Fullstack Development of a Railway Reservation Platform

Title: MBrailway Website

Github Repo: https://github.com/Idokoken/mbrailway2

Live (Hosted) Website link: https://mbrailway.onrender.com/

Technologies Used

1. Java
2. Javascript
3. Spring Framework
4. MySql
5. Html
6. CSS
7. Bootstrap Framework
8. Some other external dependencies like Spring Security, Thymeleaf, Spring Data JPA, Spring Web, Lombok etc.

Introduction

Overview

- A Railway Reservation Platform that allows users to:
    - Book train tickets
    - Manage reservations
    - View train schedules

System Architecture

- **Frontend**: Thymeleaf (HTML, CSS, JavaScript) for UI rendering
- **Backend**: Java and Spring Boot for API development
- **Database**: MySQL for storing data
- **ORM**: Spring Data JPA for database interactions
- The simple **architecture diagram** is
    - Client ↔ Spring Boot Backend ↔ MySQL Database

Technology Stack

- **Backend**:
    - Java
    - Spring Boot (Spring MVC, Spring Data JPA)
- **Frontend**:
    - Thymeleaf (server-side rendering)
    - HTML, CSS, JavaScript
- **Database**:
    - MySQL (Relational Database)
- **Development Tools**:
    - IntelliJ
    - Maven (dependency management)

Features

- **User Features**:
    - User registration/login
    - Book tickets, view reservations
- **Admin Features**:
    - Add/Remove trains
    - Manage reservations
- **Core Functionalities**:
    - Real-time reservation system
    - Secure data management with MySQL

Workflow

1. **User Authentication**: Login/Register
2. **View Trains**: Display available trains (Thymeleaf + Spring MVC)
3. **Reservation**: Book a ticket → Save to database (Spring Data JPA)
4. **Admin Actions**: Manage trains and reservations

Database Design

- **Tables**:
    1. **User**: Stores user details
    2. **Train**: Holds train schedule and details
    3. **Reservation**: Contains booking information

Code Overview

- **Controller Layer**: Handling requests and responses
- **Service Layer**: Business logic implementation
- **Repository Layer**: Data access using **Spring Data JPA**
- **Model Layer:** Database Entity/table

Frontend Design

UI with Thymeleaf

- Clean, responsive design using:
    - Thymeleaf templating engine
    - HTML, CSS, and basic JavaScript for interactivity
- Some Pages of the website includes the
    - Home Page
    - Booking Page
    - About us Page
    - Contact us Page
    - Train Timetable Page
    - Some other Resource Pages etc.

Benefits

Benefits of the Platform includes

- Fully automated reservation system
- User-friendly interface with real-time booking
- Reliable and efficient backend
- Scalable and easy to maintain

Challenges

Challenges Faced includes

- Integrating Thymeleaf with Spring Boot
- Ensuring database integrity with MySQL
- Managing user roles and security

Future Enhancements

Next Steps

- Add payment integration for ticket booking
- Introduce an API for third-party applications

Conclusion

- A robust full-stack Railway Reservation Platform
- Combines efficiency, reliability, and scalability
- Built with modern tools: **Java, Spring Boot, Thymeleaf, MySQL**