DELIVERABLE 3 & 4

SOFTWARE DEVELOPMENT & CONSTRUCTION

SMART ACADEMIC ASSISTANCE SYSTEM

MEMBERS

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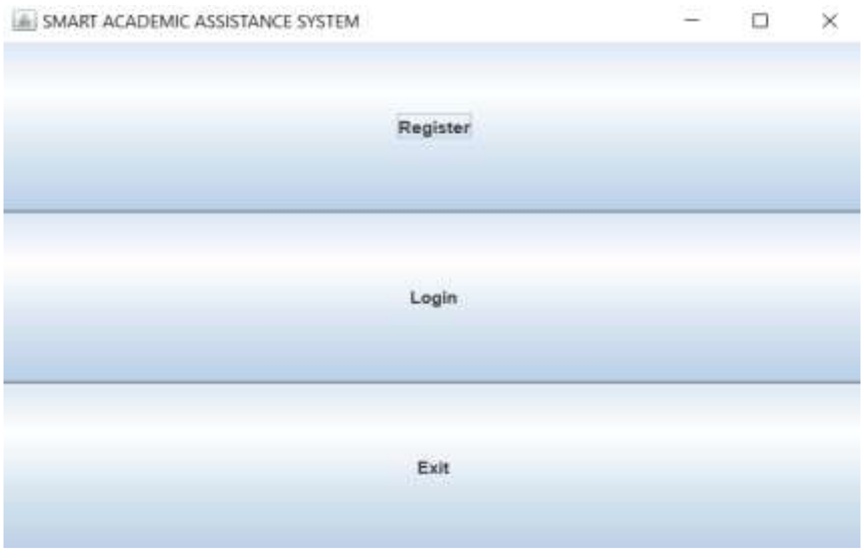
IMPLEMENTATION:

```java
import javax.swing.*;
import java.awt.*;
import java.util.ArrayList;
import java.util.List;
public class Main {
    static List<Course> courses = new ArrayList<>();
    static List<User> users = new ArrayList<>();
    static List<Instructor> instructors = new ArrayList<>();
    static List<Admin> admins = new ArrayList<>();
    static List<Feedback> feedbacks = new ArrayList<>();
    static List<Company> companies = new ArrayList<>();
    static User currentUser;

    public static void main(String[] args) {
        SwingUtilities.invokeLater(() -> new MainFrame());
    }
}
class MainFrame extends JFrame {
    CardLayout cardLayout;
    JPanel mainPanel;
    JPanel studentPanel;
    JPanel instructorPanel;
    JPanel adminPanel;
    public MainFrame() {
        setTitle("University Management System");
        setSize(600, 400);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setLocationRelativeTo(null);
        // Adding sample data
        Admin admin = new Admin("admin", "password");
        Main.admins.add(admin);
        Instructor instructor = new Instructor("instructor", "password");
        Main.instructors.add(instructor);
        Student student = new Student("student", "password");
        Main.users.add(student);
        Main.courses.add(new Course("Java 101"));
        // Creating main panel with card layout
        cardLayout = new CardLayout();
        mainPanel = new JPanel(cardLayout);
        getContentPane().add(mainPanel);
        // Creating panels for each screen
        JPanel welcomePanel = new JPanel();
        JPanel registerPanel = new JPanel();
        JPanel loginPanel = new JPanel();
        studentPanel = new JPanel();
        instructorPanel = new JPanel();
        adminPanel = new JPanel();
        // Adding panels to main panel
        mainPanel.add(welcomePanel, "Welcome");
        mainPanel.add(registerPanel, "Register");
        mainPanel.add(loginPanel, "Login");
        mainPanel.add(studentPanel, "Student");
        mainPanel.add(instructorPanel, "Instructor");
        mainPanel.add(adminPanel, "Admin");
        // Welcome panel
        welcomePanel.setLayout(new GridLayout(3, 1));
        JButton registerButton = new JButton("Register");
        JButton loginButton = new JButton("Login");
        JButton exitButton = new JButton("Exit");
        welcomePanel.add(registerButton);
        welcomePanel.add(loginButton);
        welcomePanel.add(exitButton);
        // Register panel
        registerPanel.setLayout(new GridLayout(4, 2));
        JTextField registerUsernameField = new JTextField();
        JPasswordField registerPasswordField = new JPasswordField();
        String[] userTypes = {"Student", "Instructor", "Admin"};
        JComboBox<String> userTypeComboBox = new JComboBox<>(userTypes);
        JButton registerSubmitButton = new JButton("Register");
        registerPanel.add(new JLabel("Username:"));
        registerPanel.add(registerUsernameField);
        registerPanel.add(new JLabel("Password:"));
        registerPanel.add(registerPasswordField);
        registerPanel.add(new JLabel("User Type:"));
        registerPanel.add(userTypeComboBox);
        registerPanel.add(new JLabel());
        registerPanel.add(registerSubmitButton);
        // Login panel
        loginPanel.setLayout(new GridLayout(3, 2));
        JTextField loginUsernameField = new JTextField();
        JPasswordField loginPasswordField = new JPasswordField();
        JButton loginSubmitButton = new JButton("Login");
        loginPanel.add(new JLabel("Username:"));
        loginPanel.add(loginUsernameField);
        loginPanel.add(new JLabel("Password:"));
        loginPanel.add(loginPasswordField);
        loginPanel.add(new JLabel());
        loginPanel.add(loginSubmitButton);
        // Student panel
        studentPanel.setLayout(new GridLayout(5, 1));
        JButton enrollButton = new JButton("Enroll in Course");
        JButton accessLecturesButton = new JButton("Access Lectures");
        JButton submitAssignmentButton = new JButton("Submit Assignment");
        JButton attemptQuizButton = new JButton("Attempt Quiz");
        JButton studentLogoutButton = new JButton("Logout");
        studentPanel.add(enrollButton);
        studentPanel.add(accessLecturesButton);
        studentPanel.add(submitAssignmentButton);
        studentPanel.add(attemptQuizButton);
        studentPanel.add(studentLogoutButton);
        // Instructor panel
        instructorPanel.setLayout(new GridLayout(5, 1));
        JButton uploadLectureButton = new JButton("Upload Lecture");
        JButton uploadQuizButton = new JButton("Upload Quiz");
        JButton uploadAssignmentButton = new JButton("Upload Assignment");
        JButton viewAttendanceButton = new JButton("View Attendance");
        JButton instructorLogoutButton = new JButton("Logout");
        instructorPanel.add(uploadLectureButton);
        instructorPanel.add(uploadQuizButton);
        instructorPanel.add(uploadAssignmentButton);
        instructorPanel.add(viewAttendanceButton);
        instructorPanel.add(instructorLogoutButton);
        // Admin panel
        adminPanel.setLayout(new GridLayout(5, 1));
        JButton manageCoursesButton = new JButton("Manage Courses");
        JButton manageCompaniesButton = new JButton("Manage Companies");
        JButton viewFeedbackButton = new JButton("View Feedback");
        JButton adminProfileButton = new JButton("Profile Management");
        JButton adminLogoutButton = new JButton("Logout");
        adminPanel.add(manageCoursesButton);
        adminPanel.add(manageCompaniesButton);
        adminPanel.add(viewFeedbackButton);
        adminPanel.add(adminProfileButton);
        adminPanel.add(adminLogoutButton);
        // Button actions
        registerButton.addActionListener(e -> cardLayout.show(mainPanel,
"Register"));
        loginButton.addActionListener(e -> cardLayout.show(mainPanel,
"Login"));
        exitButton.addActionListener(e -> System.exit(0));
        registerSubmitButton.addActionListener(e -> {
            String username = registerUsernameField.getText();
            String password = new String(registerPasswordField.getPassword());
            String userType = (String) userTypeComboBox.getSelectedItem();
            switch (userType) {
                case "Student":
                    Main.users.add(new Student(username, password));
                    JOptionPane.showMessageDialog(this, "Student registered
successfully.");
                    break;
                case "Instructor":
                    Main.instructors.add(new Instructor(username, password));
                    JOptionPane.showMessageDialog(this, "Instructor registered 
successfully.");
                    break;
                case "Admin":
                    Main.admins.add(new Admin(username, password));
                    JOptionPane.showMessageDialog(this, "Admin registered 
successfully.");
                    break;
                default:
                    JOptionPane.showMessageDialog(this, "Invalid user type.");
            }
            cardLayout.show(mainPanel, "Welcome");
        });
        loginSubmitButton.addActionListener(e -> {
            String username = loginUsernameField.getText();
            String password = new String(loginPasswordField.getPassword());
            User user = getUserByUsername(username);
            if (user != null && user.getPassword().equals(password)) {
                JOptionPane.showMessageDialog(this, "Login successful.");
                Main.currentUser = user;
                if (user instanceof Student) {
                    cardLayout.show(mainPanel, "Student");
                } else if (user instanceof Instructor) {
                    cardLayout.show(mainPanel, "Instructor");
                } else if (user instanceof Admin) {
                    cardLayout.show(mainPanel, "Admin");
                }
            } else {
                JOptionPane.showMessageDialog(this, "Invalid username or 
password.");
            }
        });
        // Student functionalities
        enrollButton.addActionListener(e -> {
            String[] courseTitles = 
Main.courses.stream().map(Course::getTitle).toArray(String[]::new);
            String selectedCourse = (String) JOptionPane.showInputDialog(this, 
"Select Course", "Enroll", JOptionPane.QUESTION_MESSAGE, null, courseTitles, 
courseTitles[0]);
            if (selectedCourse != null) {
                Course course = Main.courses.stream().filter(c -> 
c.getTitle().equals(selectedCourse)).findFirst().orElse(null);
                if (course != null) {
                    course.addStudent(Main.currentUser);
                    JOptionPane.showMessageDialog(this, "Enrolled in " + 
selectedCourse);
                }
            }
        });
        accessLecturesButton.addActionListener(e -> extracted());
        submitAssignmentButton.addActionListener(e -> {
            String[] courseTitles =
Main.courses.stream().map(Course::getTitle).toArray(String[]::new);
            String selectedCourse = (String) JOptionPane.showInputDialog(this,
"Select Course", "Submit Assignment", JOptionPane.QUESTION_MESSAGE, null,
courseTitles, courseTitles[0]);
            if (selectedCourse != null) {
                String assignmentDetails = JOptionPane.showInputDialog(this,
"Assignment Details:");
                if (assignmentDetails != null) {
                    Course course = Main.courses.stream().filter(c ->
c.getTitle().equals(selectedCourse)).findFirst().orElse(null);
                    if (course != null) {
                        Assignment assignment = new Assignment(course,
assignmentDetails);
                        course.addAssignment(assignment);
                        JOptionPane.showMessageDialog(this, "Assignment
submitted.");
                    }}}
        });
        attemptQuizButton.addActionListener(e -> {
            String[] courseTitles =
Main.courses.stream().map(Course::getTitle).toArray(String[]::new);
            String selectedCourse = (String) JOptionPane.showInputDialog(this,
"Select Course", "Attempt Quiz", JOptionPane.QUESTION_MESSAGE, null,
courseTitles, courseTitles[0]);
            if (selectedCourse != null) {
                String quizDetails = JOptionPane.showInputDialog(this, "Quiz
Details:");
                if (quizDetails != null) {
                    Course course = Main.courses.stream().filter(c ->
c.getTitle().equals(selectedCourse)).findFirst().orElse(null);
                    if (course != null) {
                        Quiz quiz = new Quiz(course, quizDetails);
                        course.addQuiz(quiz);
                        JOptionPane.showMessageDialog(this, "Quiz
attempted.");
                    }}}
        });
        studentLogoutButton.addActionListener(e -> {
            Main.currentUser = null;
            cardLayout.show(mainPanel, "Welcome");
        });
        // Instructor functionalities
        uploadLectureButton.addActionListener(e -> {
            String[] courseTitles =
Main.courses.stream().map(Course::getTitle).toArray(String[]::new);
            String selectedCourse = (String) JOptionPane.showInputDialog(this,
"Select Course", "Upload Lecture", JOptionPane.QUESTION_MESSAGE, null,
courseTitles, courseTitles[0]);
            if (selectedCourse != null) {
                String lectureDetails = JOptionPane.showInputDialog(this,
"Lecture Details:");
                if (lectureDetails != null) {
                    Course course = Main.courses.stream().filter(c ->
c.getTitle().equals(selectedCourse)).findFirst().orElse(null);
                    if (course != null) {
                        Lecture lecture = new Lecture(lectureDetails);
                        course.addLecture(lecture);
                        JOptionPane.showMessageDialog(this, "Lecture
uploaded.");
                    }}}
        });

        uploadQuizButton.addActionListener(e -> {
            String[] courseTitles =
Main.courses.stream().map(Course::getTitle).toArray(String[]::new);
            String selectedCourse = (String) JOptionPane.showInputDialog(this,
"Select Course", "Upload Quiz", JOptionPane.QUESTION_MESSAGE, null,
courseTitles, courseTitles[0]);
            if (selectedCourse != null) {
                String quizDetails = JOptionPane.showInputDialog(this, "Quiz
Details:");
                if (quizDetails != null) {
                    Course course = Main.courses.stream().filter(c ->
c.getTitle().equals(selectedCourse)).findFirst().orElse(null);
                    if (course != null) {
                        Quiz quiz = new Quiz(course, quizDetails);
                        course.addQuiz(quiz);
                        JOptionPane.showMessageDialog(this, "Quiz uploaded.");
                    }}}
        });
        uploadAssignmentButton.addActionListener(e -> {
            String[] courseTitles =
Main.courses.stream().map(Course::getTitle).toArray(String[]::new);
            String selectedCourse = (String) JOptionPane.showInputDialog(this,
"Select Course", "Upload Assignment", JOptionPane.QUESTION_MESSAGE, null,
courseTitles, courseTitles[0]);
            if (selectedCourse != null) {
                String assignmentDetails = JOptionPane.showInputDialog(this,
"Assignment Details:");
                if (assignmentDetails != null) {
                    Course course = Main.courses.stream().filter(c ->
c.getTitle().equals(selectedCourse)).findFirst().orElse(null);
                    if (course != null) {
                        Assignment assignment = new Assignment(course,
assignmentDetails);
                        course.addAssignment(assignment);
                        JOptionPane.showMessageDialog(this, "Assignment
uploaded.");
                    }
                }
            }
        });
        viewAttendanceButton.addActionListener(e -> extracted2());

        instructorLogoutButton.addActionListener(e -> {
            Main.currentUser = null;
            cardLayout.show(mainPanel, "Welcome");
        });
        // Admin functionalities
        manageCoursesButton.addActionListener(e -> {
            String[] options = {"Add Course", "View Courses"};
            String selectedOption = (String) JOptionPane.showInputDialog(this,
"Manage Courses", "Course Management", JOptionPane.QUESTION_MESSAGE, null,
options, options[0]);
            if (selectedOption != null) {
                switch (selectedOption) {
                    case "Add Course":
                        String courseTitle = JOptionPane.showInputDialog(this,
"Course Title:");
                        if (courseTitle != null) {
                            Main.courses.add(new Course(courseTitle));
                            JOptionPane.showMessageDialog(this, "Course
added.");
                        }
                        break;
                    case "View Courses":
                        StringBuilder coursesList = new
StringBuilder("Courses:\n");
                        for (Course course : Main.courses) {
                            coursesList.append("-
").append(course.getTitle()).append("\n");
                        }
                        JOptionPane.showMessageDialog(this,
coursesList.toString());
                        break;
                }
            }
        });
        manageCompaniesButton.addActionListener(e -> {
            String[] options = {"Add Company", "View Companies"};
            String selectedOption = (String) JOptionPane.showInputDialog(this,
"Manage Companies", "Company Management", JOptionPane.QUESTION_MESSAGE, null,
options, options[0]);
            if (selectedOption != null) {
                switch (selectedOption) {
                    case "Add Company":
                        String companyName = JOptionPane.showInputDialog(this,
"Company Name:");
                        if (companyName != null) {
                            Main.companies.add(new Company(companyName));
                            JOptionPane.showMessageDialog(this, "Company
added.");
                        }
                        break;
                    case "View Companies":
                        StringBuilder companiesList = new
StringBuilder("Companies:\n");
                        for (Company company : Main.companies) {
                            companiesList.append("-
").append(company.getName()).append("\n");
                        }
                        JOptionPane.showMessageDialog(this,
companiesList.toString());
                        break;
                }
            }
        });
        viewFeedbackButton.addActionListener(e -> {
            StringBuilder feedbackList = new StringBuilder("Feedbacks:\n");
            for (Feedback feedback : Main.feedbacks) {
                feedbackList.append("-
").append(feedback.getUser().getUsername()).append(":
").append(feedback.getContent()).append("\n");
            }
            JOptionPane.showMessageDialog(this, feedbackList.toString());
        });
        adminProfileButton.addActionListener(e -> {
            // Profile management functionalities here
        });
        adminLogoutButton.addActionListener(e -> {
            Main.currentUser = null;
            cardLayout.show(mainPanel, "Welcome");
        });
        setVisible(true);
    }
    private void extracted2() {
```

```java
        Instructor instructor = (Instructor) Main.currentUser;
        StringBuilder attendance = new StringBuilder("Attendance:\n");
        for (Course course : Main.courses) {
            if (course.getEnrolledStudents().contains(instructor)) {
                attendance.append(course.getTitle()).append(":\n");
                for (User student : course.getEnrolledStudents()) {
                    attendance.append("-
").append(student.getUsername()).append("\n");
                }
            }
        }
        JOptionPane.showMessageDialog(this, attendance.toString());
    }
    private void extracted() {
        Student student = (Student) Main.currentUser;
        StringBuilder lectures = new StringBuilder("Lectures:\n");
        for (Course course : Main.courses) {
            if (course.getEnrolledStudents().contains(student)) {
                lectures.append(course.getTitle()).append(":\n");
                for (Lecture lecture : course.getLectures()) {
                    lectures.append("-
").append(lecture.getDetails()).append("\n");
                }
            }
        }
        JOptionPane.showMessageDialog(this, lectures.toString());
    }
    private User getUserByUsername(String username) {
        for (User user : Main.users) {
            if (user.getUsername().equals(username)) {
                return user;
            }
        }
        for (Instructor instructor : Main.instructors) {
            if (instructor.getUsername().equals(username)) {
                return instructor;
            }
        }
        for (Admin admin : Main.admins) {
            if (admin.getUsername().equals(username)) {
                return admin;
            }}
        return null;
    }}
abstract class User {
    private String username;
    private String password;
    public User(String username, String password) {
        this.username = username;
        this.password = password;
    }
    public String getUsername() {
        return username;
    }
    public String getPassword() {
        return password;
    }}
class Student extends User {
    public Student(String username, String password) {
        super(username, password);
    }}
class Instructor extends User {
    public Instructor(String username, String password) {
        super(username, password);
    }}
class Admin extends User {
    public Admin(String username, String password) {
        super(username, password);
    }}
class Course {
    private String title;
    private List<User> enrolledStudents = new ArrayList<>();
    private List<Lecture> lectures = new ArrayList<>();
    private List<Assignment> assignments = new ArrayList<>();
    private List<Quiz> quizzes = new ArrayList<>();
    public Course(String title) {
        this.title = title;
    }
   public String getTitle() {
        return title;
    }
    public void addStudent(User student) {
        enrolledStudents.add(student);
    }
    public List<User> getEnrolledStudents() {
        return enrolledStudents;
    }
    public void addLecture(Lecture lecture) {
        lectures.add(lecture);
    }
    public List<Lecture> getLectures() {
        return lectures;
    }
    public void addAssignment(Assignment assignment) {
        assignments.add(assignment);
    }
    public void addQuiz(Quiz quiz) {
        quizzes.add(quiz);
    }}
class Assignment {
    private Course course;
    private String details;

    public Assignment(Course course, String details) {
        this.course = course;
        this.details = details;
    }}
class Quiz {
    private Course course;
    private String details;
    public Quiz(Course course, String details) {
        this.course = course;
        this.details = details;
    }}
class Lecture {
    private String details;

    public Lecture(String details) {
        this.details = details;
    }
    public String getDetails() {
        return details;
    }}
class Feedback {
    private User user;
    private String content;
    public Feedback(User user, String content) {
        this.user = user;
        this.content = content;
    }
    public User getUser() {
        return user;
    }
    public String getContent() {
        return content;
    }}
class Company {
    private String name;
    public Company(String name) {
        this.name = name;
    }
    public String getName() {
        return name;
    }}
```



UNIT TEST CASES:

Test Case ID	Test Description	Inputs	Partition Tested	Expected Output	Pass/Fail
TC1	Add a valid user	Username: "touseer_amir", Role: "User"	Valid input	User is added successfully	Pass
TC2	Add a user with existing username	Username: "touseer_amir", Role: "Admin"	Duplicate username	Exception: "User already exists"	Pass
TC3	Add a user with empty username	Username: "", Role: "User"	Invalid username	Exception: "Username cannot be empty"	Pass
TC4	Add a user when capacity is full	Username: "new_user", Role: "User"	Maximum capacity	Exception: "Cannot create user. Maximum capacity reached"	Pass
TC5	Add a user with special characters	Username: "imran@khan", Role: "User"	Invalid characters in username	Exception: "Username contains invalid characters"	Pass
TC6	Add a user with invalid role	Username: "validuser", Role: "invalidrole"	Invalid role	Exception: "Role is not recognized"	Pass

GITHUB REPOSITORY & LINK:

https://github.com/saifkhan16137/SCD-Project-