



ព្រះរាជាណាចក្រកម្ពុជា
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Software Engineering

Project: Research Conference Registration and Session Management System

Week1

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1. Project Overview

The Research Conference Registration and Session Management System is designed to support the management of academic conferences by providing functionality for user registration, session selection, administrative scheduling, and session chair responsibilities. The system aims to simulate a real-world conference management platform using role-based access control and structured data management.

This project was selected from the provided list as it involves multiple system components, including security, database design, backend logic, and frontend presentation, making it suitable for applying software engineering principles.

2. System Requirements Analysis

The system defines three primary user roles:

- **Administrator:** Responsible for managing users, creating and scheduling conference sessions, and overseeing system data.
- **Session Chair:** Assigned to specific sessions and responsible for managing session-related activities.
- **Participant:** Registers for the conference and selects sessions to attend.

The main functional requirements of the system include:

- User authentication and authorization using role-based access control
- Creation and management of conference sessions
- Participant registration and session selection
- Controlled access to system features based on user roles
- Web-based user interface using server-side rendering

3. Task Allocation and Development Plan

Based on the project specification, the system development was divided into the following major components:

1. Security and Authentication
2. Main Entity CRUD Operations

3. Secondary Module CRUD Operations
4. Frontend Development with Thymeleaf
5. Database Design and Management

Each component was further divided into smaller subtasks to allow incremental development and parallel progress. This task division helps reduce dependency issues and improves development efficiency.

4. Work Completed (Current Progress)

1. Progress Week 1

Project Setup (SOPHAT Odom)

The Spring Boot project was successfully configured with required dependencies, including Spring Web, Spring Data JPA, Thymeleaf, MySQL, and Flyway. The application runs successfully and connects to the database.

Security and Authentication (THY Pharoth)

Backend structures for authentication and authorization were prepared by creating the User entity, Role enum (ADMIN, CHAIR, PARTICIPANT), and User repository. These components provide the foundation for implementing login, role-based access control, and secure password management in the next development phase.

```
1 package main.java.com.project5.rcrsms;  
2  
3 public enum Role {  
4     ADMIN,  
5     CHAIR,  
6     PARTICIPANT  
7 }
```

```

1  package main.java.com.project5.rcrsms;
2
3  import org.springframework.data.jpa.repository.JpaRepository;
4  import org.springframework.stereotype.Repository;
5  import java.util.Optional;
6
7  @Repository
8  public interface UserRepository extends JpaRepository<User, Long> {
9      Optional<User> findByUsername(String username);
10 }

```

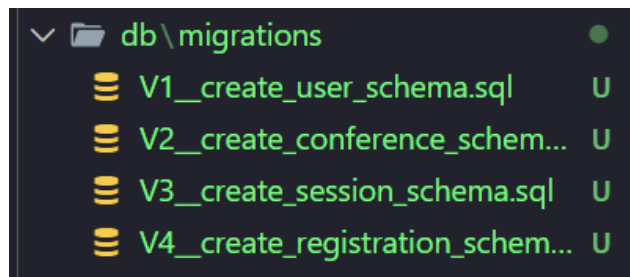
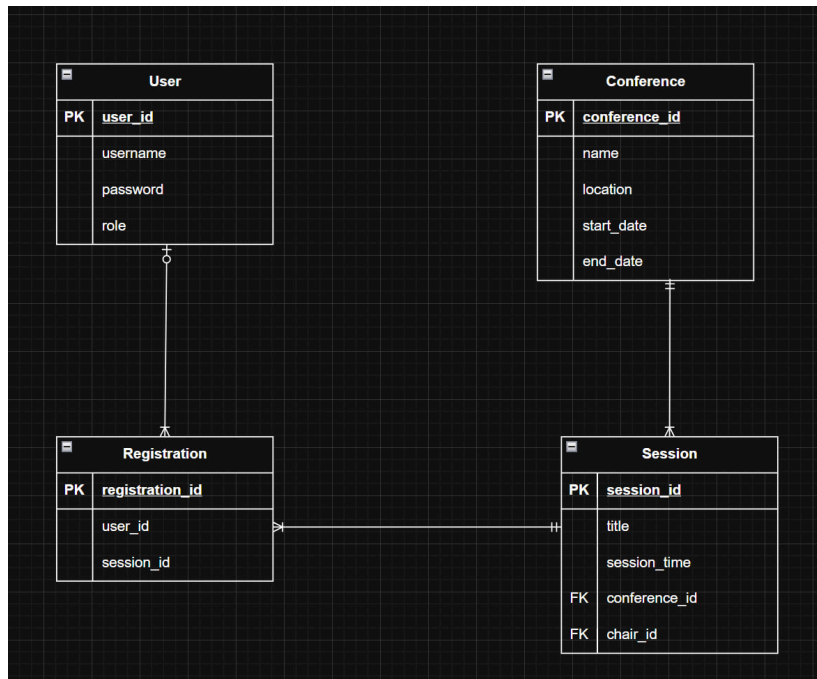
```

1  package com.project5.demo.security;
2  import jakarta.persistence.*;
3
4  @Entity
5  @Table(name = "users")
6  public class User {
7
8      @Id
9      @GeneratedValue(strategy = GenerationType.IDENTITY)
10     private Long id;
11
12     @Column(unique = true, nullable = false)
13     private String username;
14
15     @Column(nullable = false)
16     private String password;
17
18     @Enumerated(EnumType.STRING)
19     private Role role;
20
21     public User() {}
22
23     public User(String username, String password, Role role) {
24         this.username = username;
25         this.password = password;
26         this.role = role;
27     }
28
29     public Long getId() { return id; }
30
31     public String getUsername() { return username; }
32
33     public String getPassword() { return password; }
34
35     public Role getRole() { return role; }
36 }

```

Database Design (SOPHAT Odom)

Core database entities were identified, including User, Session, and Registration. Relationships between these entities were defined to support session assignment and participant registration. Flyway was introduced to manage database schema versioning and ensure controlled database evolution.



```

1 CREATE TABLE users (
2   user_id INT PRIMARY KEY AUTO_INCREMENT,
3   username VARCHAR(255) NOT NULL,
4   password VARCHAR(255) NOT NULL,
5   role ENUM('ADMIN', 'CHAIR', 'PARTICIPANT') NOT NULL
6 );
  
```

```

1 CREATE TABLE conferences (
2   conference_id INT PRIMARY KEY AUTO_INCREMENT,
3   name VARCHAR(255) NOT NULL,
4   location VARCHAR(255) NOT NULL,
5   start_date DATE NOT NULL,
6   end_date DATE NOT NULL
7 );
  
```

```

1 CREATE TABLE sessions (
2   session_id INT PRIMARY KEY AUTO_INCREMENT,
3   title VARCHAR(255) NOT NULL,
4   session_time DATETIME NOT NULL,
5   conference_id INT NOT NULL,
6   chair_id INT NOT NULL,
7   FOREIGN KEY (conference_id) REFERENCES conferences(conference_id),
8   FOREIGN KEY (chair_id) REFERENCES users(user_id)
9 );
  
```

```

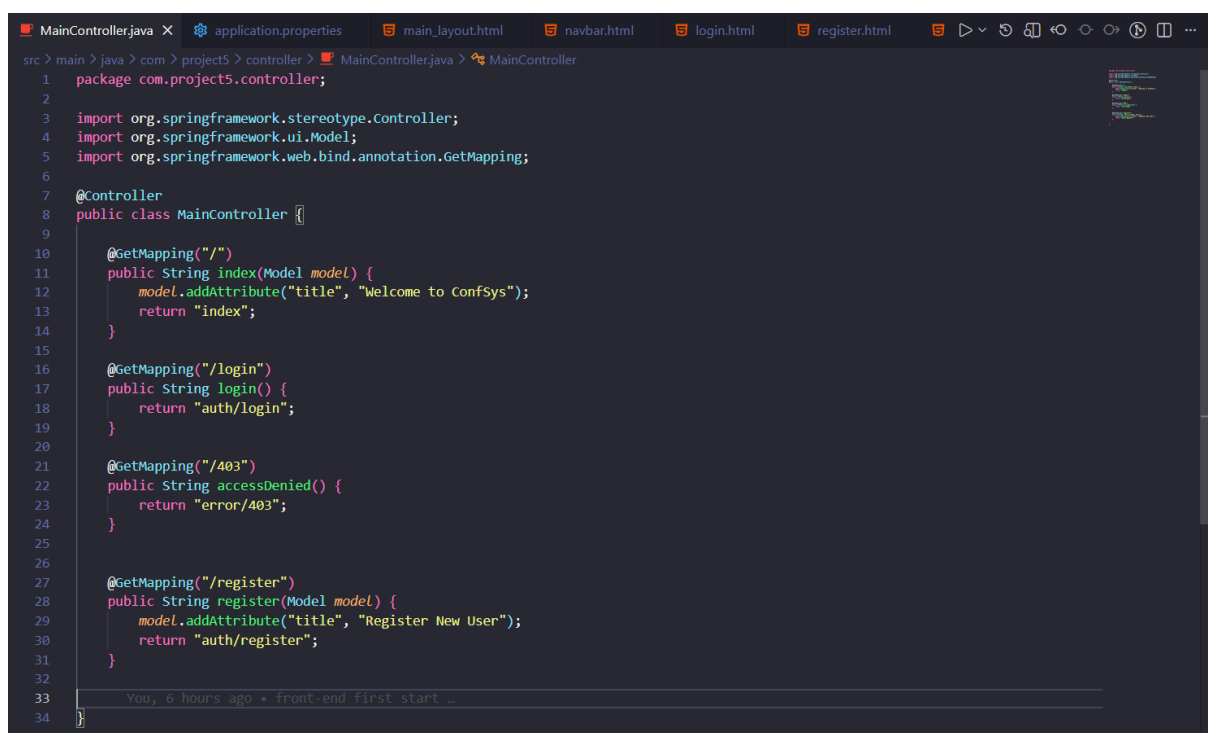
1 CREATE TABLE registrations (
2     registration_id INT PRIMARY KEY AUTO_INCREMENT,
3     user_id INT NOT NULL,
4     session_id INT NOT NULL,
5     created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP,
6     FOREIGN KEY (session_id) REFERENCES sessions(session_id),
7     FOREIGN KEY (user_id) REFERENCES users(user_id)
8 );

```

Frontend/Thymeleaf (SOPHEAP Sothiphak)

Initial Thymeleaf templates were prepared for login and role-based pages. Page structure and navigation flow were designed to align with backend security rules, providing the foundation for user interaction and access-controlled views. We have built the testing Login Page, Register Page and Landing Page and also a MainController.java with a mock data for testing the frontend.

MainController.java

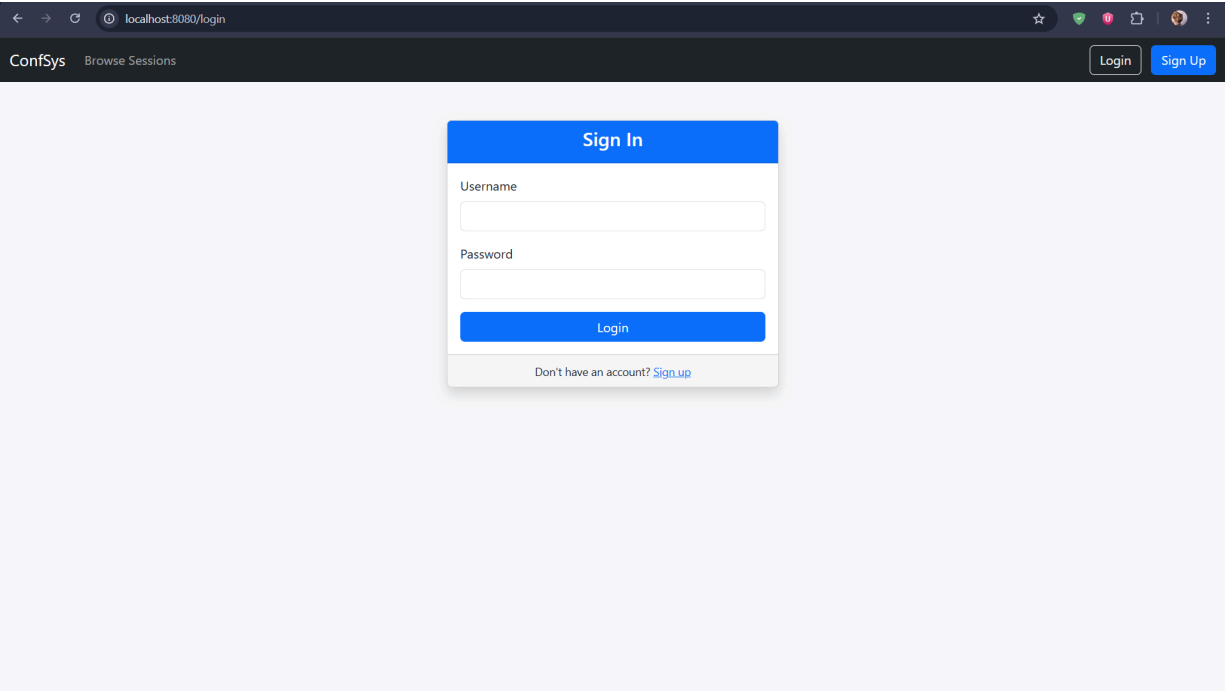


```

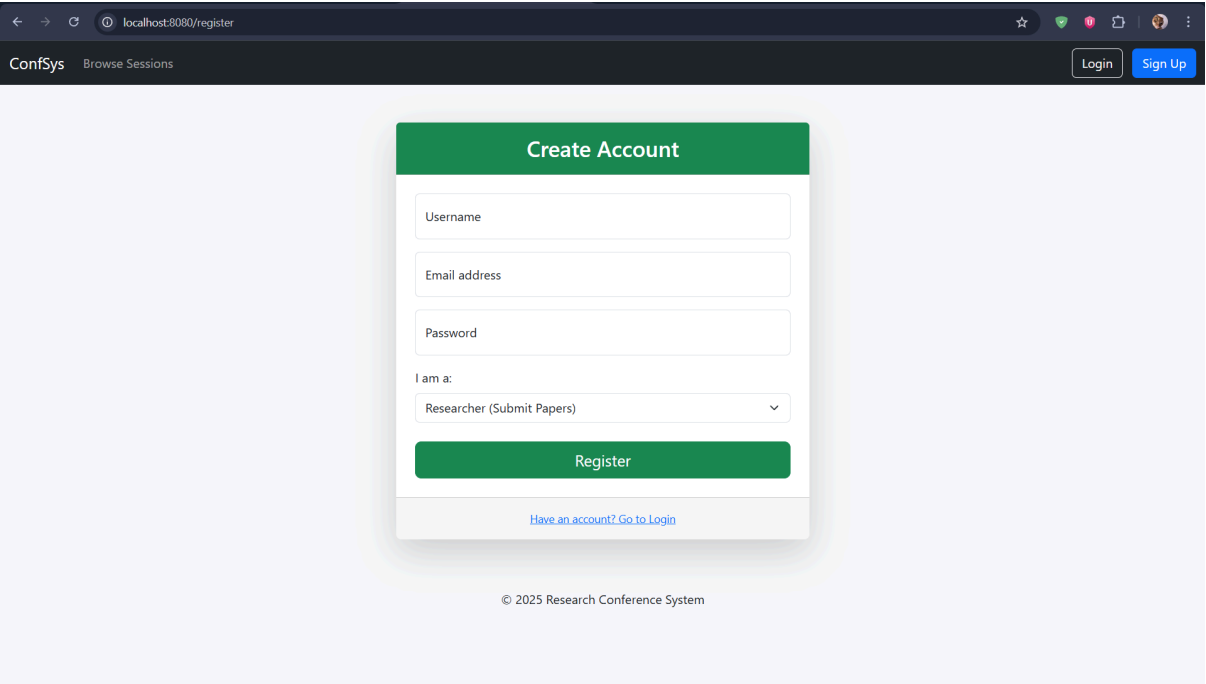
src > main > java > com > project5 > controller > MainController.java > MainController
1 package com.project5.controller;
2
3 import org.springframework.stereotype.Controller;
4 import org.springframework.ui.Model;
5 import org.springframework.web.bind.annotation.GetMapping;
6
7 @Controller
8 public class MainController {
9
10     @GetMapping("/")
11     public String index(Model model) {
12         model.addAttribute("title", "Welcome to ConfSys");
13         return "index";
14     }
15
16     @GetMapping("/login")
17     public String login() {
18         return "auth/login";
19     }
20
21     @GetMapping("/403")
22     public String accessDenied() {
23         return "error/403";
24     }
25
26     @GetMapping("/register")
27     public String register(Model model) {
28         model.addAttribute("title", "Register New User");
29         return "auth/register";
30     }
31 }
32
33 You, 6 hours ago • front-end first start ...
34

```

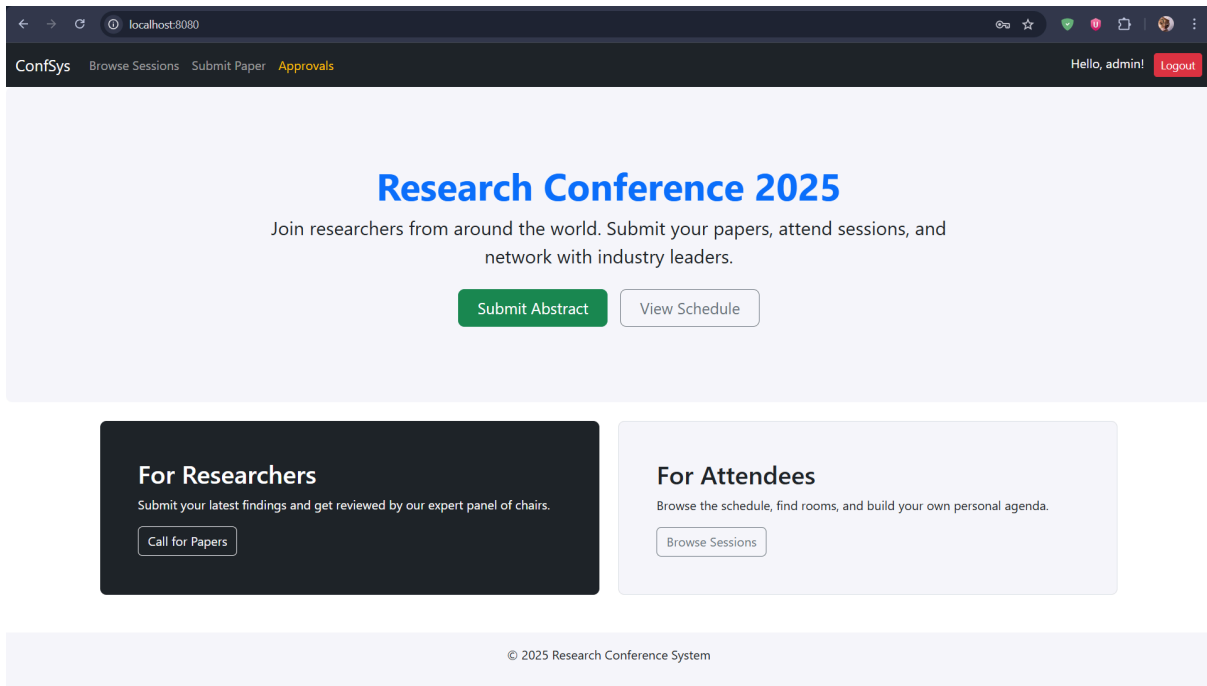
Login Page



Register Page



Landing Page



Backend Entity and CRUD Design (PHE Rithika & RA Socheatey)

Entity classes were created to map application objects to database tables. Repository interfaces were prepared to support basic CRUD operations, forming the foundation for backend business logic such as user management and session selection.

PHE Rithika work:

- User Entity & Repository

```
package main.java.com.projects.rcrsm;

import jakarta.persistence.*;
import jakarta.validation.constraints.*;
import java.util.ArrayList;
import java.util.List;

@Entity
@Table(name = "users")
public class User {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Column(name = "user_id")
    private Long userId;

    @NotBlank(message = "Username is required")
    @Size(min = 3, max = 50, message = "Username must be between 3 and 50 characters")
    @Column(unique = true)
    private String username;

    @NotBlank(message = "Password is required")
    @Size(min = 6, message = "Password must be at least 6 characters")
    private String password;

    @NotBlank(message = "Role is required")
    private String role;

    @OneToMany(mappedBy = "user", cascade = CascadeType.ALL, orphanRemoval = true)
    private List<Registration> registrations = new ArrayList<>();

    // Constructors
    public User() {}

    // Getters and Setters
    public Long getUserId() { return userId; }
    public void setUserId(Long userId) { this.userId = userId; }

    public String getUsername() { return username; }
    public void setUsername(String username) { this.username = username; }

    public String getPassword() { return password; }
    public void setPassword(String password) { this.password = password; }
```



```

package com.project5.repository;

import com.project5.entity.User;
import org.springframework.data.jpa.repository.JpaRepository;
import org.springframework.stereotype.Repository;

@Repository
public interface UserRepository extends JpaRepository<User, Long> {
}

```

● Conference Entity & Repository

```

import jakarta.persistence.*;
import jakarta.validation.constraints.*;
import java.time.LocalDate;
import java.util.ArrayList;
import java.util.List;

@Entity
@Table(name = "conference")
public class Conference {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Column(name = "conference_id")
    private Long conferenceId;

    @NotBlank(message = "Name is required")
    @Size(min = 3, max = 200, message = "Name must be between 3 and 200 characters")
    private String name;

    @NotBlank(message = "Location is required")
    private String location;

    @NotNull(message = "Start date is required")
    @Column(name = "start_date")
    private LocalDate startDate;

    @NotNull(message = "End date is required")
    @Column(name = "end_date")
    private LocalDate endDate;

    @OneToMany(mappedBy = "conference", cascade = CascadeType.ALL, orphanRemoval = true)
    private List<Session> sessions = new ArrayList<>();

    public Conference() {}

    public Long getConferenceId() { return conferenceId; }
    public void setConferenceId(Long conferenceId) { this.conferenceId = conferenceId; }

    public String getName() { return name; }
    public void setName(String name) { this.name = name; }

    public String getLocation() { return location; }
    public void setLocation(String location) { this.location = location; }

    public LocalDate getStartDate() { return startDate; }
    public void setStartDate(LocalDate startDate) { this.startDate = startDate; }

    public LocalDate getEndDate() { return endDate; }
    public void setEndDate(LocalDate endDate) { this.endDate = endDate; }

    public List<Session> getSessions() { return sessions; }
    public void setSessions(List<Session> sessions) { this.sessions = sessions; }
}

```

```

package com.project5.rcrsms.repository;

import com.project5.rcrsms.model.Conference;
import org.springframework.data.jpa.repository.JpaRepository;
import org.springframework.stereotype.Repository;

@Repository
public interface ConferenceRepository extends JpaRepository<Conference, Long> {
}

```

- Session Entity & Repository

```

import java.util.List;

@Entity
@Table(name = "session")
public class Session {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Column(name = "session_id")
    private Long sessionId;

    @NotBlank(message = "Title is required")
    @Size(min = 3, max = 200, message = "Title must be between 3 and 200 characters")
    private String title;

    @NotNull(message = "Session time is required")
    @Column(name = "session_time")
    private LocalDateTime sessionTime;

    @ManyToOne(fetch = FetchType.LAZY)
    @JoinColumn(name = "conference_id", nullable = false)
    @NotNull(message = "Conference is required")
    private Conference conference;

    @ManyToOne(fetch = FetchType.LAZY)
    @JoinColumn(name = "chair_id")
    private User chair;

    @OneToMany(mappedBy = "session", cascade = CascadeType.ALL, orphanRemoval = true)
    private List<Registration> registrations = new ArrayList<>();

    public Session() {}

    public Long getSessionId() { return sessionId; }
    public void setSessionId(Long sessionId) { this.sessionId = sessionId; }

    public String getTitle() { return title; }
    public void setTitle(String title) { this.title = title; }

    public LocalDateTime getSessionTime() { return sessionTime; }
    public void setSessionTime(LocalDateTime sessionTime) { this.sessionTime = sessionTime; }

    public Conference getConference() { return conference; }
    public void setConference(Conference conference) { this.conference = conference; }

    public User getChair() { return chair; }
    public void setChair(User chair) { this.chair = chair; }

    public List<Registration> getRegistrations() { return registrations; }
    public void setRegistrations(List<Registration> registrations) { this.registrations = registrations; }
}

```

```

package com.project5.rcrsms.repository;
|
import com.project5.rcrsms.model.Session;
import org.springframework.data.jpa.repository.JpaRepository;
import org.springframework.stereotype.Repository;

@Repository
public interface SessionRepository extends JpaRepository<Session, Long> {
}

```

RA SOCHEATEY work:

- **Registration Entity & Repository**

```

package com.project5.rcrsms;

import jakarta.persistence.*;
import jakarta.validation.constraints.*;
import java.time.LocalDateTime;

@Entity
@Table(name = "registration", uniqueConstraints = {
    @UniqueConstraint(columnNames = {"user_id", "session_id"})
})
public class Registration {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    @Column(name = "registration_id")
    private Long registrationId;

    @ManyToOne(fetch = FetchType.EAGER)
    @JoinColumn(name = "user_id", nullable = false)
    @NotNull(message = "User is required")
    private User user;

    @ManyToOne(fetch = FetchType.EAGER)

```

```

@JoinColumn(name = "session_id", nullable = false)
@NotNull(message = "Session is required")
private Session session;

private LocalDateTime registrationDate = LocalDateTime.now();

public Registration() {}

// Getters and Setters
public Long getRegistrationId() { return registrationId; }
public void setRegistrationId(Long registrationId) {
this.registrationId = registrationId; }

public User getUser() { return user; }
public void setUser(User user) { this.user = user; }

public Session getSession() { return session; }
public void setSession(Session session) { this.session = session; }

public LocalDateTime getRegistrationDate() { return
registrationDate; }
public void setRegistrationDate(LocalDateTime registrationDate) {
this.registrationDate = registrationDate; }
}

```

- Repository

```

1 package com.project5.rcrsms;
2
3 import org.springframework.data.jpa.repository.JpaRepository;
4 import org.springframework.stereotype.Repository;
5 import java.util.List;
6
7 → RegistrationController | ← 3 beans
8 @Repository
9 public interface RegistrationRepository extends JpaRepository<Registration, Long> {
10     // View participants per session
11     List<Registration> findBySession_SessionId(Long sessionId);
12     // Prevent duplicate registration
13     boolean existsByUser_UserIdAndSession_SessionId(Long userId, Long sessionId);
14 }

```

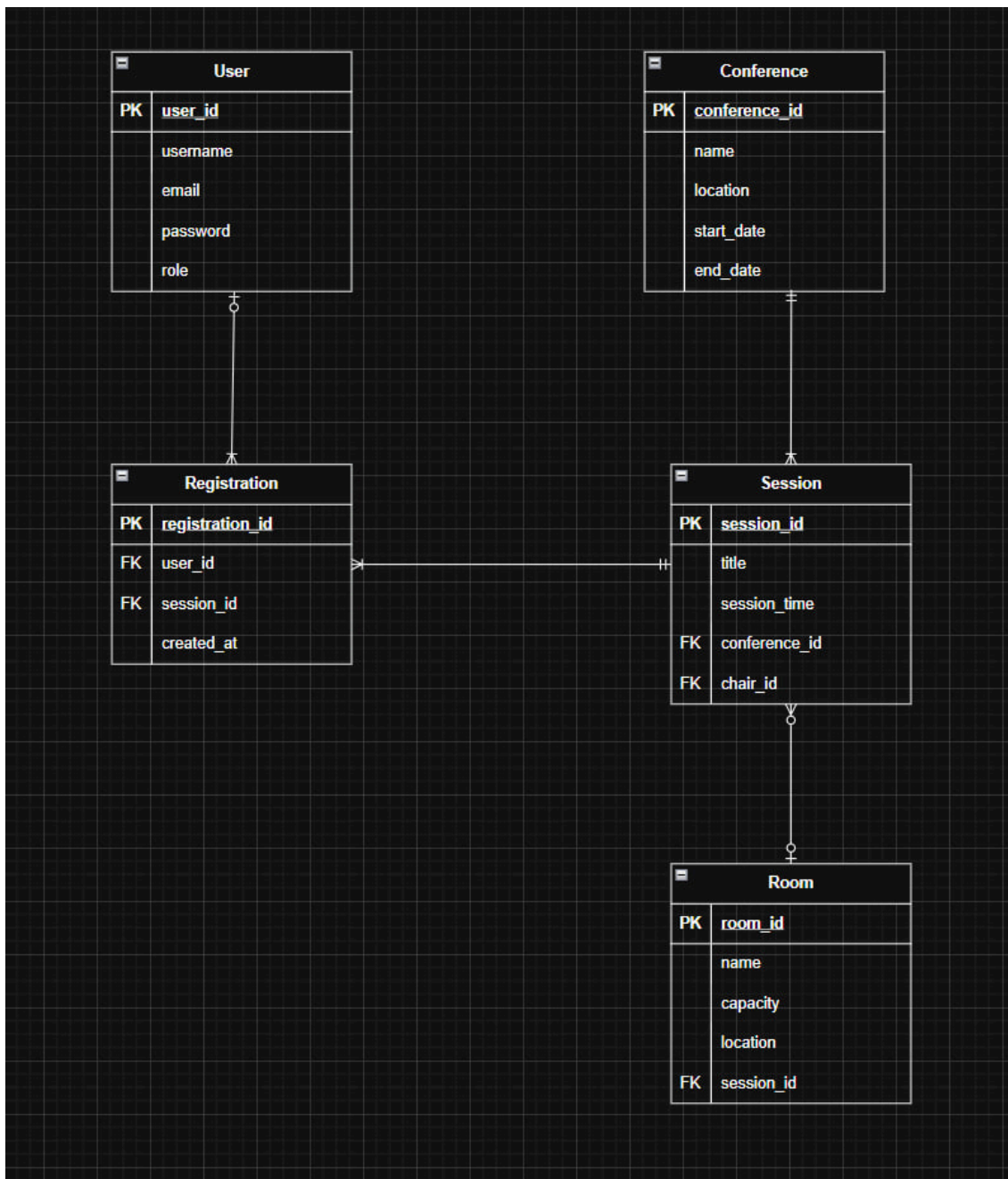
- Registration controller

```

src > main > java > com > projects > rcrsms > RegistrationController.java > Language Support for Java (TM) by Red Hat > RegistrationController > register(Long, Princ
1  package com.project5.rcrsms;
2  import org.springframework.beans.factory.annotation.Autowired;
3  import org.springframework.stereotype.Controller;
4  import org.springframework.ui.Model;
5  import org.springframework.web.bind.annotation.*;
6  import org.springframework.web.servlet.mvc.support.RedirectAttributes;
7  import java.security.Principal;
8  import RegistrationRepository SessionRepository UserRepository
9  @Controller
10 @RequestMapping("/registrations")
11 public class RegistrationController {
12     import RegistrationRepository
13     @Autowired private RegistrationRepository registrationRepo;
14     import SessionRepository
15     @Autowired private SessionRepository sessionRepo;
16     import UserRepository
17     @Autowired private UserRepository userRepo;
18
19     http://127.0.0.1:8080/registrations/add (Count=3 Total=0.91s Max=0.00s)
20     @PostMapping("/add")
21     // public String register(@RequestParam Long sessionId, Principal principal, RedirectAttributes ra) {
22     public String register(@RequestParam("sessionId") Long sessionId, Principal principal, RedirectAttributes ra) {
23         User user = userRepo.findByUsername(principal.getName());
24
25         // LOGIC: Prevent duplicate
26         if (registrationRepo.existsByUser_UserIdAndSession_SessionId(user.getUserId(), sessionId)) {
27             ra.addFlashAttribute(attributeName: "error", attributeValue: "You are already registered for this session.");
28             return "redirect:/sessions";
29         }
30
31         Registration reg = new Registration();
32         reg.setUser(user);
33         reg.setSession(sessionRepo.findById(sessionId).orElse(other: null));
34         registrationRepo.save(reg);
35
36         ra.addFlashAttribute(attributeName: "success", attributeValue: "Registration successful!");
37         return "redirect:/sessions";
38     }
39
40     http://127.0.0.1:8080/registrations/view/{id} (Count=4 Total=0.27s Max=0.00s)
41     @GetMapping("/view/{id}")
42     public String viewParticipants(@PathVariable("id") Long id, Model model) {
43         model.addAttribute(attributeName: "participants", registrationRepo.findBySession_SessionId(id));
44         return "registration-view";
45     }
46 }

```

2. Progress Week 2



Name	Task	Progress
Sophat Odom (Leader)	Database	<ul style="list-style-type: none"> - Resolve the database connection problem to spring boot - Add some constraints to some tables - Create table rooms - Manage member codes - Prepare to merge code
Sopheap Sothiphak	Frontend	<ul style="list-style-type: none"> - Create Session page - Create admin schedule page - Implement UI security
Phe Rithika	Main crud	
Ra Socheatey	Secondary Module	<ul style="list-style-type: none"> - Create registration controller - View participant in each session - Add logic to prevent duplicated registration for each session - Add simple registration page
Thy Pharoeth	Security and Authentication	<ul style="list-style-type: none"> - Security config - authController - Login response/request - User detail service

5. Challenges and Considerations

During development, challenges were encountered related to dependency configuration, particularly database migration tooling and version compatibility. Additional consideration was required to balance system realism with project scope, ensuring the design remains manageable while fulfilling all required features.

6. Next Planned Tasks

The next phase of development will include:

- Implementing CRUD operations for conference sessions
- Completing user registration and session selection workflows
- Integrating role-based access control into the frontend views
- Finalizing database migrations and constraints
- Testing system functionality and access restrictions

7. Conclusion

At this stage, the project foundation has been successfully established. Core system requirements have been analyzed, the database schema has been designed, and the application structure is in place. The project is progressing according to plan, and future development will focus on completing functionality and improving system integration.