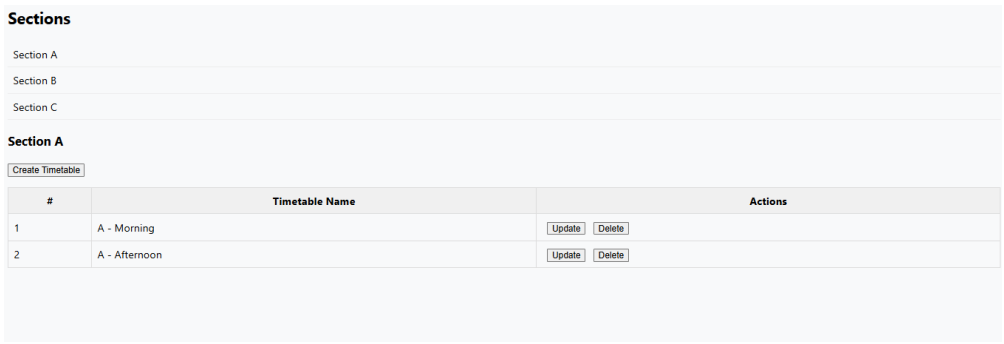


Figure 5.5: Sectional Head Time Table Management Page

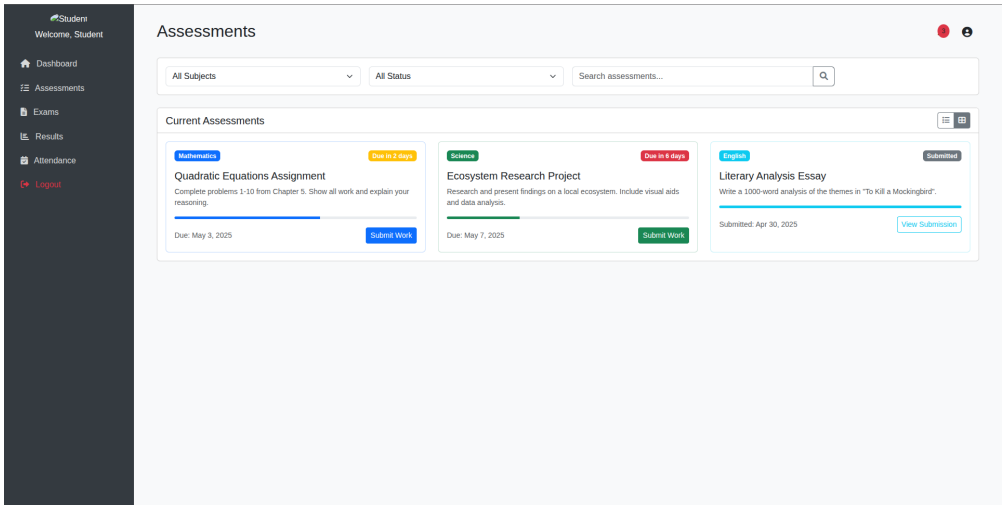


Figure 5.6: Student Assessment Page

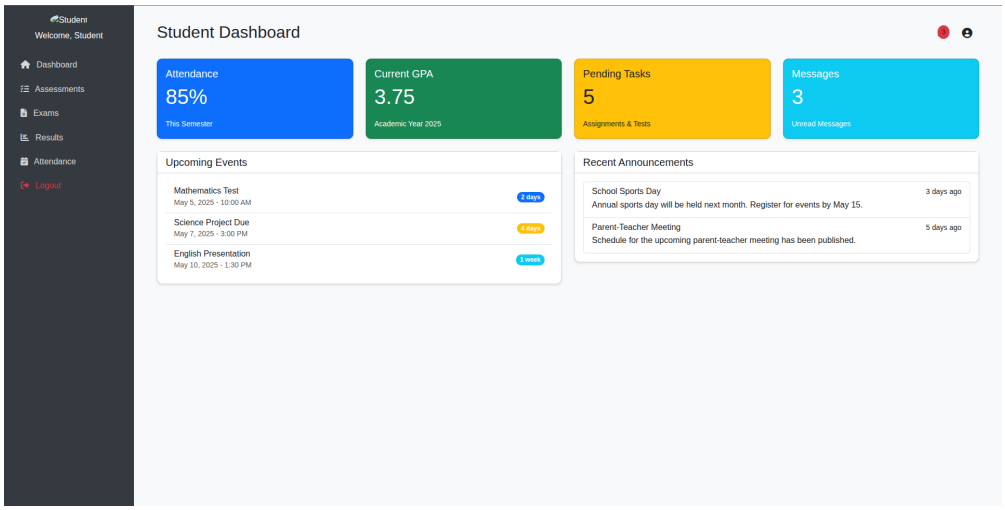


Figure 5.7: Student Dashboard Page

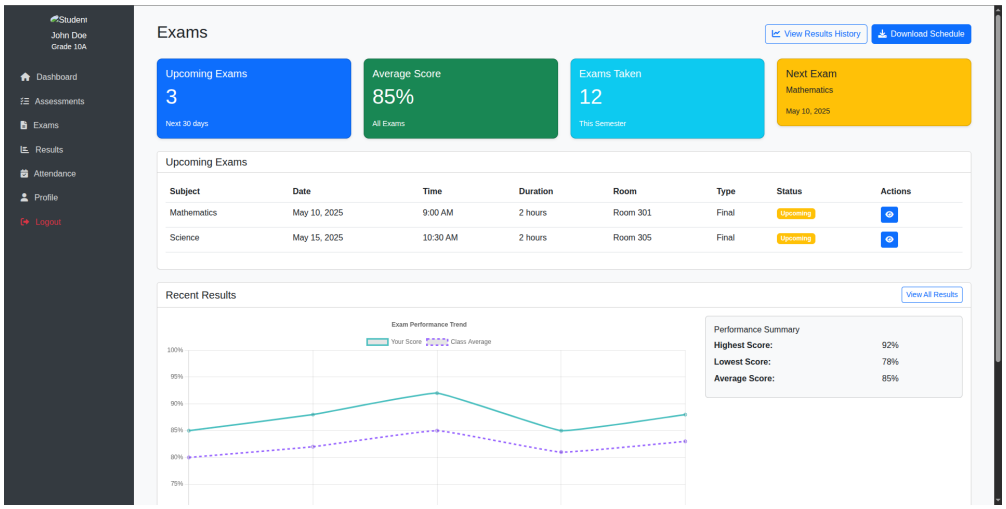


Figure 5.8: Student Exams Page

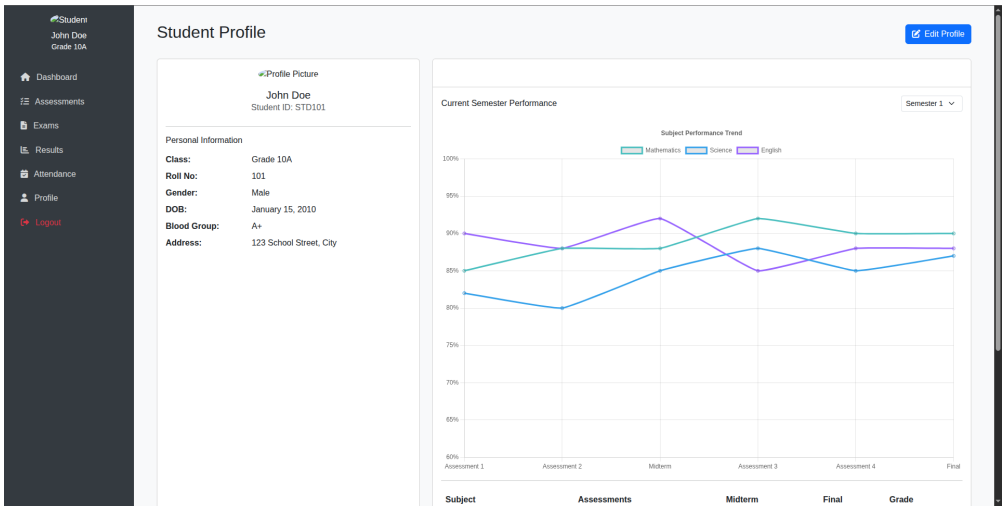


Figure 5.9: Student Profile Page

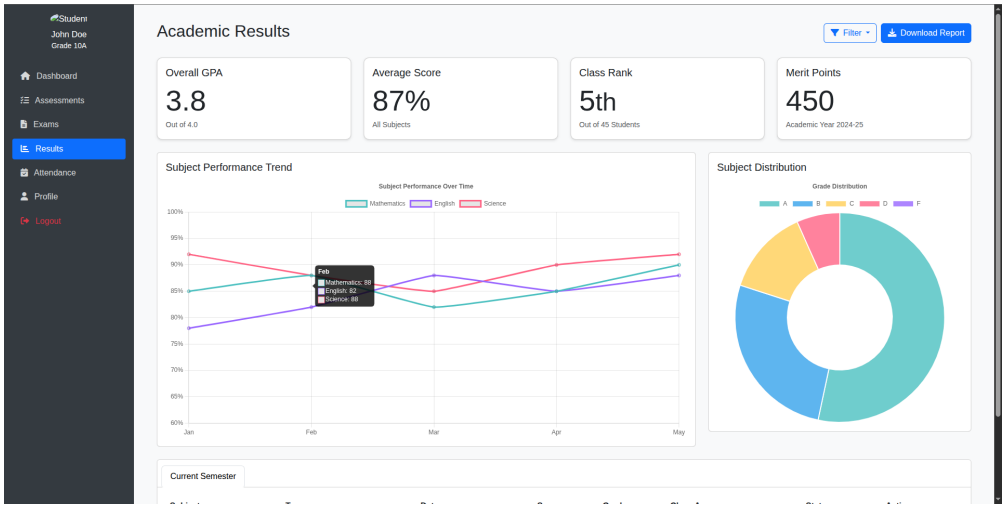


Figure 5.10: Student Results Page

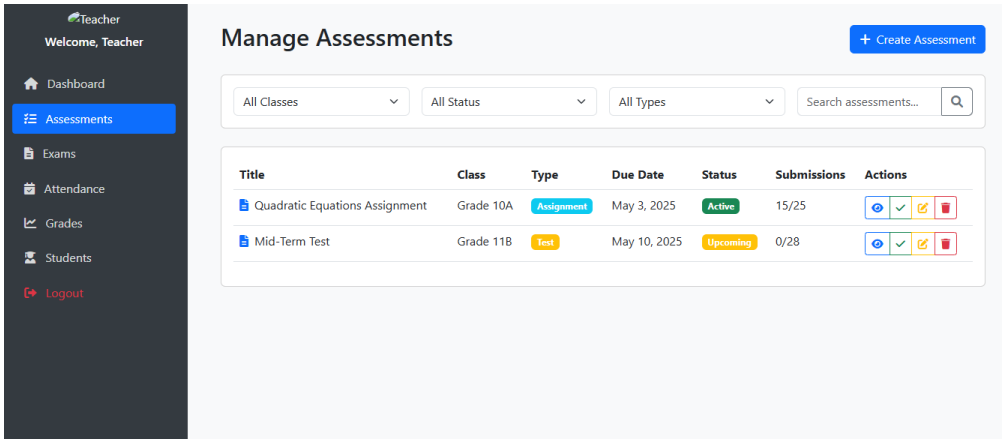


Figure 5.11: Teacher Assesements Page

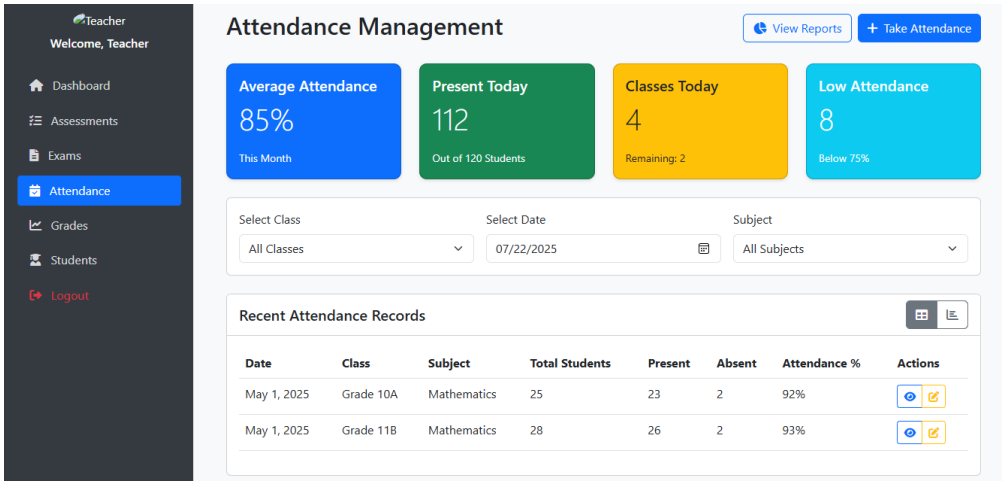


Figure 5.12: Teacher Attendance Page

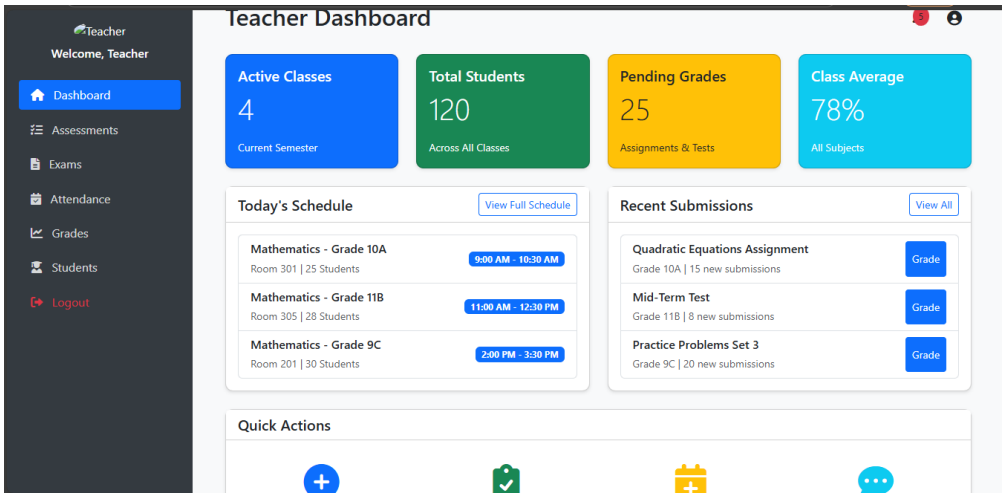


Figure 5.13: Teacher Dashboard Page

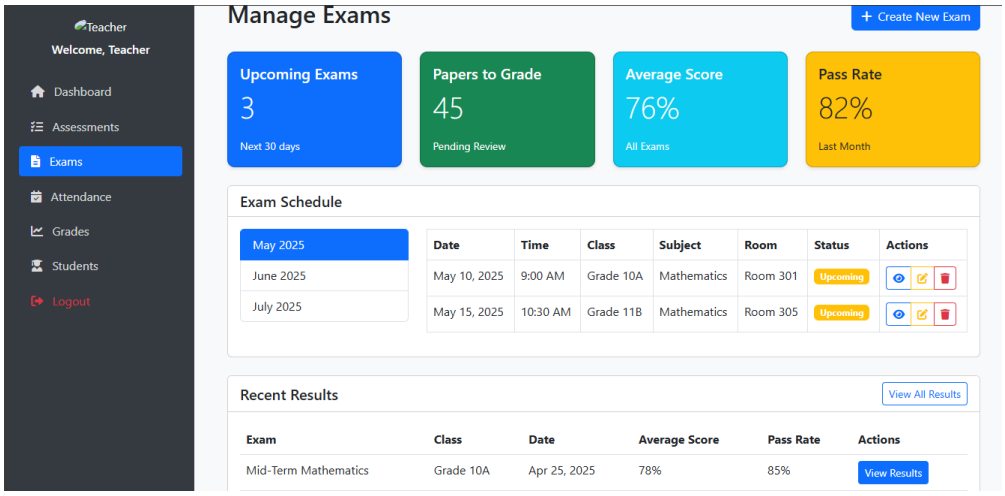


Figure 5.14: Teacher Exams Page

5.3 Principal Dashboard

5.4 Sectional Head Staff Management Page

5.5 Sectional Head Time Table Management Page

5.6 Student Assessment Page

5.7 Student Dashboard Page

5.8 Student Exams Page

5.9 Student Profile Page

5.10 Student Results Page

5.11 Teacher Assesements Page

5.12 Teacher Attendance Page

5.13 Teacher Dashboard Page

5.14 Teacher Exams Page

5.15 Teacher Submission Management Page

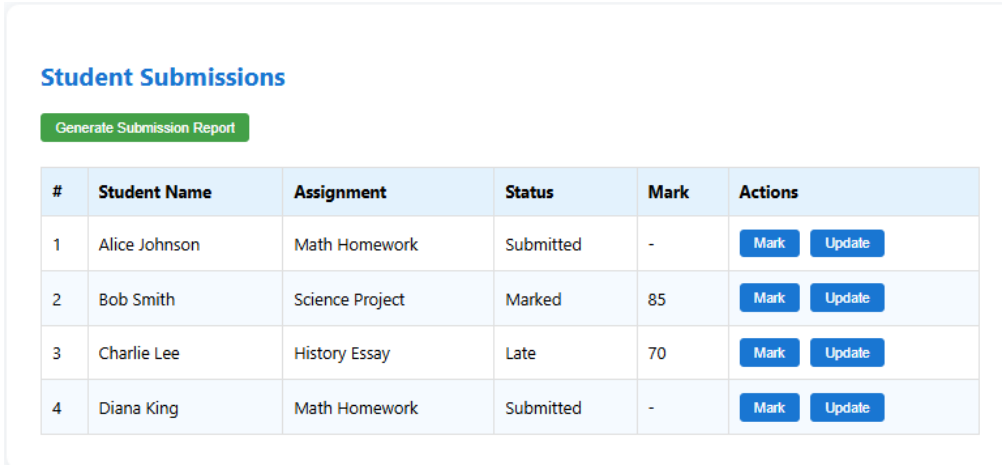


Figure 5.15: Teacher Submission Management Page

6 Sequence Diagrams

6.1 Admin User Management

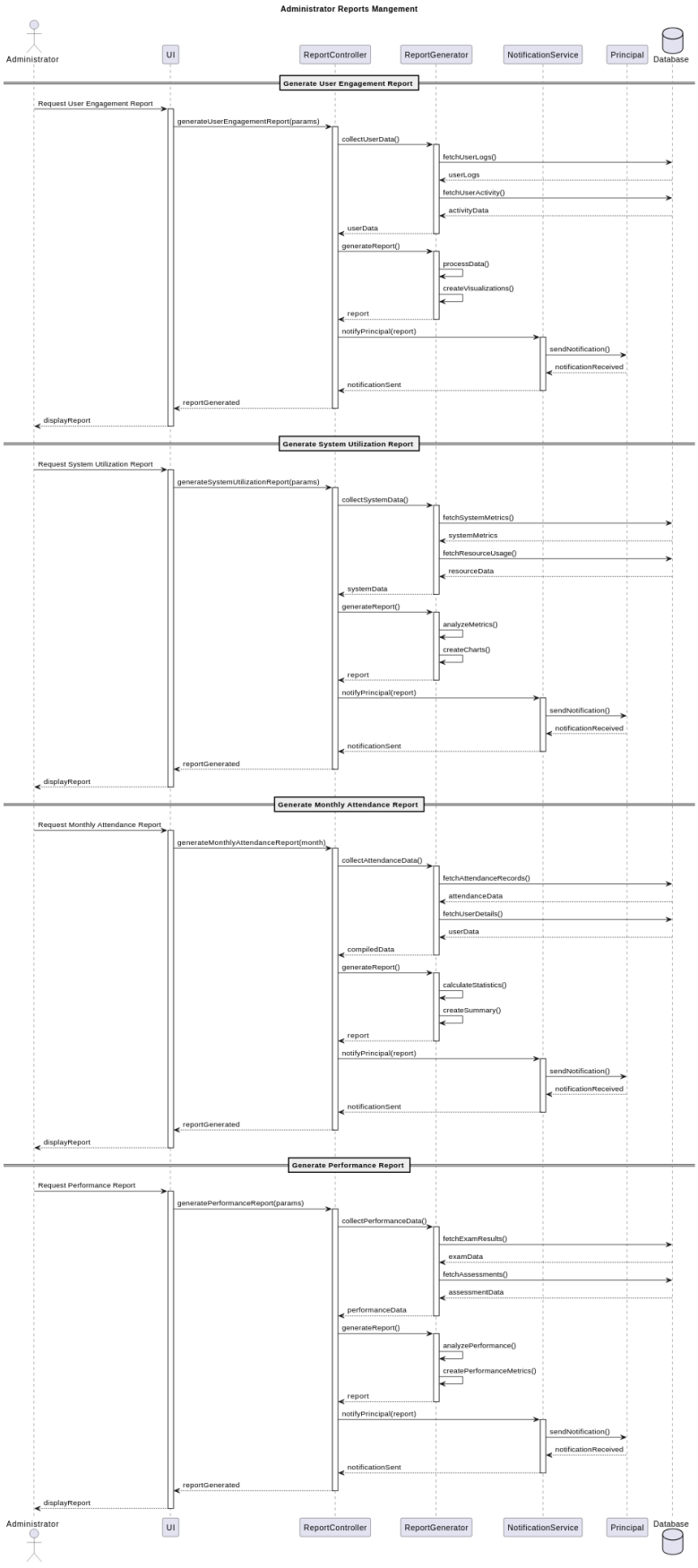


Figure 6.1: Admin User Management Sequence

6.2 Administrator Report Management

6.3 Assessment Sequence

6.4 Attendance Management Sequence

6.5 Attendance Sequence

6.6 Authentication Flow Sequence

6.7 Authentication Sequence

6.8 Communication Flow Sequence

6.9 Exam Management Sequence

6.10 Exam Sequence

6.11 Generate Monthly Report dministrator Sequence

6.12 Principal Broadcast Sequence

6.13 Sectional Head Staff Management Sequence

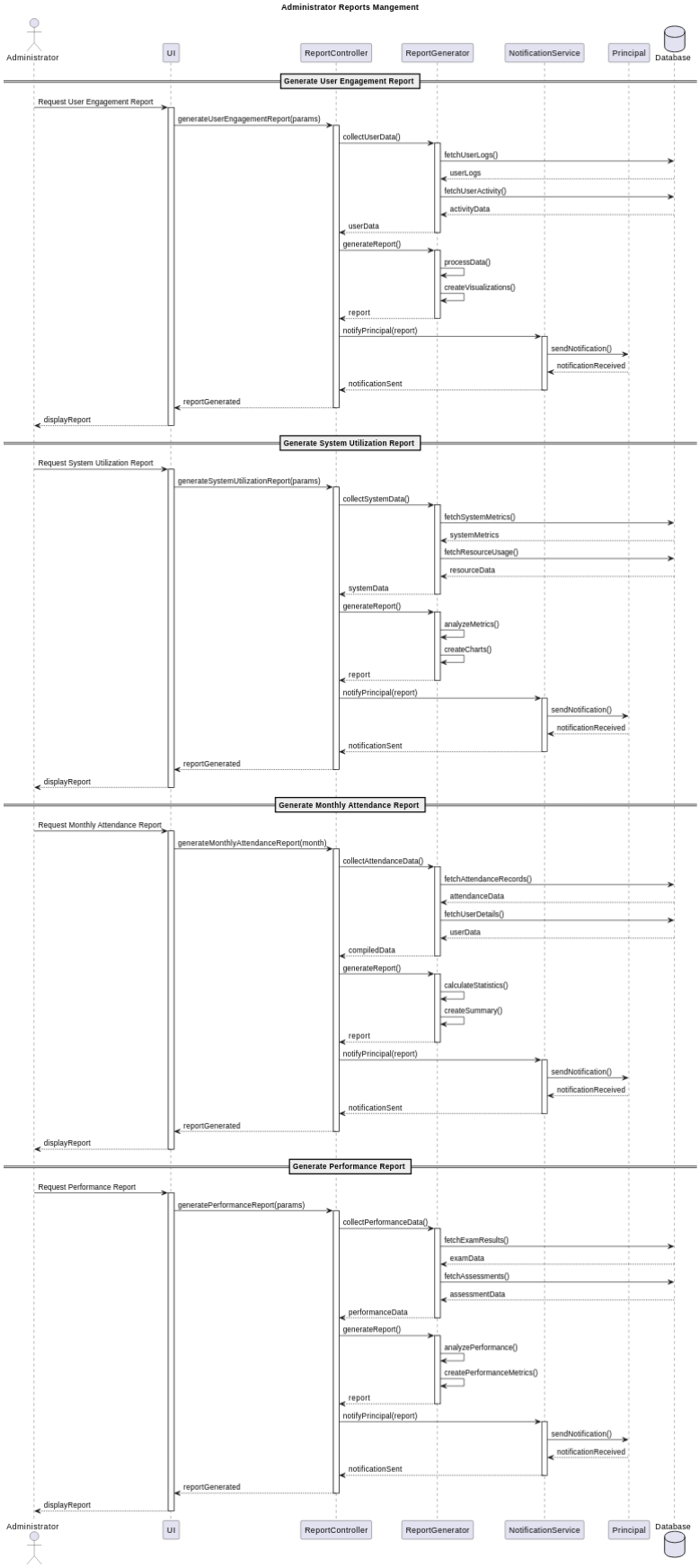


Figure 6.2: Administrator Report Management Sequence

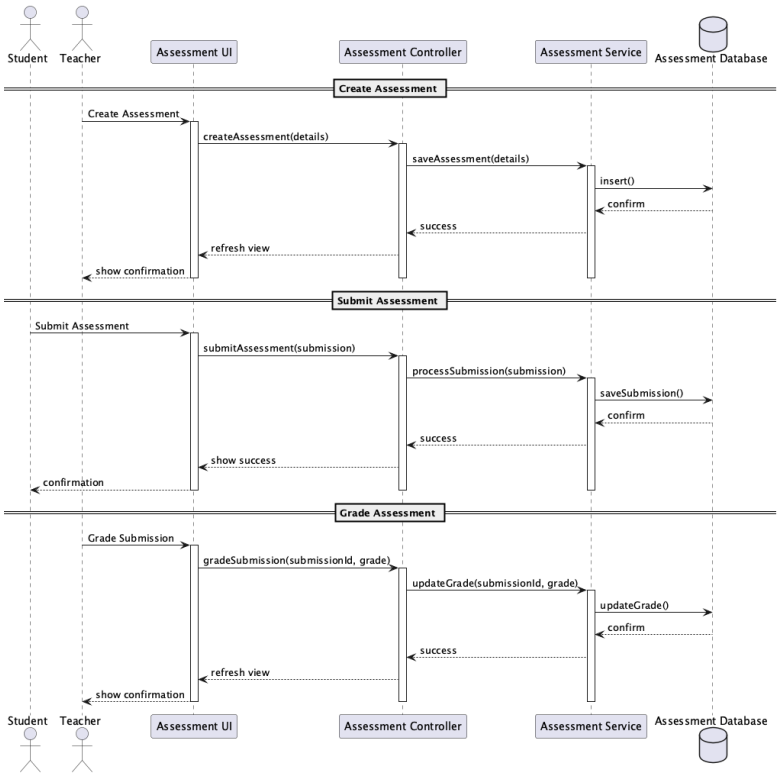


Figure 6.3: Assessment Sequence

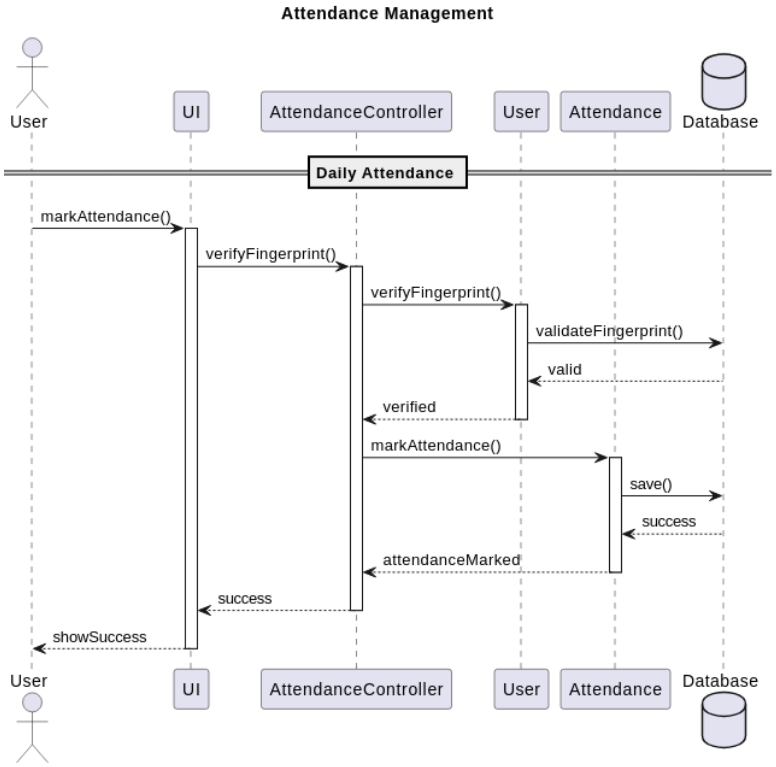


Figure 6.4: Attendance Management Sequence

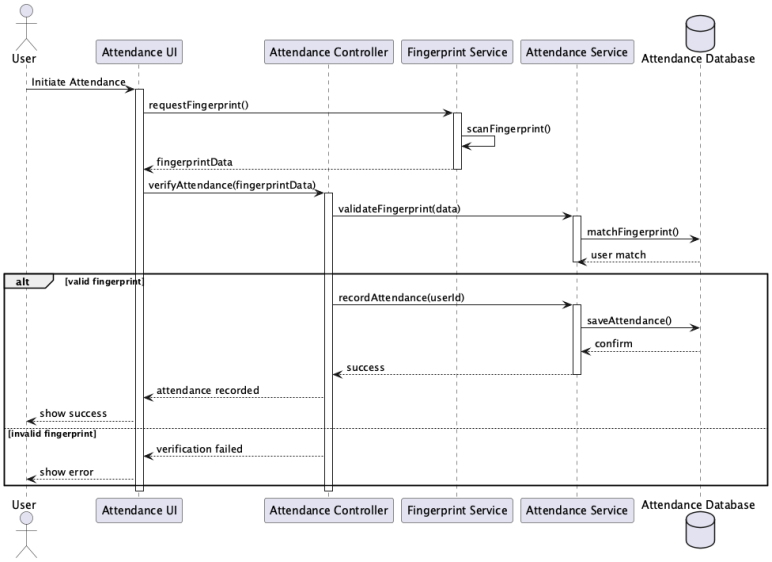


Figure 6.5: Attendance Sequence

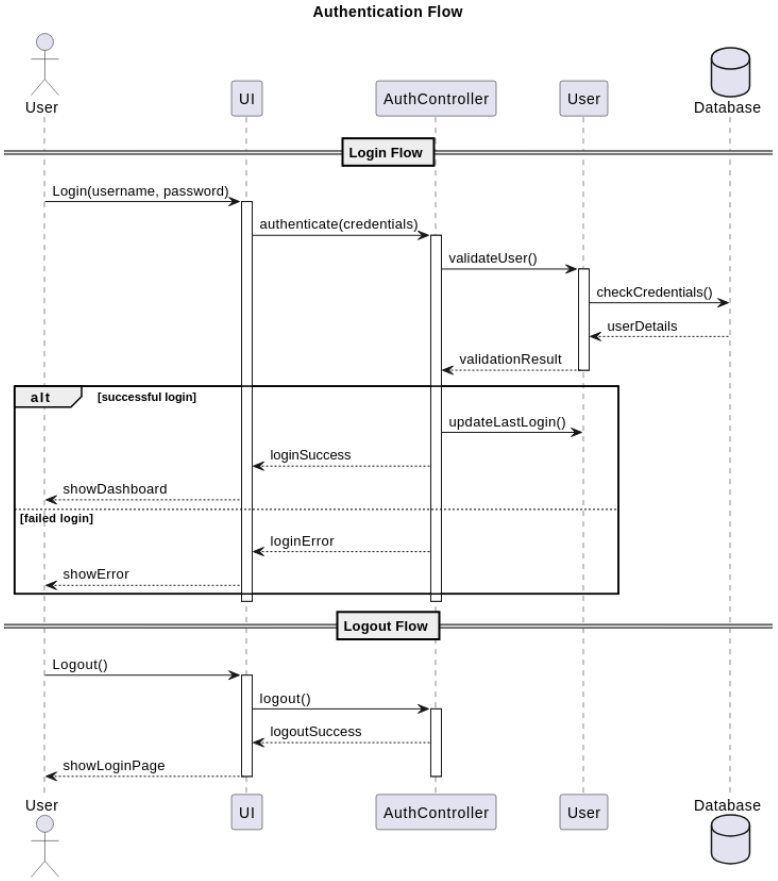


Figure 6.6: Authentication Flow Sequence

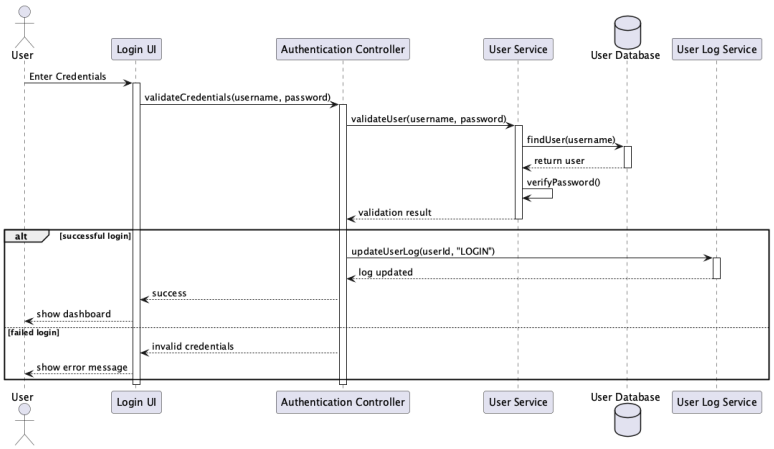


Figure 6.7: Authentication Sequence

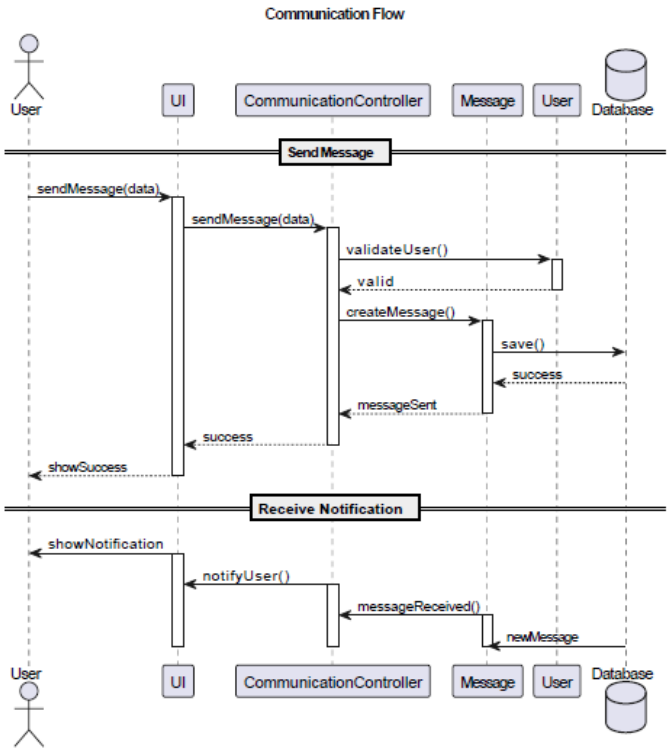


Figure 6.8: Communication Flow Sequence

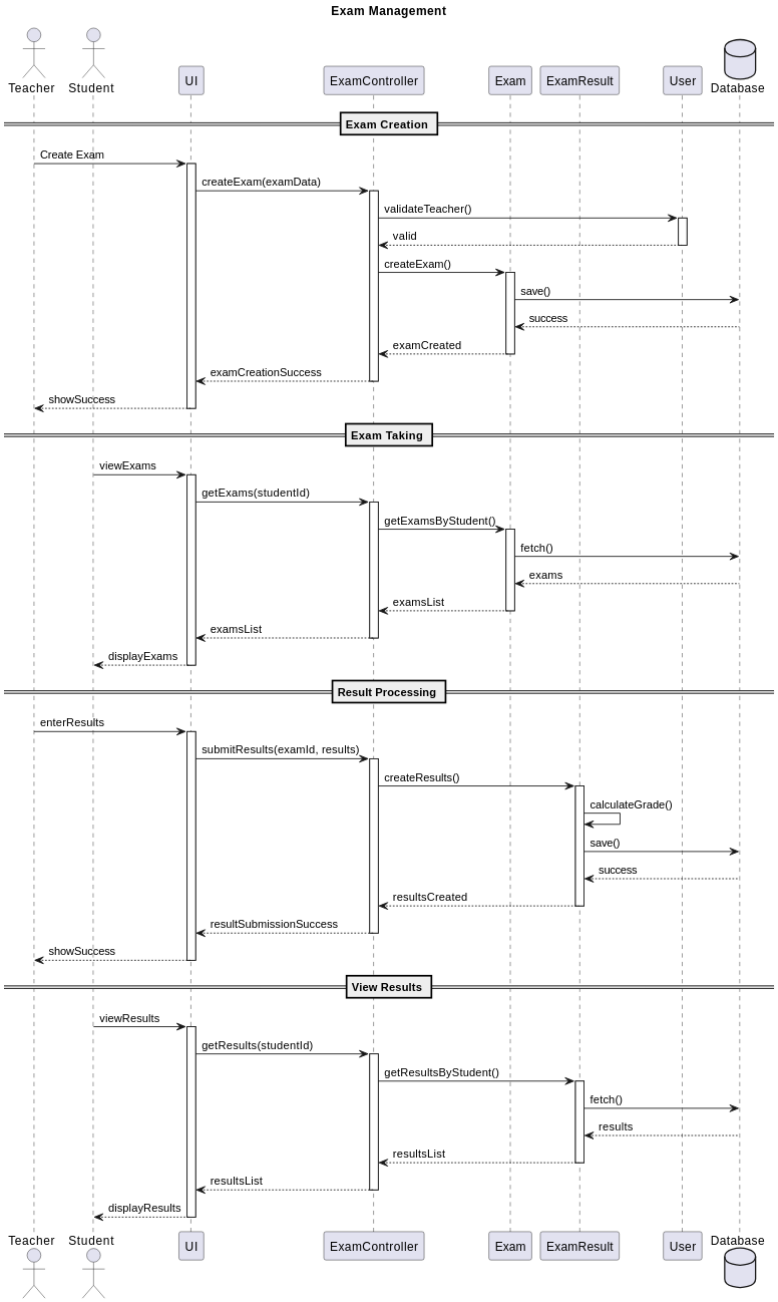


Figure 6.9: Exam Management Sequence

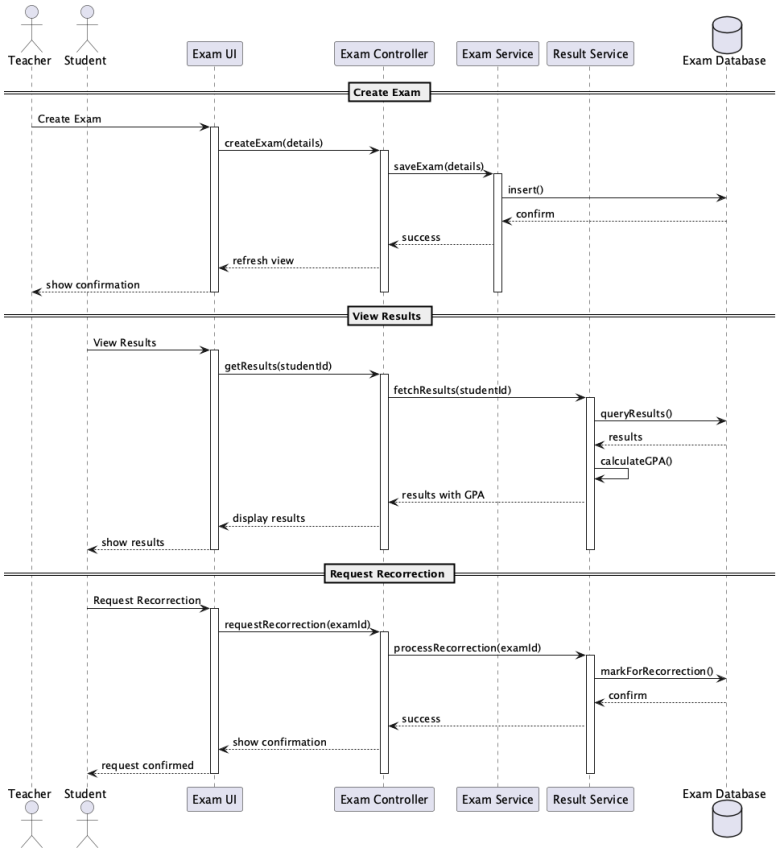


Figure 6.10: Exam Sequence

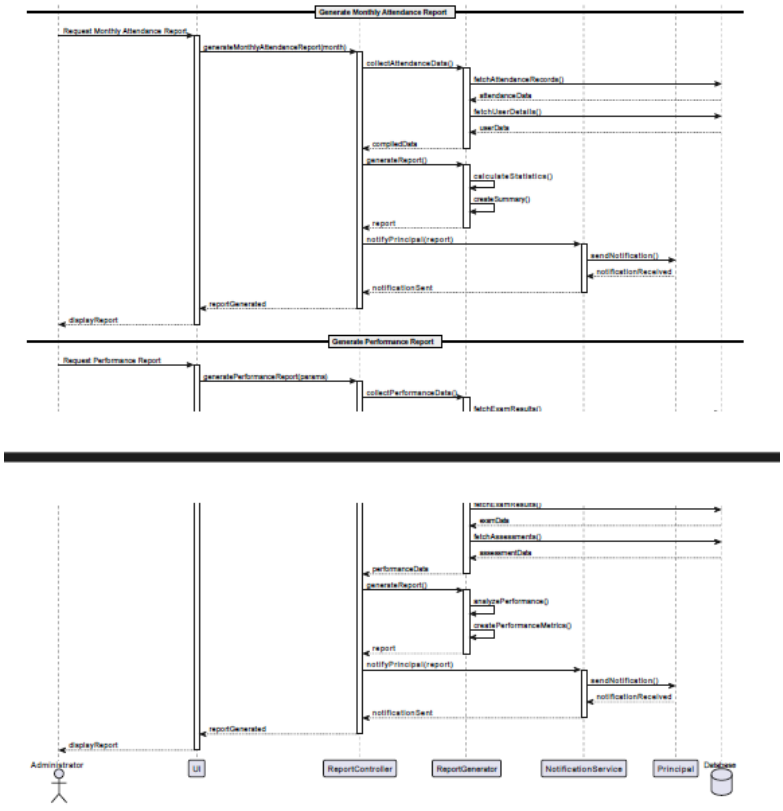


Figure 6.11: Generate Monthly Report dministrator Sequence

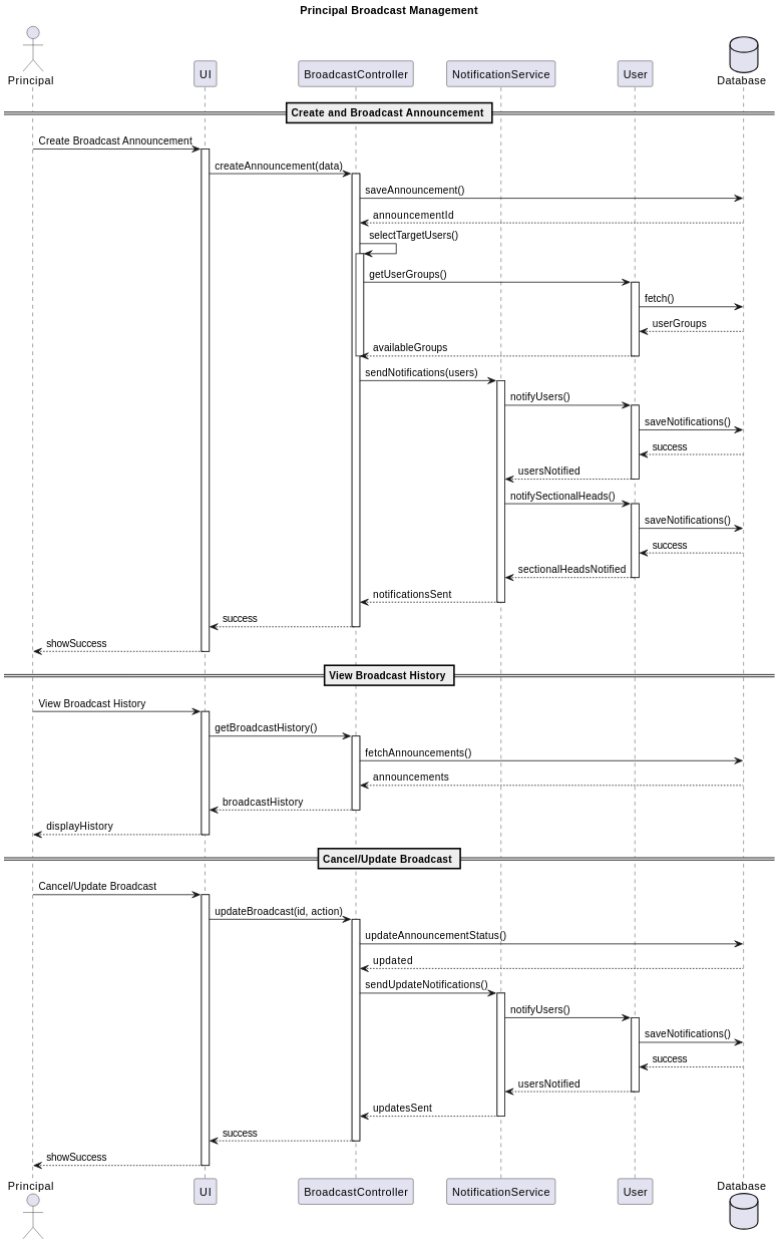


Figure 6.12: Principal Broadcast Sequence

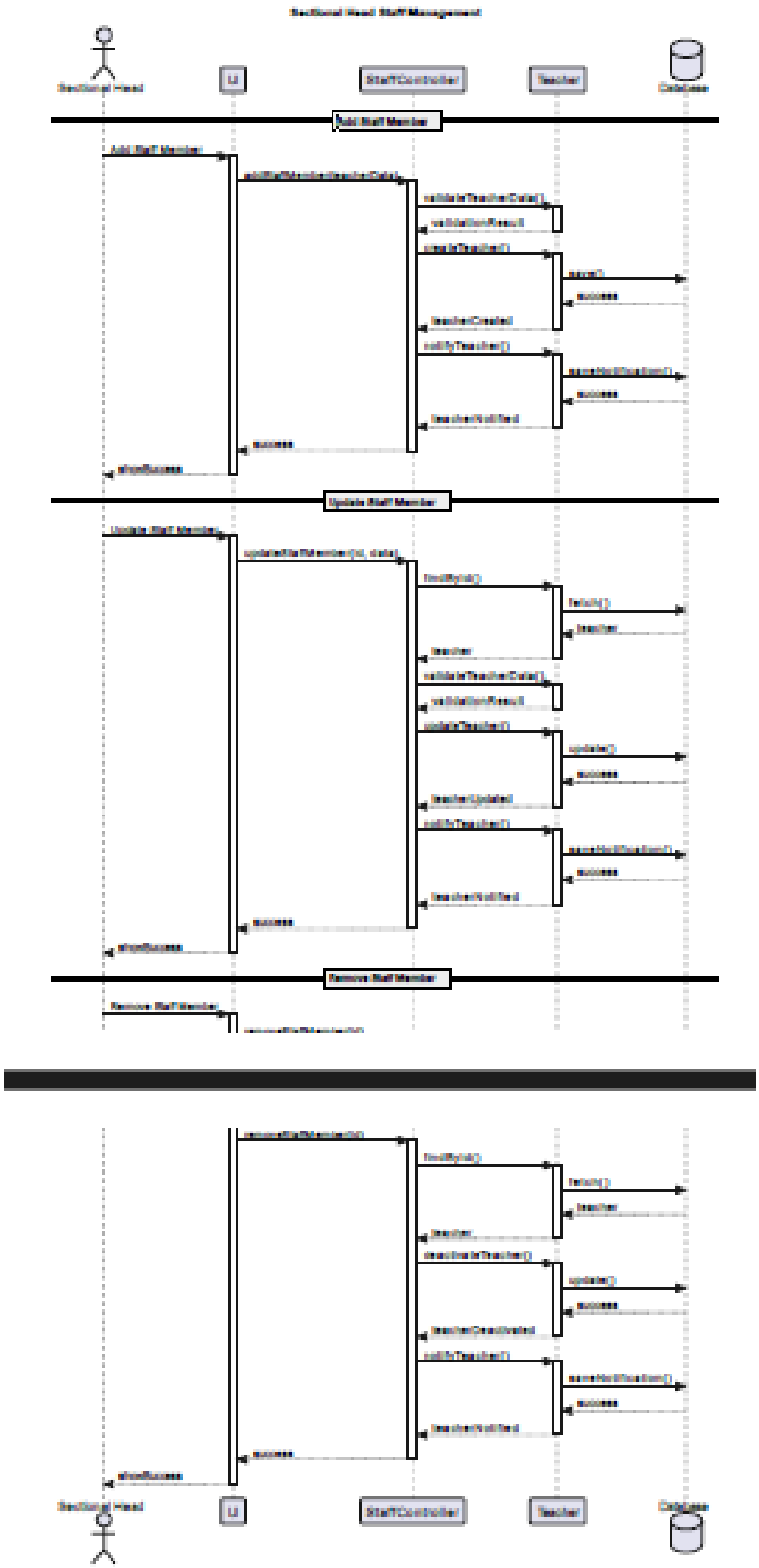


Figure 6.13: Sectional Head Staff Management Sequence

6.14 Student Assesment Management Sequence

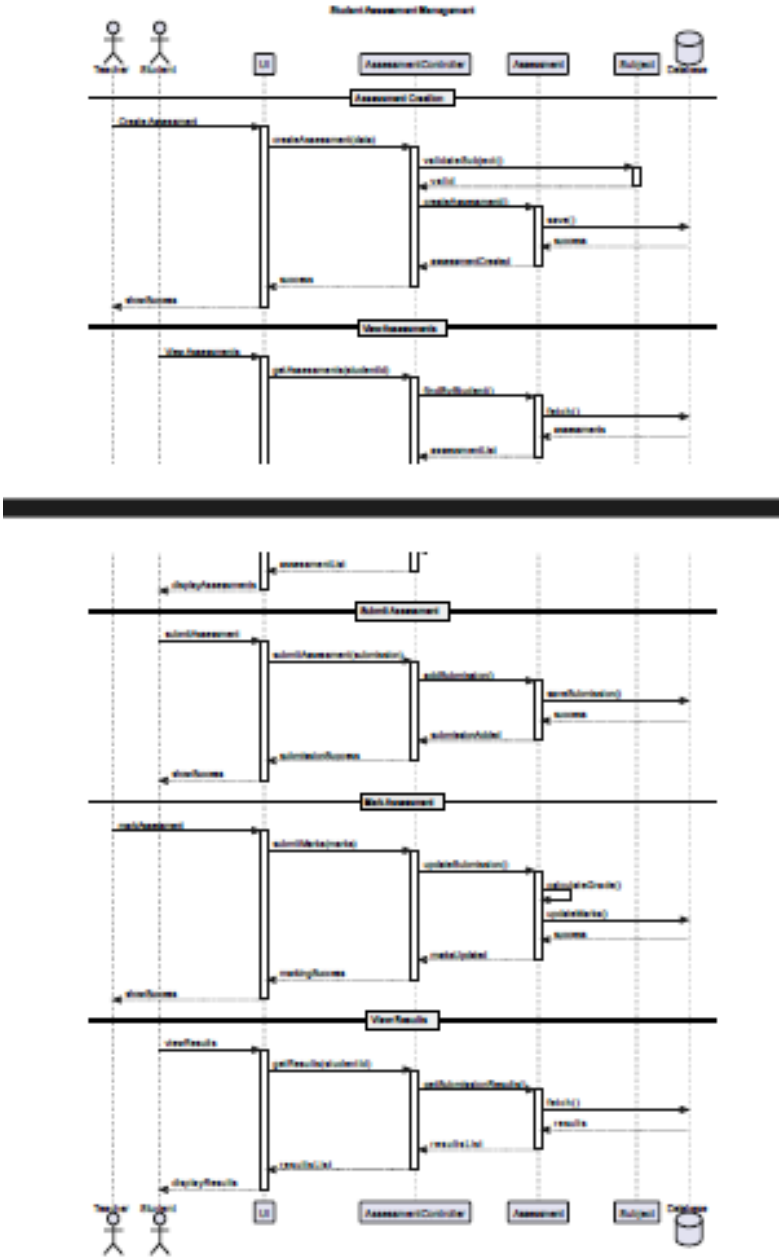


Figure 6.14: Student Assesment Management Sequence

7 Conclusion

The School Management System represents a significant step forward in educational institution management. By addressing current system limitations and incorporating modern technology, the system promises to:

- Improve administrative efficiency
- Support data-driven decision making

The modular design ensures future scalability and adaptability to changing educational needs.

Bibliography

[1] Diploma in Software Engineering Project Guidelines, NIBM

A Appendices

A.1 Project Schedule

The project was executed over a period of six months, following the schedule outlined below.

Table A.1: Project Execution Timeline

Phase	**Key Activities**	**Duration**
Phase 1: Planning & Analysis	Requirements gathering, feasibility study, project planning, and initial stakeholder meetings.	4 Weeks
Phase 2: System Design	System architecture design, database schema design, UI/UX wireframing, and technology stack finalization.	4 Weeks
Phase 3: Core Development	Development of user authentication, profile management, and core academic modules.	8 Weeks
Phase 4: Feature Implementation	Development of attendance, assessment, and communication features.	6 Weeks
Phase 5: Testing & Deployment	Unit testing, integration testing, user acceptance testing (UAT), and initial deployment.	4 Weeks

Continued on next page

Table A.1 – continued from previous page

Phase	Key Activities	Duration
Phase 6: Documentation & Handover	Final report writing, user manual creation, and project handover.	2 Weeks

A.2 Questionnaires and Interview Questions

A.2.1 For School Administration

- What are the biggest challenges in managing student data currently?
- How is communication with parents currently handled?
- What are the key reports required by the Ministry of Education?

A.2.2 For Teachers

- How much time do you spend on administrative tasks daily?
- What features in a digital system would be most helpful to you?
- How do you currently track student attendance and performance?

A.3 Meeting Minutes and Log Sheets

A.3.1 Sample Meeting Minutes

Date: 2024-08-07

Attendees: Project Team, School Vice Principal Seelarathana Thero

Agenda:

1. Gather Client requirements
2. Discussion about the current plan limitations and changes

Decisions:

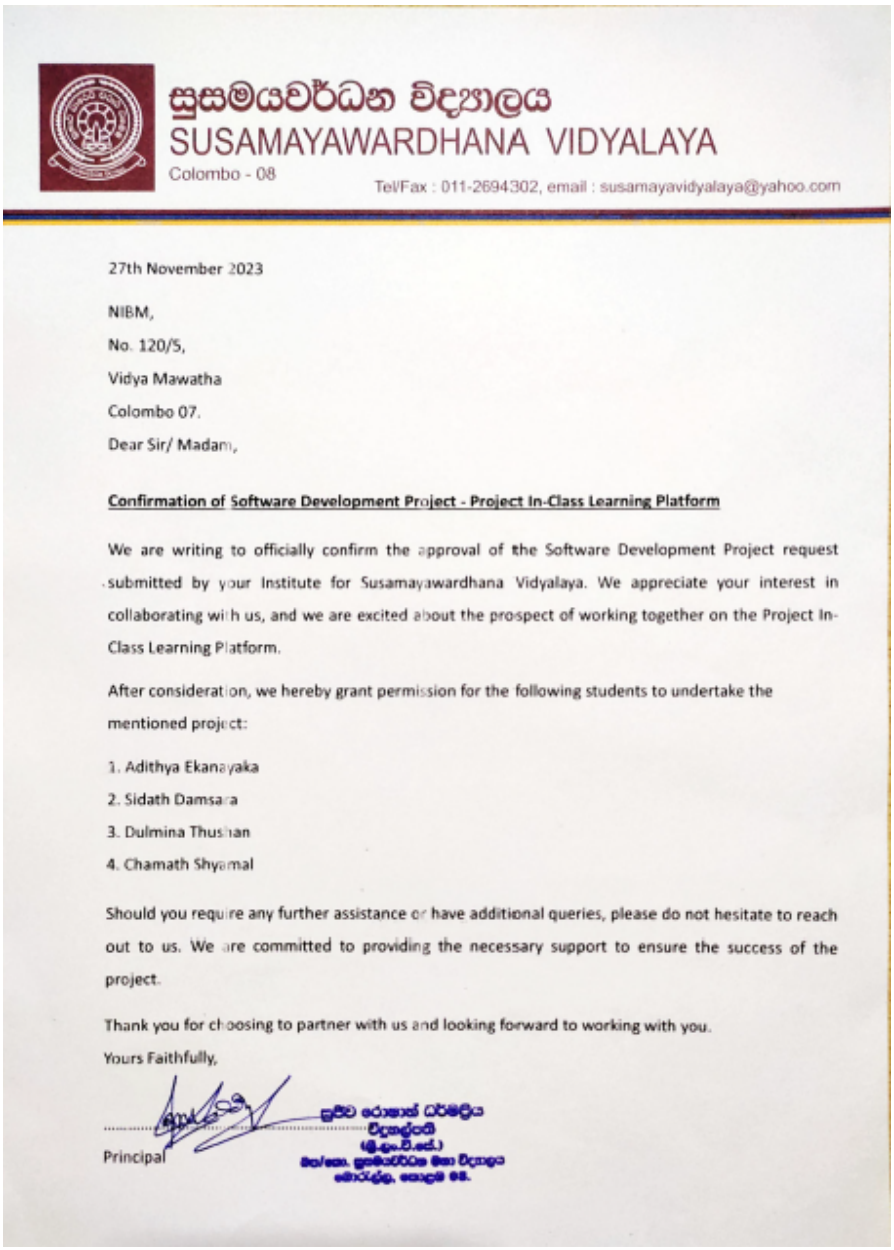
- Changed the teacher permissions to manage and access student functions to test from student side.
- Discussed how to gather user data like fingerprint data and attendance.

A.4 Reviewed Documents

The following documents from Susamayawardhana College were reviewed during the analysis phase:

- Student Admission Application Form
- Manual Attendance Register for Grade 10
- Term Test Report Card Template
- Staff Leave Application Form

A.5 Permission Letter



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SUSAMAYAWARDHANA VIDYALAYA
Colombo - 08
Tel/Fax : 011-2694302, email : susamayavidyalaya@yahoo.com

27th November 2023

NIBM,
No. 120/5,
Vidya Mawatha
Colombo 07.

Dear Sir/ Madam,

Confirmation of Software Development Project - Project In-Class Learning Platform

We are writing to officially confirm the approval of the Software Development Project request submitted by your Institute for Susamayawardhana Vidyalaya. We appreciate your interest in collaborating with us, and we are excited about the prospect of working together on the Project In-Class Learning Platform.

After consideration, we hereby grant permission for the following students to undertake the mentioned project:

1. Adithya Ekanayaka
2. Sidath Damsara
3. Dulmina Thushan
4. Chamath Shyamal

Should you require any further assistance or have additional queries, please do not hesitate to reach out to us. We are committed to providing the necessary support to ensure the success of the project.

Thank you for choosing to partner with us and looking forward to working with you.

Yours Faithfully,

Principal

Figure A.1: School Permission Letter