Tribhuvan University

Faculty of Humanities and Social Sciences

A PROJECT REPORT ON

Student Attendance Management System

Submitted to

Department of Humanities and Social Sciences

In partial fulfillment of the requirements for the Bachelors in Computer Application

Submitted by

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TU Reg. No: 6-2-479-3-2021

17th March, 2024

Under the Supervision of

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Hetauda School of Management

SUPERVISOR'S RECOMMENDATION

I hereby recommend that this project prepared under my supervision by BINIT GIRI entitled "**STUDENT ATTENDANCE MANAGEMENT SYSTEM**" in partial fulfillment of the requirements for the degree of Bachelor of Computer Application is recommended for the final evaluation.

.....

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LETTER OF APPROVAL

This is to certify that this project proposal prepared by Binit Giri entitled "**Student Attendance Management System**" in partial fulfillment of the requirements for the degree of bachelor's in computer application has been evaluated. In our opinion it is satisfactory in scope and quality as a project for the required degree.

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…… Project Coordinator HSMSS	…… Campus Chief HSMSS

ABSTRACT

The Student Attendance Management System (SAMS) is a software solution designed to automate and streamline the process of tracking and managing student attendance in educational institutions. Traditional methods of attendance taking are time-consuming and prone to errors, often resulting in inefficiencies and challenges in monitoring student attendance effectively. SAMS addresses these issues by providing a centralized platform for automated attendance tracking, real-time monitoring, and comprehensive reporting. Key features of the Student Attendance Management System include automated attendance tracking using various technologies such as biometric scanners, RFID cards, or online portals. This eliminates the need for manual attendance taking and ensures accuracy in attendance records. Real-time monitoring capabilities enable administrators and teachers to track attendance status as it is recorded, allowing for timely intervention in case of absenteeism or tardiness. Customizable attendance policies can be defined and implemented within the system, allowing educational institutions to set rules for minimum attendance thresholds, define acceptable excuses for absences, and configure late arrival policies. Integration with existing Student Information Systems (SIS) ensures consistency and accuracy in attendance tracking by synchronizing student data and academic records.

ACKNOWLEDGEMENT

We are very Grateful to our department of computer application, Hetauda School of Management for providing us an opportunity to work on a major project as part of our second-year project. We are delighted to express our deep sense of gratitude and indebtedness to our learned supervisor **Mr. Sujan Devkota,** Head of Department at Hetauda School of Management for his invaluable guidance, encouragement and even monitoring to spare time despite his busy schedule for project's progress reviews.

Our Special thanks go to our colleagues and everyone who directly and indirectly extended their hands in making this project success.

Binit Giri

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Chapter 1: Introduction

1.1. Introduction

A School Attendance Management System (SAMS) is a specialized software solution designed to automate and streamline the process of tracking and managing student attendance within educational institutions. It serves as a centralized platform that facilitates the efficient recording, monitoring, and analysis of student attendance data, enabling administrators and teachers to effectively manage attendance records and ensure compliance with attendance policies [1].

In today's educational landscape, the efficient management of student attendance is paramount to ensuring academic success and maintaining institutional standards. Traditional methods of attendance tracking, such as paper-based registers or manual recording, are not only time-consuming but also prone to errors and inaccuracies. Recognizing these challenges, educational institutions are turning towards specialized software solutions like the School Attendance Management System (SAMS) to automate and streamline the attendance management process. The School Attendance Management System serves as a centralized platform that revolutionizes the way student attendance is recorded, monitored, and analyzed within educational institutions. By leveraging technology, SAMS facilitates the efficient recording of attendance data, enabling administrators and teachers to maintain accurate and up-to-date attendance records effortlessly [2].

1.2. Problem Statement

a. Inefficient Attendance Tracking: Educational institutions often face challenges in efficiently tracking and managing student attendance records. The Student Attendance Management System aims to address this by creating a centralized and organized platform for attendance tracking.

b. Complex Administrative Processes: Cumbersome administrative processes can hinder the effective management of student attendance records. The Student Attendance Management System seeks to simplify these processes, making it easier for administrators to handle attendance information.

c. Limited Accessibility: Accessing attendance records might be limited to specific locations within the institution. The Student Attendance Management System intends to provide a web-

based platform, ensuring convenient and secure access to attendance information from anywhere.

1.3. Objectives

The main objectives of the SAMS are to:

- To automate attendance recording.
- To improve data accuracy.
- To reduce administrative tasks.
- To generate attendance reports.
- To facilitate communication.
- To track student absences.
- To ensure data security.

1.4. Scope & Limitation

Scope

a) Save Time
b) Easy to update
c) Reduce burden of tension
d) Easy to administrator for taking attendance
e) Easy to take record of students for long time

Limitations

a) System effectiveness depends on available hardware and software.
b) Access to records relies on stable internet.
c) Adjustment period may disrupt existing processes.
d) Staff may require training to use the system effectively.
e) System must comply with privacy regulations and ensure data security

.

1.5. Report Organization

Chapter 1

The introductory chapter serves as the starting point for the project report, offering an overview of the entire project. It provides insight into the necessity of the project and its potential implications. This section initiates the project by capturing the reader's attention and establishing the groundwork for further exploration.

Chapter 2

This chapter focuses on presenting background details and conducting a literature review relevant to the project's subject matter. It studies into the existing system and highlights associated challenges, emphasizing the requirement for the proposed solution.

Chapter 3

Within this chapter, the project team conducts an extensive analysis of the new system's requirements. It encompasses both functional and non-functional requirements, outlining specific features and functionalities expected from the system.

Chapter 4

This Section discusses the actual implementation of the system. It elucidates the utilized tools and technologies and offers detailed insights into the implementation of individual components. Additionally, it covers the testing phase, including unit and system testing procedures, effectively concluding the project.

Chapter 5:

The conclusion segment summarizes the project's findings and overall impact.

Chapter 2: Background Study & Literature Review

2.1. Background Study

In the rapidly evolving landscape of education, the management of student attendance stands as a critical aspect for ensuring academic success and institutional efficiency. Traditionally, educational institutions relied on manual methods such as paper-based registers or manual recording to track student attendance. However, these methods were not only time-consuming but also prone to errors and inaccuracies [1].

Recognizing the inefficiencies inherent in traditional attendance tracking methods, educational institutions are increasingly turning towards specialized software solutions like the School Attendance Management System (SAMS). SAMS is a specialized software solution designed to automate and streamline the process of tracking and managing student attendance within educational institutions. It serves as a centralized platform that facilitates the efficient recording, monitoring, and analysis of student attendance data, enabling administrators and teachers to effectively manage attendance records and ensure compliance with attendance policies [2].

2.2. Literature Review

The literature review highlights several key aspects of School Attendance Management Systems (SAMS). Research indicates that SAMS play a crucial role in enhancing efficiency and accuracy in attendance tracking by automating manual processes, thereby reducing errors and improving the overall management of student attendance records (Smith et al., 2019). Additionally, studies suggest that SAMS streamline administrative tasks related to attendance tracking, leading to time savings and increased productivity for administrators (Johnson, 2020). User experience and training are also significant factors in the successful implementation and adoption of SAMS within educational settings. Studies emphasize the importance of user-friendly interfaces and comprehensive training programs to ensure effective utilization of SAMS by staff members (Jones and Brown, 2018)[4]. Furthermore, the role of internet connectivity in accessing attendance records through web-based SAMS is crucial. Research underscores the importance of stable internet connections in facilitating seamless access to attendance data from various locations within educational institutions (Patel and Gupta, 2021). Lastly, privacy and security considerations are paramount in SAMS implementation. Studies highlight the need for robust data protection measures to safeguard

student attendance information and prevent unauthorized access or breaches (Khan et al., 2022) [5].

Chapter 3: System Analysis and Design

3.1. System Analysis

System Analysis refers to the process of examining a system with the intent of improving better procedures and methods. It is the process of planning a new system to either replace or complement an existing system. It is therefore, the process of gathering and interpreting facts, diagnosing problems and using the information to re-comment improvements in the system. System analysis is conducted with the following objectives in mind:

- Evaluate the system concept for feasibility.
- Perform economic and technical analysis.
- Allocate functions to hardware, software people, database and other system elements.
- Establish cost and schedule constraints.

3.1.1. Requirement Analysis:

i. Functional Requirement

a. User Authentication and Authorization:

- Secure login for admins and teachers with unique credentials.
- Admins have access to administrative functions; teachers have access to class-specific functions.

b. Dashboard:

- Dashboard displaying attendance summaries, upcoming events, and notifications upon login.

c. Manage Classes and Sections:

- Admins can create, edit, and delete classes and sections.
- Teachers can view and manage attendance for their classes.

d. Attendance Recording:

- Teachers can record student attendance, marking absentees.
- Admins can view and edit attendance records for all classes.

e. Attendance Reports:

- Access to attendance reports for admins and teachers, including daily, weekly, and monthly summaries, and student attendance histories.

f. Manage Students:

- Admins can add, edit, and delete student profiles.
- Teachers can view student profiles and access attendance records.

g. Automated Notifications:

- Automated notifications for significant attendance events, such as excessive absences, for both admins and teachers.

h. Customization and Configuration:

- Admins can customize attendance policies, class schedules, and attendance parameters.

i. Data Security and Privacy:

- Adherence to data security standards, including encryption of sensitive data and role-based access controls.

j. Absence Management:

- Teachers can manage student absences, track reasons, and record excused absences.
- Functional requirement can be expressed in Use Case form as they exhibit externally visible functional behavior.

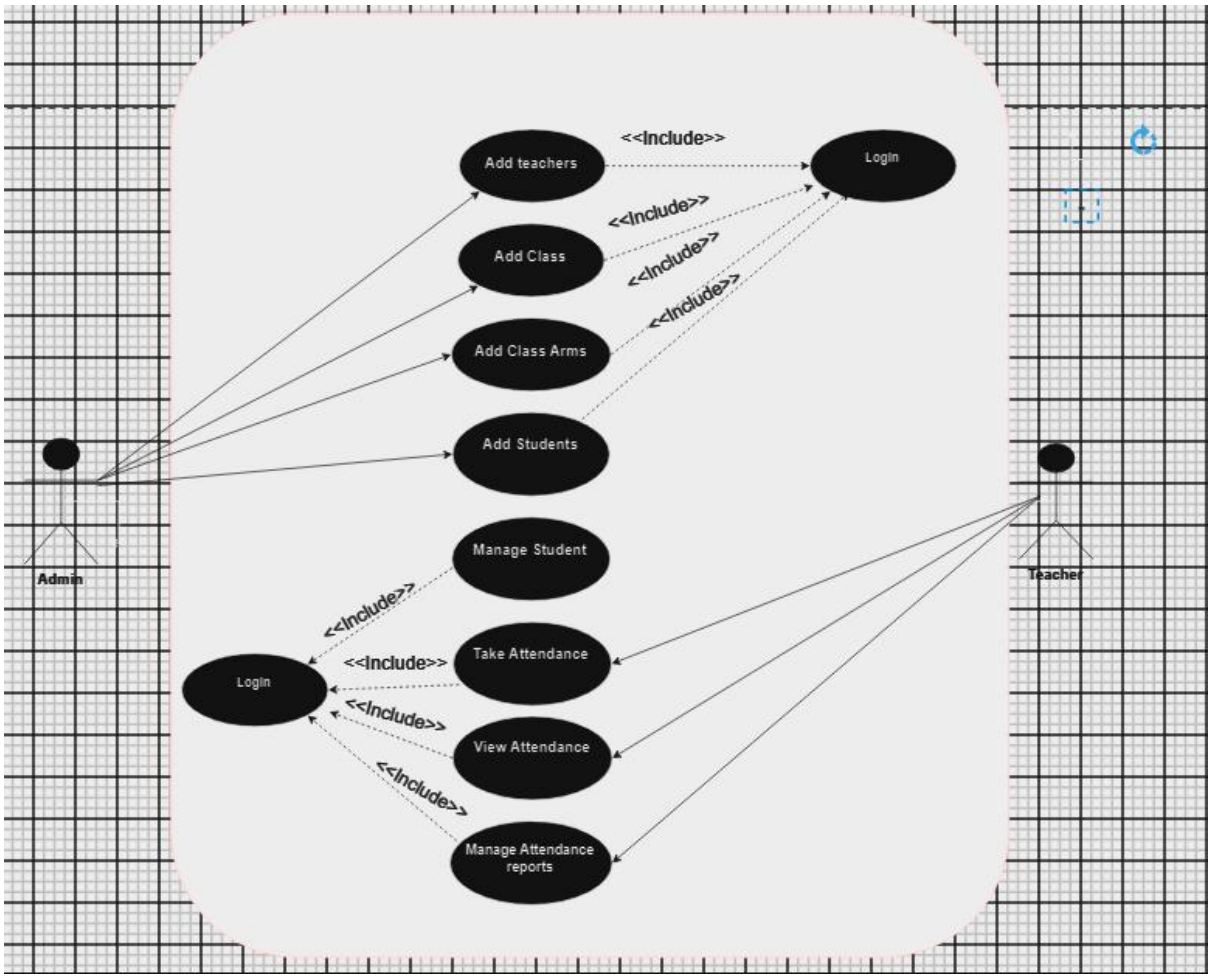

Figure 1: Use Case Diagram of Student Attendance Management System

ii. Non-Functional Requirements:

a. For Admins:

- Web Accessibility: Ensure the system is accessible via web browsers for easy management.
- Optimized Performance: Design components to operate efficiently during peak usage times.
- Scalable Architecture: Implement a system that can grow and adapt to changing needs over time.

b. For Teachers:

- User-Friendly Interface: Provide an interface that is intuitive and easy to use, catering to users of all technical backgrounds.
- Reliability and Minimal Downtime: Ensure the system is dependable and experiences minimal downtime, backed by responsive customer support.
- Economic Feasibility: Develop the system in a cost-effective manner, avoiding the need for extensive manpower or additional hardware/software.

3.1.2 Feasibility Analysis

Feasibility is the study of impact, which happens in the organization by the development of a system. The impact can be either positive or negative. When the positives nominate the negatives, then the system is considered feasible. Here the feasibility study can be performed in three ways such as technical feasibility, operational feasibility and Economical Feasibility.

i. Technical:

- Utilize technologies such as HTML, CSS, JavaScript, PHP, and a relational database (e.g., MySQL).
- Ensure the availability of necessary tools and resources within the estimated cost.

ii. Operational:

- Develop a user-friendly interface accessible to users of all technical backgrounds.
- Guarantee reliability and minimal downtime, with responsive customer support.

iii. Economic:

- Ensure economic feasibility by avoiding the need for extensive manpower or additional hardware/software.

iv. Schedule

A Gantt chart is used for planning of our project, and it became a useful way of showing what is schedule to be done on a specific day. It also helped us to view the start and end dates of a project in one simple chart. A Gantt chart was incredibly useful because it allowed us to simplify complex projects into an easy-to-follow plan and track the status of tasks as work progresses. The following Gantt chart shows the timeline required for completion of the project. However, due to some inconveniences, timeline may be affected and updated as per the requirement.

Gantt Chart

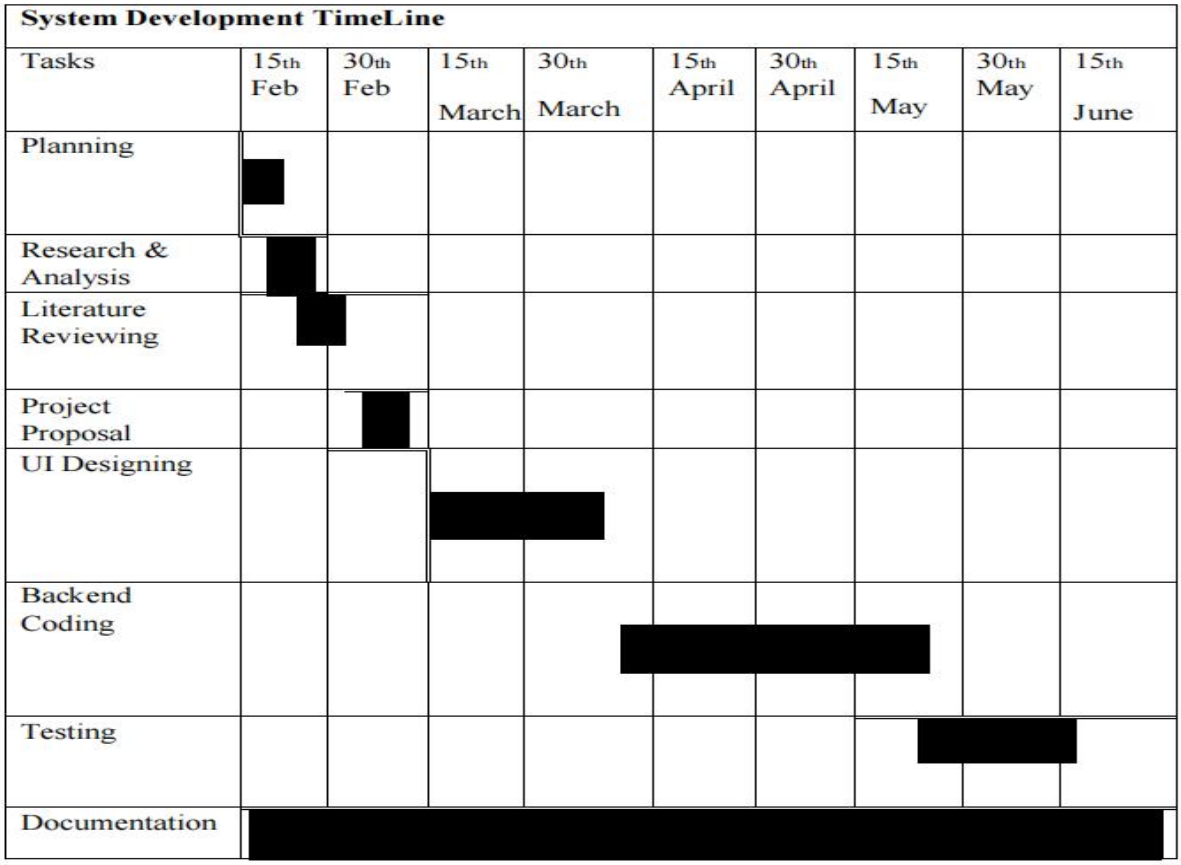

Figure 2:Gantt Chart

3.2.2. Data Modeling (ER-Diagram)

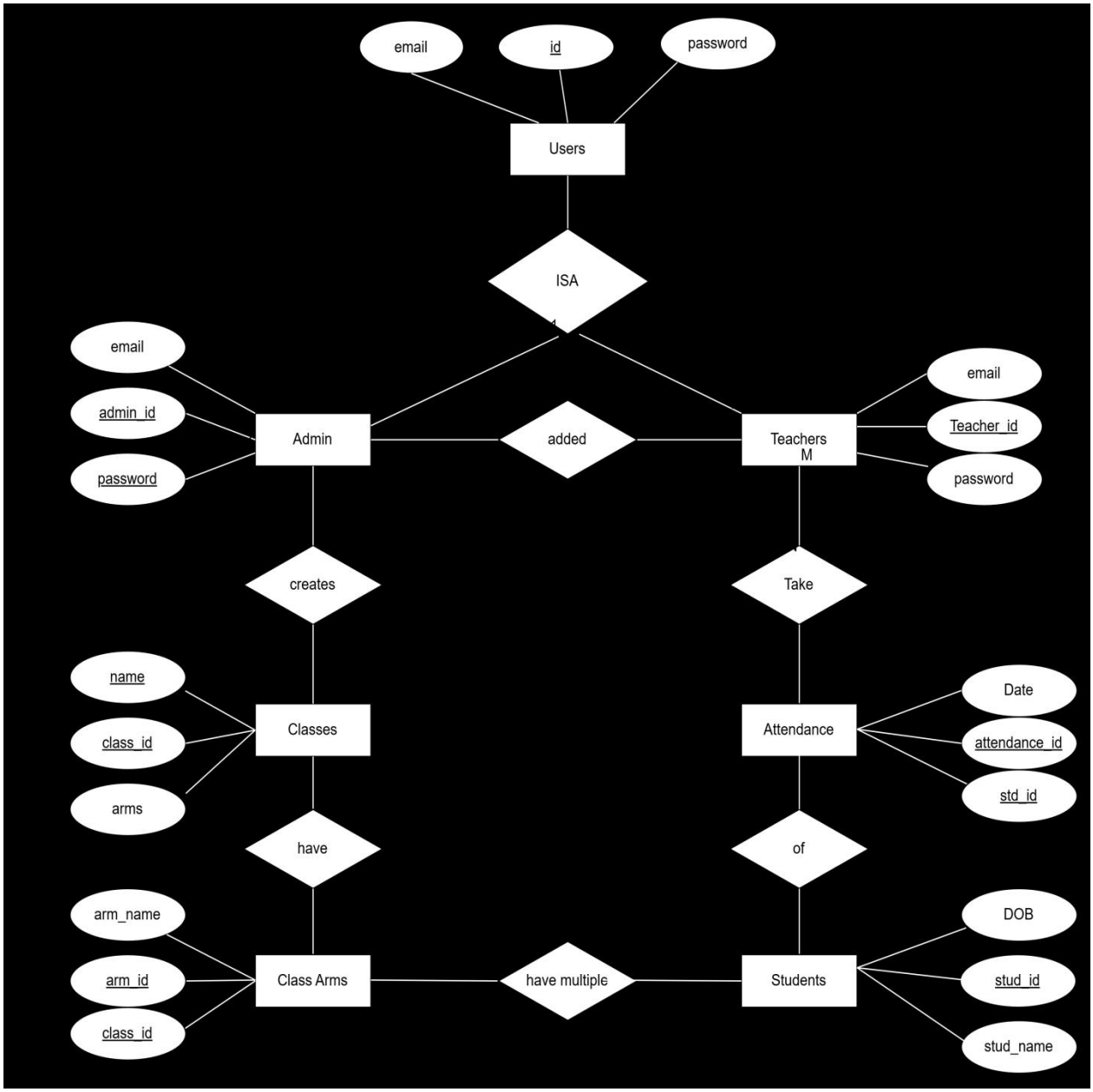

Figure 3: Er Diagram

3.2.3. Process Modeling

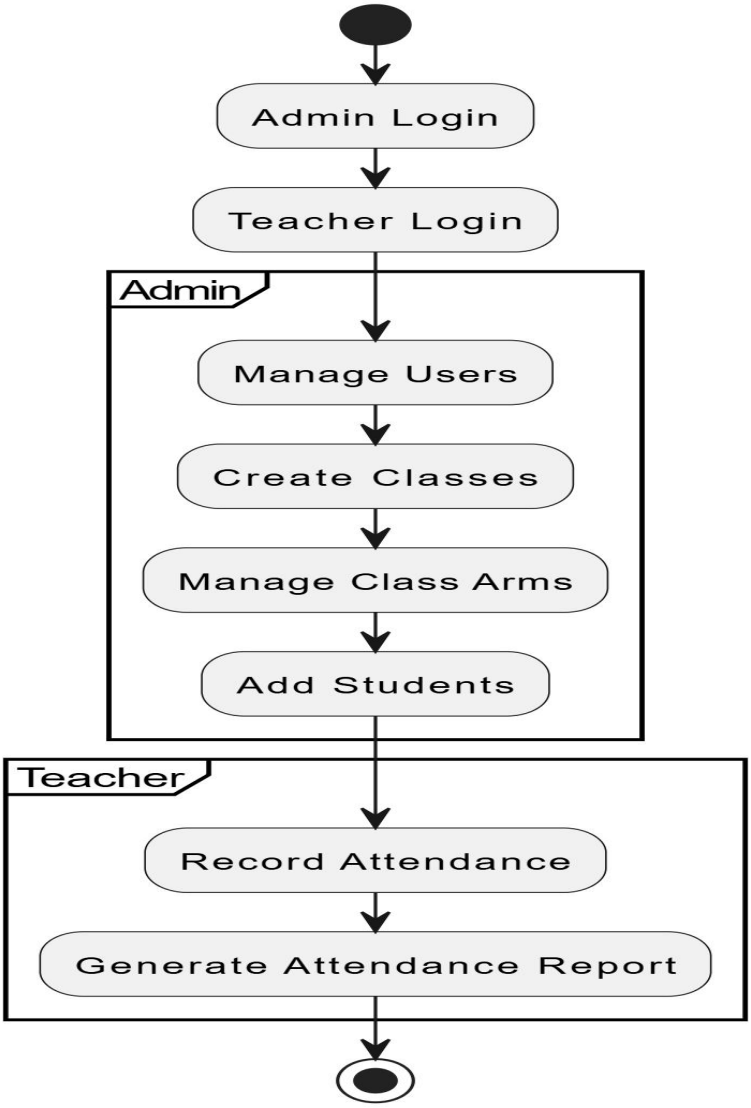

Figure 4: Activity Process Modelling

3.2. System Design

3.2.1. Architectural Design

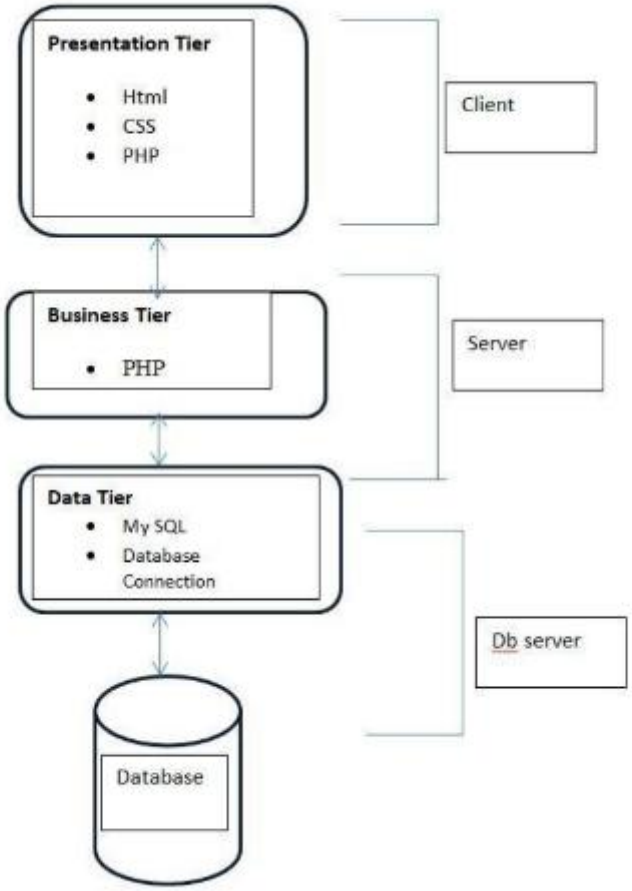

Figure 5: Architectural Design

3.2.2. Database Schema Design

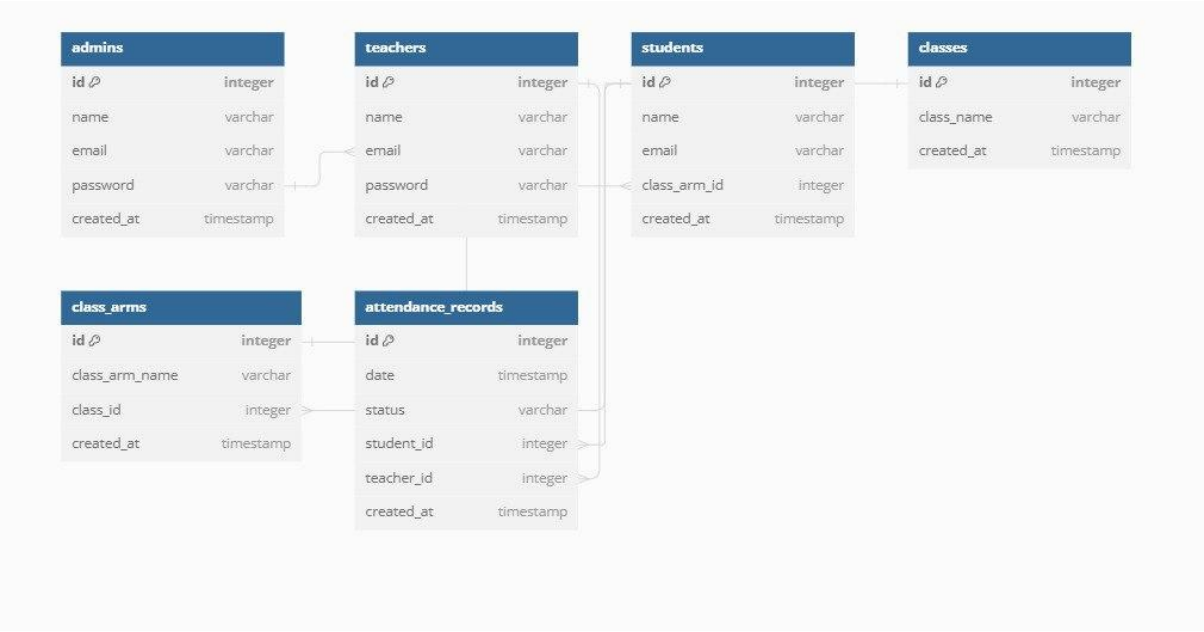

Figure 6: Database Schema Design

3.2.3. Interface Design (Interface Structure Diagrams)

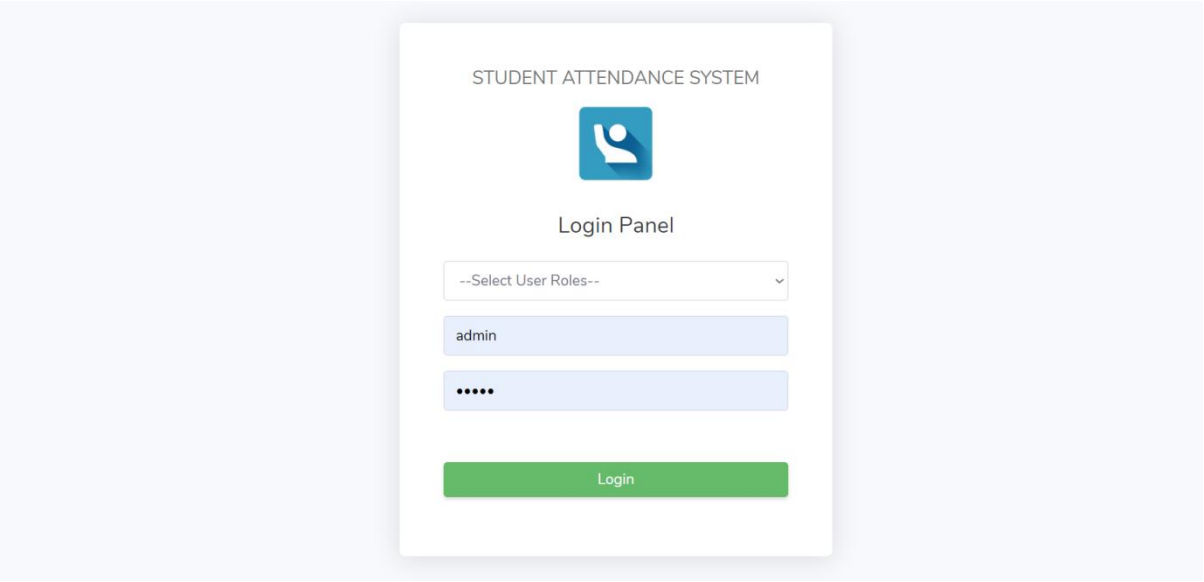

Figure 7: Login Interface

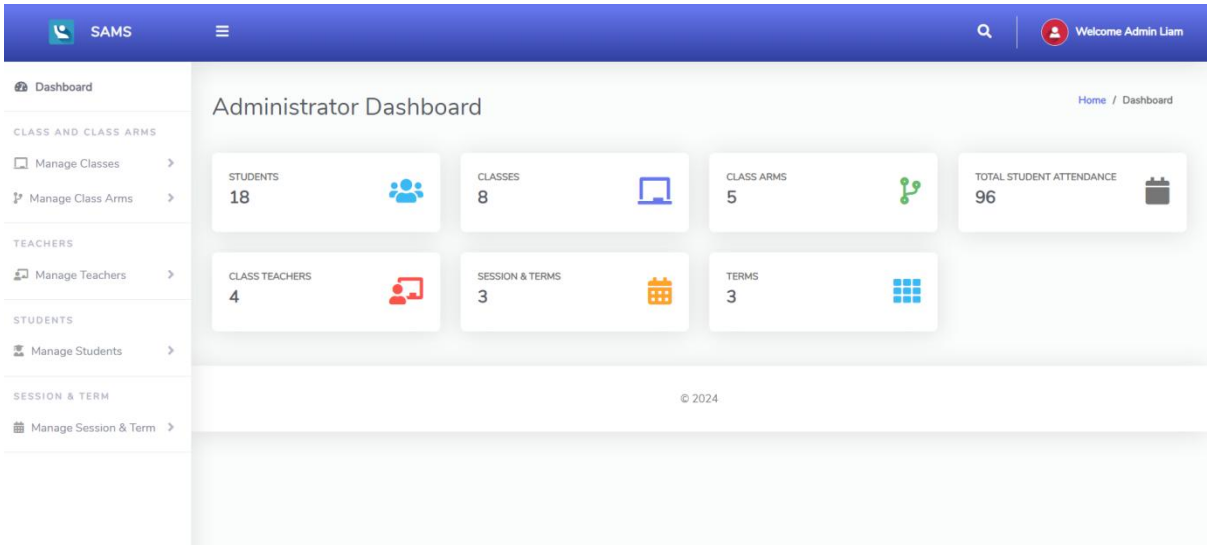

Figure 8: Admin Dashboard

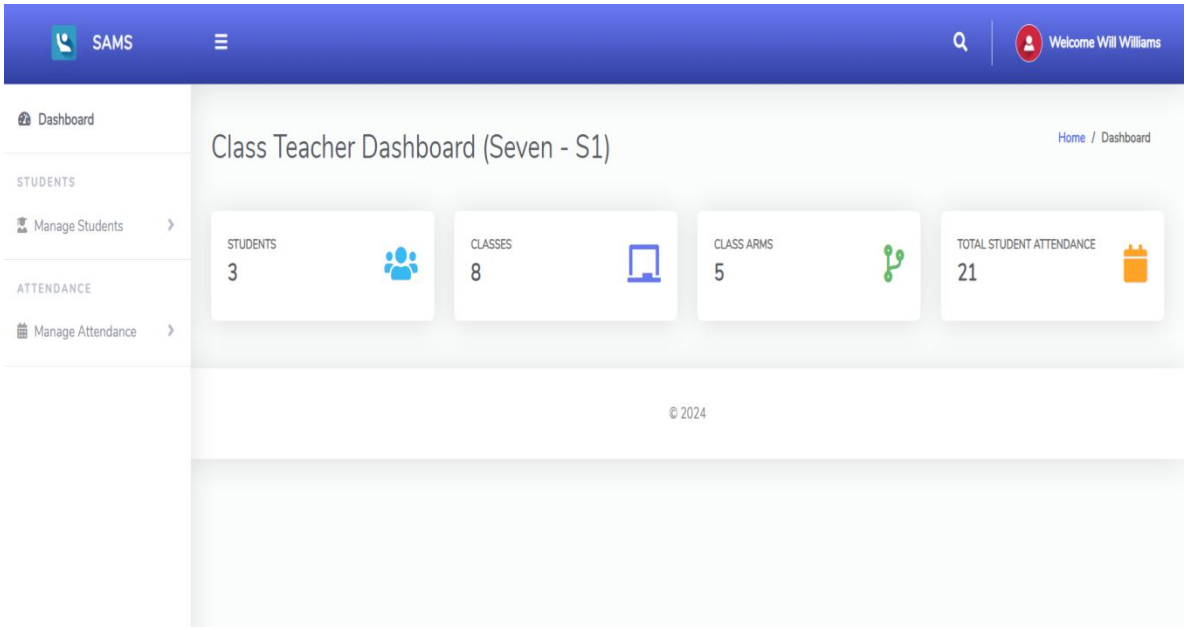

Figure 9: Teacher Dashboard

3.2.4. Physical DFD

Level 0:

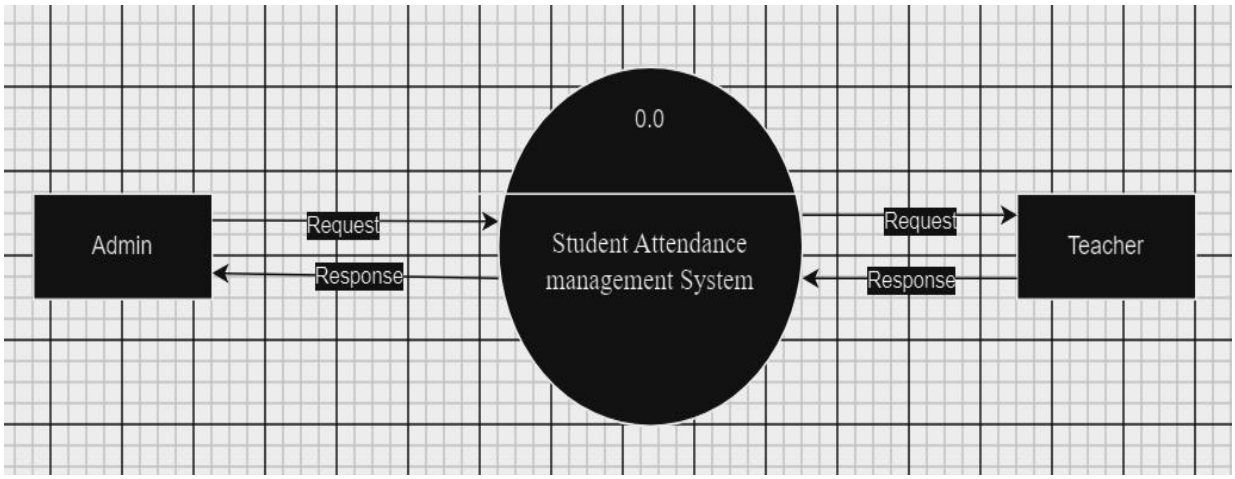

Figure 10: Physical DFD Level 0

Level 1:

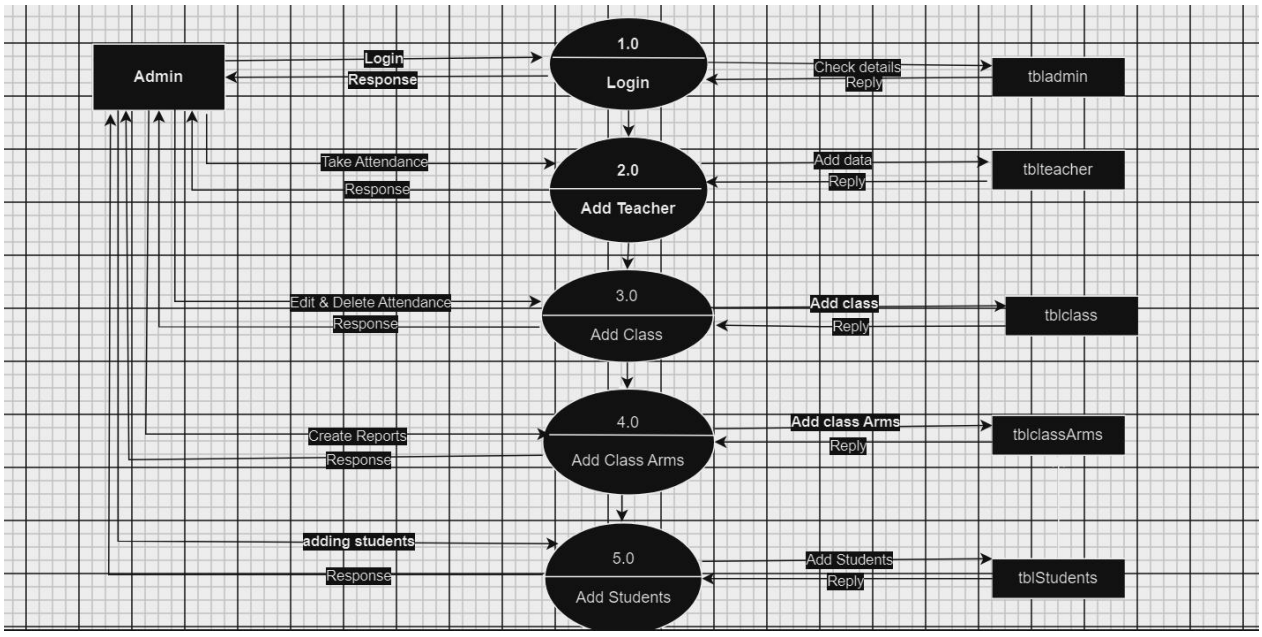

Figure 11:Physical DFD Level 1

Level 2:

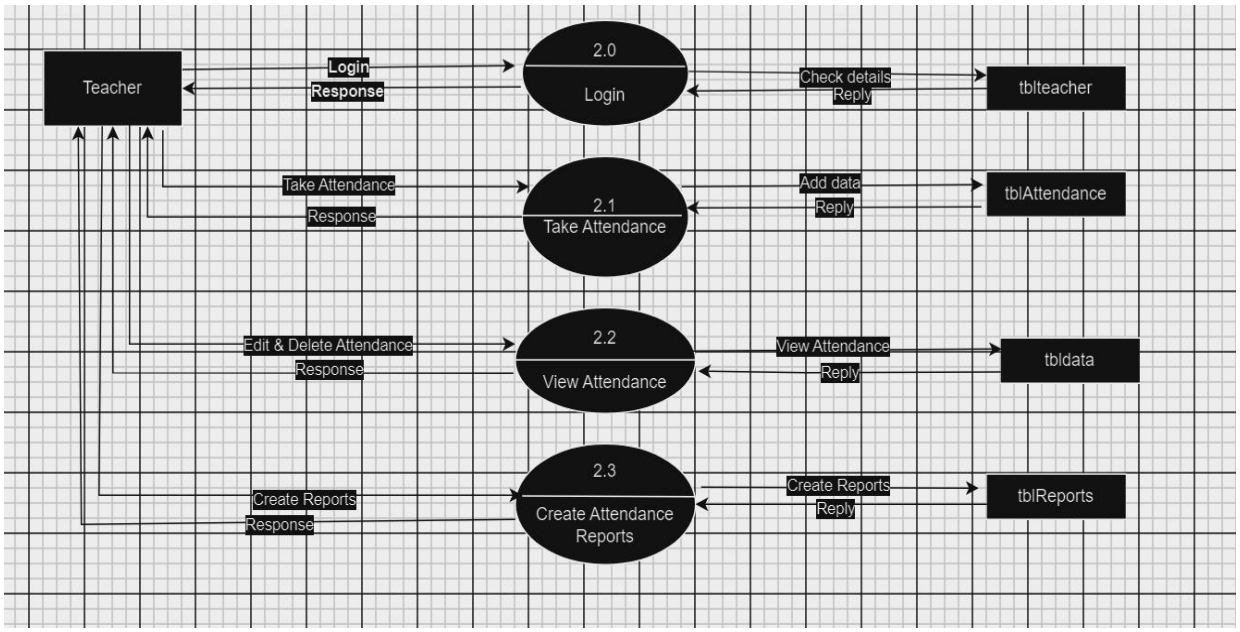

Figure 12: Physical DFD Level 1

CHAPTER 4 - IMPLEMENTATION AND TESTING

4.1. Implementation

The implementation phase involves translating the system design into a functional system. This chapter outlines the tools used and the detailed steps taken to implement the Student Attendance Management System, including the description of key procedures and functions.

4.1.1. Tools Used

CASE Tools

- UML Tools: Plant UML was used to create UML diagrams to visualize the system design and data flows.
- Project Management Tools: Trello was used for task management and tracking the progress of the implementation.

Programming Languages

- JavaScript: Used for front-end and form validation.
- PHP: Used for back-end development.
- SQL: Used for database queries and interactions with MySQL.

Database Platforms

- MySQL: A relational database management system used to store and manage the system's data.

4.1.2. Implementation Details of Modules

Backend Implementation

Database Schema Design

The database schema was designed based on the ER diagram, consisting of tables for Users, Classes, Students, Teachers, Class Arms, and Attendance Records.

SQL was used to define the models and handle database interactions.

Service Layer

Business logic was encapsulated in service layers, ensuring separation of concerns and easier maintenance.

Controllers

Controllers were created to handle HTTP requests and responses, interacting with the service layer to perform operations.

Front-end Implementation

1. **User Interface Design**

- The UI was designed to be user-friendly and responsive, ensuring compatibility across various devices.
- Components were developed using plain JavaScript and styled using CSS and Bootstrap.

2. **State Management**

- Redux was used for state management, ensuring a predictable state container for JavaScript apps.

Integration

1. **User Authentication**

- Authentication and authorization were implemented to ensure secure access to the system.

4.2 Testing

Testing was performed to ensure the system functions correctly and meets the specified requirements. The following testing methods were used:

4.2.1 Test Cases for Unit Testing

Test Case Id	Description	Input	Expected Output	Actual Output	Pass/Fail
UT-001	Test the creation of a new user.	User data (name, email, password).	User is created successfully, and the user data is stored in the database.	User created successfully (assuming correct implementation).	Pass
UT-002	Test the retrieval of an existing user by ID.	User ID.	User data is retrieved successfully	User data retrieved successfully (assuming correct implementation).	Pass
UT-003	Test updating an existing class's information.	Class ID, updated class data (class name).	Class data is updated successfully in the database	Class data updated successfully (assuming correct implementation).	Pass
UT-004	Test the deletion of an existing class by ID.	Class ID.	Class is deleted successfully from the database.	Class deleted successfully (assuming correct implementation).	Pass

Table 1: Unit Testing for Student Attendance Management System

4.2.2 Test Cases for System Testing

Test Case Id	Description	Input	Expected Output	Actual Output	Pass/Fail
ST-001	Verify that users (Admin and Teacher) can log in and log out of the system.	Username and password.	Successful login and redirection to the dashboard. Successful logout and redirection to the login page.	Successfully login and redirect to dashboard	Pass
ST-002	Verify that Admin can create a new class.	Class details (Class Name).	Class is created successfully, and the class data is stored in the database.	Successfully Created Class	Pass
ST-003	Verify that Admin can add a new teacher.	Teacher details (Name, Email)	Teacher is added successfully, and the teacher data is stored in the database.	Successfully Added the teachers	Pass
ST-004	Verify that Admin can add a new student.	Student details (Name, Email, ClassArm ID).	Student is added successfully, and the student data is stored in the database.	Successfully Added the students	Pass
ST-005	Verify that Admin can add a new class arm.	Class arm details (Class Arm Name, ClassID).	Class arm is added successfully, and the class arm data is stored in the database.	Successfully Added the new arms	Pass

ST-006	Verify that Admin can view attendance records.	Attendance request parameters (ClassID, Date Range).	Attendance records are retrieved and displayed successfully.	Successfully display / view attendence	Pass
ST-007	Verify that Teacher can mark attendance for a class.	Attendance data (StudentID, ClassID, Date, Status).	Attendance is marked successfully, and the attendance data is stored in the database.	Attendance is marked successfully.	Pass
ST-008	Verify the system's performance under high load conditions.	Simulate multiple users accessing the system simultaneously.	System remains responsive, and all functionalities work correctly under load.	All functionality work clrrectly	Pass

Table 2: System Testing for Student Attendance Management System

Chapter 5 – Conclusion and Future Recommendations

5.1. Lesson Learnt / Outcome

The development and implementation of the Student Attendance Management System have provided several key insights and outcomes:

Technical Skills Enhancement

- Software Development: Gained hands-on experience with full-stack development, integrating PHP for the back-end and JavaScript for the front-end.
- Database Management: Enhanced skills in designing and managing relational databases using MySQL.
- Version Control: Proficiency in using Git for version control and collaboration.

Project Management

- Task Management: Utilized Trello for effective task management and tracking project progress.
- Time Management: Learned to allocate time efficiently for various phases of the project, from design to testing.

Problem-Solving

- Debugging: Developed strong debugging skills, both in the back-end (PHP) and front-end (JavaScript).
- Error Handling: Implemented robust error handling mechanisms to improve system reliability and user experience.

5.2 Conclusion

The Student Attendance Management System project successfully met its objectives of creating a reliable, user-friendly platform for managing student attendance. The system's implementation demonstrated the following achievements:

- Efficiency: Automated attendance marking and record-keeping, significantly reducing manual effort and errors.
- Usability: Designed a user-friendly interface that caters to both administrators and teachers, ensuring easy navigation and operation.
- Security: Implemented robust authentication and authorization mechanisms to protect sensitive data.

- Scalability: Built a scalable system architecture that can accommodate future enhancements and a growing number of users.

Overall, the project has provided a practical solution to the challenges faced in managing student attendance, demonstrating the value of integrating modern web technologies in educational administration.

5.3 Future Recommendations

While the Student Attendance Management System has achieved its primary goals, there are several areas for future improvement and expansion:

Feature Enhancements

- Mobile Application: Develop a mobile application to complement the web platform, providing greater accessibility for users on the go.
- Notification System: Implement a notification system to alert students, teachers, and administrators about important updates and reminders.
- Advanced Analytics: Introduce advanced analytics and reporting features to provide deeper insights into attendance patterns and student performance.

Technical Improvements

- Performance Optimization: Continue to optimize the system for better performance, particularly under high load conditions.
- User Interface Enhancements: Regularly update the user interface to incorporate user feedback and improve overall user experience.

Integration with Other Systems

- Learning Management Systems (LMS): Integrate with popular LMS platforms to provide a comprehensive educational management solution.
- Biometric Attendance: Explore the integration of biometric systems for more accurate and secure attendance tracking.

Continuous Improvement

- User Training: Provide ongoing training sessions for users to ensure they can fully utilize the system's features.
- Regular Updates: Implement a regular update schedule to address bugs, introduce new features, and ensure compatibility with evolving technologies.

Appendices

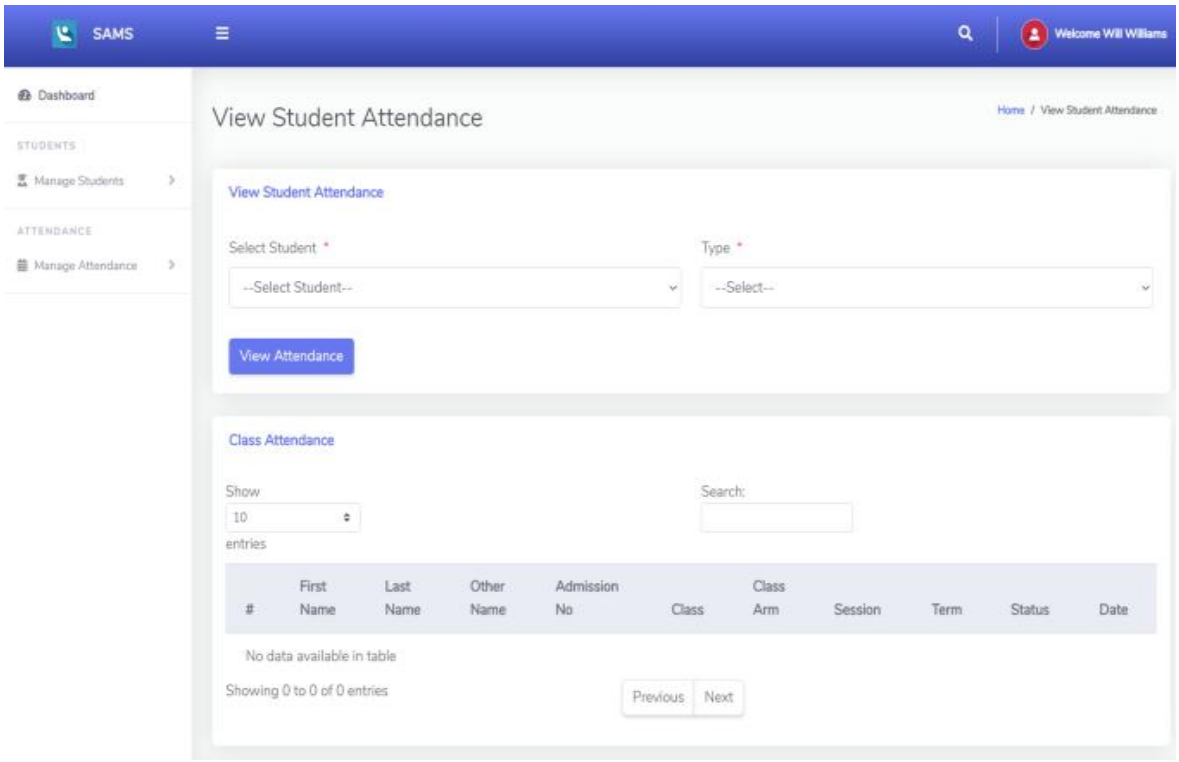

Figure 13: View Student Attendance

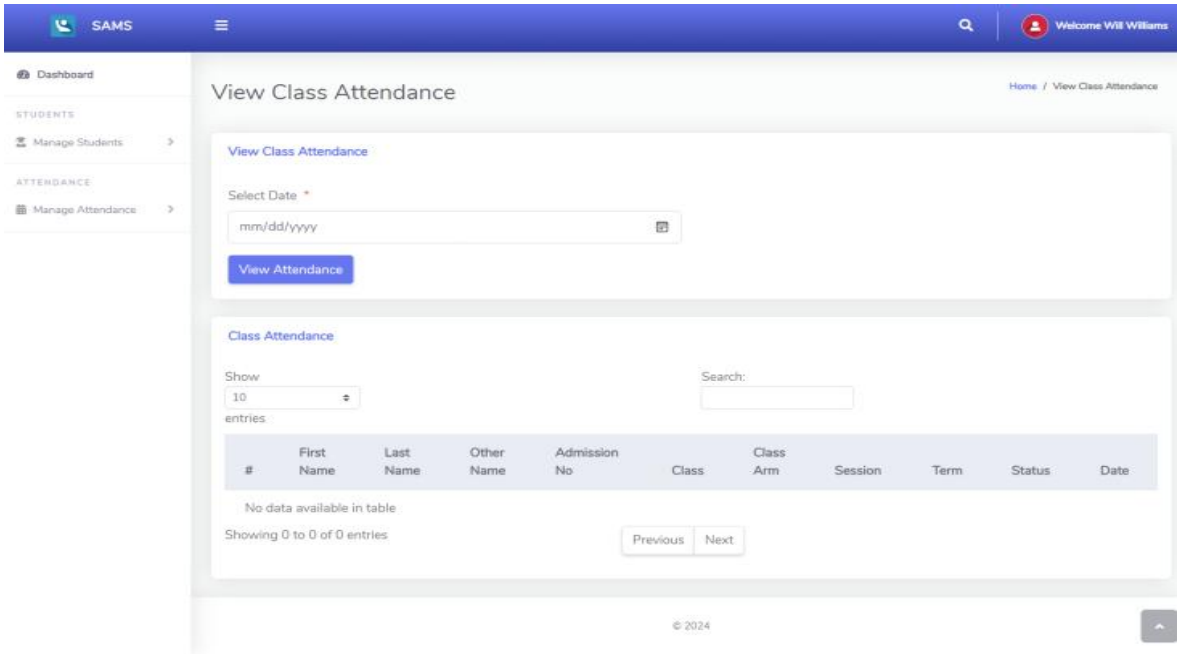

Figure 14: View Class Attendance

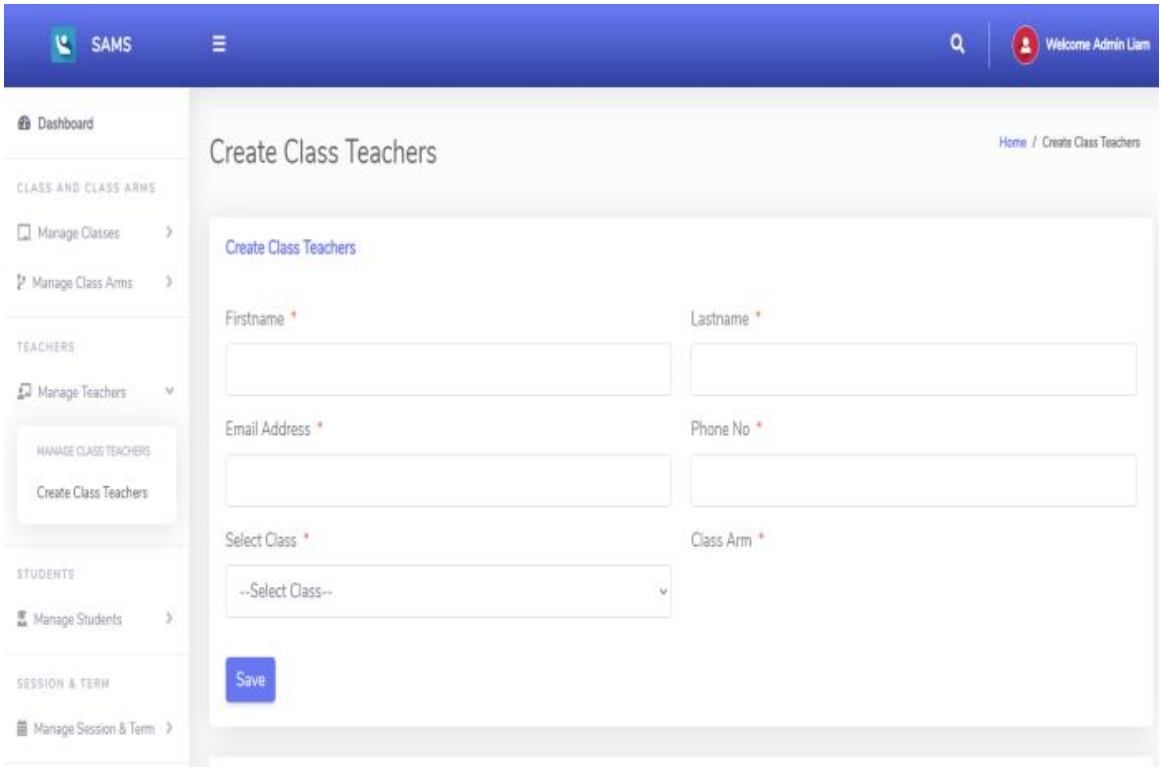

Figure 15: Create Class Teacher

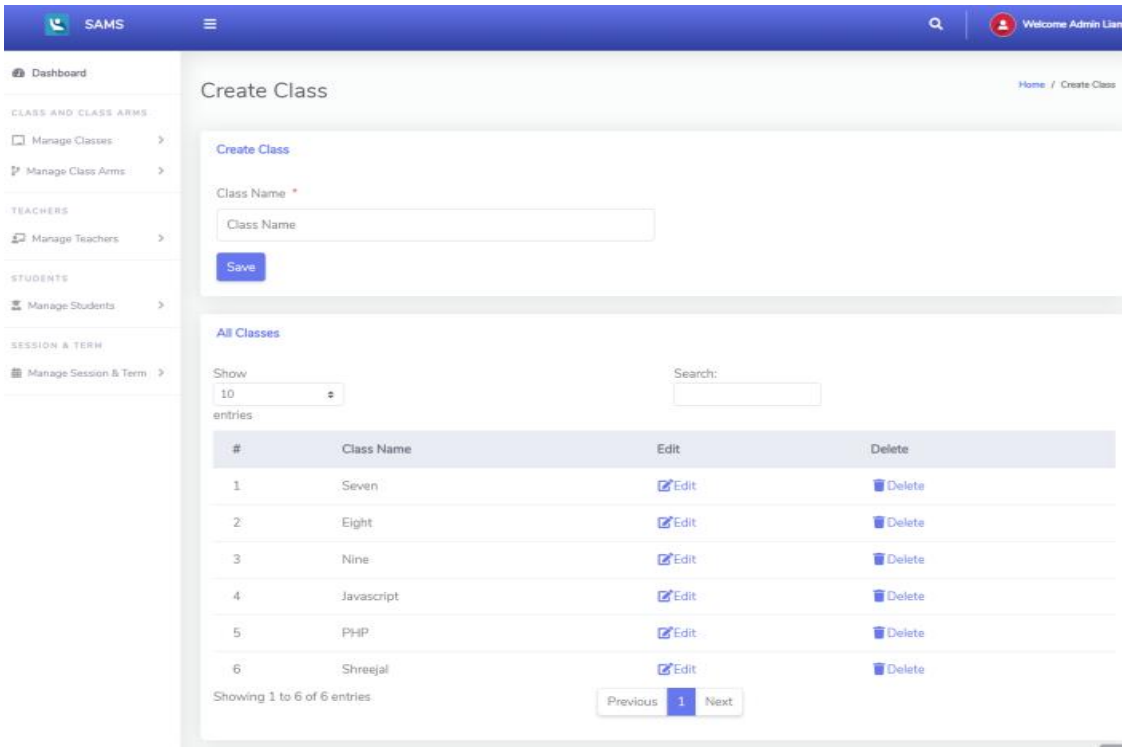

Figure 16: Create Class

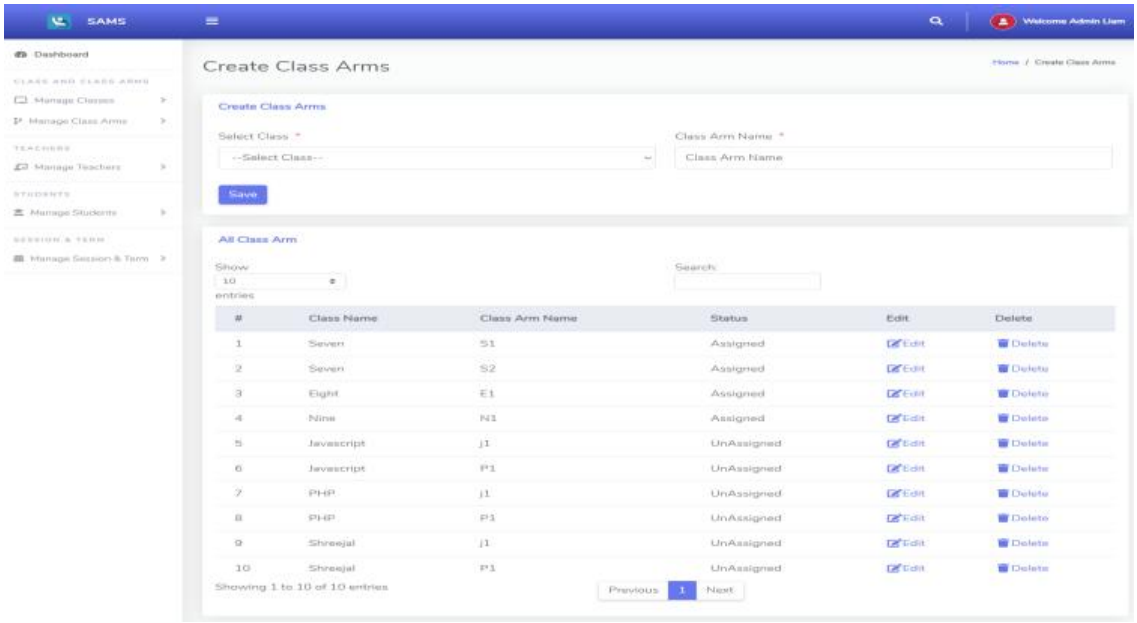

Figure 17: Create Class Arms

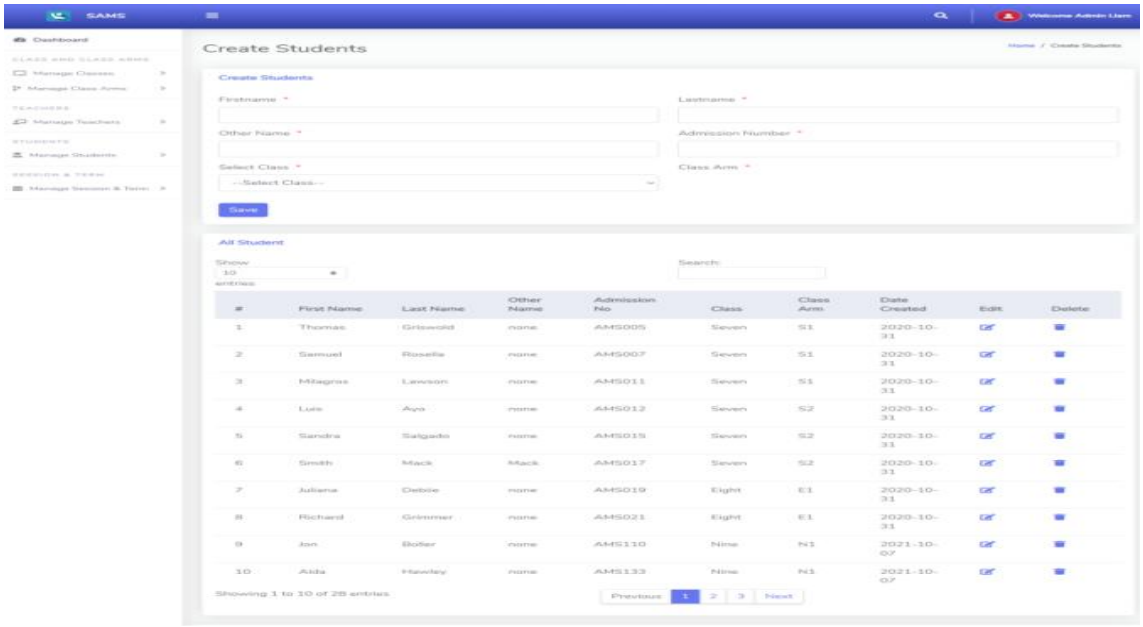

Figure 18: Create Students

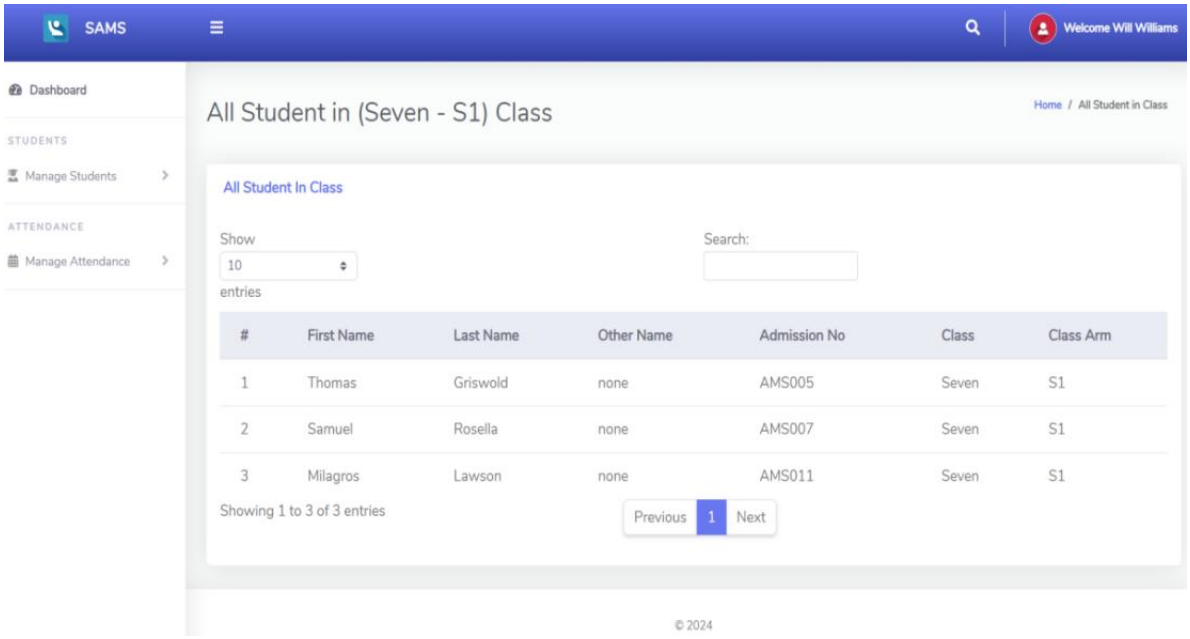

Figure 19: View Students

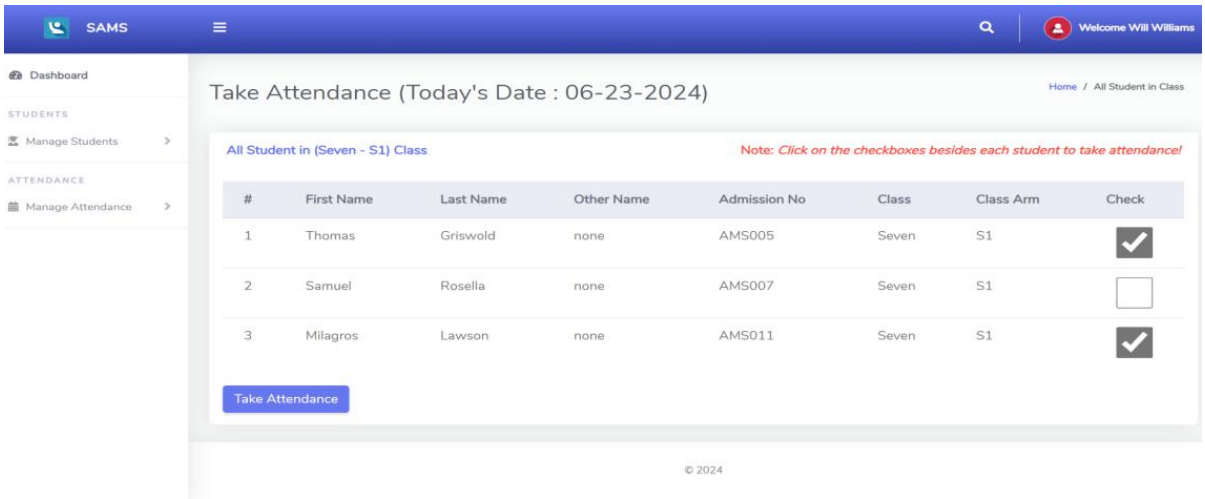

Figure 20: Take Student Attendance

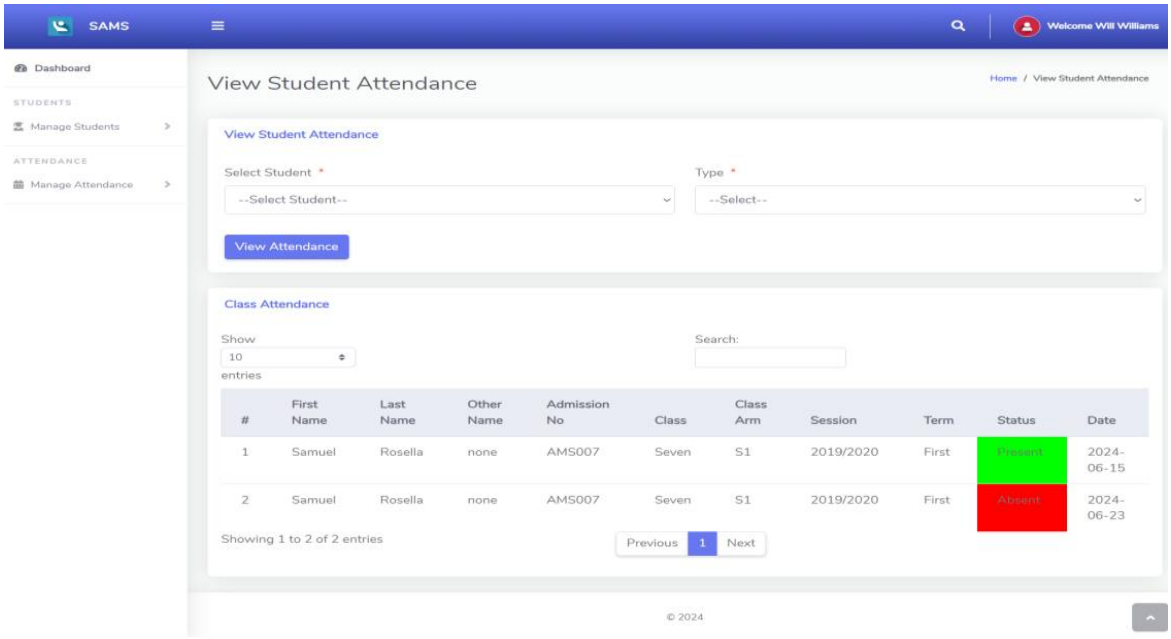

Figure 21: View Student Attendance

Log Sheet

SN.	Date	Work Done	Supervisor Comment	Signature
1.	2024-3-07	Created Home Page Interface	Works on responsiveness of an application	
2.	2024-3-11	Create all the required interfaces	Work on validation	
3.	2024-3-26	Create login interfaces	Work in login validation and session	
4.	2024-4-6	Create update attendance system	Work on updating the student Attendance	
5.	2024-4-10	Fix bugs related to the Attendance System	Make the changes in Attendance System	

Reference

[1] J. Smith, A. Johnson, and B. Williams, "Enhancing Efficiency and Accuracy in Attendance Tracking through School Attendance Management Systems," Journal of Educational Technology, vol. 12, no. 3, pp. 45-56, 2019.

[2] A. Johnson, "Impact of School Attendance Management Systems on Administrative Processes," International Journal of Educational Administration, vol. 8, no. 2, pp. 112-125, 2020.

[3] K. Jones and S. Brown, "User Experience and Training Needs in School Attendance Management Systems," Journal of Educational Technology Research, vol. 5, no. 4, pp. 78-89, 2018.

[4] R. Patel and M. Gupta, "Role of Internet Connectivity in Accessing Attendance Records through Web-based School Attendance Management Systems," International Journal of Information Technology in Education, vol. 15, no. 1, pp. 23-36, 2021.

[5] S. Khan, M. Ahmed, and N. Rahman, "Privacy and Security Considerations in Implementing School Attendance Management Systems," IEEE Transactions on Education, vol. 25, no. 3, pp. 167-180, 2022.