IJSE®

CMJD - Comprehensive Master Java Developer
Course work – Batch 110/111

Assignment 2: Front end Development with React

Task: Research Project Tracker for an Educational Institute

Objective

Develop a responsive and interactive React front-end that connects with the Spring Boot backend (Research Project Tracker system). This interface should enable users to manage projects, milestones, and documents while enforcing role-based access and secure JWT-based authentication.

Tech Stack

- React (with TypeScript template)
- Supportive Libraries:
  - React Router (for Single Page Application navigation)
  - Axios (for backend communication)
  - Context API (for global state and authentication management)
  - React Bootstrap (for styling and responsive layout)

Task Flow

1. React Project Setup

- Create a React + TypeScript application using:
  npx create-react-app research-tracker --template typescript
- Add required libraries:
  Ex: *npm install react-router-dom axios bootstrap*
- Integrate routing using React Router for Single Page Application navigation.

2. Authentication Handling

- Design Sign-In and Sign-Up user interfaces.
- Include form validation for all required inputs.

• Connect to backend endpoints via Axios:

- POST /api/auth/signup
- POST /api/auth/login

• On successful login:

- Store the JWT token securely (e.g., localStorage)
- Decode the token to identify user and role
- Redirect to role-based dashboard pages

• Implement Logout functionality to clear stored tokens.

3. Navigation

• Create a navigation bar using React Router's NavLink or Link.

• Configure routes for major pages:

- /login → Sign In
- /register → Sign Up
- /projects → Project list
- /projects/:id → Project details
- /milestones → Milestone management
- /documents → Document uploads
- /admin → Admin panel (restricted to ADMIN role)

• Implement role-based menu visibility and data access.

4. Component Management

- Create components that align with backend operations.
- Ensure the UI supports complete CRUD operations.

5. UI/UX Design

• Maintain consistent colors, fonts, and layouts across the UI.

• Design a clean dashboard with sections for Projects, Milestones, and Documents.

• Use Tailwind CSS (preferred) or Bootstrap for styling.

• Implement responsive design for mobile and desktop views (Some R&D may be involved).

• Add spinners and loaders for better user feedback.

6. JWT Integration

• Attach JWT tokens to each backend request

• Redirect to login when token is expired or invalid.

7. Version Control (VCS)

• Use GitHub for source code management.

• Maintain meaningful commit messages (e.g., feat, fix, refactor).

• Include in repository:

- Source code
- README.md with setup instructions
- Screenshots or demo link
- Backend API endpoint summary

• Submit GitHub repository link upon completion.

Expected Deliverables

1. Fully functional React front-end integrated with backend API.
2. Authentication and role-based routing implemented using JWT.
3. Responsive UI supporting CRUD for Projects, Milestones, and Documents.
4. Proper navigation and routing with restricted access.
5. Clean, documented, and reusable code.
6. GitHub repository link submitted with README file.

Expected Learning Outcomes

Upon completion, students will:

- Learn how to integrate React front-end with Spring Boot REST APIs.
- Implement JWT authentication and secure routing.
- Build reusable components and manage global state.
- Apply modern UI/UX practices for responsive design.
- Demonstrate front-end integration skills aligned with enterprise Java development standards.