

Software Design Document (SDD) for Student Attendance System



Team Name: Group Alpha

Project Title: Student Attendance System

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1. Introduction

1.1 Purpose

This software design document describes the architecture and system design of the Student Attendance System. It is intended for developers, project managers, testers, and documentation writers to ensure a common understanding of the system's design.

1.2 Scope

The Student Attendance System aims to automate the process of recording and managing student attendance using biometric systems, QR codes, and RFID technology. The project goals include improving attendance accuracy, providing real-time monitoring, and generating attendance reports. The system will integrate with existing Learning Management Systems (LMS).

1.3 Overview

This document is organized into sections covering system architecture, data design, component design, human interface design, requirements matrix, and appendices.

1.4 Reference Material

- IEEE Std 1016-1998: IEEE Recommended Practice for Software Design Descriptions
- SRS Document for Student Attendance System

1.5 Definitions and Acronyms

- **RFID:** Radio Frequency Identification
- **QR Code:** Quick Response Code
- **LMS:** Learning Management System
- **Student:** A person enrolled in a course or program.
- **Course:** A academic program offered.
- **Grade:** A measure of a student's performance in a course.

- **Administrator:** A university staff member responsible for managing student data and course schedules.
- **Instructor:** A university faculty member responsible for teaching courses.

2. System Overview

The Student Attendance System will automate attendance recording using biometric systems, QR codes, and RFID technology. It will provide real-time monitoring and alerts, data analytics, and reporting. The system will operate on various platforms, ensuring compatibility with different devices and integration with existing LMS.

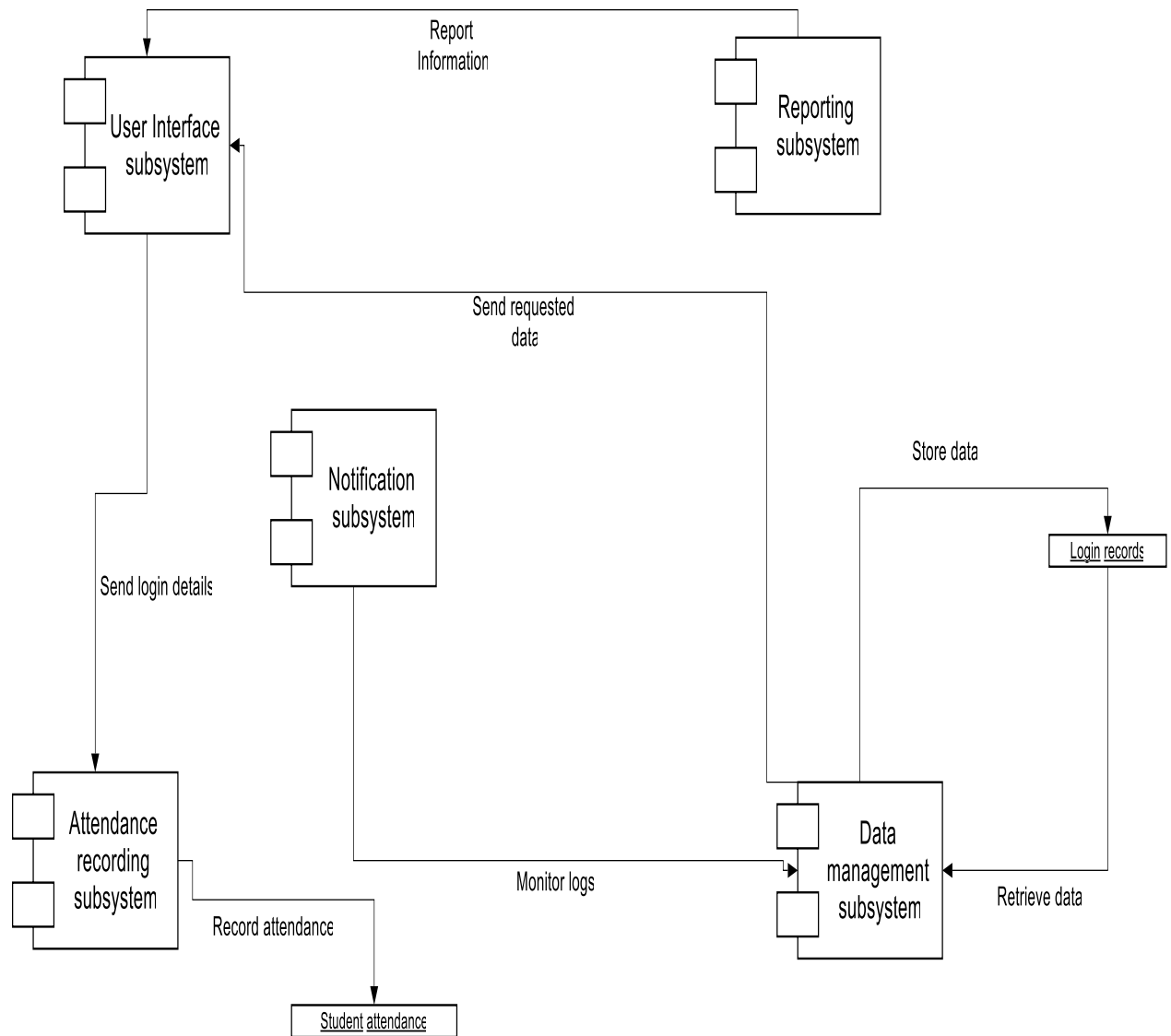
3. System Architecture

3.1 Architectural Design

The system is designed using a modular approach, with the following high-level subsystems:

- **User Interface Subsystem:** Manages user interactions.
- **Attendance Recording Subsystem:** Handles biometric, QR code, and RFID attendance recording.
- **Data Management Subsystem:** Manages attendance data storage and retrieval. It interacts with the user interface subsystem to retrieve the desired data.
- **Notification Subsystem:** Sends alerts and notifications to users. It interacts with the attendance recording subsystem to send accurate notifications to intended users.
- **Reporting Subsystem:** Generates attendance reports and analytics. It interacts with the reporting subsystem to generate desired reports.

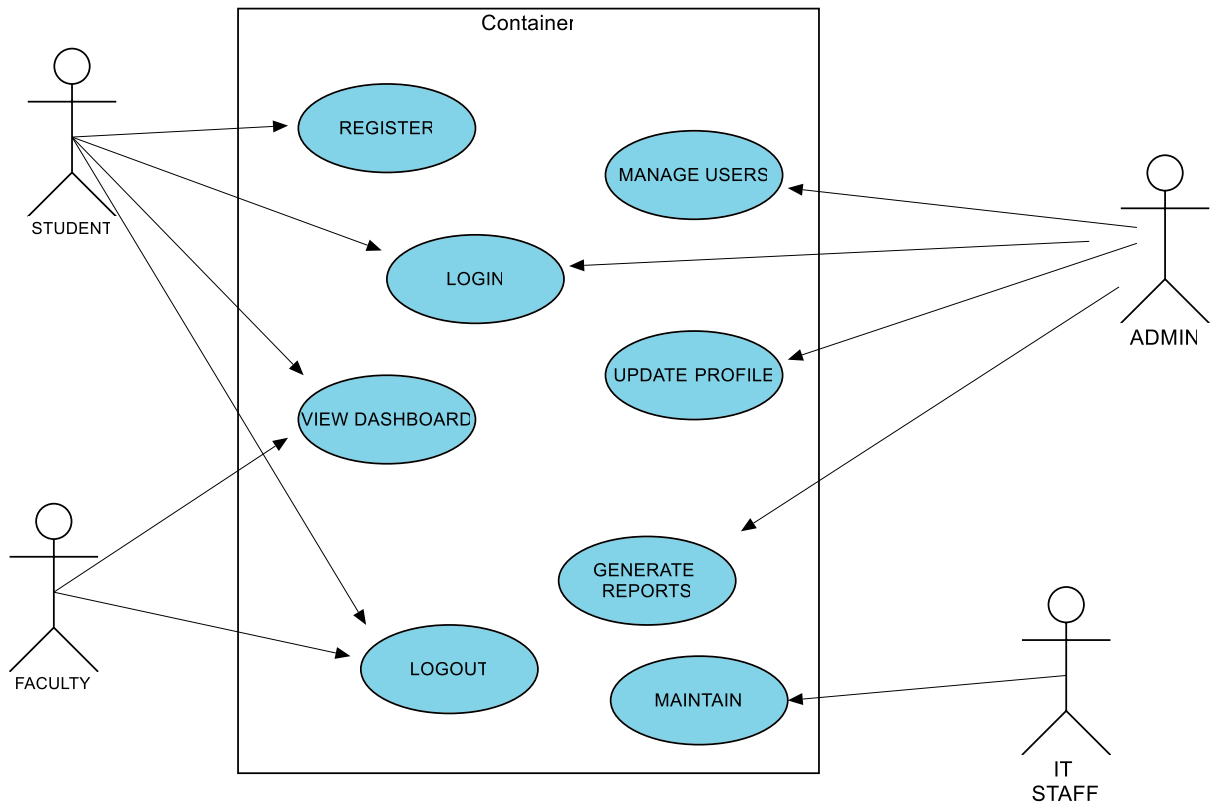
Diagram showing major sub-systems and data repositories.



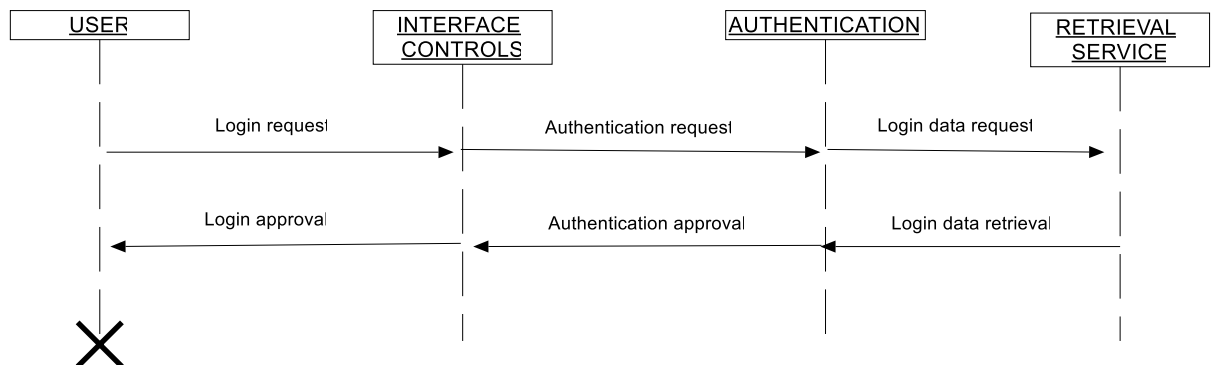
3.2 Decomposition Description

- **User Interface Subsystem:**

- Use case diagram

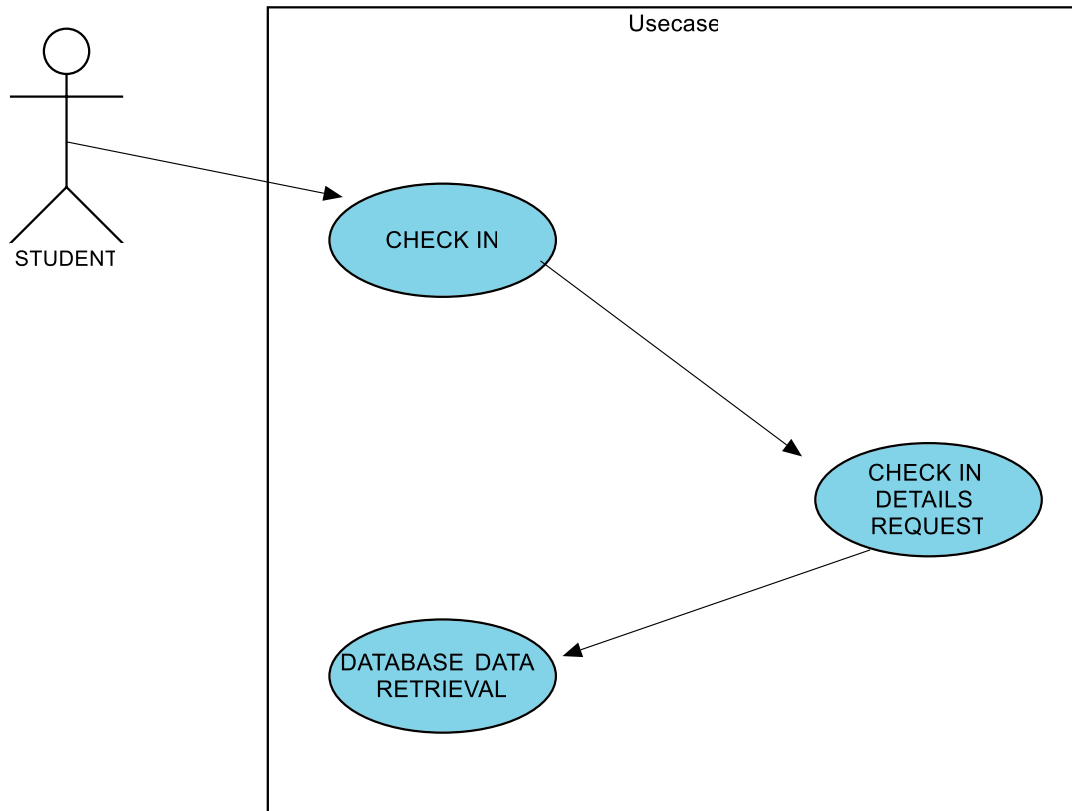


Sequence diagram

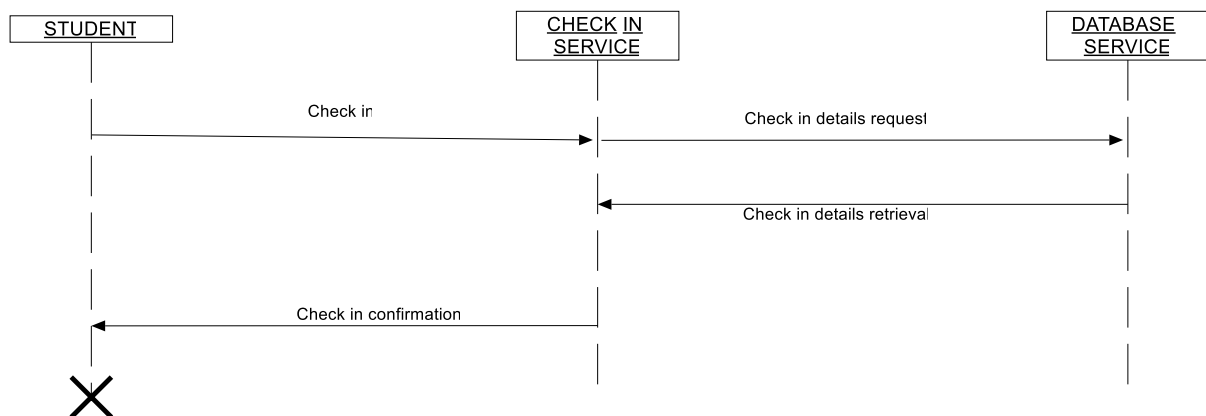


- **Attendance Recording Subsystem:**

Use case diagram

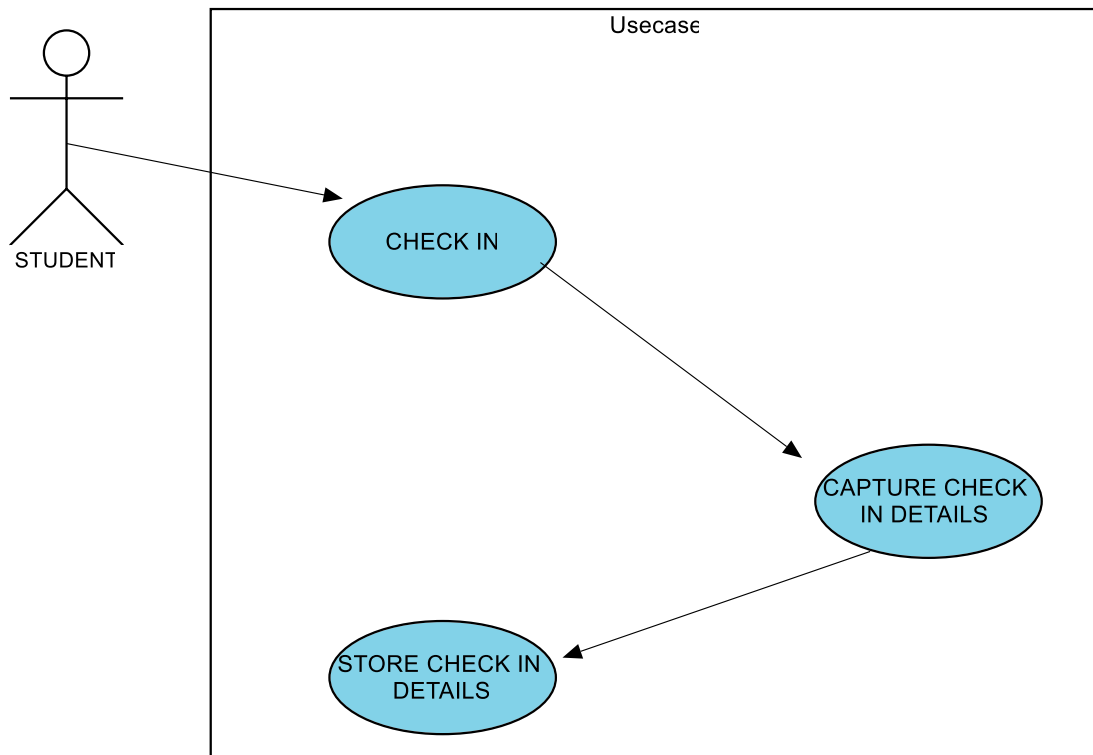


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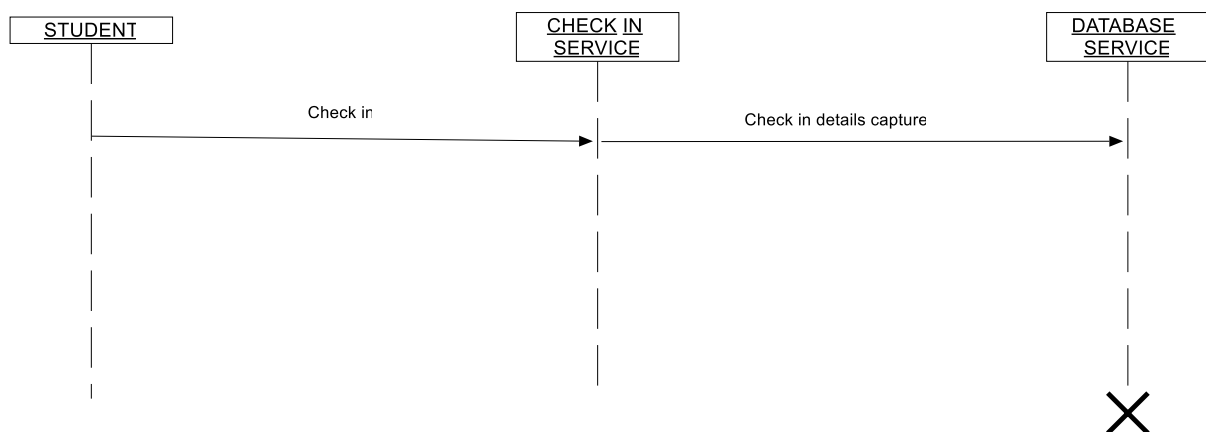


- **Data Management Subsystem:**

Use case diagram

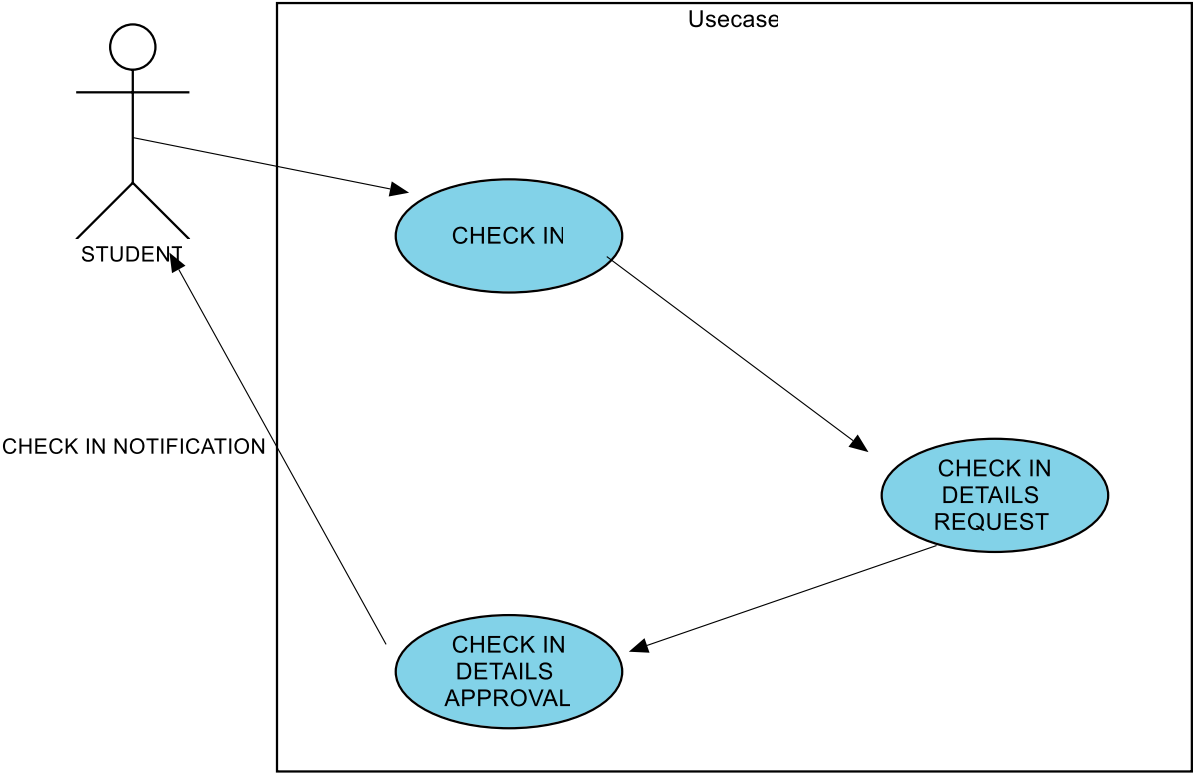


Sequence diagram

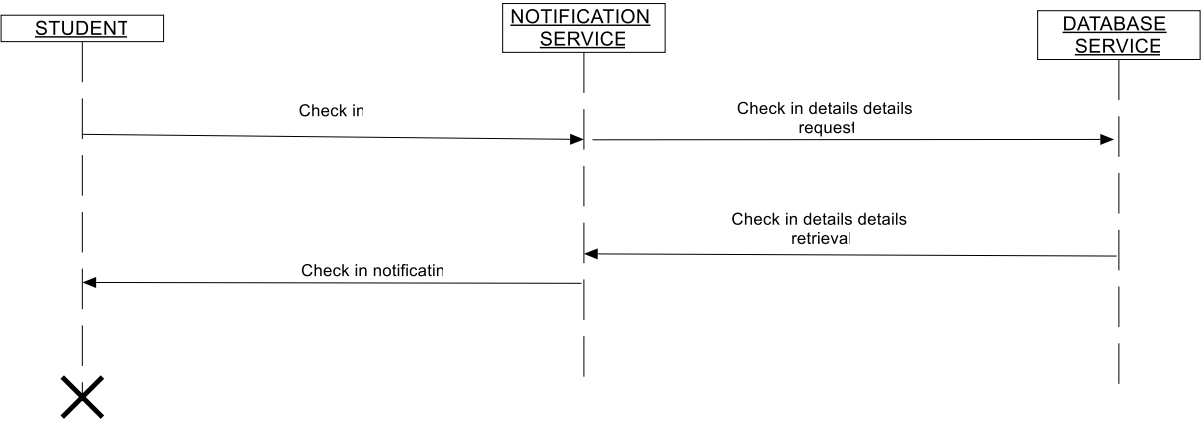


- **Notification Subsystem:**

Use case diagram

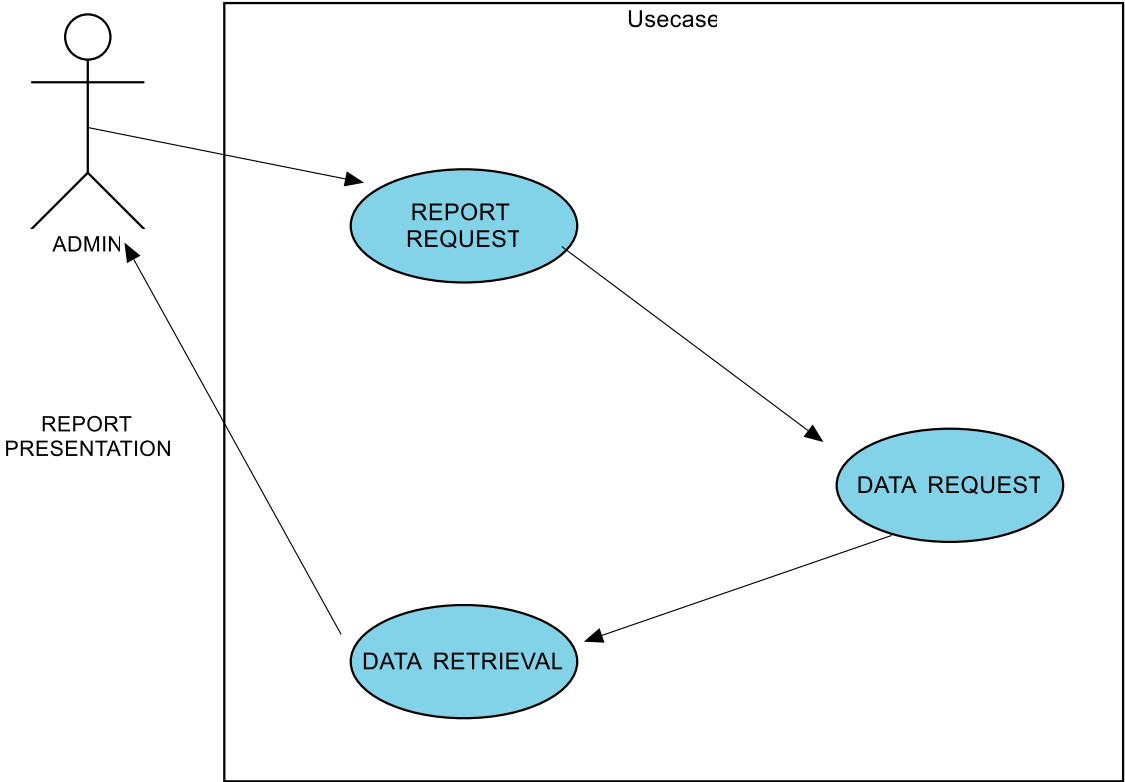


Sequence diagram

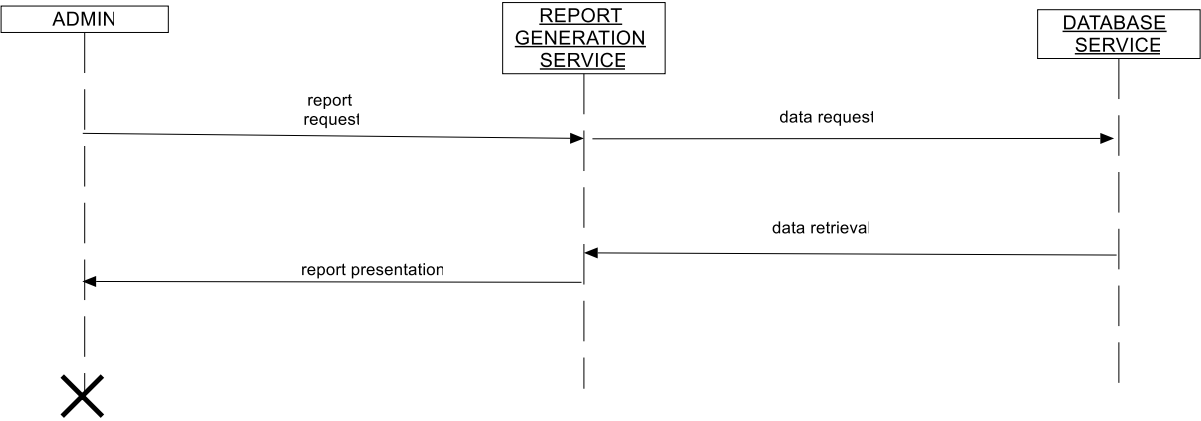


- **Reporting Subsystem:**

Use case diagram



Sequence diagram



3.3 Design Rationale

The architecture was selected to ensure scalability, modularity, and ease of integration with existing LMS. Alternatives considered included a monolithic architecture, which was discarded due to concerns about scalability and maintainability.

4. Data Design

4.1 Data Description

The system's information domain is transformed into the following data structures:

- **Student Data:** Stores student information such as ID, name, and class.
- **Attendance Data:** Records attendance events, including student ID, date, time, and method (biometric, QR code, RFID).
- **Notification Data:** Stores notification details like recipient, message, and status.

4.2 Data Dictionary

- **Student Data:**
 - ID: Integer
 - Name: String
 - Class: String
- **Attendance Data:**
 - StudentID: Integer
 - Date: Date
 - Time: Time
 - Method: String
- **Notification Data:**
 - Recipient: String
 - Message: String
 - Status: String

5. Component Design

- **Login Module:**

- Function: Authenticate user credentials
- Pseudocode:

```
function authenticate(username, password)

    if valid_credentials(username, password)

        grant_access()

    else

        deny_access()
```

- **Biometric Module:**

- Function: Capture and verify biometric data
- Pseudocode:

```
function capture_biometric(student_id)

    biometric_data = read_biometric_sensor()

    if verify_biometric(student_id, biometric_data)

        record_attendance(student_id, "biometric")

    else

        alert_failure()
```

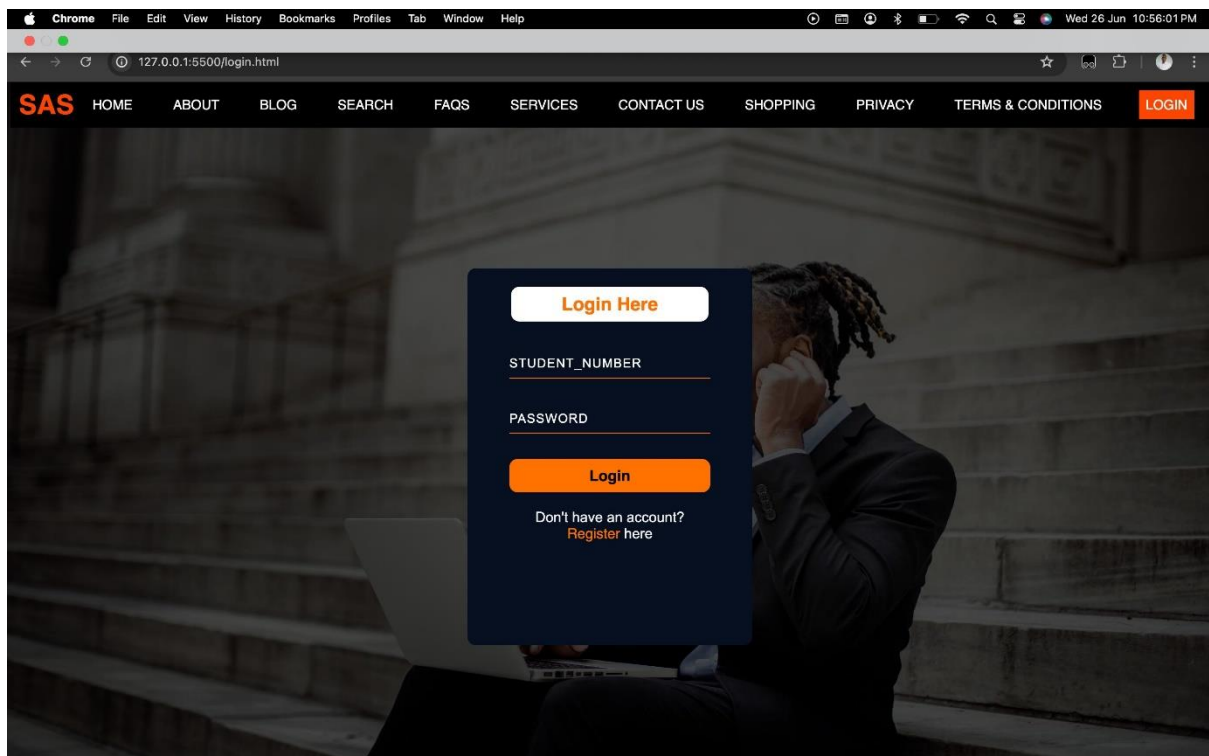
6. Human Interface Design

6.1 Overview of User Interface

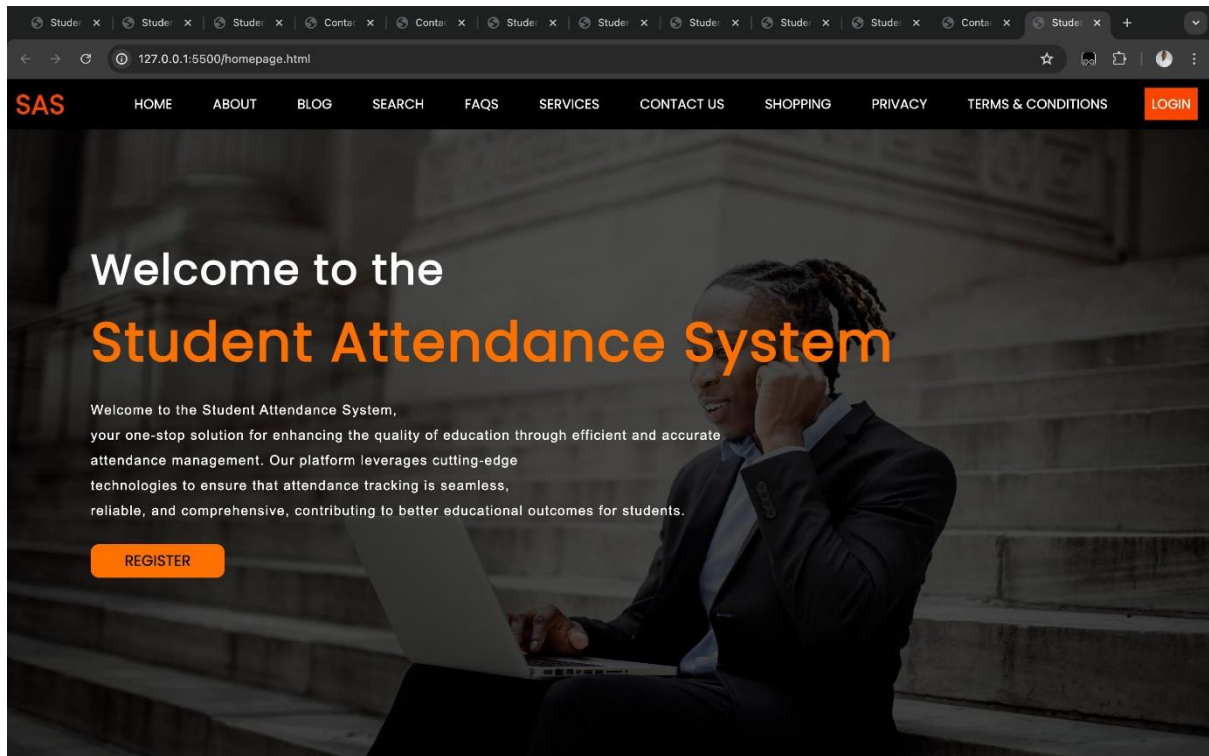
The system provides a user-friendly interface for students and faculty to record attendance, view attendance records, and generate reports. Users will interact with the system through a secure login screen, a real-time monitoring dashboard, and various forms for data input and report generation.

6.2 Screen Images

- **Login Screen:**
 - Fields: Student number, Password
 - Buttons: Login, Forgot Password



- **Dashboard:**
 - Real-time attendance status
 - Alerts and notifications



6.3 Screen Objects and Actions

- **Login Button:** Validates user credentials and grants access to the system.
- **Record Attendance Button:** Initiates attendance recording using biometric, QR code, or RFID methods.

7. Requirements Matrix

Requirement ID	Component	Description
FR1	Biometric Module	Record attendance using biometric data
FR2	QR Code Module	Record attendance using QR codes
FR3	RFID Module	Record attendance using RFID technology
FR4	Notification Module	Send attendance alerts and notifications
FR5	Reporting Module	Generate attendance reports

8. Appendices

- **Appendix A:** Glossary of Terms
- **Appendix B:** Detailed Data Flow Diagrams
- **Appendix C:** User Manual

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