Student Management System

Java Swing + Postgres Academic Management Solution
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Core Functionalities
🔐 Authentication

- Admin login (email/password)
- Session management

👩‍🎓 Student Management

- CRUD operations for students/subjects/marks
- Age/name validation

📚 Academic Operations

- Subject creation
- Grade assignment (0–100)
- Student–subject relationships

Architecture

3-Tier Design

🖥️ Presentation Layer (Swing Views)

- LoginView, StudentView, MarkView

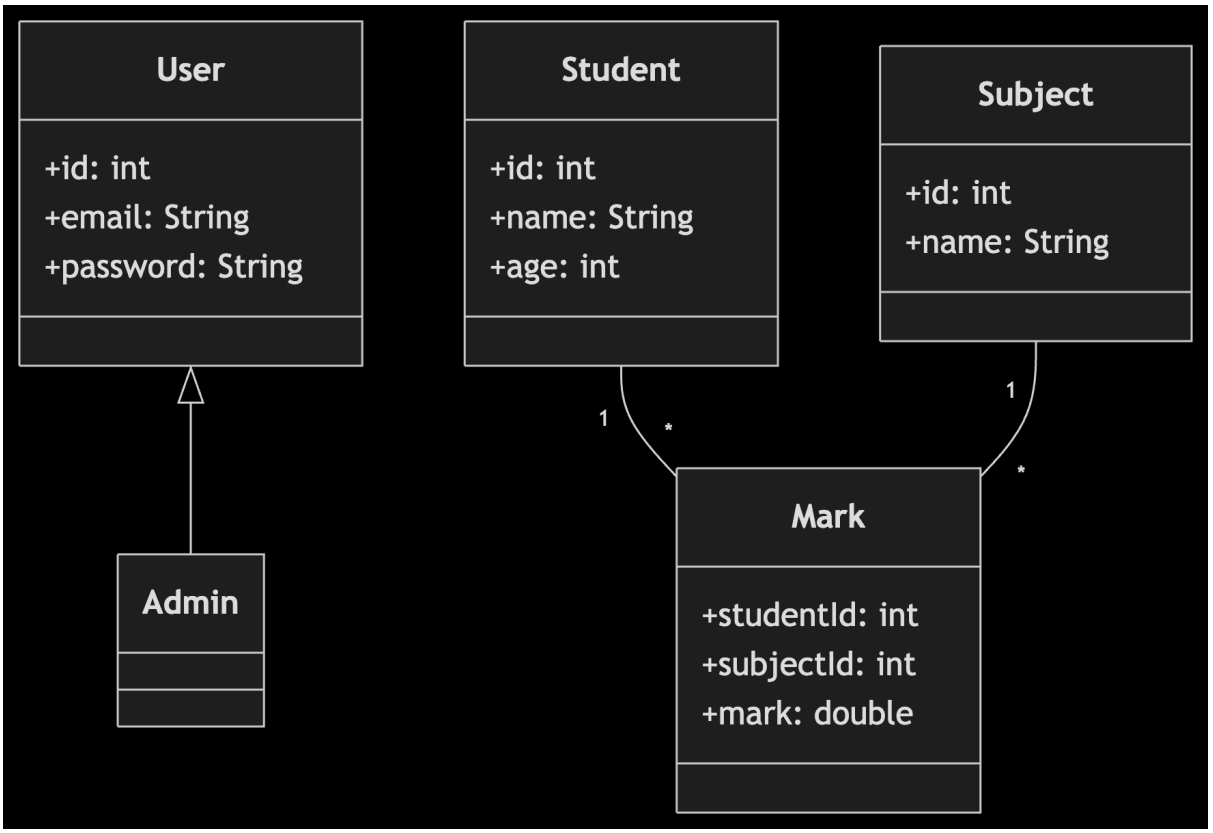
🧠 Business Logic (Controllers)

- AuthController, StudentController, SubjectController, MarkController
- Input validation logic

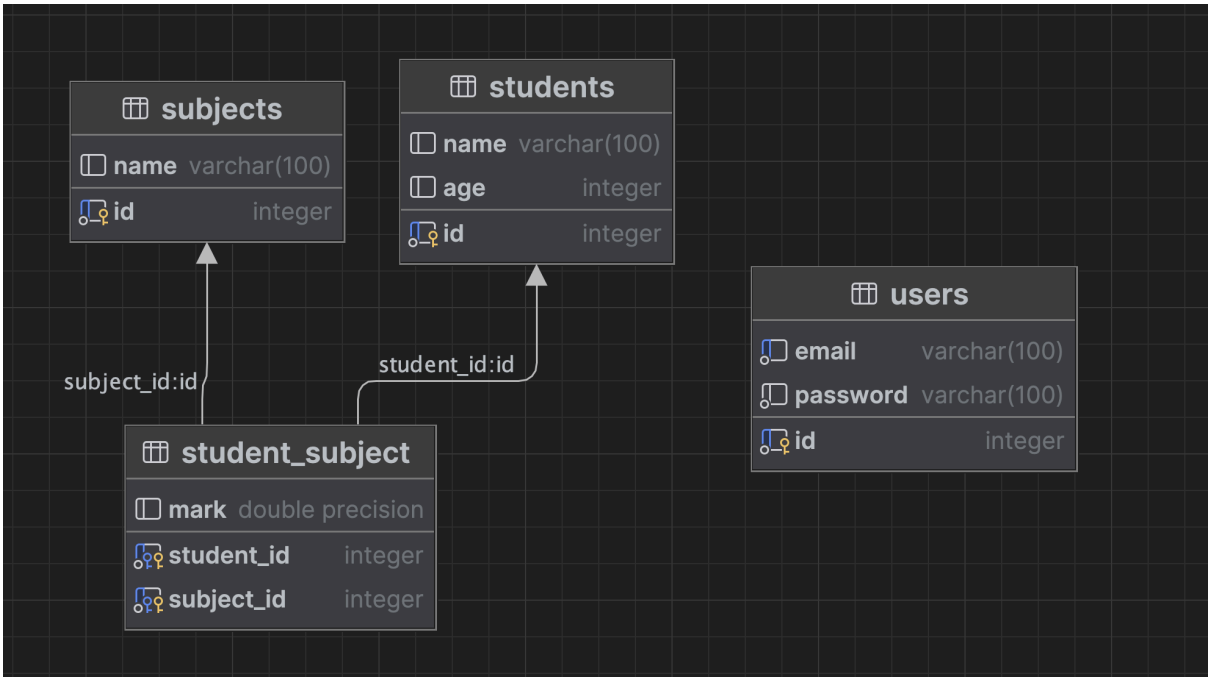
🗃️ Data Access (DAO Pattern)

- `DatabaseConnection` (Singleton)
- `UserDAO`, `StudentDAO` interfaces

Classes Diagram:



Database Schema



Relationships Many-to-many: Students ↔ Subjects (via student_subject)

Design Patterns

✅ Singleton

- For database connection

✅ DAO

- Abstraction layer: `StudentDAO` ↔ `StudentDAOImpl`

✅ MVC

- Flow: View → Controller → Model

✅ Observer

- Swing event listeners for buttons

Demo Highlights

🔑 Login Credentials:

`admin@example.com` / `admin123`

👨‍🎓 Student Management

- Add / Edit / Delete students and subjects and marcas

📝 Grade Assignment

- Link students to subjects
- Assign marks (0–100)

🚀 Application Setup Guide

🛠️ Requirements:

- Docker installed
- Java installed

📦 Step 1: Start the Database with Docker

1. Open your terminal.
2. Navigate to the project folder containing the `docker-compose.yml` file.
3. Run the following command:

```
docker-compose up -d
```

✅ This will spin up your database container in the background.

🗂️ Step 2: Populate the Database

1. Wait a few seconds for the database to be ready.
2. Run the `bootstrap.sql` file using your preferred SQL client (e.g., DBeaver, pgAdmin, or command line).

Example using `psql`:

```
psql -h localhost -U your_user -d your_database -f bootstrap.sql
```

Replace `your_user` and `your_database` with actual values from your setup.

✅ You're Done!

Your database is now set up and ready to be used by the application.