INSTITUTION OF TECHNOLOGY OF CAMBODIA

DEPARTMENT: GIC I4-B

Report of Software Engineering

Project 3: Course Enrollment and Classroom Scheduling System

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Academic year 2025-2026

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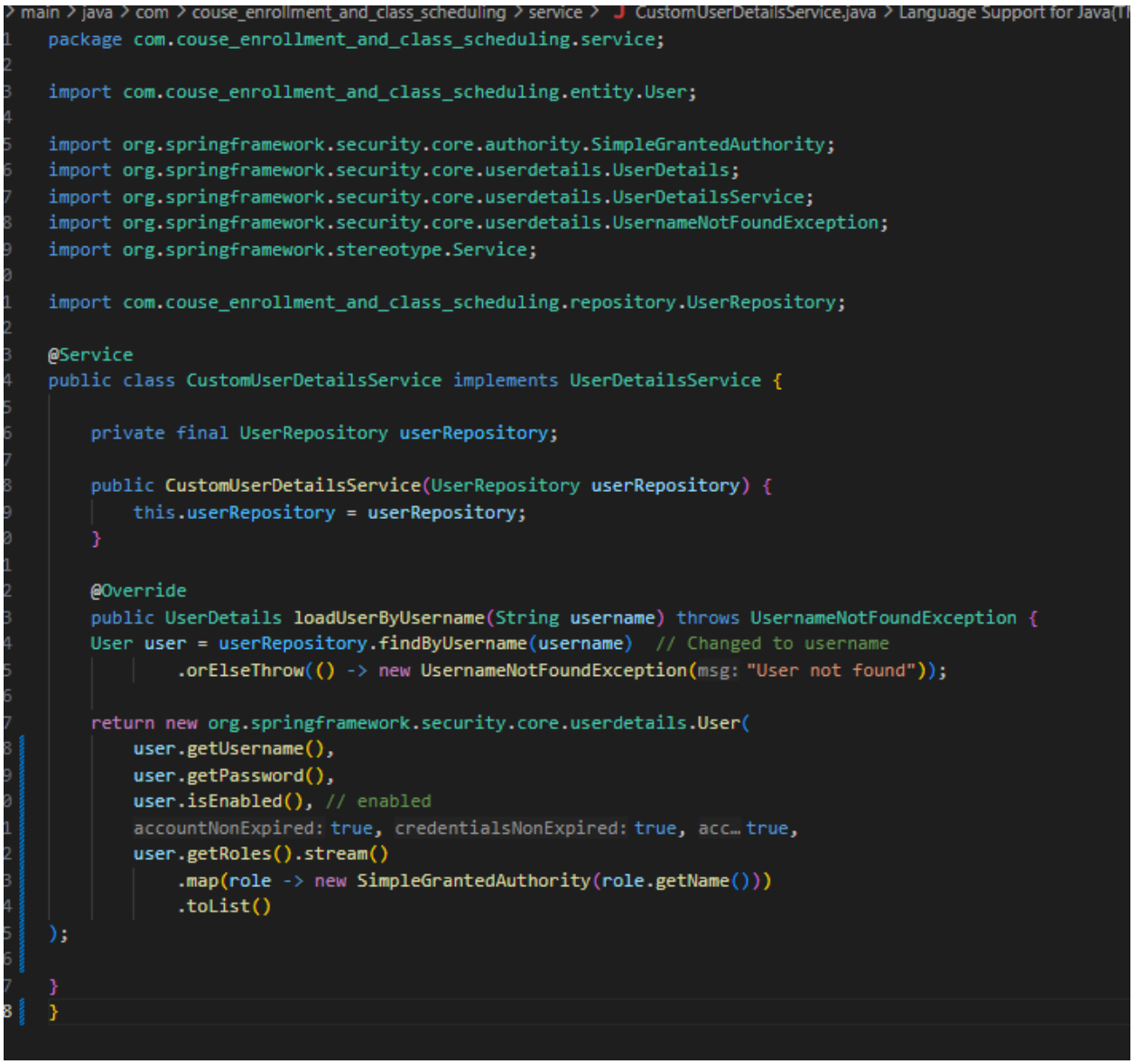
- **Spring Security Config:** Create the `SecurityConfig.java` class. Configure the `SecurityFilterChain` to define which URLs are public (e.g., `/login`, `/css/**`) and which are private

```java
@Configuration
@EnableMethodSecurity
public class SecurityConfig {

    private final CustomUserDetailsService userDetailsService;
    private final CustomLoginSuccessHandler loginSuccessHandler;

    public SecurityConfig(CustomUserDetailsService userDetailsService,
                          CustomLoginSuccessHandler loginSuccessHandler) {
        this.userDetailsService = userDetailsService;
        this.loginSuccessHandler = loginSuccessHandler;
    }

    @Bean
    public PasswordEncoder passwordEncoder() {
        return new BCryptPasswordEncoder();
    }

    @Bean
    public SecurityFilterChain filterChain(HttpSecurity http) throws Exception {

        http
            .csrf(csrf -> csrf.disable())
            .authorizeHttpRequests(auth -> auth
                .requestMatchers(...patterns: "/login", "/register", "/css/**").permitAll()
                .requestMatchers(...patterns: "/admin/**").hasRole(role: "ADMIN")
                .requestMatchers(...patterns: "/lecturer/**").hasRole(role: "LECTURER")
                .requestMatchers(...patterns: "/student/**").hasRole(role: "STUDENT")
                .anyRequest().authenticated()
            )
            .formLogin(login -> login
                .loginPage(loginPage: "/login")
                .successHandler(loginSuccessHandler)
                .permitAll()
            )
            .exceptionHandling(ex -> ex
                .accessDeniedPage(accessDeniedUrl: "/accessDenied")
            )
            .logout(logout -> logout
                .logoutSuccessUrl(logoutSuccessUrl: "/login?logout")
            );

        return http.build();
    }

    @Bean
    public AuthenticationManager authenticationManager(
            AuthenticationConfiguration config) throws Exception {
        return config.getAuthenticationManager();
    }
}
```

- **User Management:** Create the `UserDetailsService` implementation to load users from the database

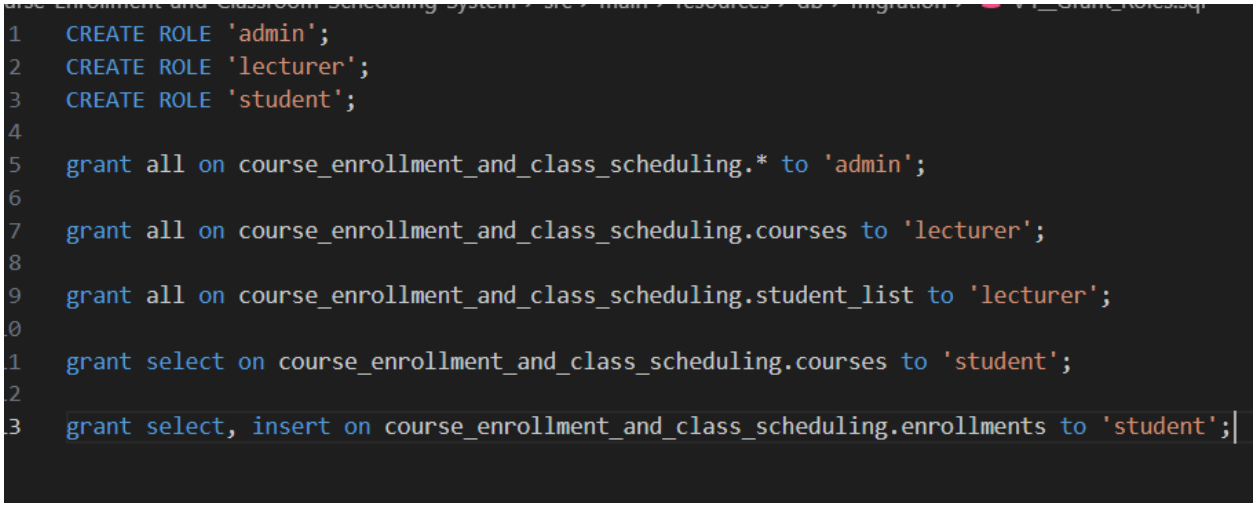


- **AuthController.java**

```java
@Controller
public class AuthController {

    private final UserRepository userRepository;
    private final RoleRepository roleRepository;
    private final PasswordEncoder passwordEncoder;

    public AuthController(UserRepository userRepository,
                          RoleRepository roleRepository,
                          PasswordEncoder passwordEncoder) {
        this.userRepository = userRepository;
        this.roleRepository = roleRepository;
        this.passwordEncoder = passwordEncoder;
    }

    @GetMapping("/login")
    public String login() {
        return "login";
    }

    @GetMapping("/register")
    public String registerForm(Model model) {
        model.addAttribute(attributeName: "user", new User());
        return "register";
    }

    @PostMapping("/register")
    public String register(@Valid @ModelAttribute("user") User user,
                           BindingResult bindingResult,
                           RedirectAttributes redirectAttributes) {

        // Validate input
        if (bindingResult.hasErrors()) {
            return "register";
        }

        // Check if username already exists
        if (userRepository.existsByUsername(user.getUsername())) {
            bindingResult.rejectValue(field: "username", errorCode: "error.user",
                    defaultMessage: "Username already exists");
            return "register";
        }

        // Check if email already exists
        if (userRepository.existsByEmail(user.getEmail())) {
            bindingResult.rejectValue(field: "email", errorCode: "error.user",
                    defaultMessage: "Email already registered");
            return "register";
        }
```

```
        // Encode password
        user.setPassword(passwordEncoder.encode(user.getPassword()));

        // Initialize roles collection
        if (user.getRoles() == null) {
            user.setRoles(new HashSet<>());
        }

        // Assign ROLE_STUDENT by default
        Optional<Role> studentRole = roleRepository.findByName(name: "ROLE_STUDENT");
        if (studentRole.isEmpty()) {
            redirectAttributes.addFlashAttribute(attributeName: "error",
                    attributeValue: "System error: Default role not found");
            return "redirect:/register";
        }

        user.getRoles().add(studentRole.get());

        // Set user as active
        user.setEnabled(enabled: true);

        // Save user
        try {
            userRepository.save(user);
            redirectAttributes.addFlashAttribute(attributeName: "success",
                    attributeValue: "Registration successful! Please login.");
            return "redirect:/login?registered";
        } catch (Exception e) {
            redirectAttributes.addFlashAttribute(attributeName: "error",
                    "Registration failed: " + e.getMessage());
            return "redirect:/register";
        }
    }

    @GetMapping("/accessDenied")
    public String accessDenied(Model model, Authentication auth) {
        if (auth != null) {
            String roles = auth.getAuthorities().stream()
                    .map(a -> a.getAuthority())
                    .reduce((a, b) -> a + ", " + b)
                    .orElse(other: "No roles");

            model.addAttribute(attributeName: "userRoles", roles);
            model.addAttribute(attributeName: "requiredRole", attributeValue: "ADMIN / LECTURER / STUDENT");
        }
        return "accessDenied";
    }

}
```

- **Roles:** Implement 3 distinct roles:
    - `ROLE_ADMIN`: Can create courses, assign lecturers, and manage classrooms.
    - `ROLE_LECTURER`: Can view their assigned courses and see the student list.
    - `ROLE_STUDENT`: Can browse courses and enroll



```sql
CREATE ROLE 'admin';
CREATE ROLE 'lecturer';
CREATE ROLE 'student';

grant all on course_enrollment_and_class_scheduling.* to 'admin';

grant all on course_enrollment_and_class_scheduling.courses to 'lecturer';

grant all on course_enrollment_and_class_scheduling.student_list to 'lecturer';

grant select on course_enrollment_and_class_scheduling.courses to 'student';

grant select, insert on course_enrollment_and_class_scheduling.enrollments to 'student';
```

Nget Darapich

- **Create ViewCourseScheduleController.java**
- **Create ClassScheduleService.java**
- **Insert datas for testing**
- **Create class-schedule.html and my-course.html in templates**

main > java > com > couse_enrollment_and_class_scheduling > controller > ViewCourseScheduleController.java > Language Support for Java(TM) by

```java
package com.couse_enrollment_and_class_scheduling.controller;

import com.couse_enrollment_and_class_scheduling.service.CourseService;
import com.couse_enrollment_and_class_scheduling.service.EnrollmentService;
import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Controller;
import org.springframework.ui.Model;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.PathVariable;

@Controller
public class ViewCourseScheduleController {

    private final CourseService courseService;
    private final EnrollmentService enrollmentService;

    @Autowired
    public ViewCourseScheduleController(CourseService courseService, EnrollmentService enrollmentService) {
        this.courseService = courseService;
        this.enrollmentService = enrollmentService;
    }

    @GetMapping("/class-schedule")

    public String showClassSchedule(Model model) {
        model.addAttribute(attributeName: "courses", courseService.getAllCourses());
        return "class-schedule"; // Looks for templates/class-schedule.html
    }

    @GetMapping("/my-courses/{studentId}")
    public String showMyCourses(@PathVariable Long studentId, Model model) {
        model.addAttribute(attributeName: "myEnrollments", enrollmentService.getStudentSchedule(studentId));
        return "my-course"; // FIXED: Changed from "my-courses" to "my-course"
    }
}
```

main > java > com > couse_enrollment_and_class_scheduling > service > ClassScheduleService.java > ...

```java
public class ClassScheduleService {

    public ClassSchedule addSchedule(ClassSchedule schedule) {

        // Validation 1: Classroom double booking
        List<ClassSchedule> classroomConflicts = classScheduleRepository.findConflicts(
                schedule.getClassroom().getId(),
                schedule.getDayOfWeek(),
                schedule.getStartTime(),
                schedule.getEndTime());

        if (!classroomConflicts.isEmpty()) {
            throw new IllegalArgumentException(
                    s: "Classroom is already booked during this time");
        }

        // Validation 2: Course double scheduling
        List<ClassSchedule> courseConflicts = classScheduleRepository.findCourseConflicts(
                schedule.getCourse().getId(),
                schedule.getDayOfWeek(),
                schedule.getStartTime(),
                schedule.getEndTime());

        if (!courseConflicts.isEmpty()) {
            throw new IllegalArgumentException(
                    s: "Course already has a schedule during this time");
        }

        return classScheduleRepository.save(schedule);
    }

    // --------------------
    // Update existing schedule
    // --------------------
    @Transactional
```

main > resources > db > migration > V3__Insert_Courses_Classrooms_Schedules.sql

```sql
-- 1. Insert Lecturers first
INSERT INTO lecturers (id, full_name, department, office_hours)
VALUES
(1, 'Dr. Alice Smith', 'Computer Science', 'Mon 10:00-12:00'),
(2, 'Dr. Bob Johnson', 'Information Technology', 'Tue 14:00-16:00');

-- 2. Insert Classrooms
INSERT INTO classrooms (id, room_number, building, max_capacity)
VALUES
(1, 'Room 304', 'Building A', 40),
(2, 'Room 305', 'Building A', 30);

-- 3. Insert Courses (Linked to Lecturers and Classrooms)
-- Note: We include lecturer_id and classroom_id here so course.lecturer.fullName works!
INSERT INTO courses (id, course_code, course_name, credits, capacity, lecturer_id, classroom_id)
VALUES
(1, 'CS301', 'Database Systems', 3, 30, 1, 1),
(2, 'CS302', 'Operating Systems', 3, 2, 2, 2);

-- 4. Insert Schedules (For the calendar/time view)
INSERT INTO class_schedules (course_id, classroom_id, day_of_week, start_time, end_time)
VALUES
(1, 1, 'MONDAY', '09:00:00', '11:00:00'),
(2, 2, 'MONDAY', '11:00:00', '13:00:00');

-- 5. Insert a Test Student (so you can test enrollment)
INSERT INTO users (id, username, password, email, full_name, enabled)
VALUES
(1, 'student1', '$2a$10$dXJ3SW6G7P50lGekeFaboe3QwvGz7z0yENRKSLYSlZhsFhQH.vA7u', 'john@test.com', 'John Doe', 1),
(2, 'student2', '$2a$10$dXJ3SW6G7P50lGekeFaboe3QwvGz7z0yENRKSLYSlZhsFhQH.vA7u', 'jane@test.com', 'Jane Smith', 1);
```

main > resources > templates > class-schedule.html > html > body.container.mt-5

```
<!DOCTYPE html>
<html xmlns:th="http://www.thymeleaf.org">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Available Class Schedule</title>
    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">
</head>
<body class="container mt-5">

    <div class="d-flex justify-content-between align-items-center mb-3">
        <h2>Available Class Schedule</h2>
        <a href="/my-courses/1" class="btn btn-outline-primary">My Enrolled Courses</a>
    </div>

    <div th:if="${courses == null || #lists.isEmpty(courses)}" class="alert alert-warning">
        No courses available at the moment.
    </div>

    <table th:unless="${courses == null || #lists.isEmpty(courses)}" class="table table-striped mt-3">
        <thead class="table-dark">
            <tr>
                <th>Course Name</th>
                <th>Lecturer</th>
                <th>Capacity</th>
                <th>Status</th>
                <th>Action</th>
            </tr>
        </thead>
        <tbody>
            <tr th:each="course : ${courses}">
                <td th:text="${course.courseName}">Course Name</td>
                <td th:text="${course.lecturer != null ? course.lecturer.fullName : 'TBA'}">Lecturer</td>
                <td th:text="${course.currentStudents != null ? course.currentStudents : 0} + '/' + ${cours
                <td>
                    <span th:if="${course.currentStudents != null && course.currentStudents >= course.capa
                    <span th:unless="${course.currentStudents != null && course.currentStudents >= course.
                </td>
                <td>
```

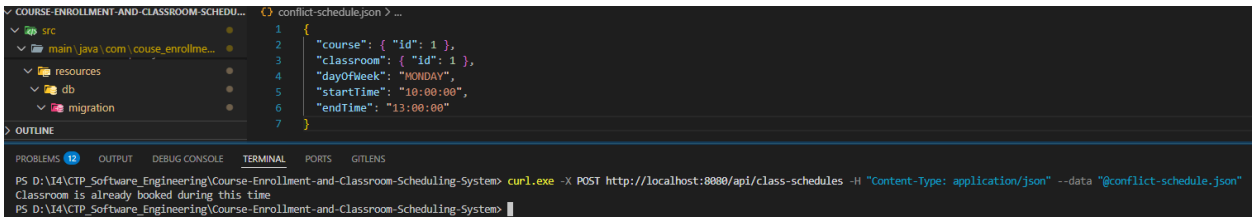
```
<!DOCTYPE html>
<html xmlns:th="http://www.thymeleaf.org">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>My Schedule</title>
    <link rel="stylesheet" href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css">
</head>
<body class="container mt-5">

    <div class="d-flex justify-content-between align-items-center mb-3">
        <h2>My Enrolled Courses</h2>
        <a href="/class-schedule" class="btn btn-outline-secondary">Back to Schedule</a>
    </div>

    <div th:if="${myEnrollments == null || #lists.isEmpty(myEnrollments)}" class="alert alert-info mt-4">
        You are not enrolled in any courses yet.
        <a href="/class-schedule" class="alert-link">Browse available courses</a>
    </div>

    <table th:unless="${myEnrollments == null || #lists.isEmpty(myEnrollments)}" class="table table-hover mt-3">
        <thead class="table-info">
            <tr>
                <th>Course Name</th>
                <th>Enrollment Date</th>
                <th>Lecturer</th>
                <th>Building/Room</th>
            </tr>
        </thead>
        <tbody>
            <tr th:each="enrollment : ${myEnrollments}">
                <td th:text="${enrollment.course.courseName}" class="fw-bold">Course</td>
                <td th:text="${enrollment.enrollmentDate != null ? #temporals.format(enrollment.enrollmentDate, 'dd-MM-yyyy HH:mm') : 'N/A'}">Date</td>
                <td th:text="${enrollment.course.lecturer != null ? enrollment.course.lecturer.fullName : 'TBA'}">Lecturer</td>
                <td>
                    <span th:if="${enrollment.course.classroom != null}"
                          th:text="${enrollment.course.classroom.building} + ' - ' + ${enrollment.course.classroom.roomNumber}">Building 1 - Room 101</span>
                    <span th:unless="${enrollment.course.classroom != null}">TBA</span>
                </td>
            </tr>
        </tbody>
    </table>

</body>
</html>
```

- **Validation: double booking**.

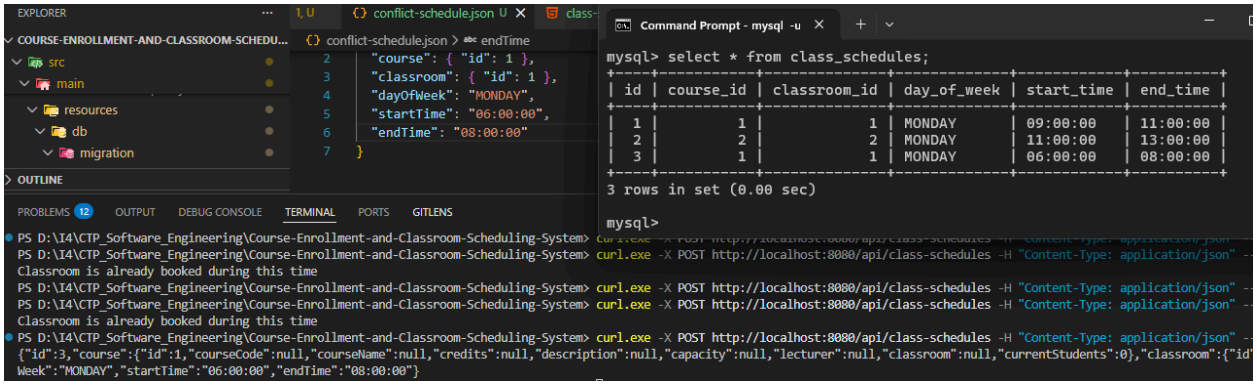
First :

```
mysql> select * from class_schedules;
+----+-----------+--------------+-------------+------------+----------+
| id | course_id | classroom_id | day_of_week | start_time | end_time |
+----+-----------+--------------+-------------+------------+----------+
|  1 |         1 |            1 | MONDAY      | 09:00:00   | 11:00:00 |
|  2 |         2 |            2 | MONDAY      | 11:00:00   | 13:00:00 |
+----+-----------+--------------+-------------+------------+----------+
2 rows in set (0.00 sec)

mysql>
```

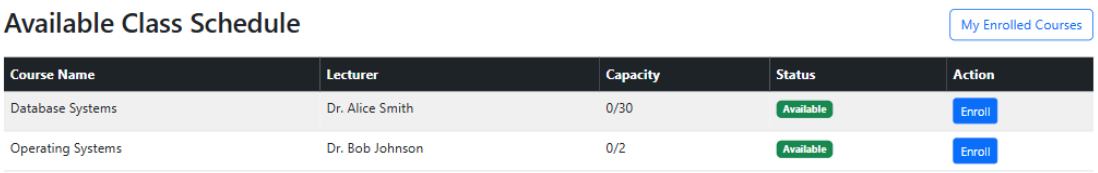
Try insert overlap schedule :



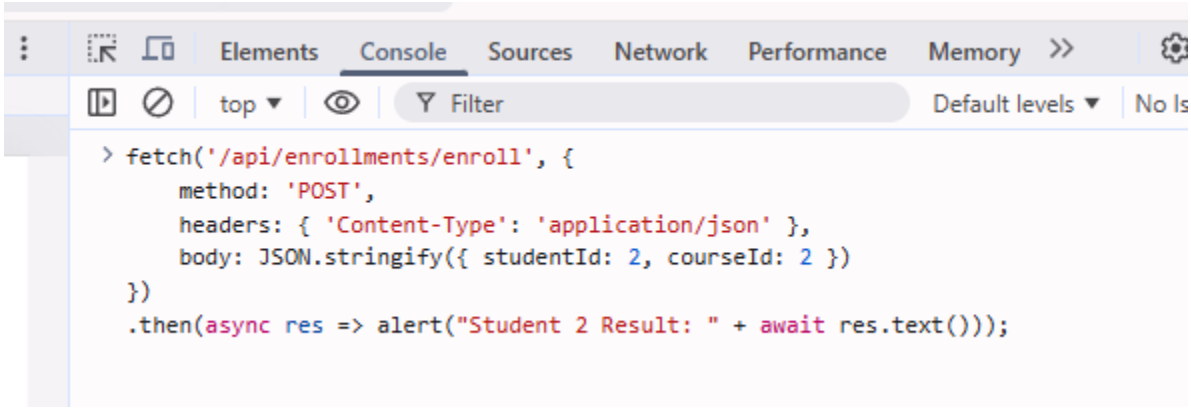
Try insert normally :



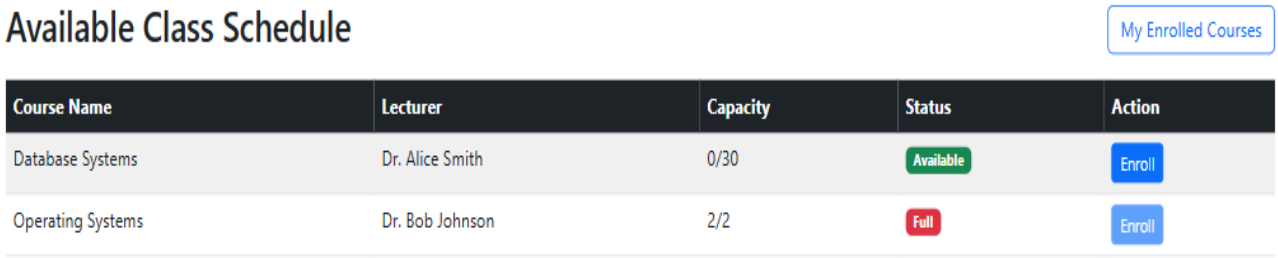
- /class-schedule



After click enroll (as student 1) and past this as student 2

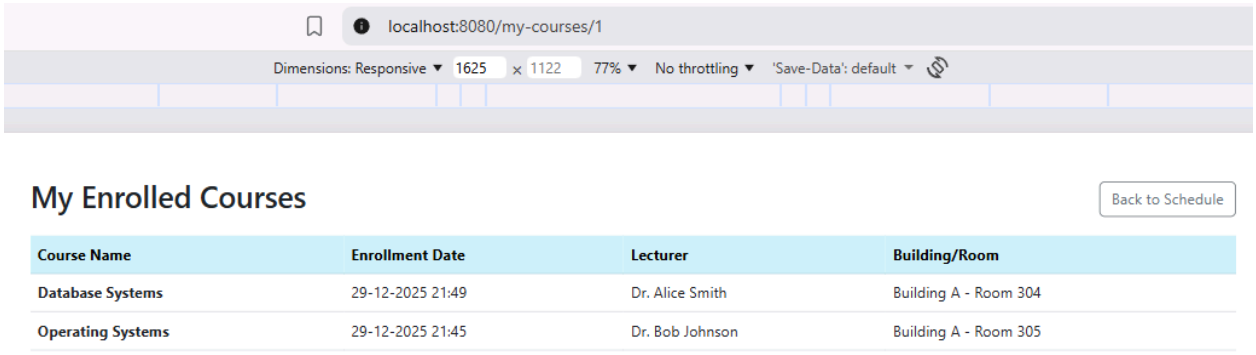


The result shown **Validation:** Check if the course is full (`currentStudents < capacity`). Check if the student is already enrolled.



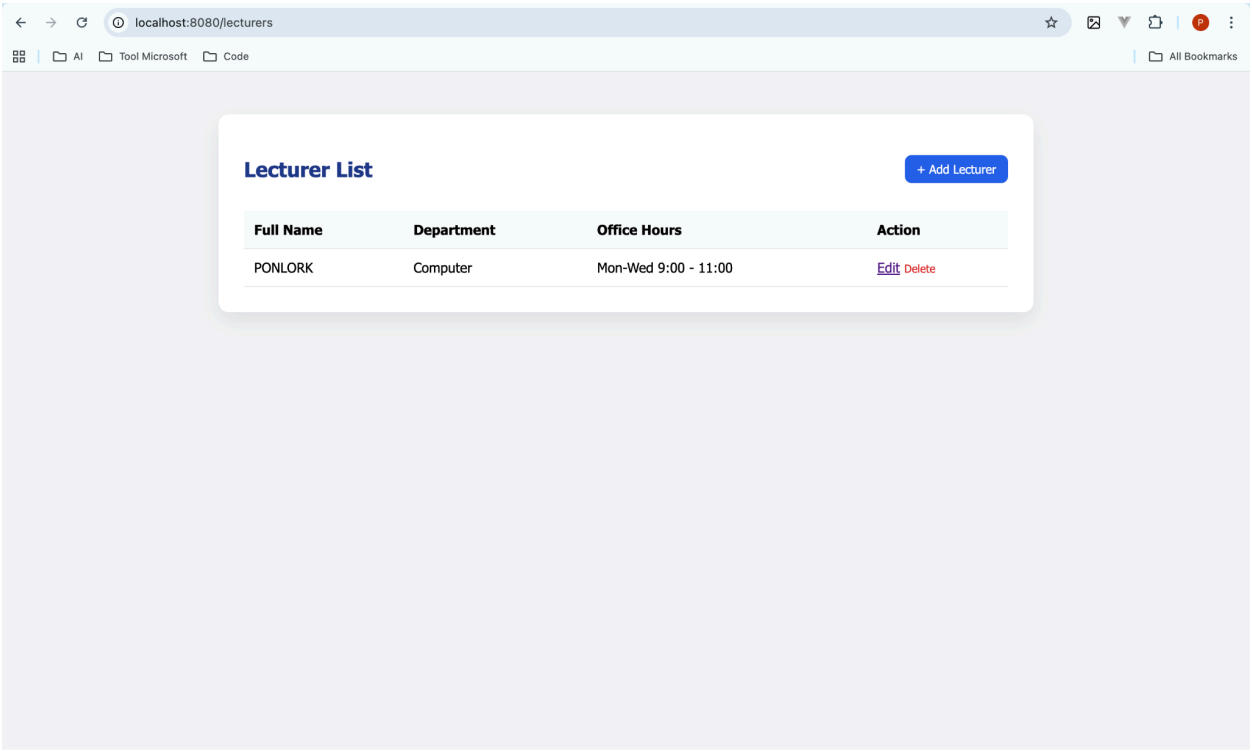
- **Views:** Logic for "My Schedule" (showing a student only *their* classes).

After I click enroll both course (as student 1) :

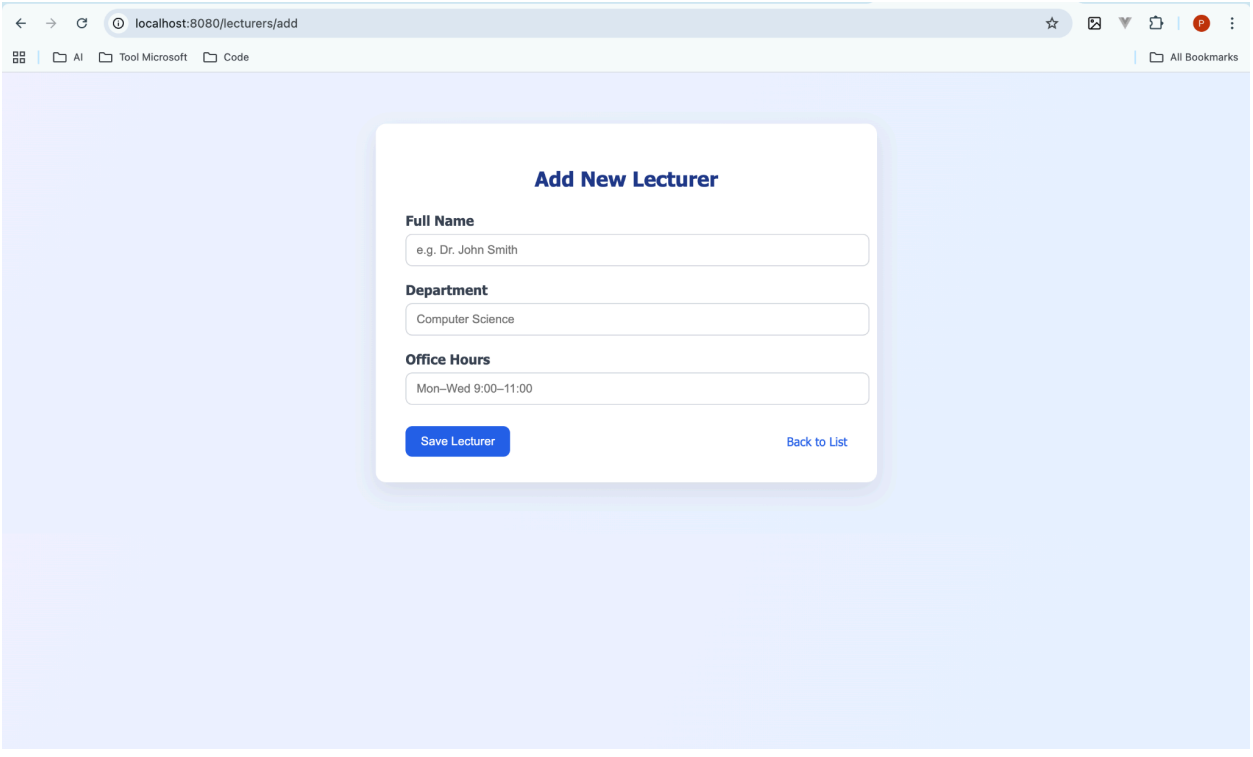


KEO CHANPONLORK

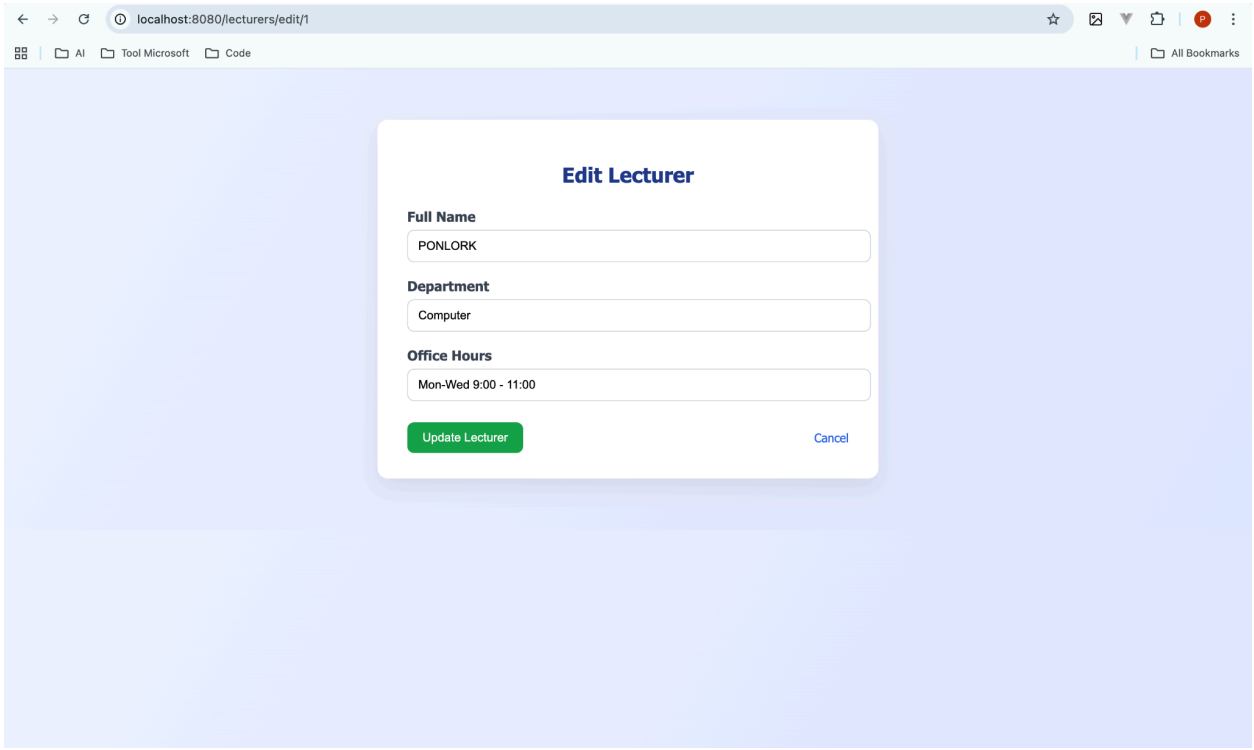
- **Lecturer**
  - Lecturer list



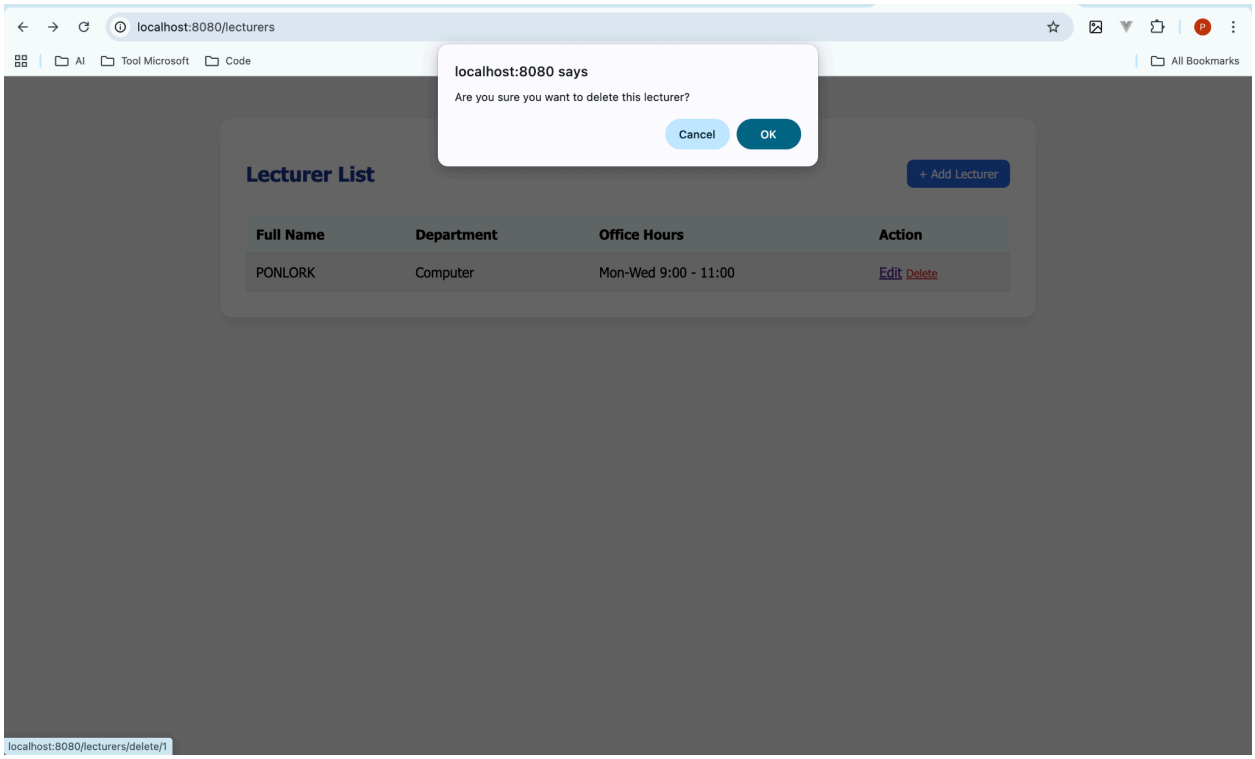
  - Add lecturer



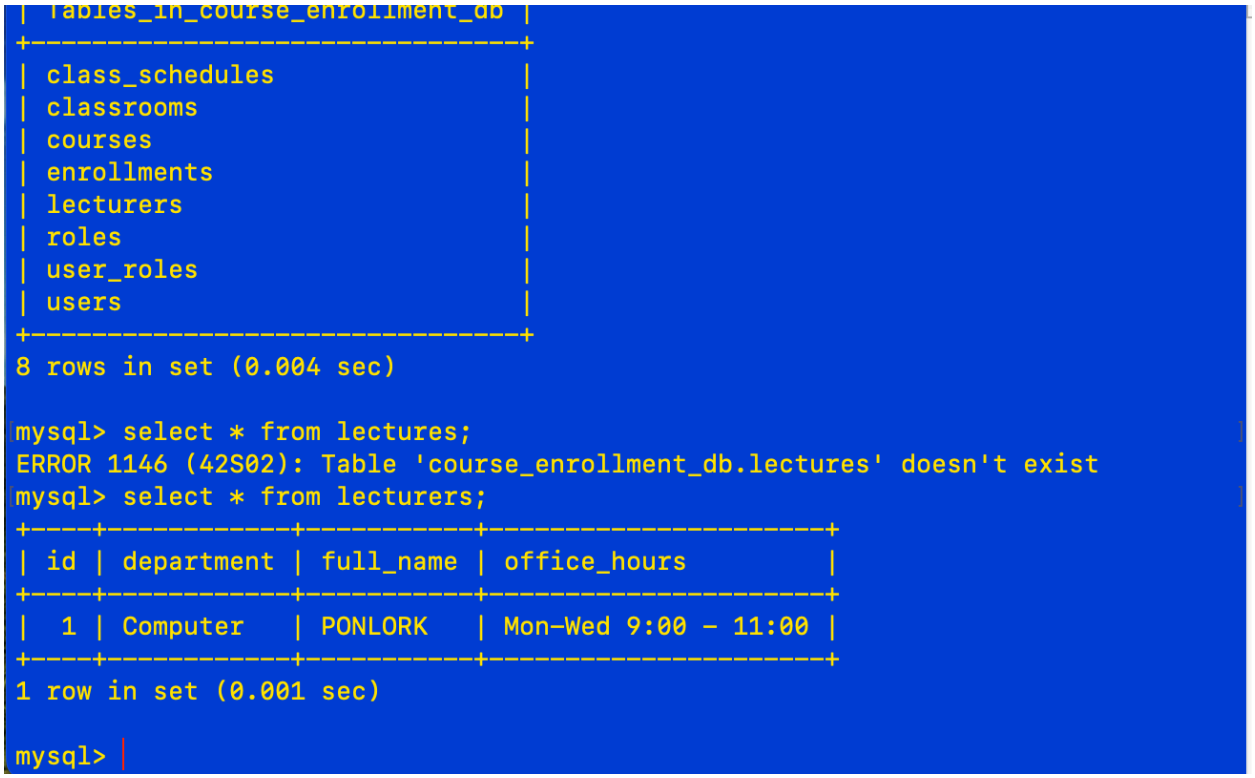
- Edit lecturer



- Detele lecturer



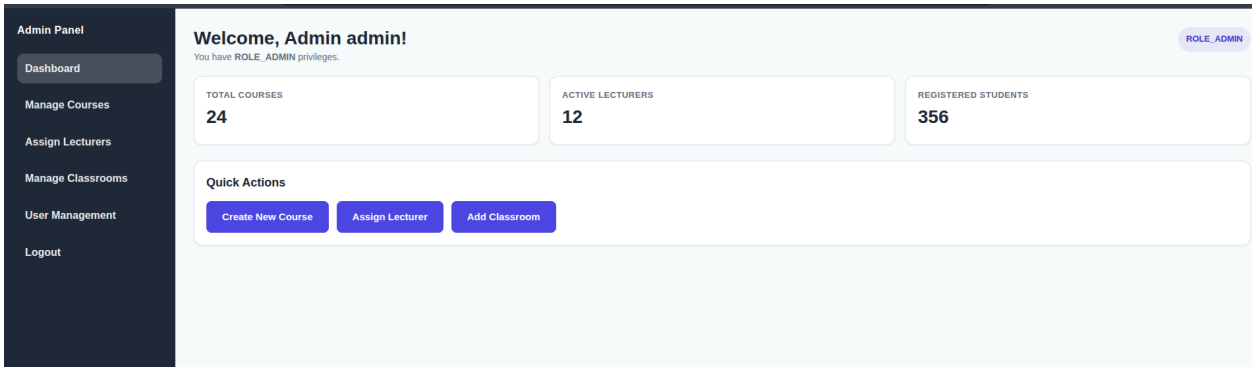
- Lecturer database

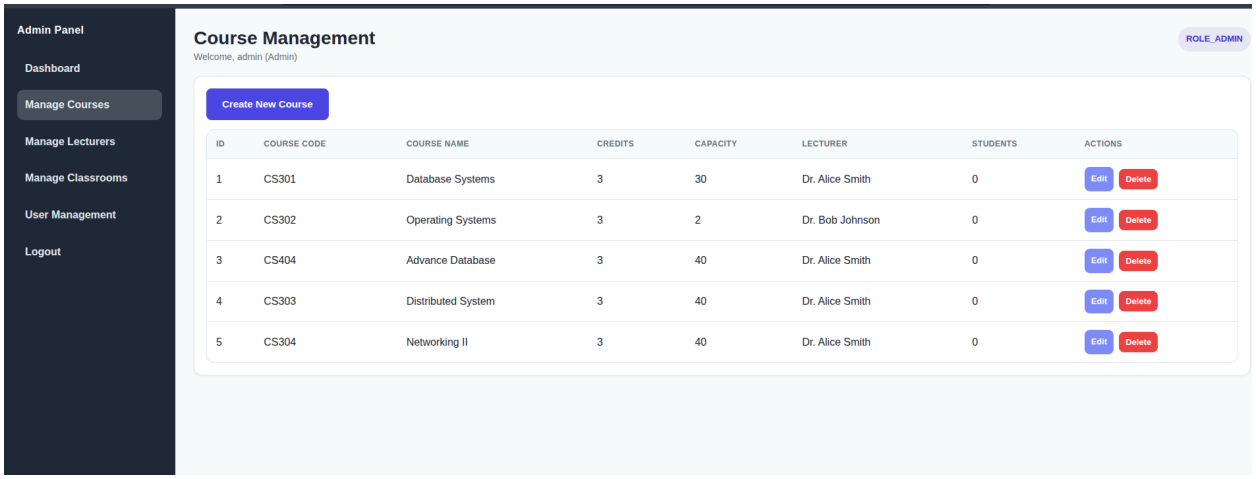


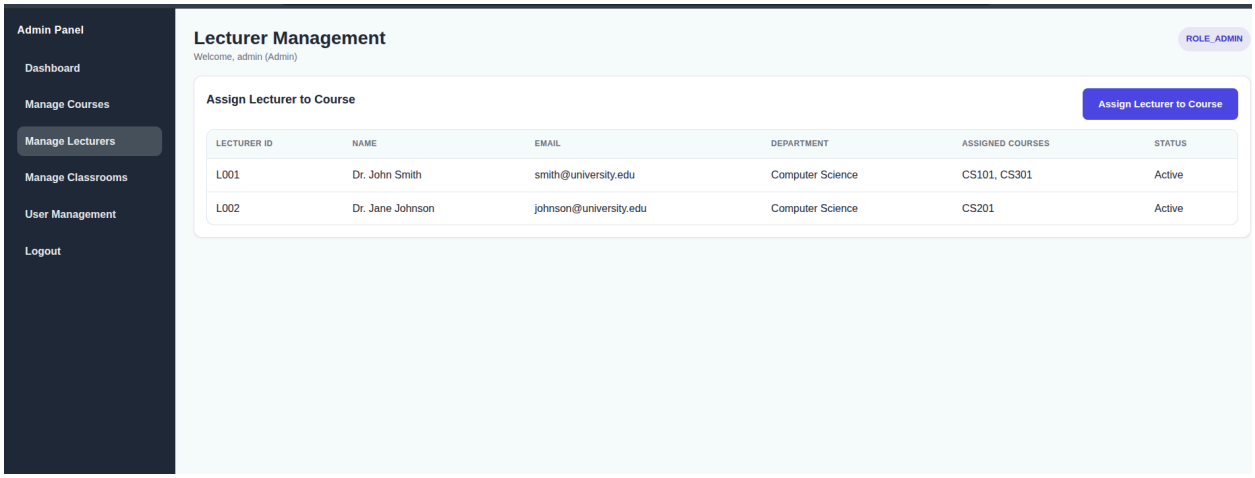
```
| Tables_in_course_enrollment_db |
+--------------------------------+
| class_schedules                |
| classrooms                     |
| courses                        |
| enrollments                    |
| lecturers                      |
| roles                          |
| user_roles                     |
| users                          |
+--------------------------------+
8 rows in set (0.004 sec)

mysql> select * from lectures;
ERROR 1146 (42S02): Table 'course_enrollment_db.lectures' doesn't exist
mysql> select * from lecturers;
+----+------------+-----------+----------------------+
| id | department | full_name | office_hours         |
+----+------------+-----------+----------------------+
|  1 | Computer   | PONLORK   | Mon-Wed 9:00 - 11:00 |
+----+------------+-----------+----------------------+
1 row in set (0.001 sec)

mysql>
```

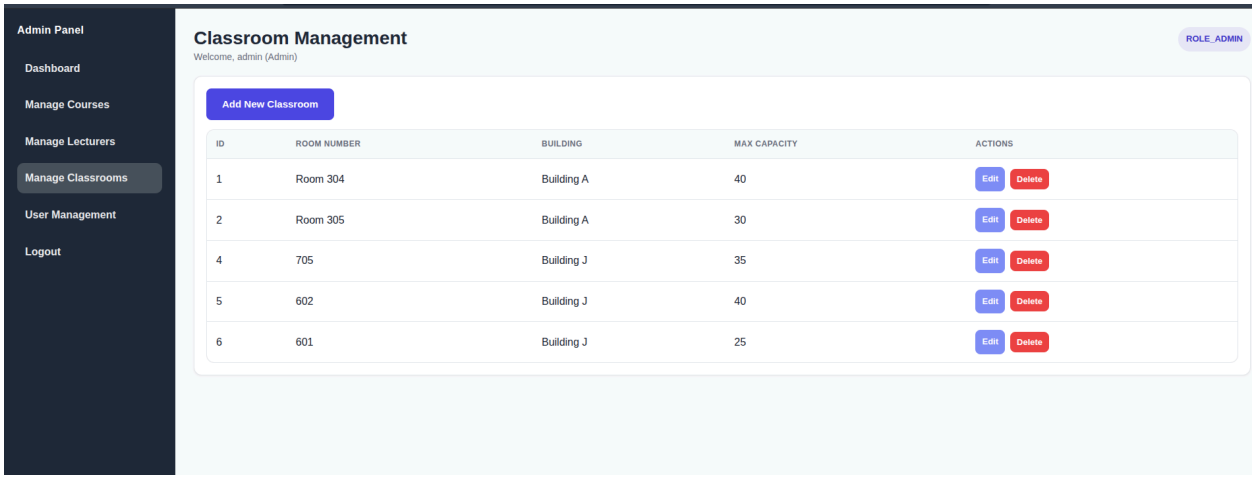
Pang Lythong

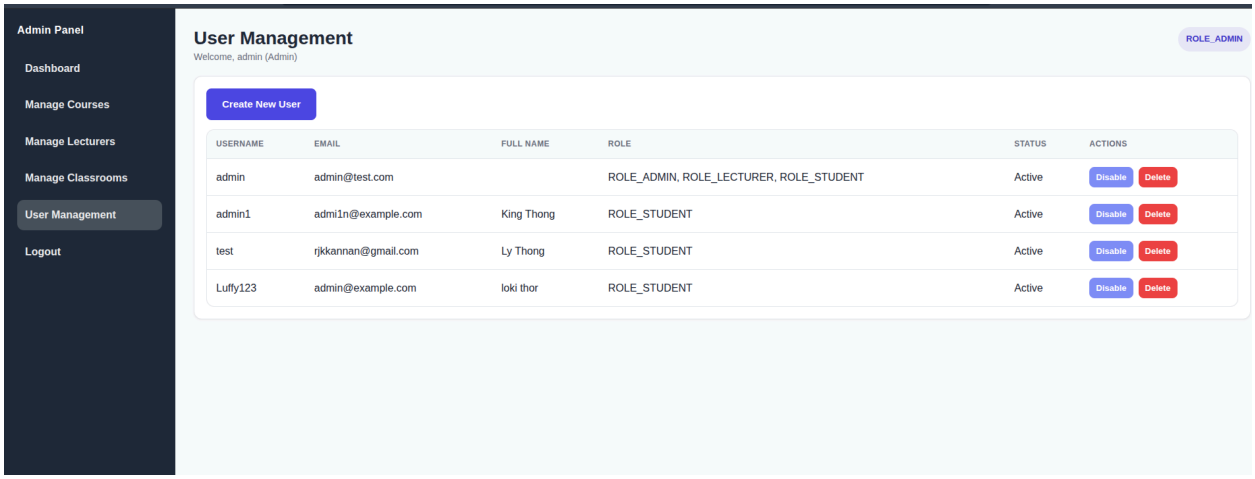
For Admin Page






Admin Panel
Dashboard
Manage Courses
Manage Lecturers
Manage Classrooms
User Management
Logout
Lecturer Management
Welcome, admin (Admin)
ROLE_ADMIN
Assign Lecturer to Course
Assign Lecturer to Course
LECTURER ID
NAME
EMAIL
DEPARTMENT
ASSIGNED COURSES
STATUS
L001
Dr. John Smith
smith@university.edu
Computer Science
CS101, CS301
Active
L002
Dr. Jane Johnson
johnson@university.edu
Computer Science
CS201
Active


Admin Panel
Dashboard
Manage Courses
Manage Lecturers
Manage Classrooms
User Management
Logout
Classroom Management
Welcome, admin (Admin)
ROLE_ADMIN
Add New Classroom
ID
ROOM NUMBER
BUILDING
MAX CAPACITY
ACTIONS
1
Room 304
Building A
40
Edit
Delete
2
Room 305
Building A
30
Edit
Delete
4
705
Building J
35
Edit
Delete
5
602
Building J
40
Edit
Delete
6
601
Building J
25
Edit
Delete


Admin Panel
Dashboard
Manage Courses
Manage Lecturers
Manage Classrooms
User Management
Logout
User Management
Welcome, admin (Admin)
ROLE_ADMIN
Create New User
USERNAME
EMAIL
FULL NAME
ROLE
STATUS
ACTIONS
admin
admin@test.com
ROLE_ADMIN, ROLE_LECTURER, ROLE_STUDENT
Active
Disable
Delete
admin1
admi1n@example.com
King Thong
ROLE_STUDENT
Active
Disable
Delete
test
rjkkannan@gmail.com
Ly Thong
ROLE_STUDENT
Active
Disable
Delete
Luffy123
admin@example.com
loki thor
ROLE_STUDENT
Active
Disable
Delete