Attendance Management System Documentation

1. Introduction

The **Student Attendance Management System** is a JavaFX-based application designed to help teachers manage student attendance efficiently. It allows teachers and students to view, update, and manage attendance records stored in a Microsoft SQL Server database.

Purpose

- Provides a user-friendly interface for teachers and students to interact with attendance records.
- Ensures accurate tracking of student attendance.
- Reduces manual effort required for maintaining attendance records.

Target Users

- **Teachers**: Can log in, view attendance, add/edit/delete records.
- **Students**: Can log in to view their attendance status.

Key Features

- **Login System**: Secure authentication for students and teachers.
- **Teacher Dashboard**: Teachers can view, edit, and manage student attendance.
- **Student Dashboard**: Students can view their attendance records.
- **Database Integration**: Uses Microsoft SQL Server for storage and retrieval of records.

2. Installation Guide

Prerequisites

1. **Java Development Kit (JDK) 17 or later**
    a. Download JDK (jdk1.8 is used while designing)
2. **Microsoft SQL Server**
    a. Install and configure SQL Server and create the AttendanceDB database.
3. **JDBC Driver for SQL Server**
    a. Download and configure Microsoft JDBC Driver

Installation Steps

- **Clone the Repository**

  git clone https://github.com/your-repo/StudentAttendanceSystem.git
  cd StudentAttendanceSystem

- **Database Setup**
  a. Create the AttendanceDB database in SQL Server.
  b. Run the necessary SQL scripts to create tables (Students, Teachers, Attendance, Subjects).
- **Configure Database Connection**
  a. Modify the database connection details in each class using SQL (e.g., LoginGUI.java, TeacherGUI.java).

```
String url =
"jdbc:sqlserver://localhost:1433;databaseName=AttendanceDB;encrypt=true;trustServerCertificate=true";
String user = "SA";
String password = "1234";
```

- **Open in IntelliJ IDEA and l**oad the project into IntelliJ IDEA. Ensure that all dependencies are correctly set up.
- **Run the Application by e**xecuting LoginGUI.java to launch the system.

3. Usage Guide

Login System (LoginGUI.java)

1. **Enter your username and password**.
2. **Select role:**
   a. "Login as Student" redirects to the student dashboard.
   b. "Login as Teacher" redirects to the teacher dashboard.

Student Dashboard (StudentGUI.java)

- Displays student name and ID.
- Students can filter and view their attendance based on subject or date.
- Uses an SQL query to fetch attendance data from the database.

Teacher Dashboard (TeacherGUI.java)

- Teachers can **view all attendance records**.
- Can filter records based on **student ID, subject, and date**.
- Options to **edit attendance data** (switches to Edit_Attendance_byTeacher.java).

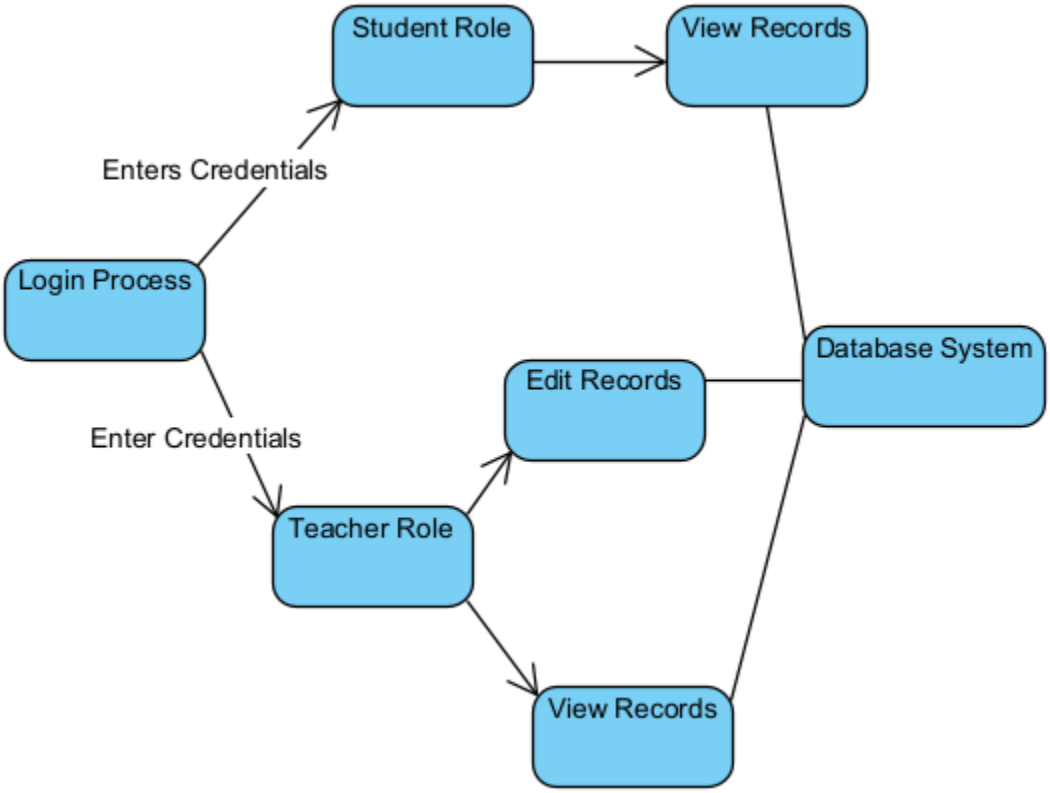
Edit Attendance (Edit_Attendance_byTeacher.java)

- Teachers can **add, update, or delete** student attendance records.
- Uses an SQL query to insert, update, or remove records from the Attendance table.

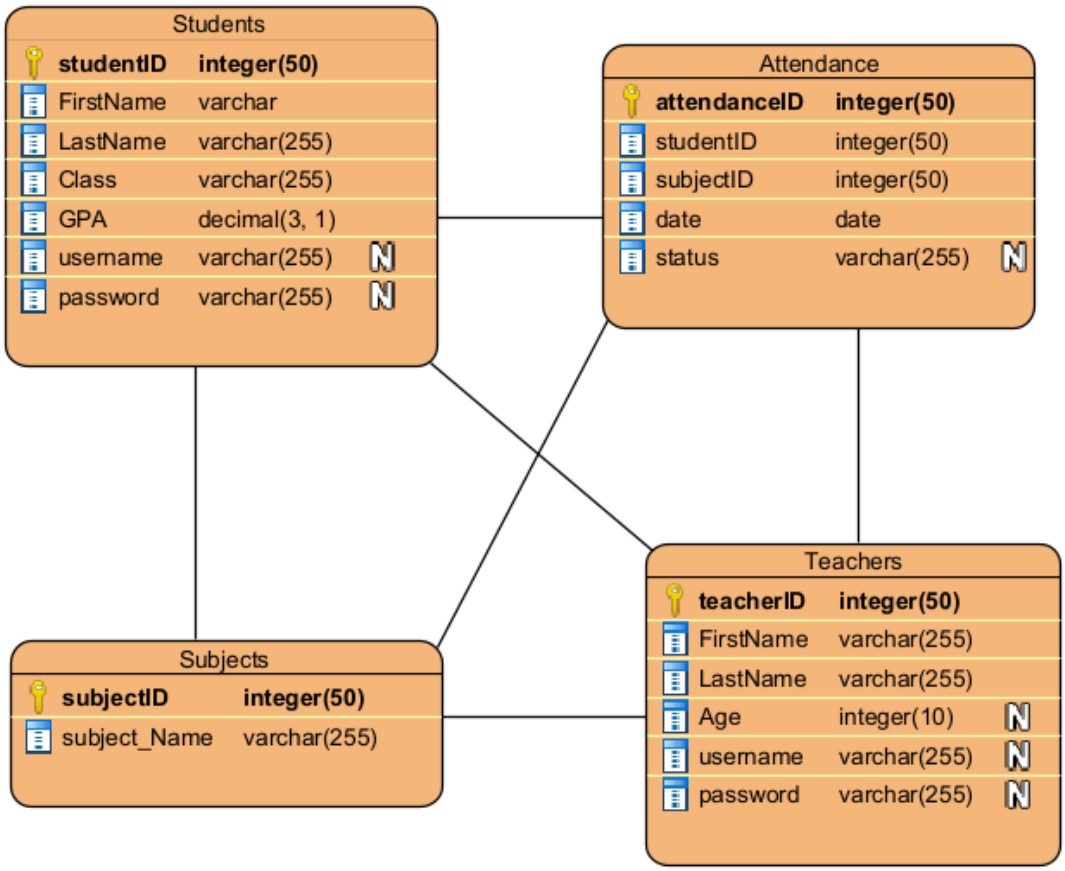
4. Architecture and Design

Software Structure

- LoginGUI.java → Handles login authentication.
- StudentGUI.java → Displays student attendance.
- TeacherGUI.java → Displays and manages attendance for teachers.
- Edit_Attendance_byTeacher.java → Allows teachers to edit attendance records.
- Database (Microsoft SQL Server) → Stores all student, teacher, and attendance records.



5. Database Schema



6. Error Handling and Troubleshooting

Common Issues and Fixes

Error	Cause	Solution
Database connection failed	SQL Server is not running or incorrect credentials	Verify database is running and credentials are correct

Invalid username or password	Incorrect credentials entered	Ensure correct credentials are used
Cannot fetch attendance records	Student/teacher not found in database	Verify records exist in the database
Verify records exist in the database	Uninitialized database connection	Ensure connectToDatabase() is called before executing queries