STUDENT ATTENDANCE SYSTEM

A Project Report

Submitted on: 24 October 2025
Prepared by: Group 5

Department of Computer Science & Engineering
Academic Year: 2025–2026

1. Introduction

The Student Attendance System is a secure and automated desktop application designed to replace traditional paper-based roll calls. It provides a modern solution for educational institutions to manage attendance digitally, ensuring efficiency, accuracy, and security.

2. Problem Statement

Traditional attendance methods face several challenges such as time-consuming manual roll calls, proxy attendance, lack of real-time monitoring, and limited reporting capabilities. These inefficiencies necessitate a digital solution that ensures data accuracy, scalability, and security.

3. Objectives

• To develop a secure and automated attendance management system.
• To implement QR code verification for student identity validation.
• To provide real-time reporting and analytics.
• To enhance data security and system scalability.
• To follow software engineering principles for maintainable design.

4. System Overview

The system is a Java-based desktop application with a MySQL backend database. It implements the Model-View-Controller (MVC) design pattern and the Data Access Object (DAO) pattern to ensure a clean and maintainable architecture.

Technologies Used

Technology	Description
Programming Language	Java
User Interface	Java Swing
Database	MySQL (via JDBC)
Architecture	MVC + DAO Pattern
Design Principles	SOLID Principles

5. Design Principles (SOLID)

• Single Responsibility: Each class has a specific purpose, improving readability and modification ease.
• Open/Closed: The system is open for extension but closed for modification, preventing regressions.
• Interface Segregation: Clients depend only on the interfaces they use, minimizing unnecessary dependencies.
• Dependency Inversion: High-level modules depend on abstractions rather than concrete implementations.

6. System Architecture

Model Layer: Handles data, business logic, and all database interactions through DAO classes.
View Layer: Built with Java Swing for a user-friendly interface.
Controller Layer: Manages user input and coordinates communication between Model and View.

7. Core Features

• Secure Admin Login – Password hashing and authentication for secure access.
• Student Registration – Automatic QR code generation with validated input.
• Attendance Marking – Real-time validation preventing duplicate entries.
• Reporting & Analytics – Date-based filtering and report generation for institutional insights.

8. Data Access Layer (DAO Pattern)

The DAO pattern creates a clean abstraction between business logic and database operations. It offers separation of concerns, maintainability, testability, and flexibility. All CRUD operations are encapsulated in DAO classes with JDBC managing connections.

9. Benefits

• Time Efficiency: Eliminates manual roll calls.

• Data Accuracy: Prevents proxy and duplicate entries.
• Security: Protects credentials and student data.
• Scalability: Supports additional features easily.
• User-Friendly Interface: Simplifies management for administrators.

10. Conclusion

The Student Attendance System revolutionizes academic attendance management by integrating secure logins, QR-based validation, and real-time analytics. The system ensures reliability, scalability, and efficiency, adhering to SOLID principles and the MVC architecture.