ONLINE RAILWAY TICKET BOOKING SYSTEM

Project report submitted
in partial fulfillment of the requirement for award of the degree of

Bachelor of Technology
in
Computer Science & Engineering

By

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CERTIFICATE

It is certified that the work contained in the project report titled ”ONLINE RAILWAY TICKET BOOKING SYSTEM ” by ”K.TEJASWI (21UECM0108), K.KEERTHI (21UECM0107), SANAGAVARAPU SHALINI (21UECM0213)” has been carried out under my supervision and that this work has not been submitted elsewhere for a degree.

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DECLARATION

We declare that this written submission represents our ideas in our own words and where other's ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea,data,fact,source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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ABSTRACT

The aim is to design and develop a web based system for a Online Railway Ticket Booking System.The web design for the online railway ticket booking system is focused on creating an intuitive, user-friendly interface that simplifies the railway ticket booking process. It employs responsive design principles to ensure optimal display and functionality on various devices, including smartphones, tablets, and desktops.This project focuses exclusively on the web design aspect, aiming to create an interface that enhances user experience while maintaining the security and reliability expected from such a critical service.The design streamlines the booking flow, reducing unnecessary steps for a more efficient user experience. Security protocols are integrated to protect user data and transactions, ensuring a safe environment. Additionally, the design is scalable to accommodate potential future enhancements and increased user demand while maintaining performance and usability.

Keywords:

Intuitive User Interface , Responsive Web design , Visual Appeal

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LIST OF ACRONYMS AND ABBREVIATIONS

HTML	Hyper Text Markup Language
CSS	Cascading Style Sheets
JS	Javascript
CDN	Content Delivery Network
DOM	Document Object Model

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Chapter 1

INTRODUCTION

1.1 Introduction

One of the most widely used modes of transportation in India is the railway system, which connects distant places, making travel accessible to millions of people.In response to this ever-growing demand for efficient transportation services the team presents the ”Online Railway Ticket Booking System” project. This initiative seeks to redefine the way individuals plan and reserve train journeys by harnessing the capabilities of HTML, CSS, JavaScript and other scripting languages to create an intuitive and dynamic web-based platform. The primary objectives include designing a user-friendly interface that simplifies train searches and bookings, integrating real-time data for accurate scheduling and availability and offering responsive user support and feedback channels. With this technological stack and a commitment to improving the railway ticket booking experience, the project aims to benefit both passengers and railway authorities alike, ushering in a new era of convenience and efficiency in railway travel.

1.2 Aim of the project

The aim of the project Online Railway Ticket Booking System is to provide a user-friendly, efficient and secure platform for passengers to seamlessly book train tickets. This project intends to simplify the ticket reservation process, eliminate the need for physical ticketing and enhance the overall experience of planning and managing train journeys.

1.3 Project Domain

The domain of the project is Web Development. Web development is a dynamic and evolving field that focuses on designing, creating and maintaining websites and web applications. It encompasses a wide range of skills and technologies, including HTML (Hypertext Markup Language), CSS (Cascading Style Sheets), JavaScript, and various programming languages for server-side development. Web developers work to ensure websites which are visually appealing, responsive across different devices

and functionally robust. In the context of the project building an online railway ticket booking system, web development is essential for creating an intuitive and efficient user interface, implementing real-time data handling and ensuring a secure and seamless online booking experience for railway passengers.

1.4 Scope of the Project

The scope of the project is extensive and multifaceted. At its core, it involves the development of a comprehensive web-based platform that enables users to search, select and book railway tickets conveniently. The scope encompasses several critical aspects:

- User Interface Design: The project includes the creation of an intuitive and user-friendly interface using HTML, CSS, and JavaScript. This interface will facilitate easy navigation, allowing users to search for trains, view schedules, and book tickets seamlessly.
- Real-Time Data Integration: To provide accurate and up-to-date information to users, the project integrates real-time data from railway databases. This includes train schedules, seat availability, pricing, and booking status.
- Security and Privacy: Ensuring the security and privacy of user data and financial transactions is paramount. The project scope incorporates robust security measures to protect sensitive information, such as personal details and payment data.
- Customization and Personalization: The system will offer customization options, allowing users to specify preferences, such as seat type or meal choices, tailoring their travel experience to their liking.
- Feedback and Support Mechanisms: The project will implement feedback channels to gather user opinions and suggestions for continuous improvement. Additionally, user support features will be in place to address inquiries and issues promptly.
- Cross-Browser and Cross-Device Compatibility: The website should function consistently across various web browsers and devices, including smartphones, tablets and desktop computers.

In summary, the scope of the project is to create a feature-rich, secure and user-centric online railway ticket booking system. It involves a wide range of technical and operational considerations to deliver a seamless and efficient platform for railway travelers, enhancing their booking experience and contributing to the modernization of railway services.

1.5 Methodology

The successful development of the Online Railway Ticket Booking System requires a structured and systematic approach. The methodology outlined below provides a comprehensive framework for managing this project:

- Project Initiation: Develop a project charter that outlines the project's objectives, scope, stakeholders, and high-level timeline. Assemble a multidisciplinary team comprising web developers, designers.
- Requirements Gathering: Conduct interviews and surveys to understand user needs, preferences, and pain points. Collaborate with railway authorities to gather technical requirements and compliance standards.
- System Design: Design the overall system architecture, including the database structure, front-end interface, and back-end components. Develop data flow diagrams to illustrate the flow of information within the system.
- Development:
  Front-End Development:
  Implement the user interface using HTML5, CSS3, JavaScript, Bootstrap, JQuery focusing on responsiveness and user experience.
  Back-End Development:
  Build the server-side components using PHP, MySQL, Apache programming languages and suitable framework to handle data storage, retrieval, and processing.
- Testing and Quality Assurance: Conduct unit testing to verify the functionality of individual components. Test the interactions between different system modules. Involve end-users to validate the system's usability and identify any issues.
- Monitoring and Support: Implement continuous monitoring to ensure system uptime and performance. Establish customer support channels to assist users with inquiries and issues.

This methodology ensures a structured and iterative approach to developing the Online Railway Ticket Booking System, emphasizing user-centric design, security, and continuous improvement throughout the project lifecycle. Regular communication with end-users is essential to adapt to evolving needs and deliver a high-quality railway ticket booking platform

Chapter 2

REQUIREMENT SPECIFICATION

2.1 User characteristics

The project is anticipated to cater to a diverse array of users, each characterized by unique attributes and requirements. Firstly, passengers, constituting the primary user group, will span various demographics, encompassing individuals from different age groups, backgrounds, and regions. This necessitates the development of an inclusive and user-friendly interface accessible to all, regardless of their technological proficiency, which may range from tech-savvy travelers to those less familiar with online platforms. Secondly, railway authorities and administrators will access the system for monitoring and managing bookings, demanding a certain level of technical expertise associated with railway operations and data management. Concurrently, customer support representatives, who play a pivotal role in assisting users with inquiries and resolving issues, require effective communication skills.

2.2 Dependencies

User Authentication and Authorization Dependency: The booking and payment modules depend on user authentication to ensure secure access and transactions. User profiles and access levels must be established before booking can occur.

- Train Information and Schedule Dependency: Access to real-time train schedules, routes, and seat availability is crucial for booking.
- Database Dependency: Many modules, including booking, payment, and user profiles, depend on a relational database to store and retrieve data. The system relies on the database's availability and integrity.
- Accessibility Features:Ensuring accessibility for all users is essential, impacting user interface and user profile modules.
- External Systems Integration: If the system integrates with external railway systems for real-time data, such as train status and seat availability, it relies on these external systems to provide

accurate information.

- Scalability Solutions: As user traffic increases, the system must scale horizontally to handle the load. Scalability depends on infrastructure and load balancing solutions.
- Data Analytics and Reporting: Data collection and storage are necessary for generating insights and reports.
- Customer Support: The customer support module depends on user inquiries and issues reported through the system. It relies on the availability of support staff to respond to user requests.

2.3 Hardware specification

The hardware requirements for users of this ”Online Railway Ticket Booking System” are minimal:

- Any device with multi-core processor and clock speed of at least 2GHz, minimum 4GB RAM and minimum 256GB storage.
- Web Server: Atleast 2 CPU cores, 4GB RAM, 50GB storage.
- Database Server: At least 4CPU cores, 8GB RAM, 100GB storage.
- Content Delivery Network (CDN).
- Any device with internet access.
- Stable internet connection is essential.
- The system should adapt to different screen sizes.

2.4 Software specification

Here are the software requirements for users of the ”Online Railway Ticket Booking System” in short lines:

- Web Browser: Browsers like Chrome, Firefox, Safari, or Edge for accessing the web application.
- Operating System: OS like Windows, MacOS, Linux, etc which is compatible with the chosen web browser.
- Versions of Software:
  Web Server: Apache
  Back-end Programming: PHP 7.2 or higher.

Database Management: MySQL 5.7 or higher.

Run Time Environment: Node Js 18.18.0 or higher.

Bootstrap Framework: 5.3 or higher.

- Integrated Development Environment(IDE): Visual Studio Code.
- Internet Connection: Stable internet connectivity to access the online system.
- Mobile App : Users may need to install a mobile app for on-the-go access.

Chapter 3

WEBSITE DESIGN

3.1 Sitemap

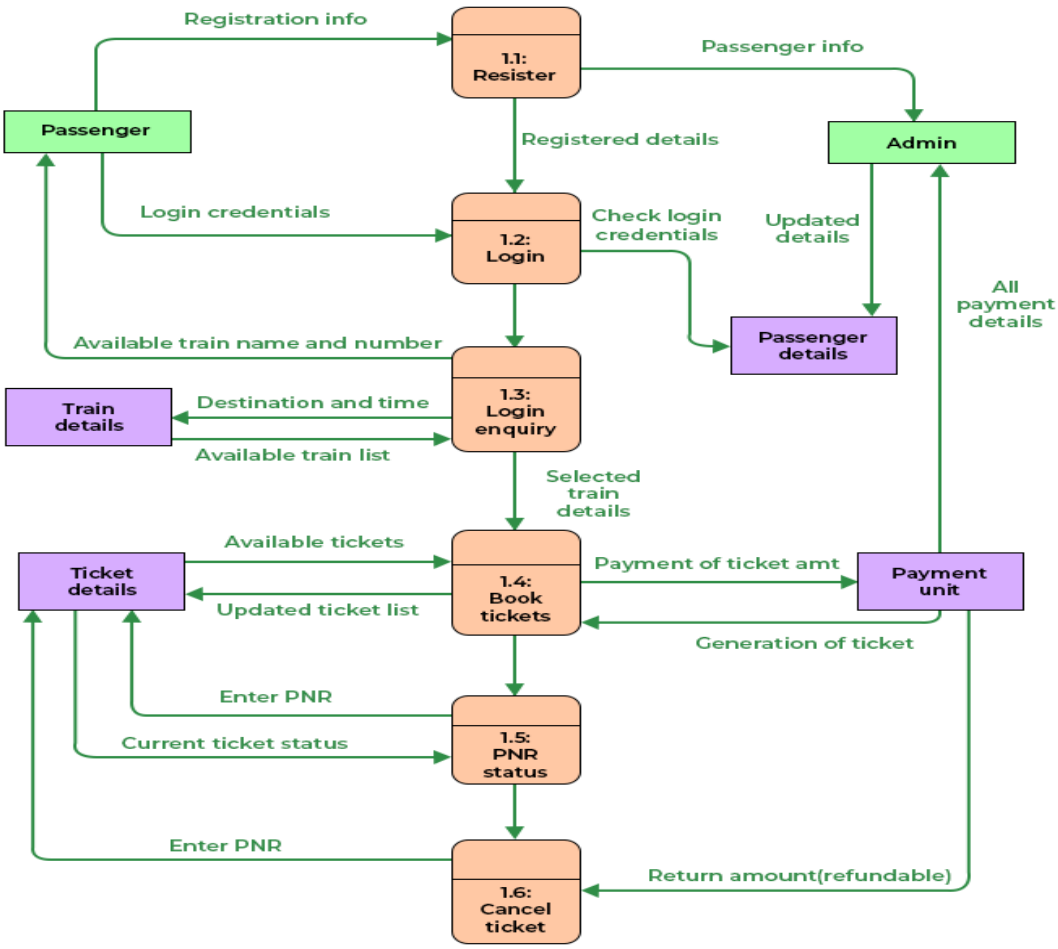

Figure 3.1: **Architecture Diagram**

The figure 3.1 depicts the architecture diagram for the online railway ticket booking system. It outlines the key components and interactions. Users access the system via web browsers, interacting with the web application responsible for user registration info ,login, passenger details, booking, train details, tickets and payments. The application server manages business logic, communicating with the database server(s) that store vital data, including user profiles, train schedules and booking records.

3.2 Design Phase

The design phase of an ”Online Railway Ticket Booking System” involves creating detailed plans and specifications for the system’s architecture, user interface and database structure.

- System Architecture Design:
  Determine the overall system architecture.
  Establish communication protocols and data flow between components.
- User Interface (UI) Design:
  Create wireframes and mockups of the user interface.
  Ensure a user-friendly and responsive design.
- Database Design:
  Design the database schema.
  Determine data storage and retrieval mechanisms.

3.2.1 Data Flow Diagram

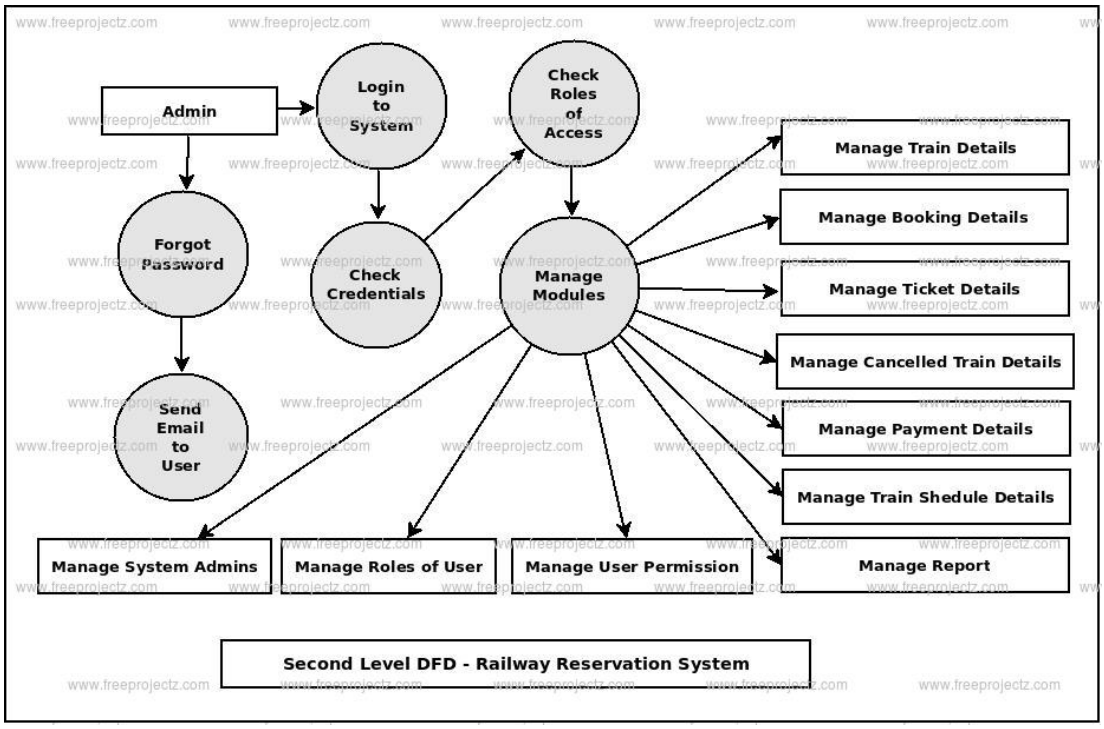

Figure 3.2: **Data Flow Diagram**

The figure 3.2 depicts the Data Flow Diagram. It serves as a visual representation that outlines the flow of data within an online railway ticket booking system. It emphasizes the interactions among

users, processes, data stores, and external entities, offering a structured view of how data is handled and processed throughout the system.

3.3 Front End and Back End Design

3.3.1 Home Page

Figure 3.3: **Home Page**

The figure 3.3 depicts a Home page of Railway Ticket Booking Website which offers a comprehensive user interface featuring a login page, signup page, real-time train status, PNR Enquiry, a user-friendly navigation menu,travel details, user account management options and language/currency preferences. It is done with the HTML5 and CSS3 concepts which includes table, styling etc.It also consists of hyperlink to all the other web pages in the system which is done through the hyperlink concept in HTML5.

3.3.2 Signup and Login page

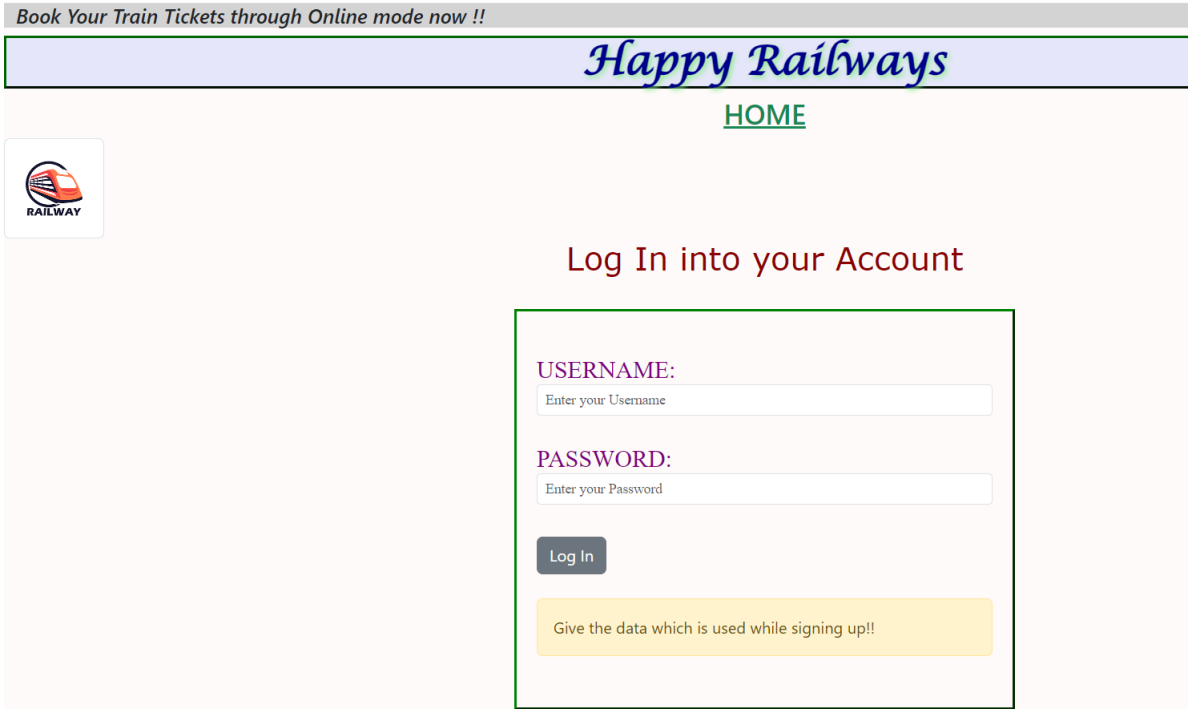

Figure 3.4: **Login Page**

Figure 3.5: **Signup Page**

The figures 3.4 and 3.5 displays the login page and signup page of a railway ticket booking website which allows new users to register and the registered users to access their accounts. It features a HTML form for signup and login with fields for username, password, email, age, gender etc and contains link to other pages.It is done with the HTML5 and CSS along with the Bootstrap Framework.It performs form validation with the help of Bootstrap Framework.

3.3.3 Form Validation

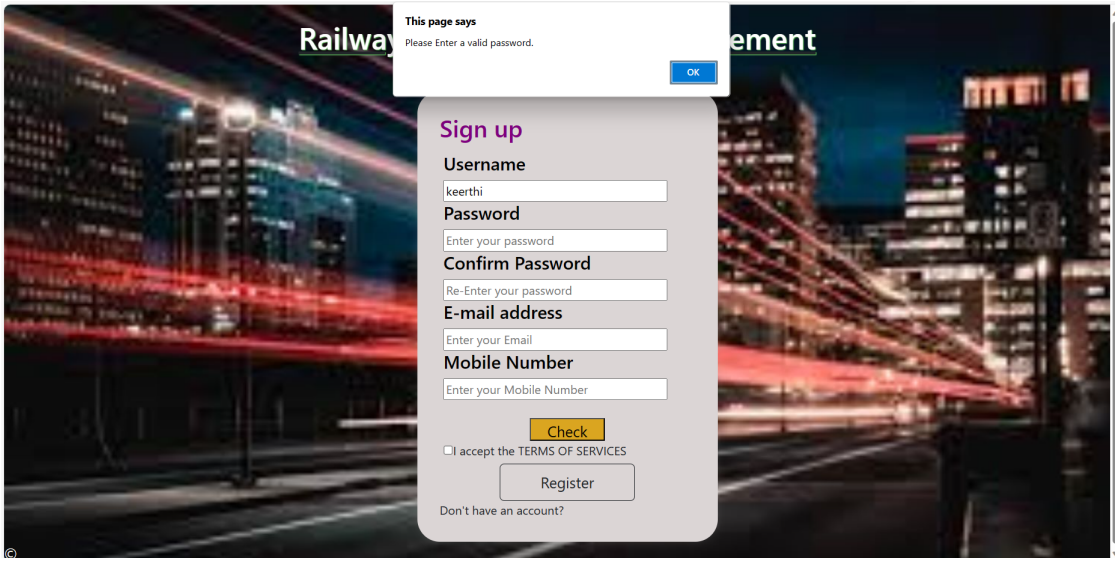

Figure 3.6: **Form Validation**

The figure 3.6 shows a signup page form of our website. It typically collects user information such as name, email address, password, etc. To ensure that the data entered by users is accurate and follows certain rules, JavaScript can be used for form validation. It verifies fields like email, password etc and displays error messages for invalid input and prevents submission until all requirements are met. It validates the input of the form with the help of patterns. These patterns are the Regular Expressions of the input website requires.

3.3.4 Parse the webpage using Jquery and DOM

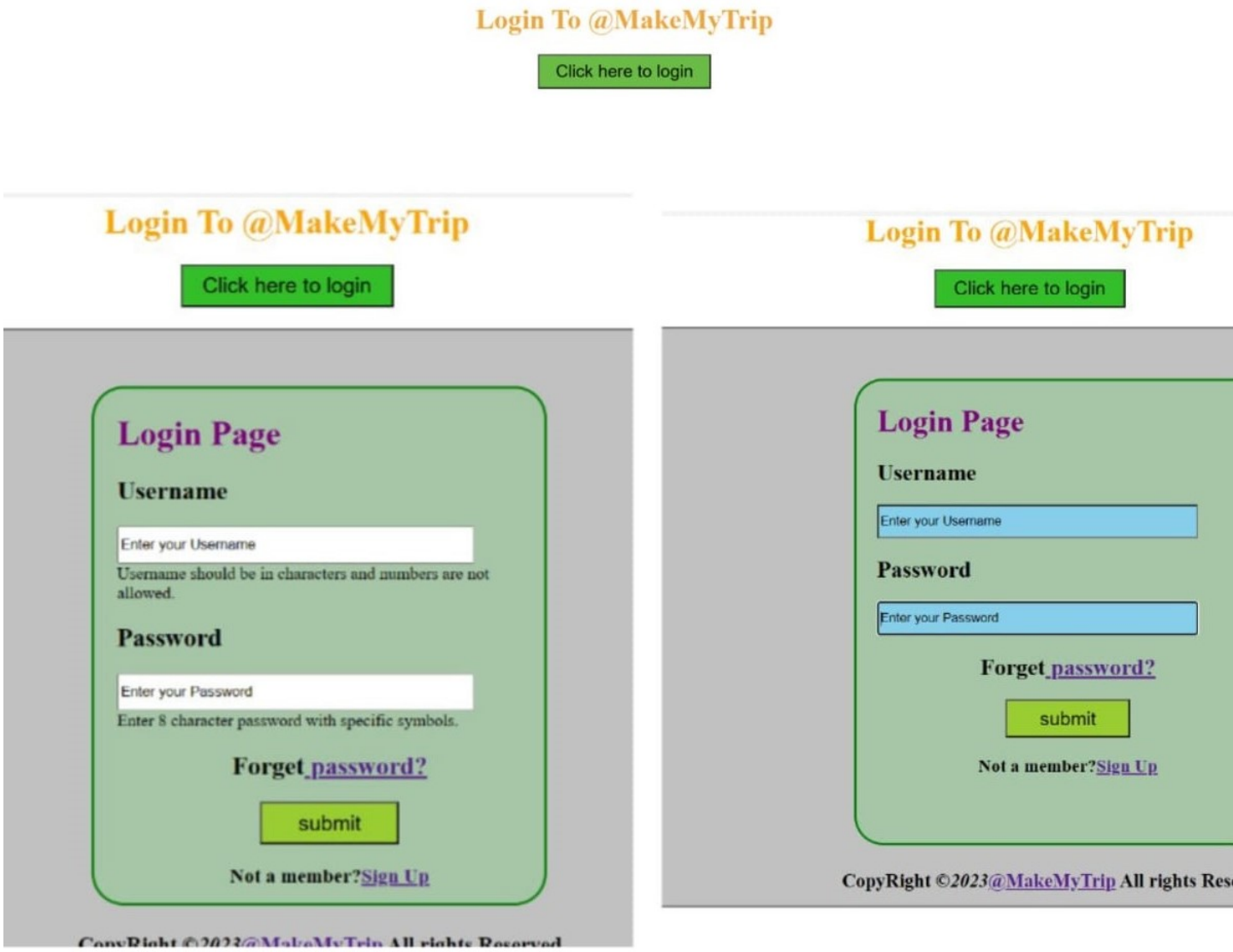

Figure 3.7: **Website with Jquery and DOM**

The figure 3.7 displays the special effects made to the login page using JQuery. It contains sliding, fading and other effects. When the user clicks on the button, the form will appear. When the user places the cursor on the input field, the colour of input box will change. These are the effects seen in the above figure. It also parses the data given by the user and displays in the alert box using DOM.

3.3.5 Creation of Webserver using Node Js

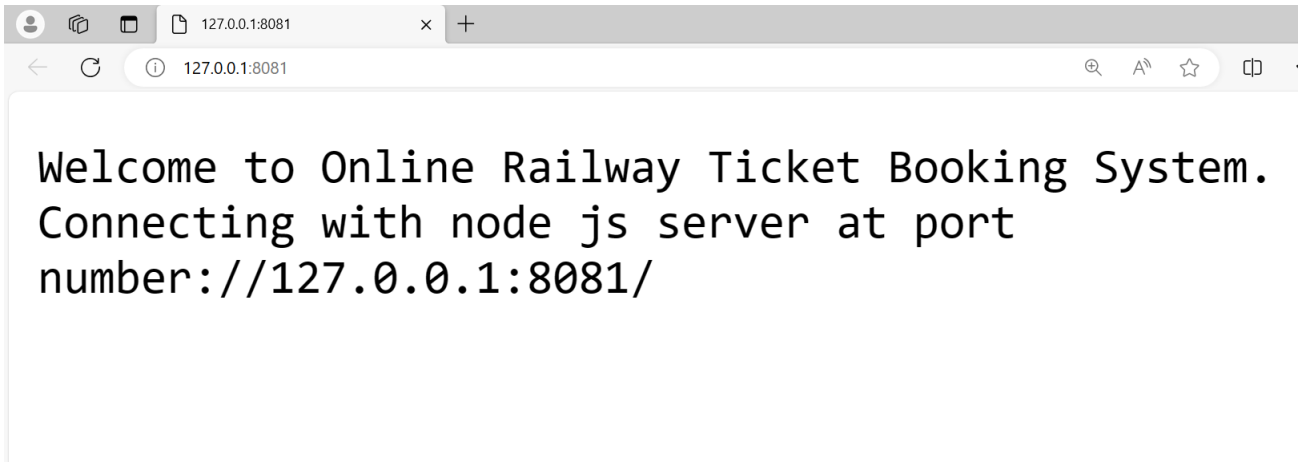

Figure 3.8: **Webserver using Node.Js**

The figure 3.8 illustrates the creation of a web server using Node.Js. Node Js is an open source, cross-platform runtime environment for executing JavaScript .A Web Server is a software application which handles HTTP requests sent by the HTTP client, like web browsers, and returns web pages in response to the clients. In the above figure the web server is created using Node Js and the request is sent by the user.

3.3.6 Design of Three Tier application using Node js and MySQL

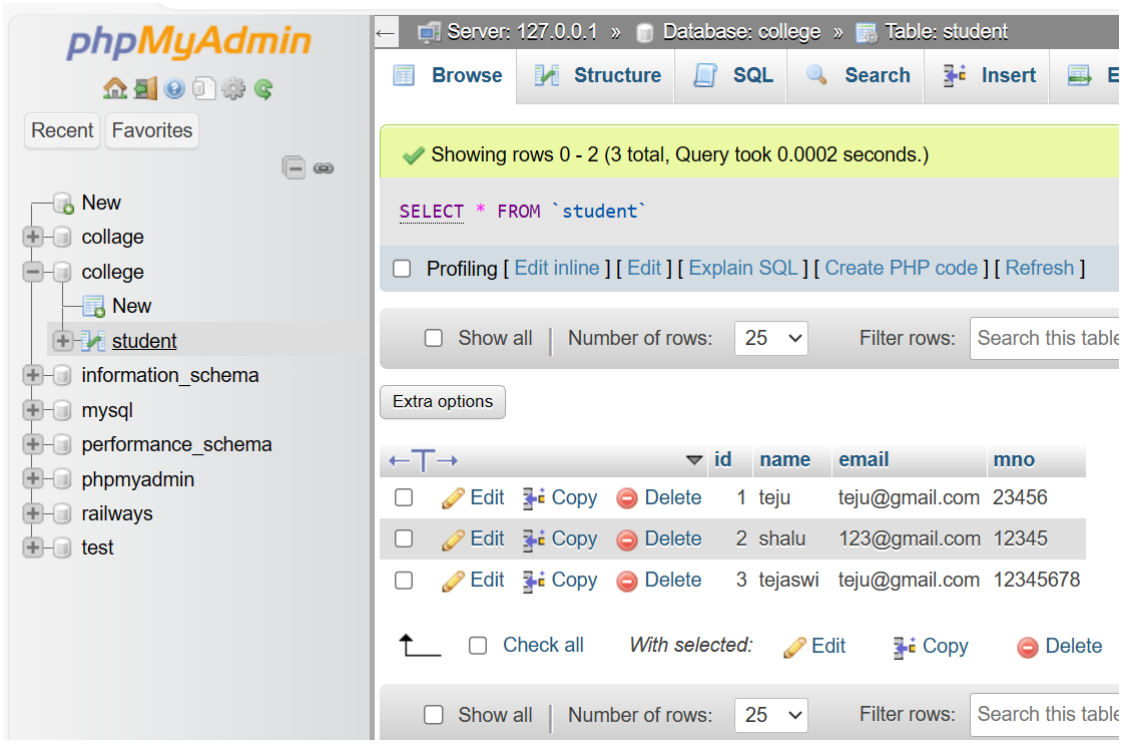

Figure 3.9: **Three Tier application**

The figure 3.9 depicts the Three-tier architecture of the website. It is done by using Node.js and MySQL with the help of XAMPP application. It is well-suited for building applications with user authentication, such as a login page. When the user gives input and fills the form, the data will be stored in the database which is part of the three tire architecture. It ensures separation of concerns, scalability, and maintainability while securely storing user data in the MySQL database managed by XAMPP.

3.3.7 Design of Reactive form for User Registration using Angular

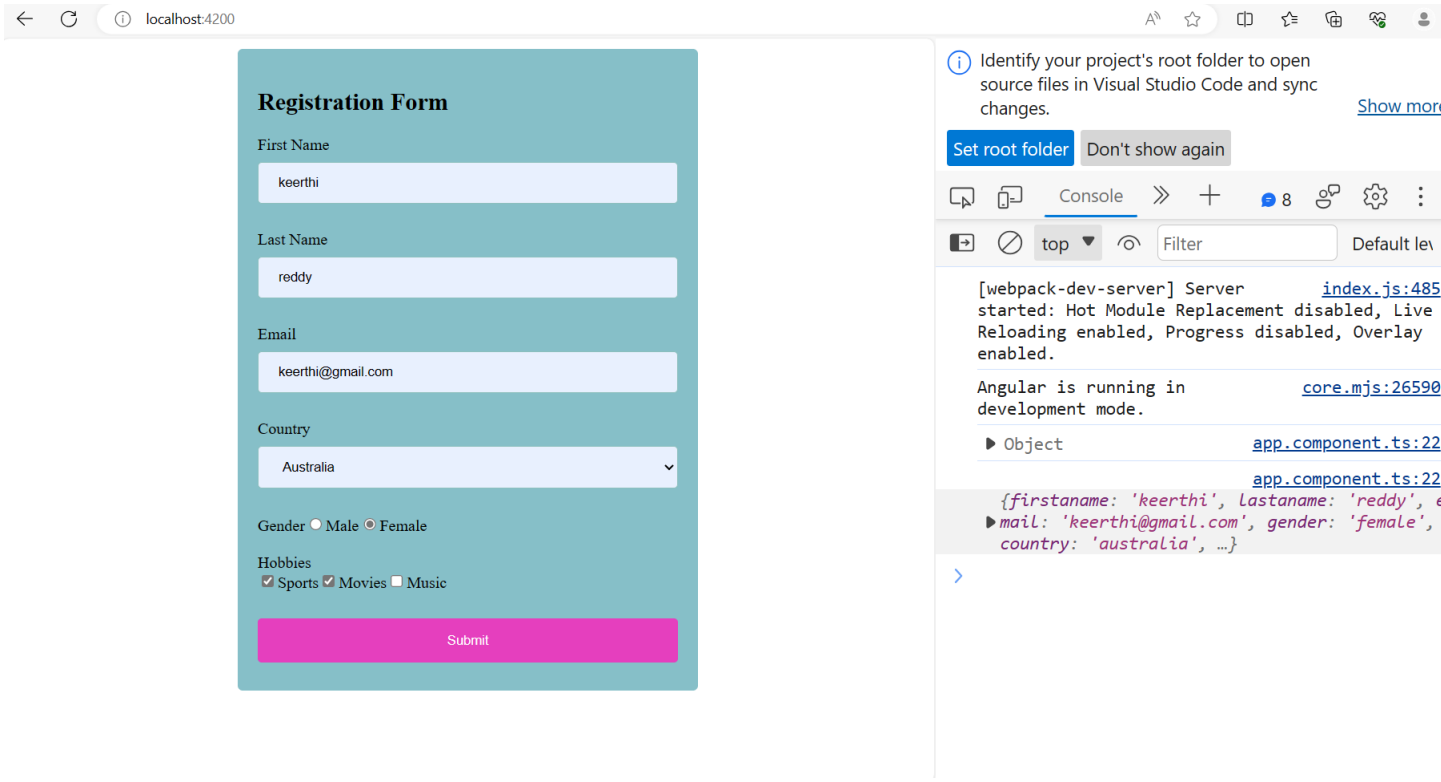

Figure 3.10: **Registration Form using Angular**

The figure 3.10 presents a reactive form for user registration.It is done by using Angular Module. This form allows users to input their information. By displaying the submitted data in the browser console upon submission, it makes the form Reactive. Thus developers can efficiently debug and troubleshoot the registration process.

3.3.8 Develop web application to implement routing and navigation in Angular

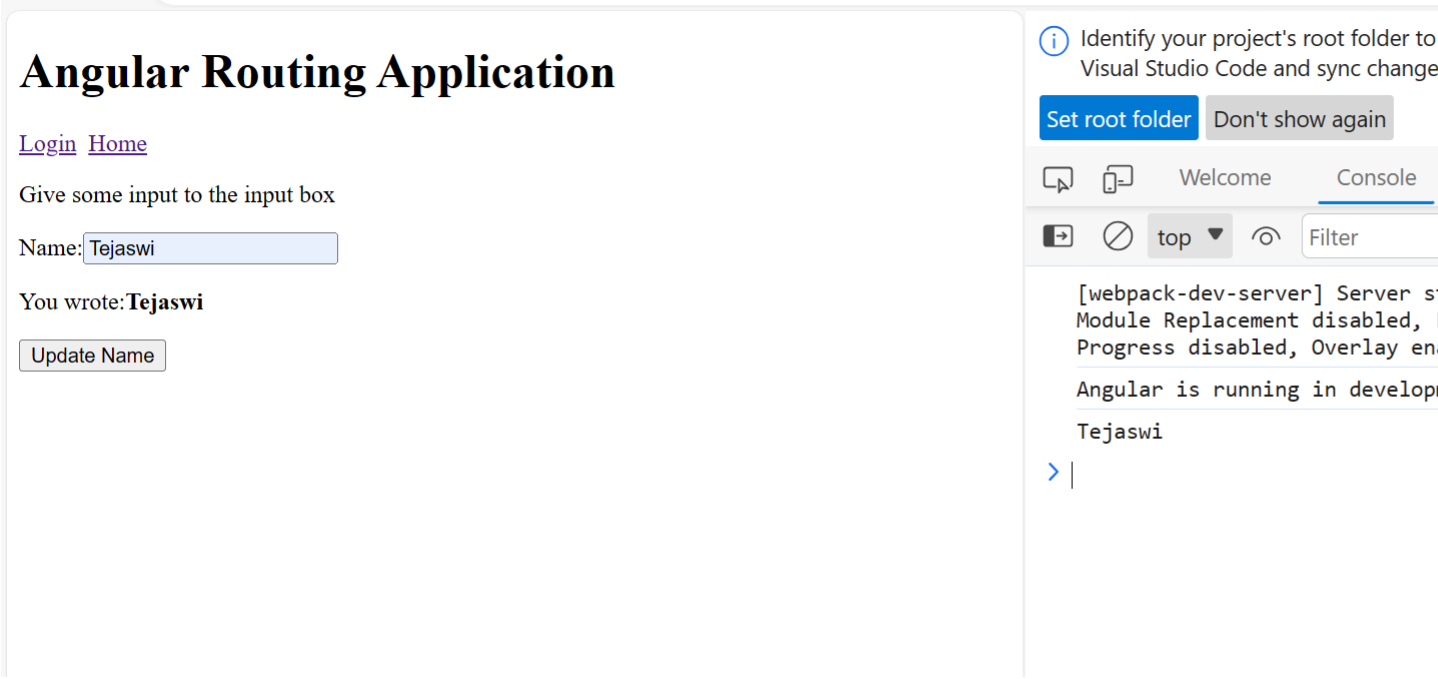

Figure 3.11: **Routing and Navigation in Angular**

The figure 3.11 illustrates the web application which is built with Angular. It demonstrates the routing and navigation in Angular for seamless user experiences. Users can log in, update their profile data and have the updated data displayed in the browser console for debugging purposes.In a single-page application, the angular can change what the user sees by showing or hiding portions of the display that correspond to particular components, rather than going out to the server to get a new page by routing and navigation.

3.3.9 Creation of Microservices

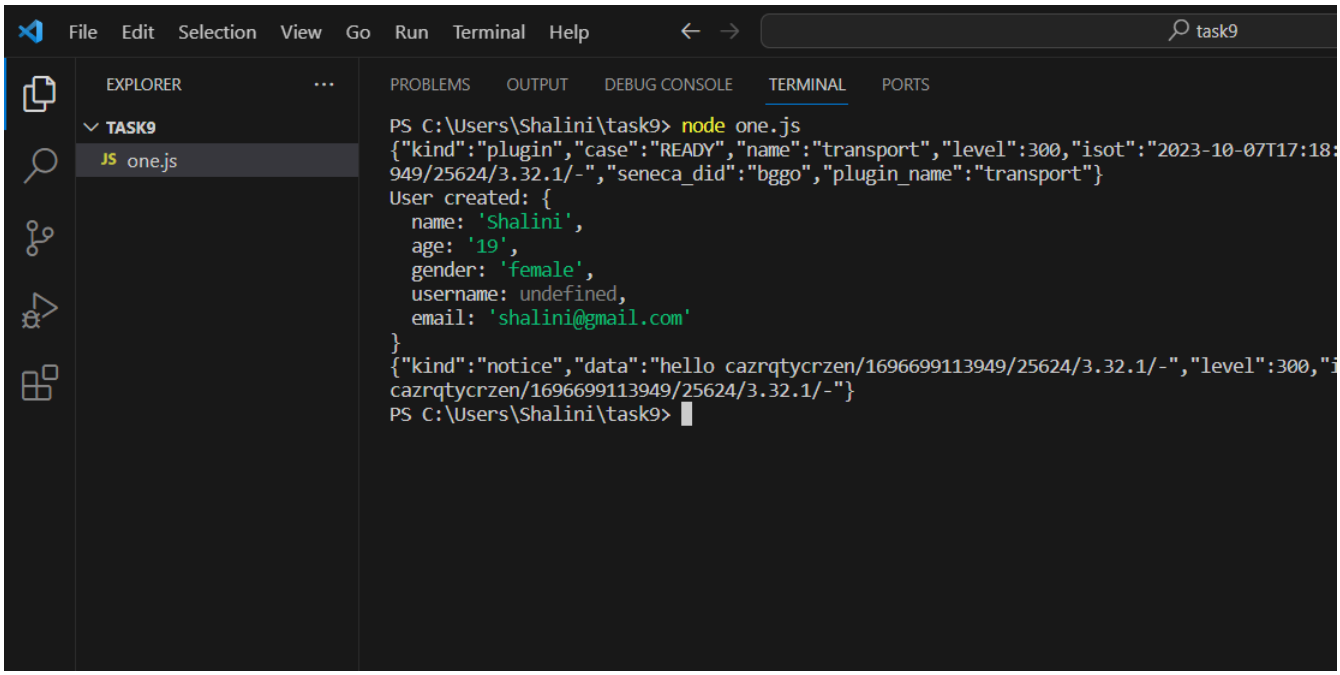

Figure 3.12: **Microservices**

The figure 3.12 displays the creation of Microservices. Microservices are many small services responsible for one functionality or domain in the website. It will allow users to input their information and it displays the submitted data in the text editor console upon submission. It can also be used to perform the arithmetic operations on the input and then displays the result on the console of the text editor. With these the users can perform small operations within the website without changing the entire page.

3.3.10 Web Application to Mobile Application

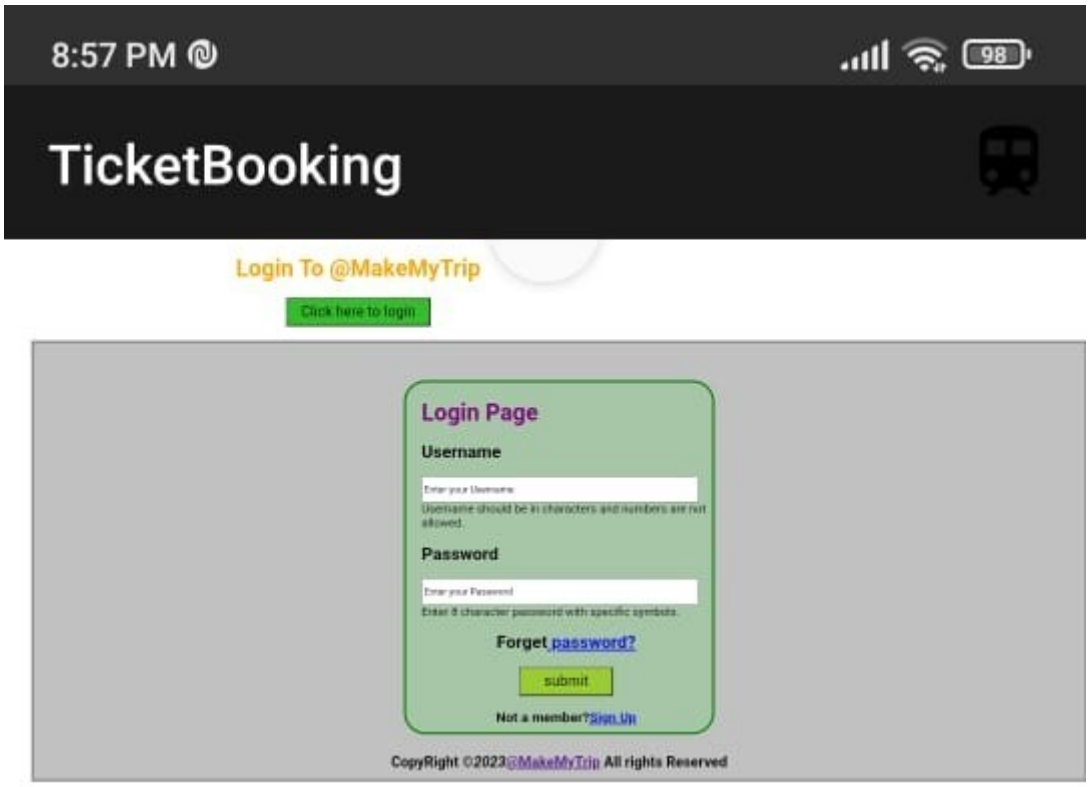

Figure 3.13: **Mobile Application**

The figure 3.13 portrays the Mobile Application for Online Railway Ticket Booking. It consists of the login page including login credentials - username,password fields along with the other details. The mobile application is made by converting the web application. It can be done with the help of online converters. It can be used on mobile phones after the installation of the application.

Chapter 4

TESTING

4.1 Testing

Testing is a critical phase in the development of an online railway ticket booking system to ensure its functionality, reliability, and security.

Unit Testing:

Isolation of Components: Unit testing focuses on isolating individual components or functions of a web page. In the context of a ticket booking system, this could involve testing specific modules responsible for user authentication, fare calculation, seat selection and so on.

Test Coverage: Ensure comprehensive coverage of the code by writing tests for various scenarios. This might involve testing edge cases, invalid inputs etc.

Data Setup: Create consistent and reproducible test data to ensure that your tests produce reliable results. In this ticket booking website, this could involve setting up sample routes, stations and passenger details.

Functional Testing:

User Registration and Login: Verify that users can create accounts, log in, and recover passwords if needed.

Search and Booking: Test the system's ability to search for trains, display schedules, and allow users to book tickets for specific journeys.

Seat Selection: Ensure that passengers can select seats or berths based on their preferences.

Payment Processing: Test the payment gateway for various payment methods, including credit/debit cards, mobile wallets, and net banking.

Ticket Confirmation: Verify that users receive booking confirmations with relevant details.

Ticket Cancellation and Refunds: Test the cancellation process and refund mechanisms for canceled tickets.

Performance Testing:

Load Testing: Assess how the system performs under various levels of user traffic to ensure it can

handle peak usage without slowdowns or crashes.

Scalability: Verify that the system can scale up to accommodate increasing user loads by adding server resources as needed.

Response Time: Monitor and optimize response times for search, booking, and payment processing.

Security Testing:

Authentication and Authorization: Ensure that user authentication and authorization mechanisms are robust and secure.

Payment Security: Test the payment gateway for vulnerabilities and compliance with industry standards such as PCI DSS.

4.1.1 Test Result

The online railway ticket booking system underwent comprehensive testing to ensure its reliability and functionality. Page transitions from the homepage to login, registration to login and booking confirmation to the ticket page were observed to be smooth and efficient. Form validation procedures accurately identified and communicated errors, such as incorrect login credentials ensuring a seamless user experience. Additionally, performance testing under simulated peak loads yielded satisfactory results. Security scans successfully identified and resolved potential vulnerabilities, further fortifying the system's integrity. The system's responsive user interface and compatibility across devices and browsers demonstrated its commitment to delivering a user-friendly experience.The system has successfully met testing criteria, including page transitions, form validation, performance and security and is prepared for user acceptance trials.

Test Case ID	Test Case Description	Input	Expected Result
TC-01	Valid Login	Username:Keerthi1234, Password:Keerthi@123	User is Successfully logged in and redirected to the dashboard/homepage.
TC-02	Invalid Username	Username:@@@@@, Password:Keerthi@123	User sees an error message indicating that the username is incorrect.
TC-03	Invalid Password	Username:Keerthi1234, Password: wgudghbd	User sees an error message indicating that the password is incorrect.
TC-04	Empty Fields	Username: (empty), Password: (empty)	User sees an error message indicating that both fields are required.
TC-06	Password Field Empty	Username: Keerthi1234, Password: (empty)	User sees an error message indicating that both fields are required.

Table 4.1: **Test Results for Login Page**

The table 4.1 illustrates the inputs given to the login page while testing it. It showcases the input given, result appeared on the web page along with the description of the individual test case.

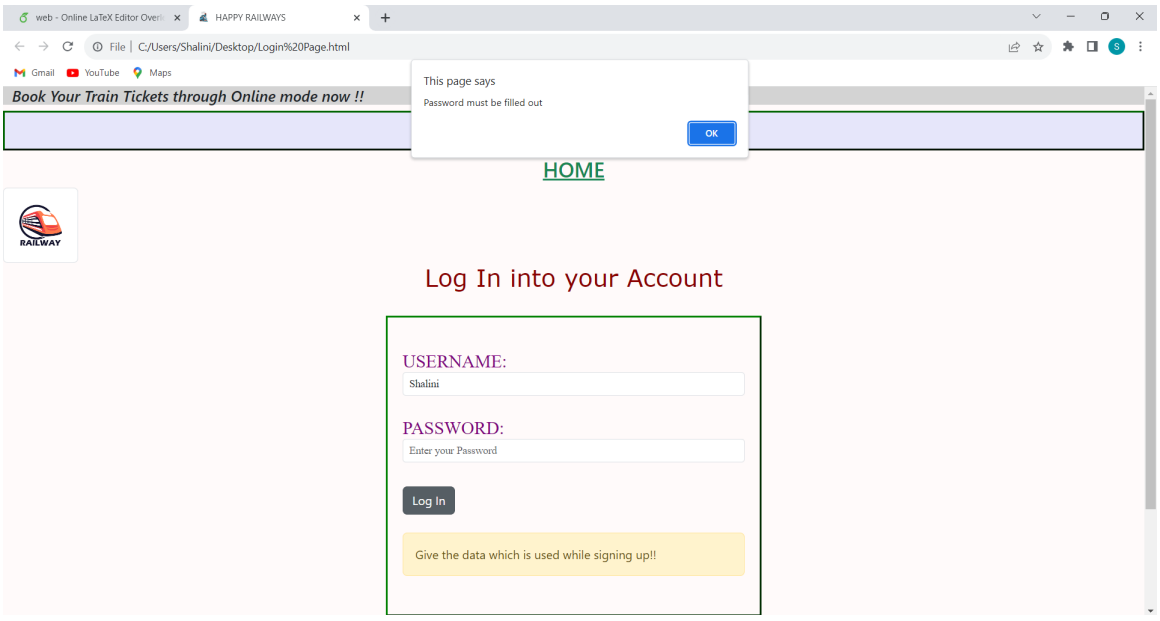

Figure 4.1: **Empty Password**

The figure 4.1 depicts the test result of the user input which contains valid username but empty password.It pops up the message box which says that the password must be filled.

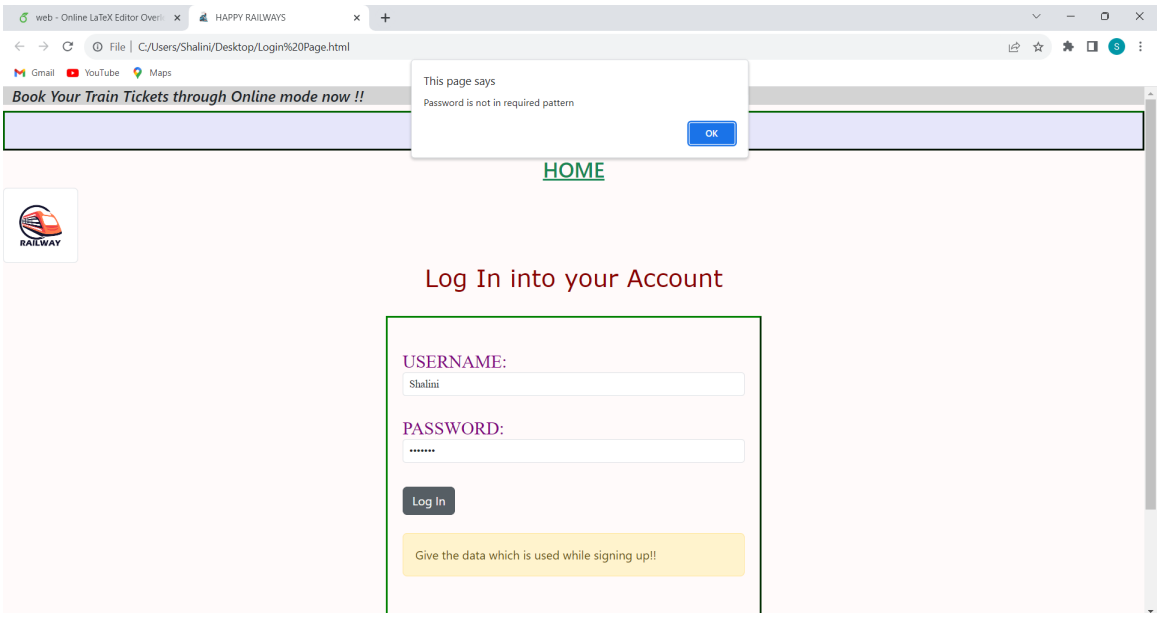

Figure 4.2: **Invalid Password**

The figure 4.2 depicts the test result of the user input which contains valid username but invalid patterned password.It pops up the message box which says that the password is not in the required pattern.

4.1.2 Test Bugs

Based on the tests conducted, the potential bugs found are :

1. Blank spaces are allowed in the username and password fields.
2. Numbers and special characters are also allowed in the username field.
3. The website takes some excessive amount of time to process a request, causing slow performance for the user.
4. The website is vulnerable to SQL injection attacks, allowing malicious users to access the database and extract sensitive information.
5. The alignment in the angular routing application is not good. The Login and the Home page links are attached to each other which makes the appearance of the website clumsy. It is solved by creating the space between the two links using the appropriate commands.

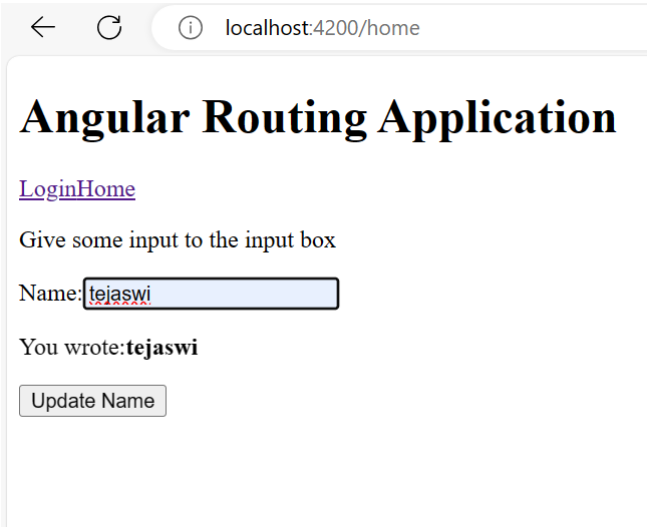

Figure 4.3: **Routing and Navigation in Angular**

The figure 4.3 displays one of the bugs identified in the angular routing application of the website. The alignment of the hyperlinks to other pages of the website are combined together.

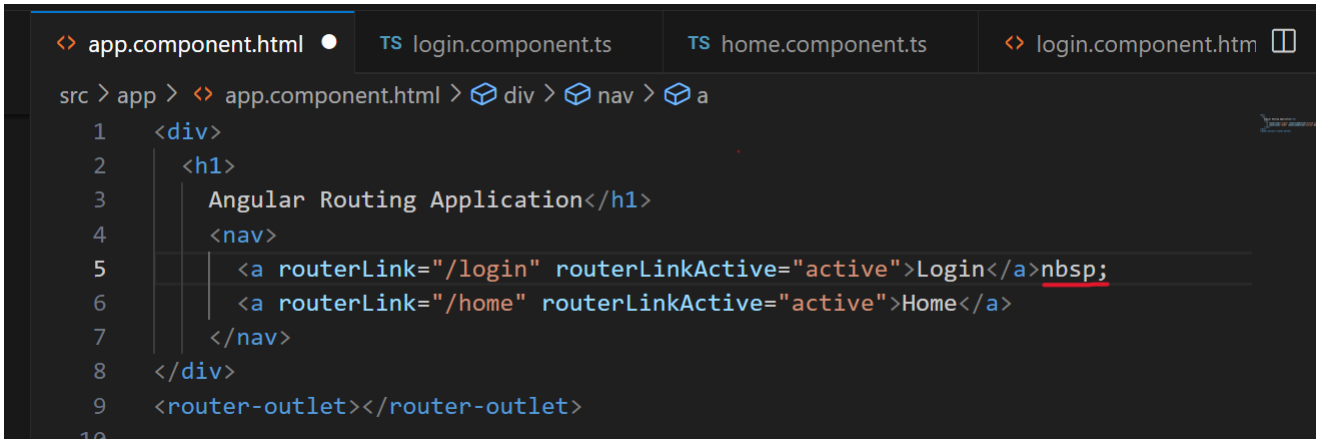

Figure 4.4: **Identified bug**

The figure 4.4 displays code of one of the bugs identified in the angular routing application of the website. The alignment of the hyperlinks to other pages of the website are combined together. To rectify this the symbol is used in between the hyperlinks in the website.

These are some of the bugs identified while testing the website. There may be possibility to discover some other bugs in the website in future.So it is important to test the website completely with all the possible test cases and ensure that it is functioning properly.

Chapter 5

WEBSITE LAUNCH

Figure 5.1: **Home Page of Website**

The figure 5.1 illustrates the Home page of the website for Online Railway Tickets Booking System. The website for Online Railway Tickets Booking is launched to serve the purpose of ticket booking in online mode. It allows the user to sign up in the website, login and check for the train tickets availability and then book the tickets in the website. It helps the user to simplify the ticket reservation process, eliminate the need for physical ticketing and enhance the overall experience of planning and managing train journeys in a secure and efficient manner.

Chapter 6

RESULTS AND DISCUSSIONS

6.1 Website performance

The online railway ticket booking website operates smoothly, offering swift loading and instant responses. It ensures a hassle-free booking experience, whether you're searching for options or confirming a booking.The website is responsive, working seamlessly on both computers and mobile devices, ensuring convenience for all users. The goal is straightforward: a user-friendly platform that performs flawlessly.To maintain this level of performance, continuous monitoring and fine-tuning occur. The focus is on providing a fast and reliable ticket booking experience, ensuring a seamless journey from start to finish.

- Swift Loading: The online railway ticket booking website is all about speed. Pages load swiftly, minimizing any wait time for users. Whether you're searching for available tickets, reviewing schedules, or finalizing your booking, you can expect a rapid response.
- Immediate Responses: The website responds instantly to your actions. Clicking on options, selecting preferences, and confirming bookings all happen without delays. This immediate response contributes to a seamless and frustration-free experience.
- Seamless Adaptation: The website is designed to work seamlessly across different devices. Whether you're accessing it on a computer, tablet, or smartphone, the interface adjusts flawlessly to your screen size. This responsive design ensures a consistent and user-friendly experience, no matter where you're booking from.
- Continuous Optimization: To maintain this high level of performance, continuously monitor and optimize the website. Regular checks and fine-tuning efforts help identify and resolve any potential performance bottlenecks, ensuring that the platform remains fast and reliable.
- User-Centric Focus:Above all, the website's performance is driven by a user-centric approach. Understanding that your time is valuable, commitment to efficient performance reflects dedication to providing you with a smooth and frustration-free ticket booking experience.

6.2 Security

The Online railway ticket booking system places the utmost importance on security to safeguard user sensitive data and ensure a worry-free experience. And ensuring safety is paramount in the online railway ticket booking system.

- Data Encryption: Prioritizing your data's security, the website relies on advanced encryption protocols to render your information unreadable during transmission. This ensures the complete confidentiality of your personal details and payment information.
- Secure Authentication: Stringent authentication methods have been implemented, encompassing robust password policies and multi-factor authentication options. These measures significantly reduce the risk of unauthorized access to your account.
- Regular Security Assessments: Dedication to security is unwavering. Frequent security audits, vulnerability assessments, and penetration tests proactively identify and address potential threats, keeping your data secure.

6.3 Responsiveness and mobile-friendliness

Prioritizing browsing experience, the online railway ticket booking website boasts a responsive and mobile-friendly design prioritizes comfort and convenience.

- Adaptability: The website seamlessly adjusts to various screen sizes and devices. Whether using a desktop computer, tablet, or smartphone, the interface effortlessly provides an optimal viewing and interaction experience.
- User-Friendly Navigation: Regardless of the device used, a consistent and user-friendly layout ensures intuitive navigation. All features and functionalities are easily accessible. Visual Appeal: The design combines functionality with visual appeal. The website maintains a captivating and professional appearance across all devices.
- Readability: Text and images are presented clearly and legibly on all screens, eliminating the need for zooming in or straining your eyes, thus ensuring a comfortable browsing experience.
- Efficiency: Whether searching for ticket options, checking schedules, or completing a booking, you can do so efficiently without any performance hiccups or layout issues.

Chapter 7

CONCLUSION AND FUTURE ENHANCEMENTS

7.1 Conclusion

In conclusion, the Online Railway Ticket Booking System is here to make users travel plans easier and more convenient. With just a few clicks, user can book their train tickets from the comfort of their home or on the go. It has brought about numerous benefits for both passengers and the railway authorities, including convenience, efficiency and improved transparency. As technology continues to advance, it can expect even more enhancements in the future, such as better user interfaces, real-time updates and integration with other modes of transportation. It has better security and ensures accessibility for all users to make this system truly inclusive and efficient. Overall, the Online Railway Ticket Booking System has made traveling by train a smoother and more user-friendly experience for passengers and its ongoing development promises even greater improvements in the years to come. Additionally, the digitalization of ticketing has fostered transparency, making fare information readily accessible to passengers and reducing the scope for fraudulent activities.

7.2 Future Enhancements

In the near future, Online Railway Ticket Booking Systems are poised for a significant transformation, driven by advancements in technology and evolving passenger expectations. It holds exciting possibilities for enhancing the overall experience for passengers. Some potential future enhancements include:

- Artificial Intelligence and Predictive Analytics: The integration of advanced AI algorithms and predictive analytics will enable the system to offer personalized recommendations to passengers. By analyzing past travel behavior and preferences, the system can suggest optimal travel times, routes, and seating options, enhancing the overall travel experience.
- Dynamic Pricing and Fare Optimization: Future systems will implement dynamic pricing mod-

els that consider real-time factors like demand, time of booking, and seat availability to provide passengers with more flexible and cost-effective fare options. This approach not only benefits passengers but also optimizes revenue for railway authorities.

- Augmented Reality (AR) and Virtual Reality (VR): AR and VR technologies will be leveraged to provide passengers with immersive experiences. Passengers can virtually explore train interiors, view seating arrangements, and even take virtual tours of stations, making informed choices and enhancing the excitement of travel.

- Biometric Authentication: To bolster security, biometric authentication methods such as fingerprint recognition or facial recognition will become more prevalent, providing passengers with a secure and convenient way to access their accounts and board trains.

- Multi-Language Support and Localization: To cater to a global audience, these systems will offer support for multiple languages and provide localized content, including station information, in the preferred language of the passenger. This will enhance accessibility and usability for travelers from diverse linguistic backgrounds.

- AI-Powered Chatbots and Virtual Assistants: Advanced chatbots and virtual assistants equipped with natural language processing capabilities will handle customer inquiries, ticket changes, and travel assistance efficiently, offering round-the-clock support and enhancing user satisfaction.

Chapter 8

SOURCE CODE

HOME.html

```
   <!DOCTYPE html>
<html>
<head>
    <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.7.0/jquery.
    <title>Registration</title>
    <style>
        .container {
            position: relative;
            display: inline-block;
        }

        img {
            width: 100%;
            height: auto;
            opacity: 0.6;
        }
        .bottom-links {
            position: absolute;
            bottom: 600px; /* Adjust the value to move the links up or down
            left: 20px;
            display: flex;
            align-items: center;
        }
        .bottom-links a {
            margin-right: 10px;
            color: white;
```

```
            text-decoration: none;
            background-color: #333;
            padding: 10px 20px;
            border-radius: 10px;
        }

        #login-register {
      position: absolute;
      top: 50px;
      right: 20px;
    }

    </style>
    <script>
        $(document).ready(function(){
            $("p").mouseleave(function(){
            $("p").animate({
                width:'150px'
            });
        });
            $("button").dblclick(function(){
                alert("We are connected with Indian Railways");
            });
            $("#2").click(function(){
                $("h2").fadeOut("slow");
            });
        });
    </script>
</head>
<body>

    <div class="container">
        <h1><center><font color="brown"><i>Indian Railway Ticket Booking</i
        <button id="2">Fade</button>
```

```
        <h2>Welcome to Indian Railway passenger Reservation Enquiry</h2>
        <img src="C:\Users\K Tejaswi Reddy\OneDrive\Pictures\Screenshots\43
        <div id="login-register">
            <a href="C:\Users\K Tejaswi Reddy\amma.html">Login</a> / <a hre
          </div>

        <div class="bottom-links">
            <a href="C:\Users\K Tejaswi Reddy\index.html">My Bookings</a>
            <a href="C:\Users\K Tejaswi Reddy\running_status.html">Running
            <a href="C:\Users\K Tejaswi Reddy\pnr_status.html">PNR Enquiry<
            <a href="C:\Users\K Tejaswi Reddy\.html">contact us</a>
            <a href="C:\Users\K Tejaswi Reddy\html">Details</a>
            <a href="C:\Users\K Tejaswi Reddy\html">Ttain schedule</a>
        </div>
    </div>
    <p>THANK YOU FOR USING OUR WEBSITE</p>
    <button>NOTE</button>
</body>
</html>
```

LOGIN.html:

```
<html >
<head>
<meta charset="UTF-8" />
<meta name="viewport" content="width=device-width, initial-scale=1">
<link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css" rel="stylesheet"
integrity="sha384-9ndCyUaIbzAi2FUVXJi0CjmCapSmO7SnpJef0486qhLnuZ2cdeRhO02iuK6FUUVM"
crossorigin="anonymous">
<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/js/bootstrap.bundle.min.js" integrity="sha384-
geWF76RCwLtnZ8qwWowPQNguL3RmwHVBC9FhGdlKrxdiJJigb/j/68SIy3Te4Bkz" crossorigin="anonymous
<style>
h1{
text-align:center; color:darkblue; border-style: outset; border-color: darkgreen; background-color:lavender;
text-shadow: 2px 2px 5px lightgreen ; font-family: 'Lucida Calligraphy'; }
h4{
```

```
font-family: 'Times New Roman'; color:purple; }
header{
background-color:lightgray; }
footer{
background-color: lightgray; text-align: center; }
</style>
<title>HAPPY RAILWAYS</title>
<link rel="icon" type="img" href="C:.png">
<script>
function validate(){
var a = document.forms["login"]["uname"].value;
if (a == "") {
alert("Username must be filled out");
return false;
}
var b = document.forms["login"]["pass"].value;
var pattern=/(?=.*)(?=.*[a-z])(?=.*[A-Z]).8,20/;
if (b == "") {
alert("Password must be filled out");
return false;
}
else if(!pattern.test(b))
alert("Password is not in required pattern");
return false;
}
}
</script>
</head>
<body style="background-color: snow;">
<header class="container-fluid"><i><h5>Book Your Train Tickets through Online mode now !!</h5¿></i><
<h1><b¿Happy Railways</b></h1>
<div class="container text-center">
<div class="row">
<div class="column">
```

<h3 >HOME </h3>

<img src=”C:Logo.png” class=”img-thumbnail” height=”100” width=”100” >
<h2 style=”color: darkred; text-align: center; font-family: Verdana;” ¿ Log In into your Account</h2>
<form name=”login”>
<div style=”width:500px;height:400px;margin: 0 auto;border:outset green;padding:20px;”>

<h4>USERNAME: <input class=”form-control form-control-sm” type=”text” name=”uname” size=”30” placeholder=”Enter your Username”>

PASSWORD: <input class=”form-control form-control-sm” type=”password” size=”30” name=”pass” placeholder=”Enter your Password”></h4>
<a class=”btn btn-secondary” onclick=”validate()”In

<div class=”alert alert-warning” role=”alert”>
Give the data which is used while signing up!!

</form>

<footer class=”container-fluid”><h5>copy;2023 Railway Tickets Booking
Followed as per the Rules of Indian Railways</h5>
Feel free to share your comments, suggestions, queries and experiences to us anytime on happyrail-ways@email.com
Contact us through: 0823-156-3578 </footer>
</body>
</html>

APP COMPONENT.html:

```
    <div>
  <h1>
    Angular Routing Application</h1>
    <nav>
      <a routerLink="/login" routerLinkActive="active">Login</a> 
      <a routerLink="/home" routerLinkActive="active">Home</a>
```

```
    </nav>
</div>
<router-outlet></router-outlet>
```

LOGIN COMPONENT.ts:

```
    import { Component,OnInit } from '@angular/core';
import{ Router } from '@angular/router';

@Component({
  selector: 'app-login',
  templateUrl: './login.component.html',
  styleUrls: ['./login.component.css']
})
export class LoginComponent implements OnInit{
  constructor(private router:Router){}
    ngOnInit():void{}
    updateName(){
      this.router.navigate(['home']);
    }
  }
```

Chapter 9

SCREENSHOTS

FRONT END:

Figure 9.1: **Home Page**

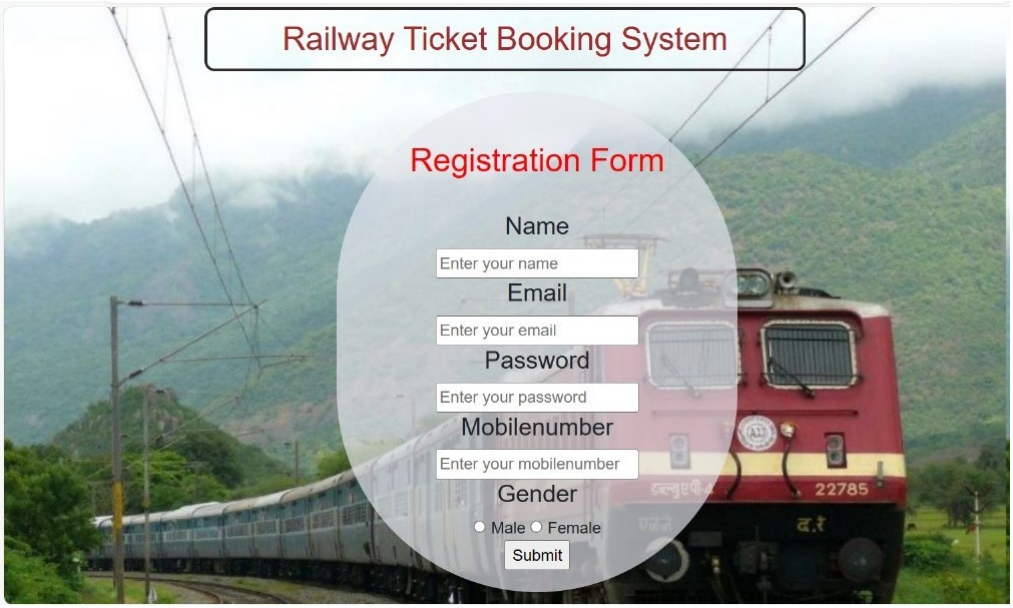

Figure 9.2: **Signup Page**

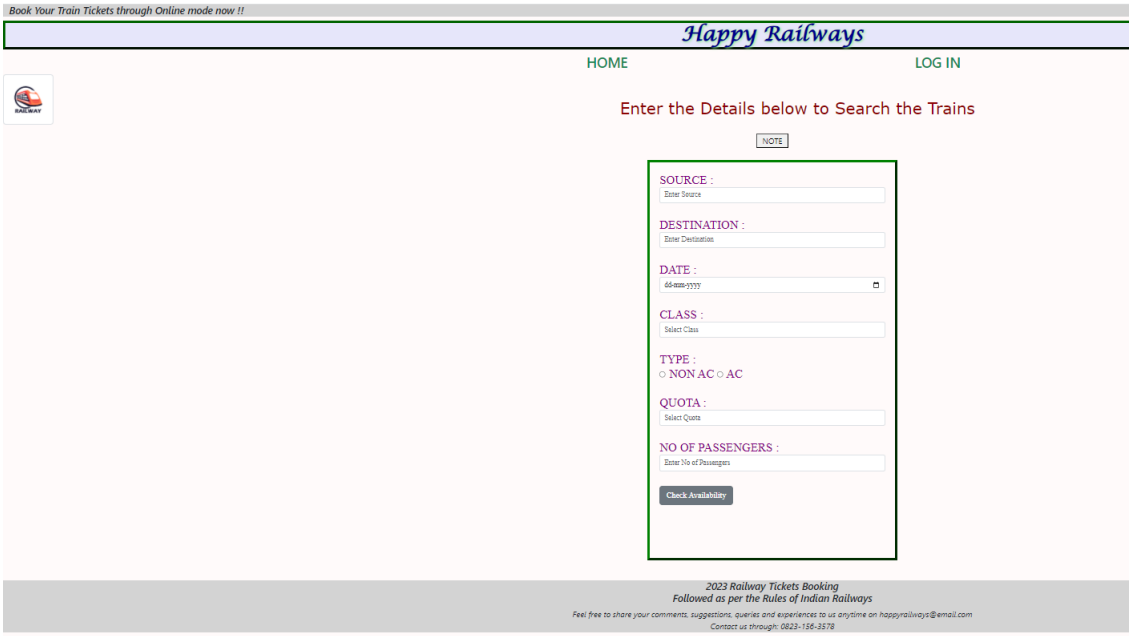

Figure 9.3: **Availability page**

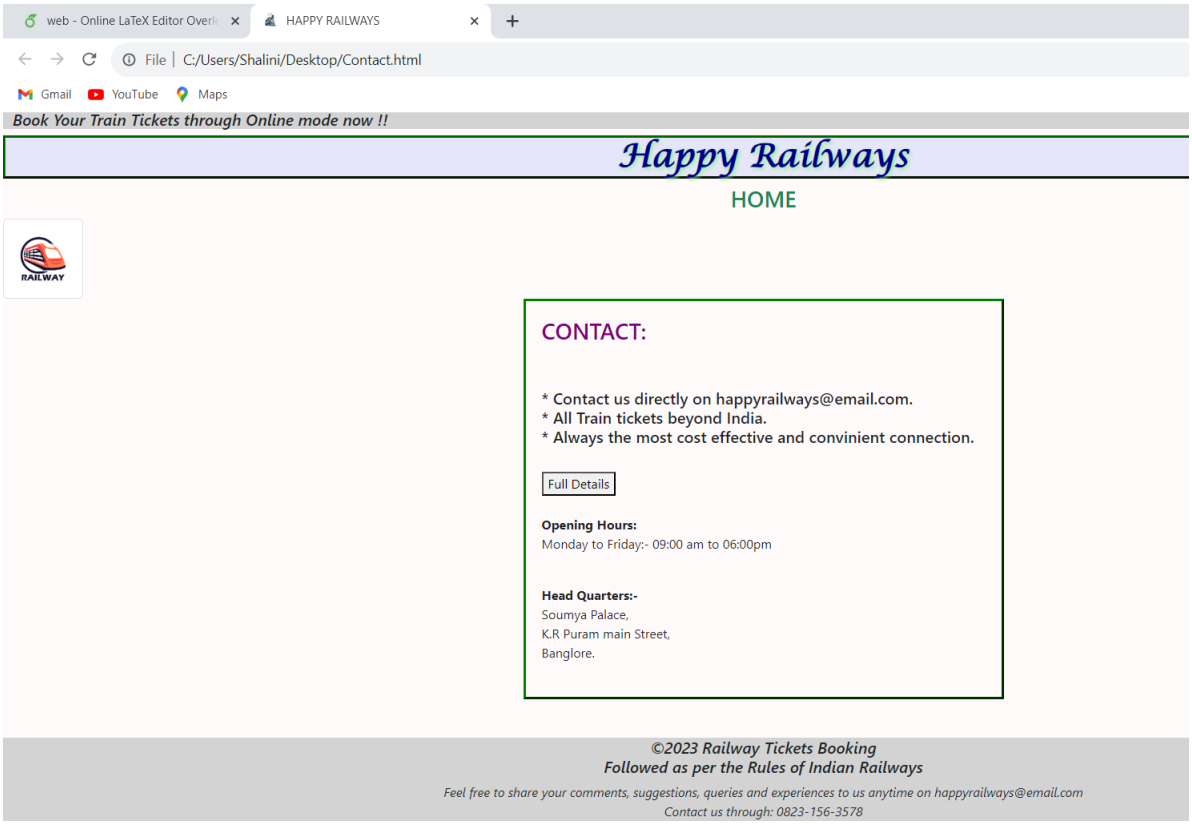

Figure 9.4: **Contact page**

BACK END:

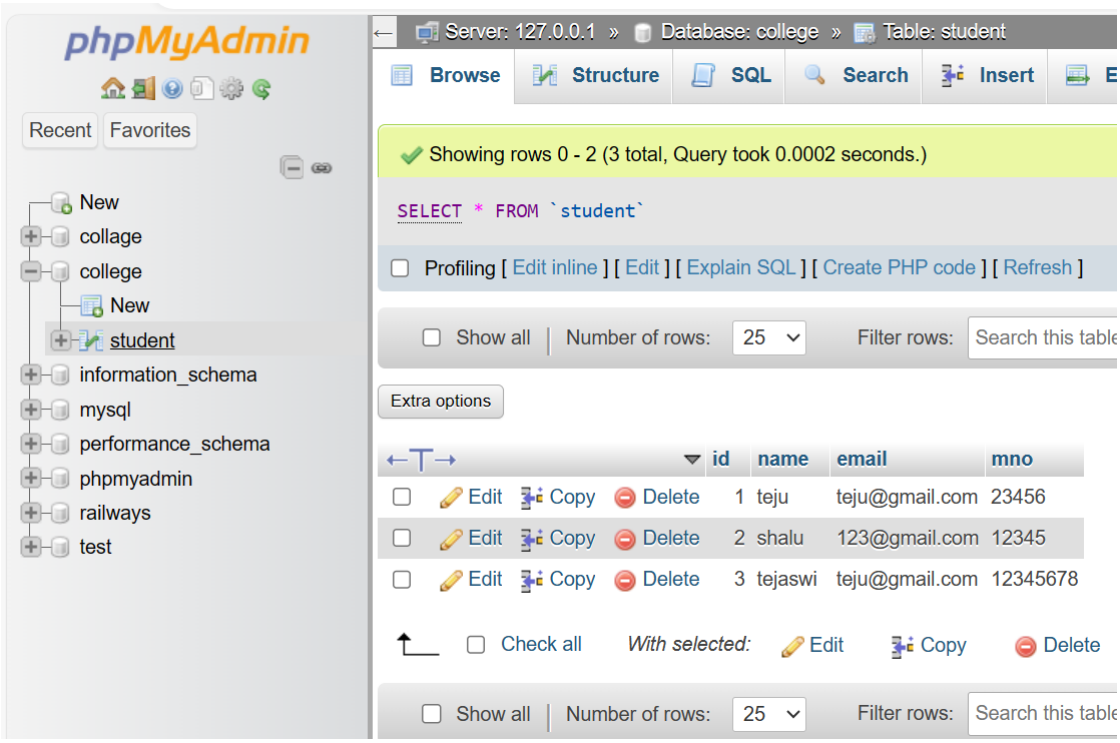

Figure 9.5: **Database**

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[1] https://www.irctc.co.in

[2] https://www.makemytrip.com/railways

[3] https://www.railyatri.in/train-ticket

[4] https://www.confirmtkt.com

[5] https://www.goibibo.com/trains

[6] https://www.easemytrip.com/railways

[7] https://getbootstrap.com

[8] https://jquery.com

[9] https://nodejs.org