A PROJECT ON

"TRAIN RESERVATION SYSTEM"

SUBMITTED IN
PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE COURSE OF
DIPLOMA IN ADVANCED COMPUTING FROM CDAC

SUNBEAM INSTITUTE OF INFORMATION TECHNOLOGY
Hinjewadi, Pune

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Faculty Member
Sunbeam Institute of Information Technology, PUNE.

CERTIFICATE

This is to certify that the project work under the title 'Train Reservation System' is done by Rahul Vishwakarma, Raghvendra Verma, Pratyush Kumar, Pranjal Sao in partial fulfillment of the requirement for award of Diploma in Advanced Computing Course.

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Mr.Yogesh Kolhe
Course Co-Coordinator

Date: 29/09/2022

ACKNOWLEDGEMENT

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We are deeply indebted and grateful to them for their guidance, encouragement and deep concern for our project. Without their critical evaluation and suggestions at every stage of the project, this project could never have reached its present form.

Last but not the least we thank the entire faculty and the staff members of Sunbeam Institute of Information Technology, Pune for their support.

Rahul Vishwakarma
Raghvendra Verma
Pratyush Kumar
Pranjal Sao

eDAC Mar 22 Batch,
SIIT Pune

ABSTRACT

The Railway Reservation System facilitates the passengers to enquire about the trains available on the basis of source and destination, Booking and Cancellation of tickets, enquire about the status of the booked tickets, etc. The aim of case study is to design and develop a database maintaining the records of different trains, train status, and passengers.

This project contains Introduction to the Railways Reservation System. It is the computerized system of reserving the seat in advanced. It is mainly used for long route. On-line reservation has made the process for the reservation of seats very much easier than even before.

In our country India, there are number of counters for the reservation of the seats and one can easily make reservation and get tickets. Then this project contains entity relationship model diagram based on railway reservation system and introduction to relation model. There is also diagram of the database of the railway reservation system based on relation model.

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1. INTRODUCTION TO PROJECT

The web based "Train Reservation System" project is an attempt to stimulatethe basic concepts of Train reservation system. The system enables the customer to do the things such as search for trains for two travel cities on a specified date, choose a train based on the details and reservation of train.

The system provides you quick search facility that provides you details about trains with or without login but if user wants to book ticket, then it must require log in into your account.

The system allows the Train passenger to search for trains that are available between the two travel cities, namely the "Departure city" and "Arrival city" for a particular departure and arrival dates. The system displays all the train's details such as train no, name, price and time of journey etc.

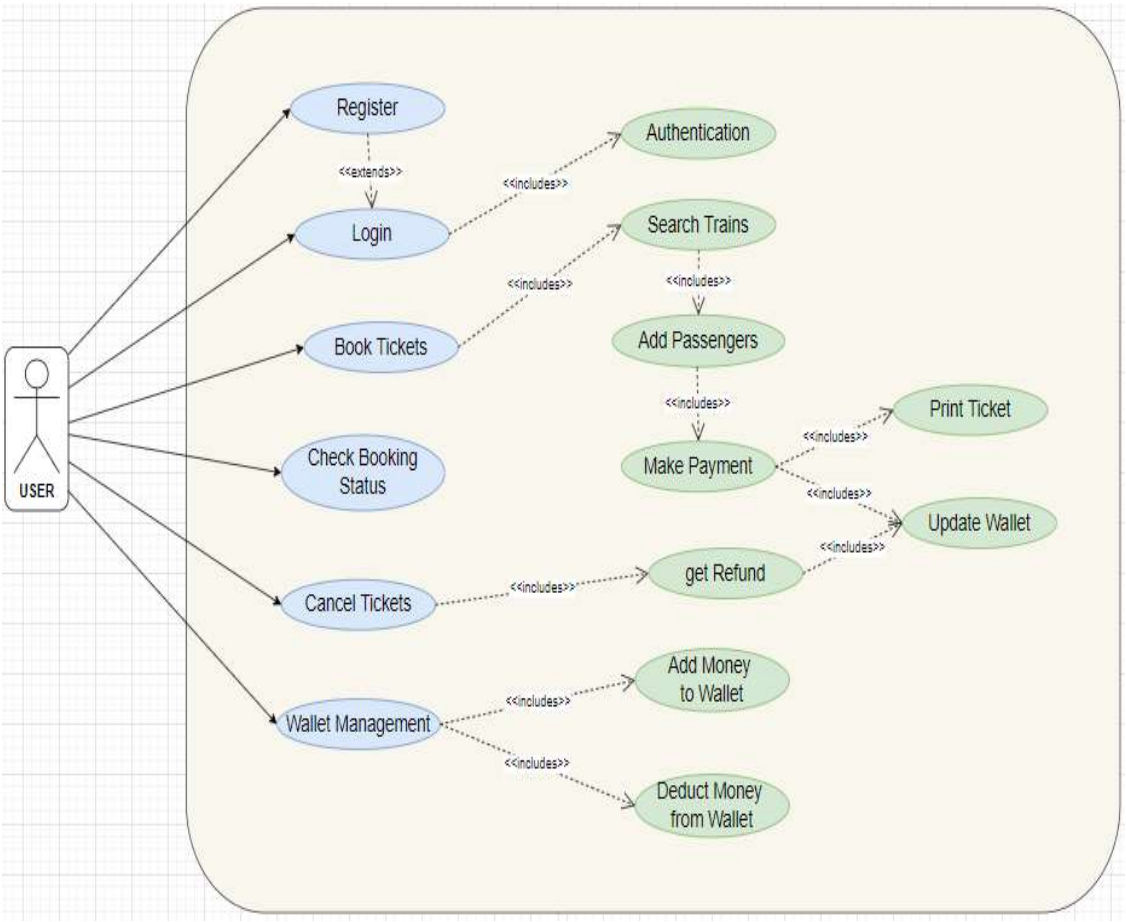
Here we provided quick search facility which displays list of available trains and allows customer to choose a particular train. Then the system checks for the availability of seats on the train. If the seats are available then the system allows the passenger to book a seat. Otherwise it asks the user to choose another train.

To book a train the system asks the customer to enter his details such as name, gender, age, identity proof type and identity proof number. Then it checks the available balance in wallet and book the train and update the Train database and user database but if the available balance in wallet is less as compared to total ticket price then it won't allow to book tickets.

2. REQUIREMENTS

2.1 FUNCTIONAL REQUIREMENTS

1. USER SCOPE



1.1 User Account

The passenger, who will henceforth be called the 'user', will be presented with 3 choices by the reservation system, as the first step in the interaction between them. A user can choose one of these and his choice would be governed by whether he is a guest or a registered user and whether he wants to check the availability of tickets or also block/buy them. The terms 'registered user' and 'guest' are described below.

A user who has traveled by the train earlier would have been given a user email id and a password. This 'personal information' would be henceforth referred to as 'profile'. Such a user with a profile in DB-users shall be called a 'registered user'. A registered user will be able to check the availability of tickets as well as block/buy a ticket by logging into the system.

A new user, on the other hand, would either have to

a) register himself with the system by providing personal information or
b) log into the system as a guest.

In case of 'a', the new user becomes a registered user.

In case of 'b', the new user would remain a guest.

A guest can only check the availability of tickets and cannot block or buy tickets.

But a registered user can also act as a guest if he only wants to check the availability of tickets.

'Availability of tickets' always refers to viewing the train schedule for given days, the price of tickets. The system shall present the user with an option to exit from the system at any time during the following processes.

1.2 Registration and creation of user profile

The system shall require a user to register, in order to carry out any transactions with it except for checking the availability of tickets. It will ask the user for the following information at the least – email id, a password, first name, last name, address, phone number, date of birth, security question and security answer.

1.3 Quick Search

Here we provided Quick Search facility for any user to search train schedule without login into account.This will provide user an option for searching trains and comparing their prices.

After logging, the system shall request him to enter the following details origin city and destination city. The original destination cities and origin cities would be entered as text.

After the origin and destination cities are ascertained, the system shall now access the train schedule database, and checks if there is a direct operational service between the two cities on particular date.

'Coach Class' refers to different coach types available in particular train. This shall be made by the user through a drop-down menu indicating all the possible choices available.

'Train type' refers to different types of trains available such as express, passenger, rajdhani etc. Thisshall be made by the user through a drop-downmenu indicating all the possible options.

Having taken all the above input from the user, the system checks for any validation constraints like empty field. In case of incompatibility, the system won't display any trains available.

The system queries the train status database to check which of the trains on the schedule have seats available. The system displays the results in a suitable form with the following information depicted – for each Train No., Train name, departure time in origin city, arrival time in destination city, departure city, arrival city, ticket price and the number of seats available on that train.

There can be several trains between two cities and all of them will be listed for the particular date that the user wants to depart from the origin city. There will be a Book button at bottom of every coach class displayed for that particular train.

The system however, won't allow user to book tickets as he is not logged in, so pop-up will appear asking the user to get login first, otherwise, if not interested he may also opt to cancel further proceedings.

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1.4 Making Reservations/Confirmation

After having taken the user through the step 2.2, Checking Availability, if he wishes to book tickets, then two possibilities could be:

a) If the user has been a guest, he will have to first register and become a registered user and then log onto the system.
b) If the user is already a registered user, and if he has logged on already, he can block/buy the ticket, but if he has been acting as a guest, he will have to log on.

Having ensured that the user is logged on validly, the user can fill the required details for all passengers whom he has added but at a time he can add only 3 passengers while booking tickets for train.

In case the user buys the ticket, the system asks for entering his or her wallet information i.e debit card or credit card CVV and then charges the price of the ticket to his wallet. However, if less balance is available than ticket's price then it won't let user to book tickets. First of all he is required to add the needed amount to his/her wallet then only he/she can proceed further and successfully book tickets.

Having taken the input from the user, the system shall now proceed to update the reservation databases DB-passengers, DB-wallet and DB-bookings. It will decrement the number of available seats on the particular train for the particular class by the number of travelers being represented by the user. Also, the amount equal to total price of tickets will be deducted from the user's wallet balance.

After booking the confirmed tickets, user will also get the option to download PDF of ticket. User just required to click one button and the ticket will get downloaded into their local machines within 10 seconds.

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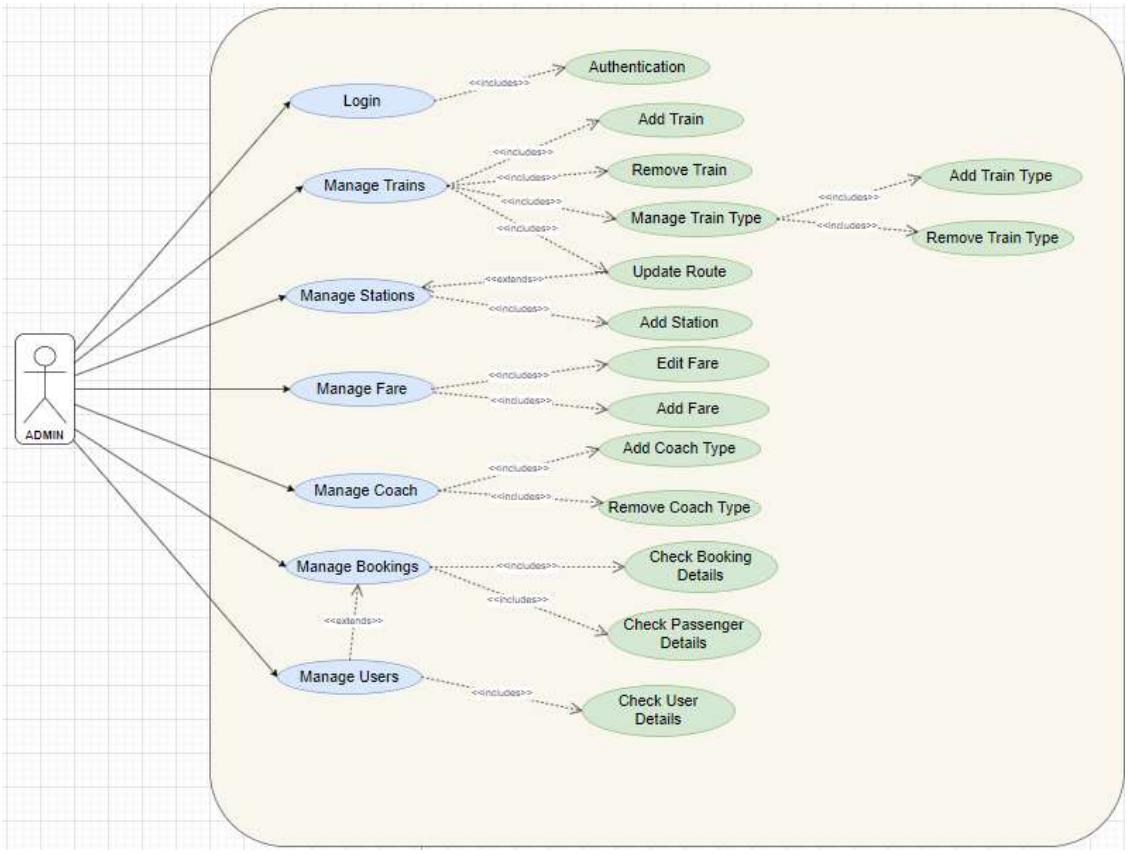
1.5 View Booking History

The system shall allow a user to view all information about his previous bookings. After logging, on a side bar there is option 'My Bookings' where he could see all the bookings made by him till date. The system accesses DB-bookings and retrieves the details of the trip and presents them to the user in a tabular format along with the status for that particular booking.

1.6 Wallet Management

After getting registered user will get the option to add wallet i.eto link bank account with their wallet by giving details such as debit card no., CVV and valid thru of the debit card. At the time of addition of new wallet, user can also add some amount as per his/her wish in wallet also.

2. ADMIN SCOPE



2.1 Retrieve Details

Admin should be able to login with proper authorization that authorize admin to Manage information related to users, bookings, trains, fare and schedule. In admin login, at sidebar admin has functionality to retrieve trains available using DB-trains, users using DB-users, bookings using DB-bookings, stations using DB-stations and seat count train type wise using DB-coach-counts in tabular form.

2.2 Creation Functions

This function implies that admin also has authority to add new data for particular database upon requirement. Some databases for which new data can be created by admin includes DB-trains, DB-train-types, DB-coaches, DB-train-schedule, DB-coach-count, DB-stations.

2.3 Update Functions

There are certain times when it has been observed that there is need to update already entered data to meet some requirements. For that purpose, admin has given access to update some data such as fare per km, seat counts and special charges etc whenever required.

2.4 Delete Functions

There are quite good chances that after some time any data become superfluous and there is no need to keep it in database as it is un-necessarily taking space in memory. Thus, system shall allow admin to remove this kind of superfluous data from database which include DB-train-schedule, DB-coach-counts, DB-train-type.

2.2 NON - FUNCTIONAL REQUIREMENTS

2.2.1 Interface

Go to Appendix B for user interfaces

2.2.2 Performance

Booking of Tickets:

The system is susceptible to any temporary server failure since it uses the strong feature of Spring Boot and Hibernate.

2.2.3 Other Requirements:

- **Hardware Interfaces**

The SPMS is expected to function on Intel PIII 900 MHz Processor equivalent or above, 128 MB RAM, 20 GB HDD.

- **Software Interfaces**

The SPMS shall work on MS Windows operating systems family (MS Windows 98, MS Windows NT Workstation, MS Windows 2000, MS Windows XP). It configures to work with Oracle database. This System works on Apache Tomcat server. It uses browser IE 5.0 & above. It uses IIS 5.0 server.

3. DESIGN

3.1 Database Design

The following table structures depict the database design.

Table 1: Users

Field	Type	Null	Key	Default	Extra
user_id	bigint	NO	PRI	NULL	
role	varchar(10)	YES		USER	
first_name	varchar(30)	YES		NULL	
last_name	varchar(30)	YES		NULL	
otp	int	YES		NULL	
security_ans	varchar(30)	YES		NULL	
security_ques	varchar(255)	YES		NULL	
user_addr	varchar(50)	YES		NULL	
user_dob	date	NO		NULL	
user_email	varchar(50)	YES	UNI	NULL	
user_mobile	varchar(10)	YES		NULL	
user_password	varchar(200)	YES		NULL	

Table 2: Stations

Field	Type	Null	Key	Default	Extra
station_id	varchar(5)	NO	PRI	NULL	
distance	int	NO		NULL	
station_name	varchar(30)	YES	UNI	NULL	

Table 3: Train Type

Field	Type	Null	Key	Default	Extra
train_type_id	varchar(5)	NO	PRI	NULL	
special_charges	double	NO		NULL	
train_type_name	varchar(20)	NO	UNI	NULL	

Table 4: Coaches

Field	Type	Null	Key	Default	Extra
coach_id	varchar(5)	NO	PRI	NULL	
fare_per_km	double	YES		NULL	

Table 5: Coach_Count

Field	Type	Null	Key	Default	Extra
seat_count	int	YES		NULL	
train_type_id	varchar(5)	NO	PRI	NULL	
coach_id	varchar(5)	NO	PRI	NULL	

Table 6: Trains

Field	Type	Null	Key	Default	Extra
train_no	bigint	NO	PRI	NULL	
dest_arr_time	time	NO		NULL	
src_dept_time	time	NO		NULL	
train_name	varchar(50)	NO	UNI	NULL	
destination_station_id	varchar(5)	NO	MUL	NULL	
source_station_id	varchar(5)	NO	MUL	NULL	
train_type	varchar(5)	NO	MUL	NULL	

Table 7: Routes

Field	Type	Null	Key	Default	Extra
dist_from_src	int	YES		NULL	
time_duration	int	YES		NULL	
train_no	bigint	NO	PRI	NULL	
station_id	varchar(5)	NO	PRI	NULL	

Table 8: Train_Schedule

Field	Type	Null	Key	Default	Extra
weekday	varchar(10)	NO	PRI	NULL	
schedule_date	date	NO	MUL	NULL	
train_no	bigint	NO	PRI	NULL	
train_type_id	varchar(5)	NO	PRI	NULL	

Table 9: Train_Status

Field	Type	Null	Key	Default	Extra
train_status_id	bigint	NO	PRI	NULL	auto_increment
date	date	NO		NULL	
day	varchar(255)	NO		NULL	
seats_available	int	YES		10	
seats_booked	int	YES		0	
seats_waiting	int	YES		0	
total_seats	int	YES		10	
version	int	YES		NULL	
coach_class	varchar(5)	NO	MUL	NULL	
train_no	bigint	NO	MUL	NULL	

Table 10: Bookings

Field	Type	Null	Key	Default	Extra
booking_id	bigint	NO	PRI	NULL	
arrival_date	date	YES		NULL	
arrival_time	time	YES		NULL	
booking_date	date	YES		NULL	
booking_status	varchar(20)	NO		ACTIVE	
departure_date	date	YES		NULL	
departure_time	time	YES		NULL	
journey_distance	int	YES		NULL	
total_amount	double	YES		NULL	
total_passengers	int	YES		NULL	
coach_coach_id	varchar(5)	NO	MUL	NULL	
journey_from	varchar(5)	YES	MUL	NULL	
journey_to	varchar(5)	YES	MUL	NULL	
train_no	bigint	YES	MUL	NULL	
user_id	bigint	YES	MUL	NULL	

Table 11: Wallets

Field	Type	Null	Key	Default	Extra
wallet_id	bigint	NO	PRI	NULL	
cvv	varchar(200)	NO		NULL	
debit_card_no	varchar(14)	NO	UNI	NULL	
valid_thru	date	NO		NULL	
wallet_amt	double	NO		NULL	
user_id	bigint	NO	UNI	NULL	

Table 12: Passengers

Field	Type	Null	Key	Default	Extra
pass_id	bigint	NO	PRI	NULL	
pass_age	int	YES		NULL	
pass_fare	int	YES		NULL	
pass_gender	varchar(10)	YES		NULL	
pass_idcard_no	varchar(10)	YES		NULL	
pass_idcard_type	varchar(10)	YES		NULL	
pass_name	varchar(20)	YES		NULL	
pass_seat	varchar(8)	YES		NULL	
pass_status	varchar(20)	YES		NULL	
booking_id	bigint	YES	MUL	NULL	

Table 13: Transactions

Field	Type	Null	Key	Default	Extra
transaction_id	bigint	NO	PRI	NULL	
total_amount	double	YES		NULL	
transaction_date	date	YES		NULL	
transaction_status	varchar(20)	YES		NULL	
booking_id	bigint	YES	MUL	NULL	
user_id	bigint	YES	MUL	NULL	

4. CODING STANDARDS IMPLEMENTED

Naming and Capitalization

Below summarizes the naming recommendations for identifiers in Pascal casing is used mainly (i.e. capitalize first letter of each word) with camel casing (capitalize each word except for the first one) being used in certain circumstances.

Identifier	Case	Examples	Additional Notes
Class	Pascal	User, Booking, Train, Passenger	Class names should be based on "objects" or "real things" and should generally be **nouns**. No '_' signs allowed. Do not use type prefixes like 'C' for class.
Method	Camel	getUserDetails, findByUserId	Methods should use **verbs** or verb phrases.
Parameter	Camel	userEmail, trainNo, trainName	Use descriptive parameter names. Parameter names should be descriptive enough that the name of the parameter and its type can be used to determine its meaning in most scenarios.
Interface	Pascal with "I" prefix	UserRepository, TrainRepository	Do not use the '_' sign
Exception Class	Pascal with "Exception" suffix	ResourceNotFound Exception,	

Comments

- Comment each type, each non-public type member, and each region declaration.
- Use end-line comments only on variable declaration lines. End-line comments are comments that follow code on a single line.
- Separate comments from comment delimiters (apostrophe) or // with one space.
- Begin the comment text with an uppercase letter.
- End the comment with a period.
- Explain the code; do not repeat it.

5. TEST REPORT

GENERAL TESTING:

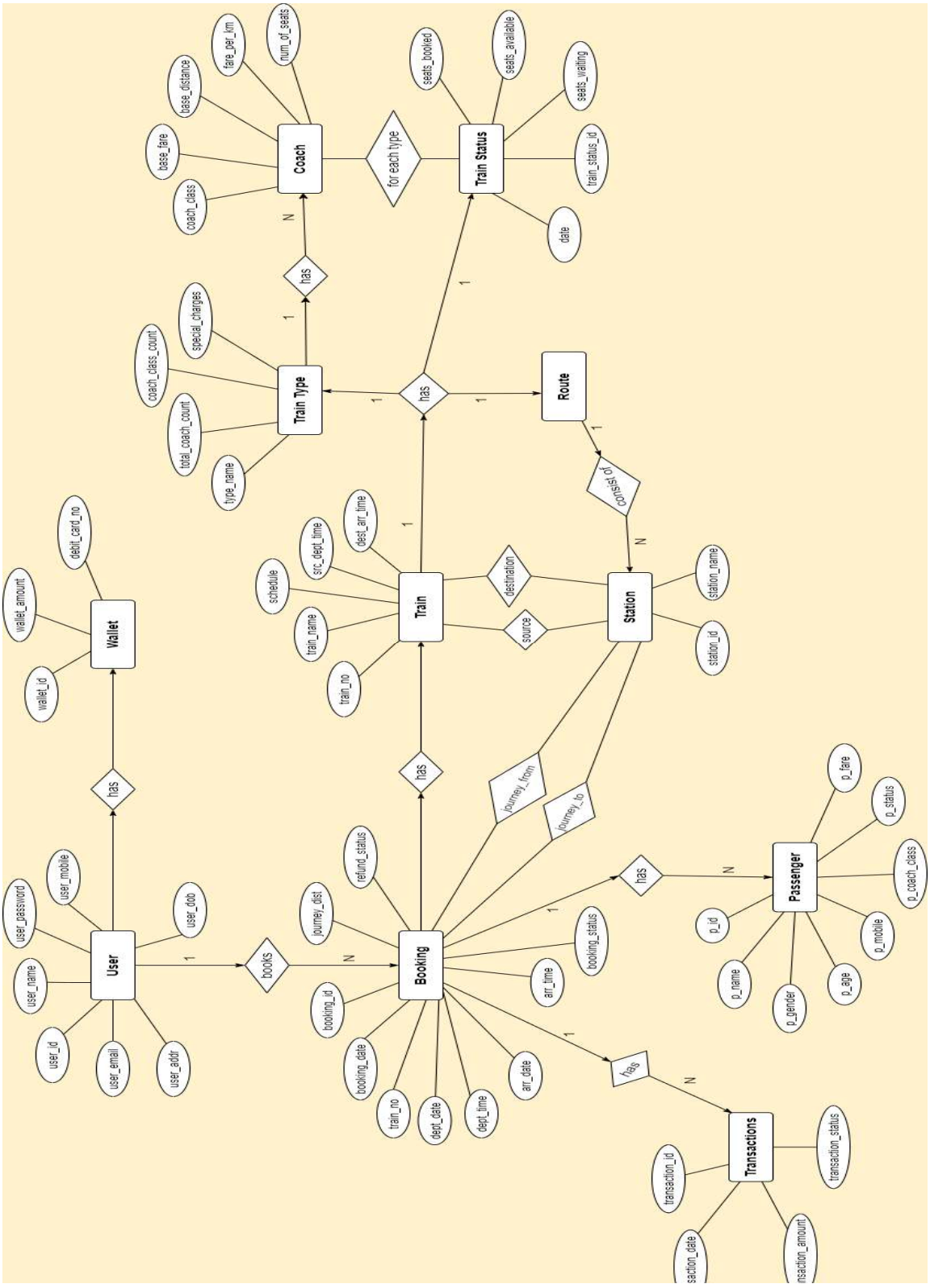
SR-NO	TEST CASE	EXPECTED RESULT	ACTUAL RESULT	ERROR MESSAGE
1	Register Page	Redirected to login page	OK	If any field is empty, confirm password & password don't match
2	Login Page	Welcome Pop-up will come	Ok	Please enter email and password, if empty or incorrect
3	Forgot password	Mail containing OTP will be sent to user email	Ok	Email or security info don't match
4	Quick search train	Gives all train details	Ok	No trains available on this date
5	Booking Ticket	All the fields should be filled for submission	Ok	Nothing
6	Checking login or not	User is logged in or not	Ok	You are not logged in
7	Add person details for tickets	Add information according to no. of seats allocated	Ok	Nothing
8	Go to ticket page	Show information about booking and cancel option available	Ok	Nothing
9	Downloading ticket	Ticket.pdf get downloaded	Ok	Nothing
10	Transaction	On having sufficient balance in wallet, it may proceed otherwise can't	Ok	Insufficient balance
11	View bookings	It shows you all bookings done previously	Ok	Nothing
12	Logout	It will log out from user profile.	Ok	Nothing
13	Show data	It will retrieve details from databases	Ok	Nothing
14	Add data	Addition of data in database	Ok	Insertion failed
15	Update data	Data present in database will get modified	Ok	Fail to update
16	Delete data	Data present in database will get deleted	Ok	Fail to delete

6. PROJECT MANAGEMENT RELATED STATISTICS

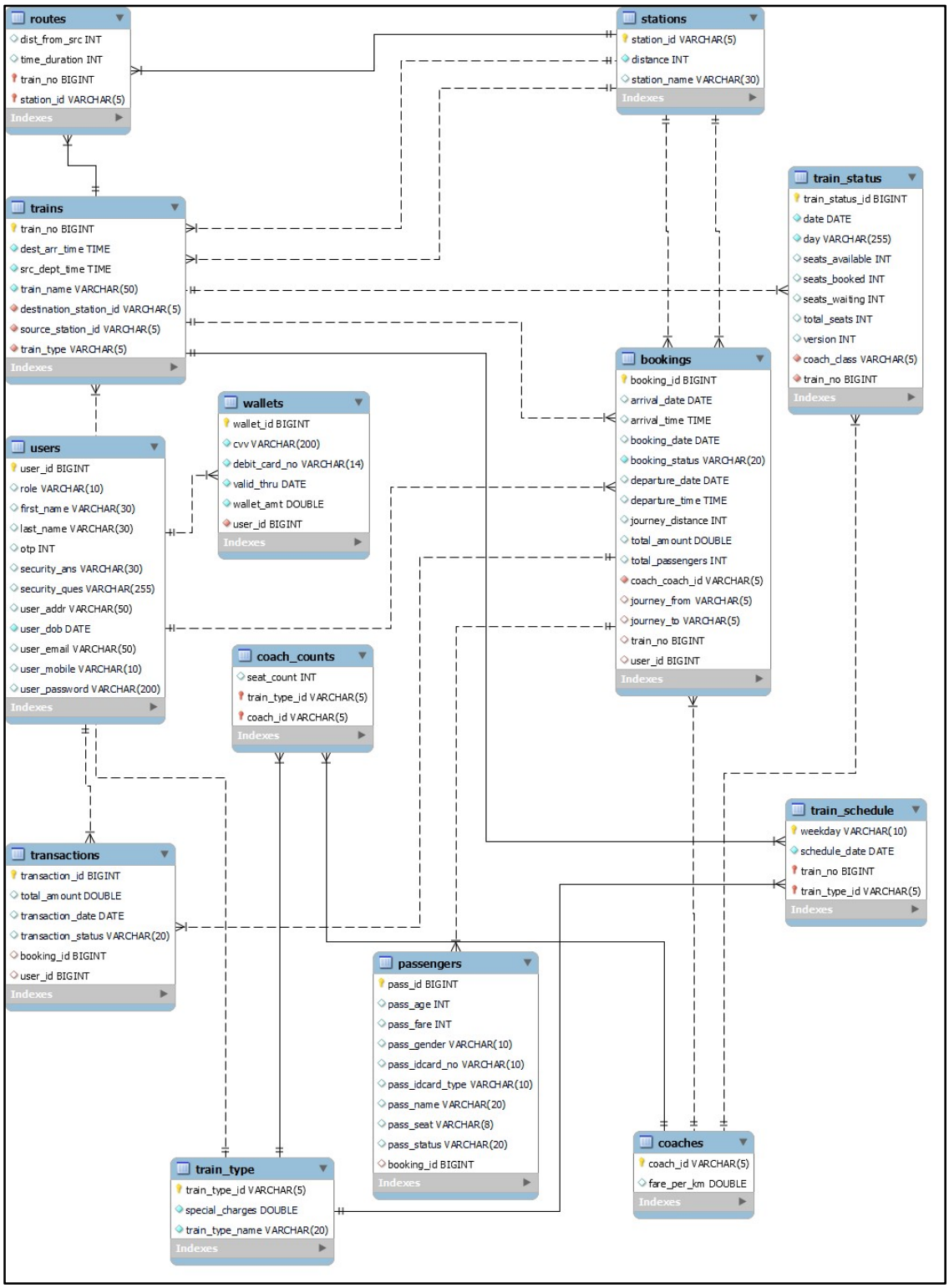
DATE	WORK PERFORMED	*SLC Phase*	Additional Notes
JUN 04,2022	Project Allotment and User Requirements Gathering	Feasibility Study	Our team started surfing IRCTC website to know requirements.
JUN 06,2022	Initial SRS Document Validation And Team Structure Decided	Requirement Analysis (Elicitation)	The initial SRS was documented to understand requirements better
JUN 08,2022	Designing the use-cases, Class Diagram, Collaboration Diagram, E-R Diagram and User Interfaces	Requirement Analysis & Design Phase	Database Design completed
SEPT 05,2022	Business Logic Component design Started	Design Phase	----------
SEPT 06,2022	Coding Phase Started	Coding Phase	Some of Class Library implemented.
SEPT 08,2022	Implementation of Web Application functions at backend started	Coding Phase	Class Library Development going on.
SEPT 10, 2022	Implementation of Web Application functions at backend continued	Coding Phase and Unit Testing	Class Library Modified as per the need.
SEPT 12, 2022	Implementation of security using spring boot	Coding Phase	--
SEPT 13, 2022	After Ensuring Proper functioning of backend, design of frontend started	Design Phase	Different designs were taken into consideration and best one was chosen

SEPT 14, 2022	Implementation of frontend started	Coding Phase	--
SEPT 16, 2022	Implementation of frontend continued along with testing	Testing Phase	Coding along with testing backend connectivity with frontend was done
SEPT 18, 2022	The Errors Found were Removed	Debugging	The Project was complete for submission
SEPT 19, 2022	Deployment of Project	Deployment Phase	The project was completed and error resolved before deployment of project
SEPT 21,2022	Containerization of services	Deployment Phase	The project was containerized using Docker and then deployed again on cloud
SEPT 29, 2022	Project Submission	Submission	The project report is submitted

Appendix A-1: Entity – Relationship Diagram

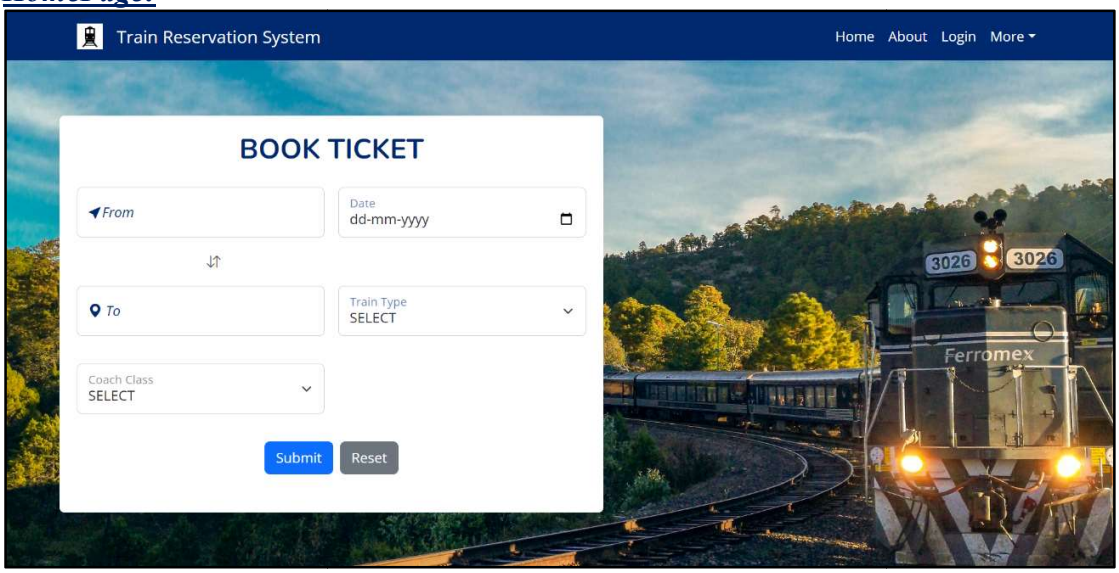


Appendix A-2: Entity – Relationship Diagram

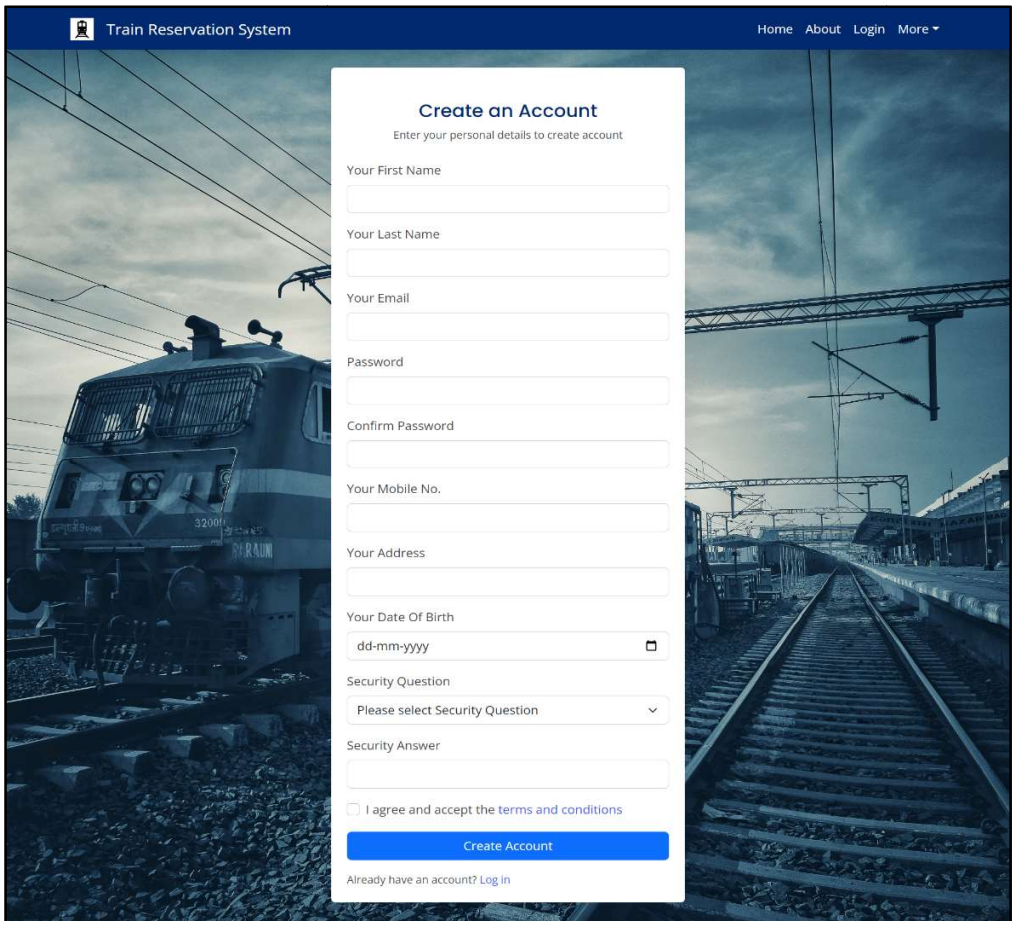


Appendix B: UI Screenshots

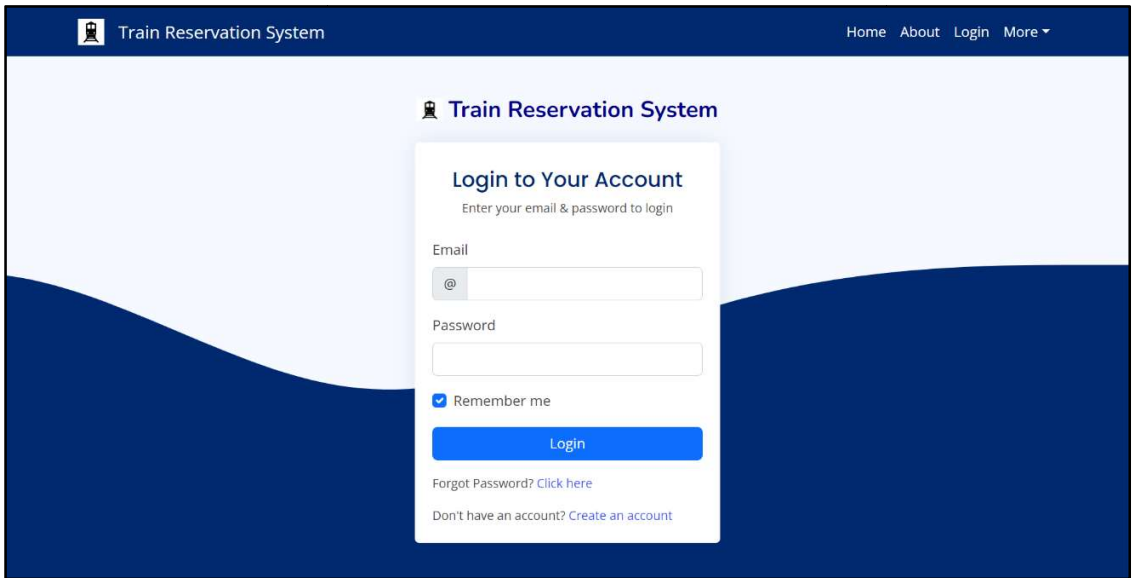
HomePage:



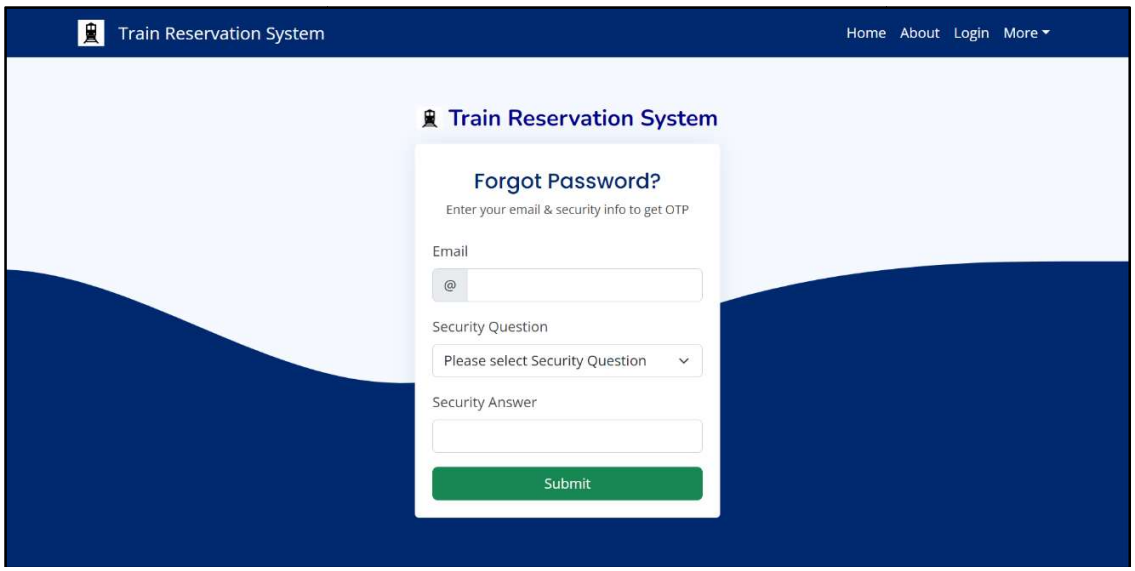
Registration Page:



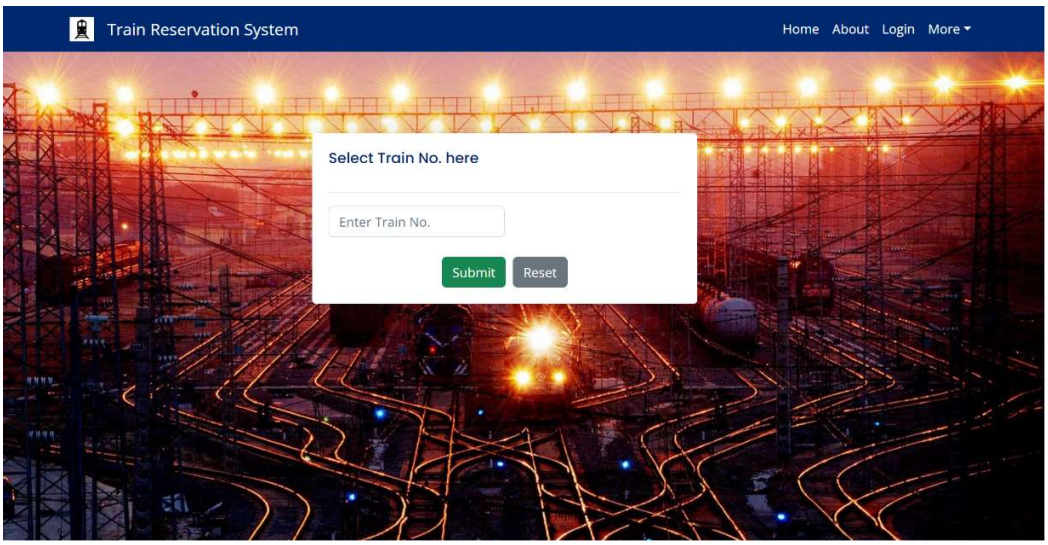
Login Page:



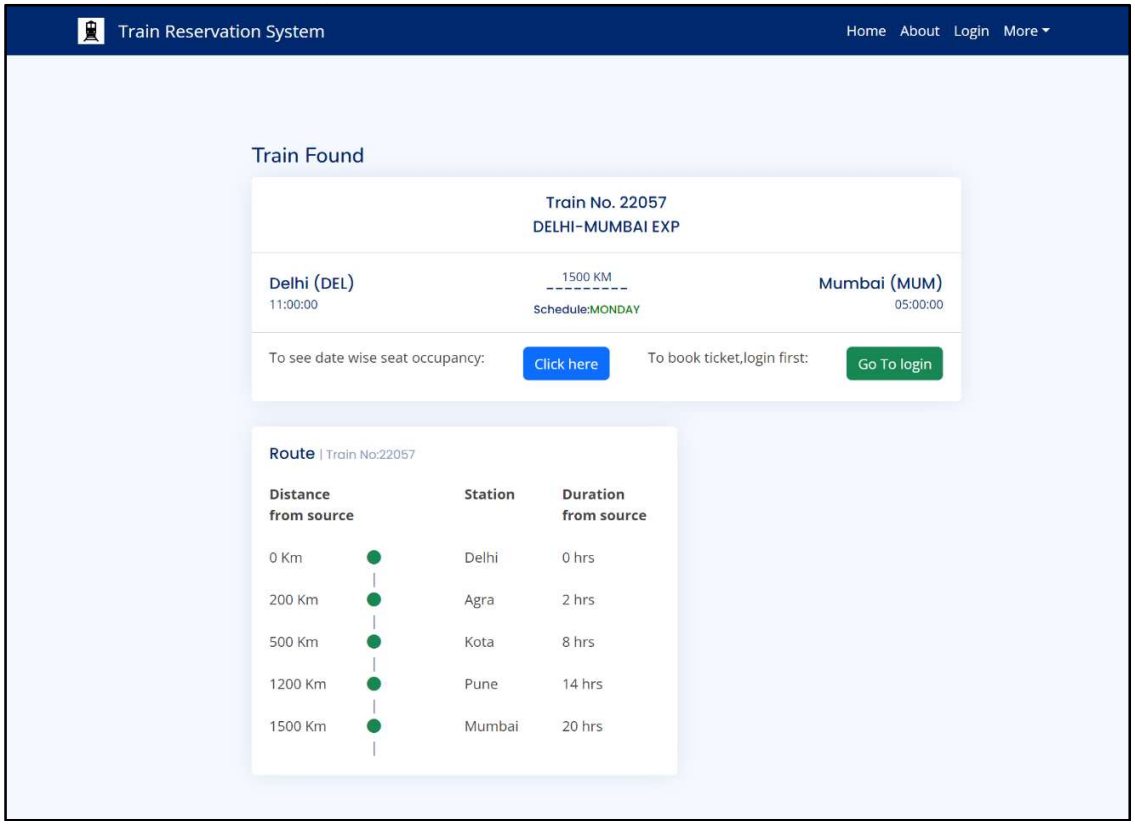
Forgot Password:



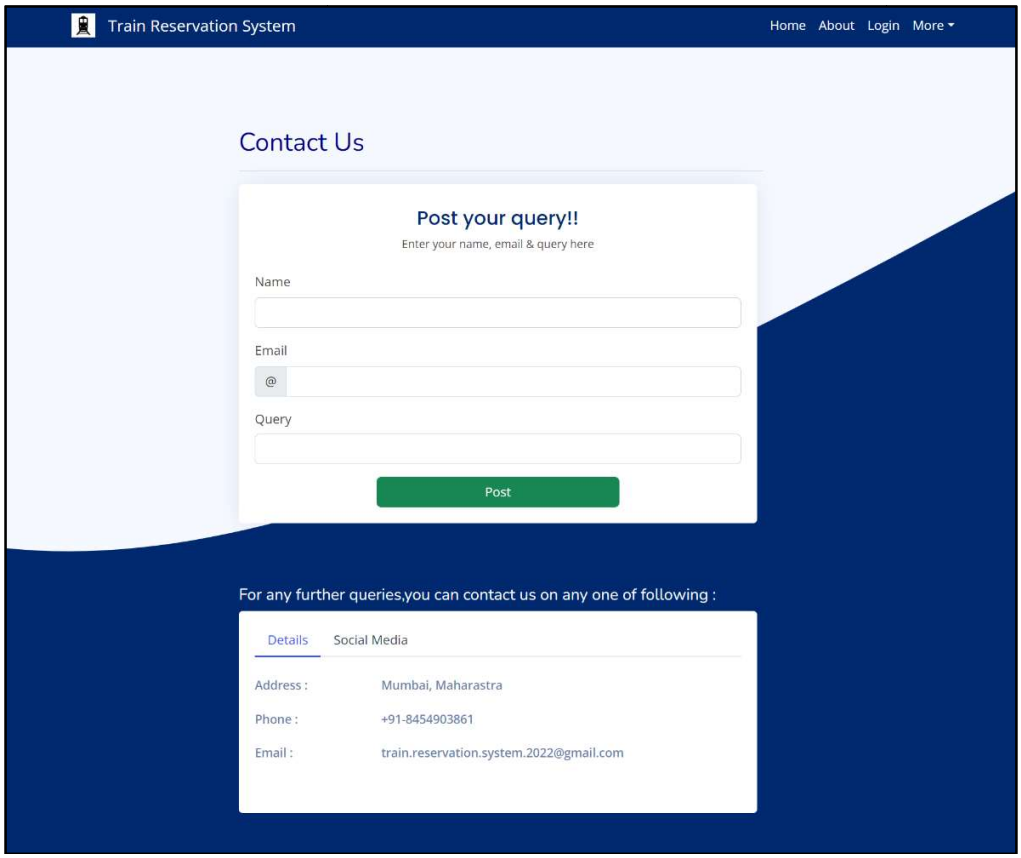
Search Train Details:



Train Details:

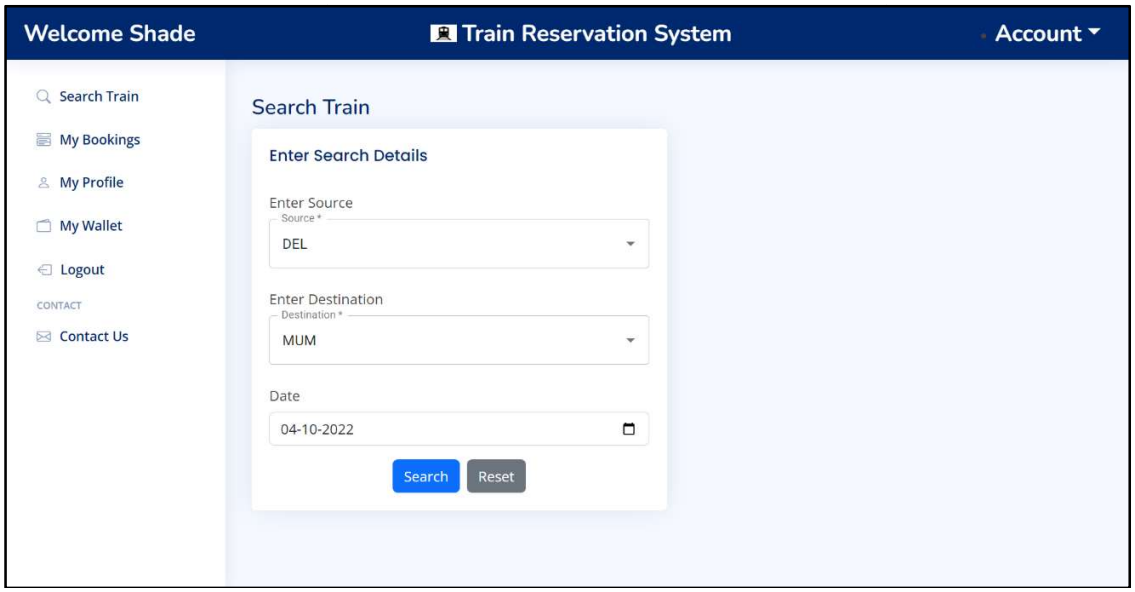


Contact Us:

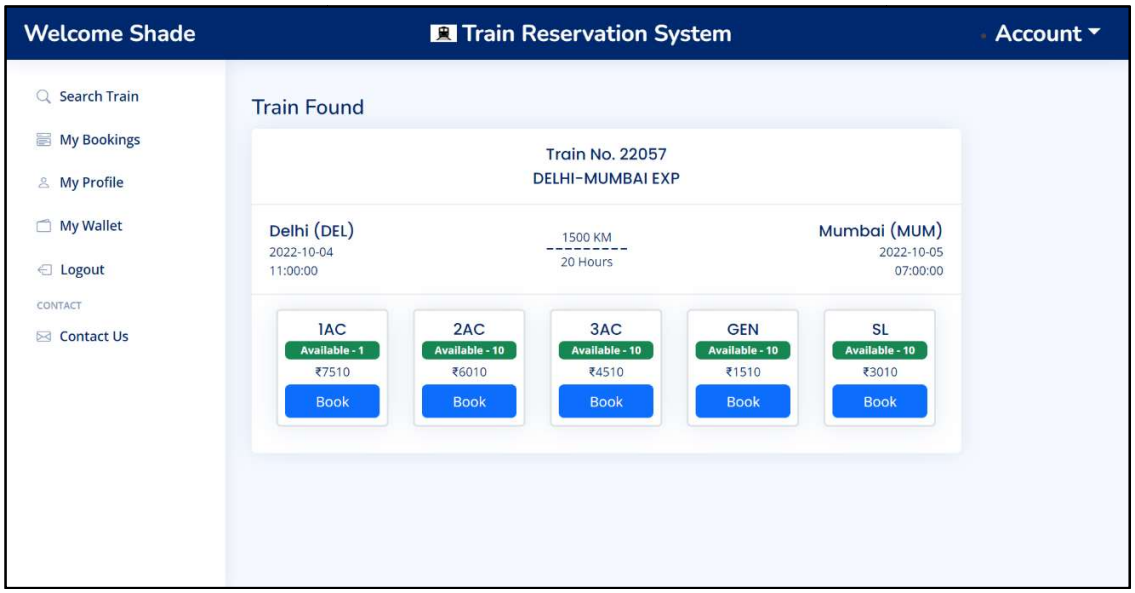


ROLE: USER

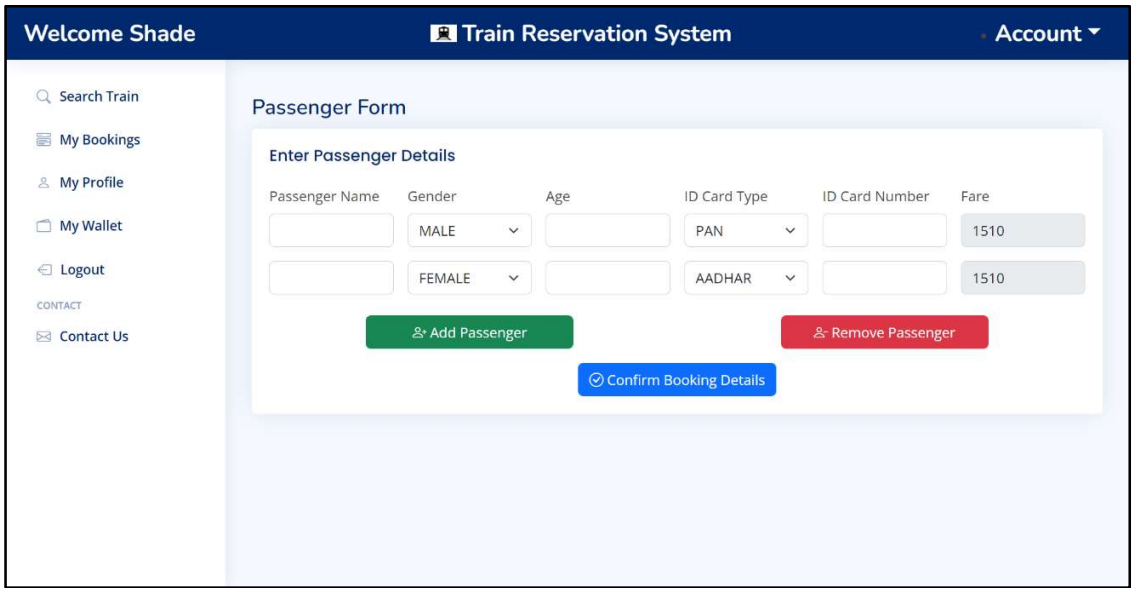
Search Page:



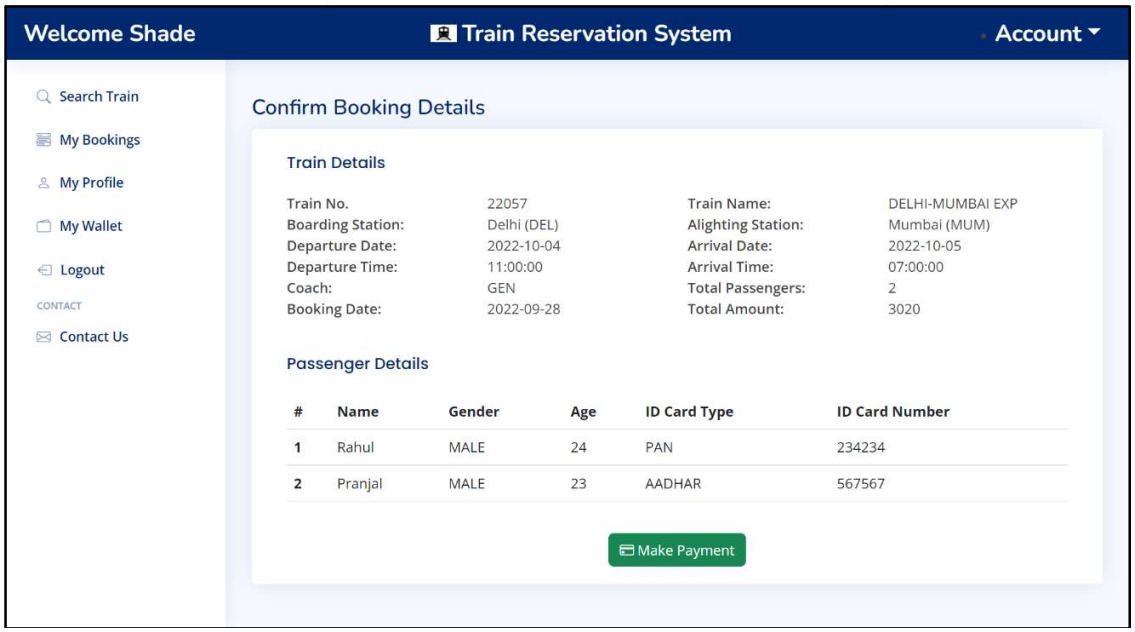
Train Search Result:



Passenger Form:



Confirmation Page:



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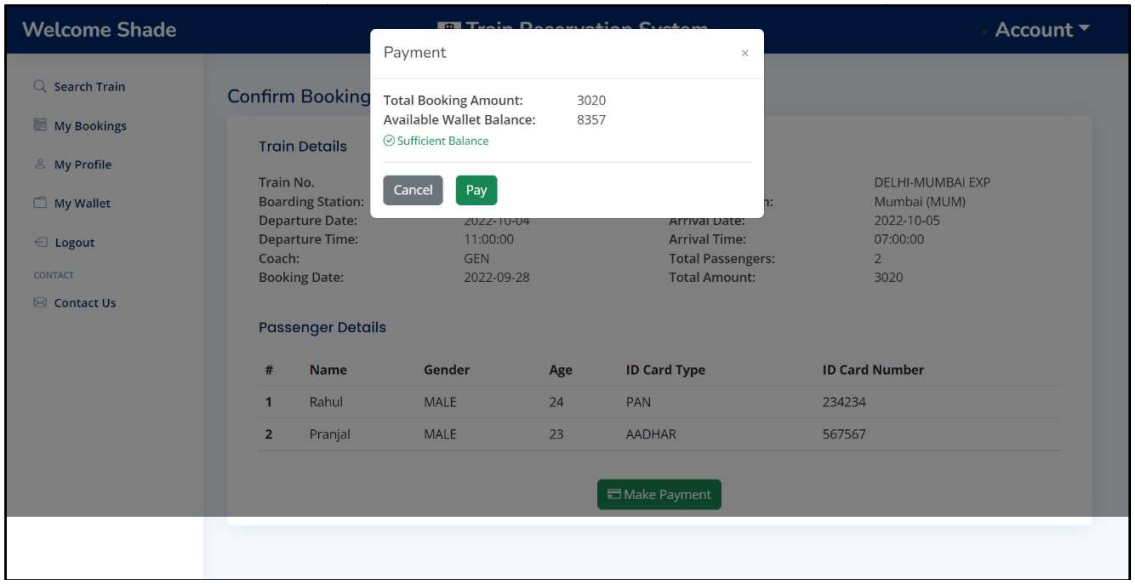

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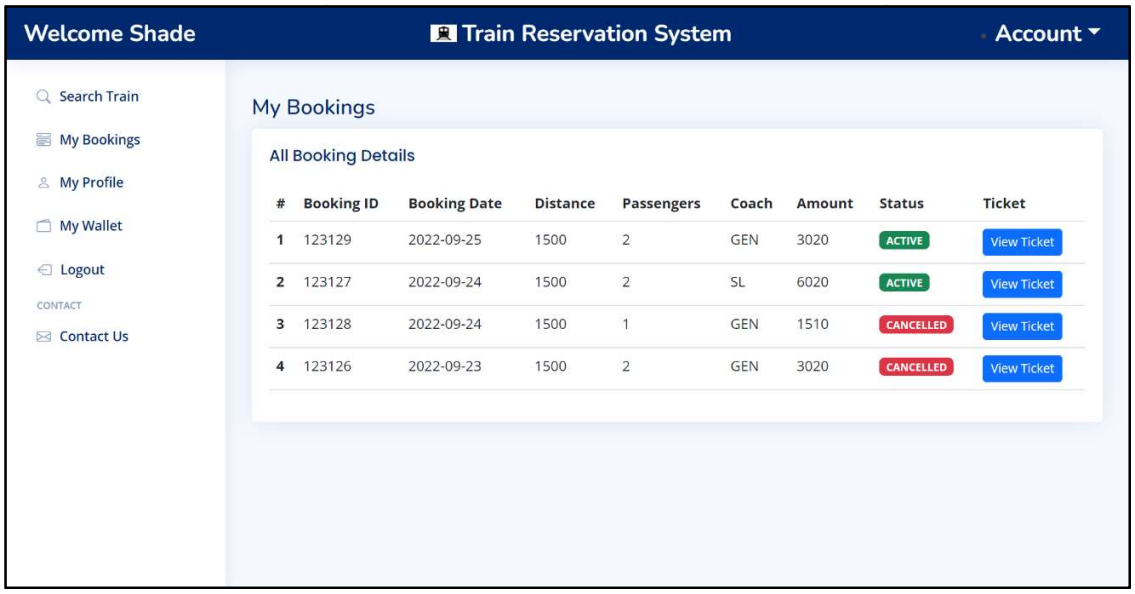

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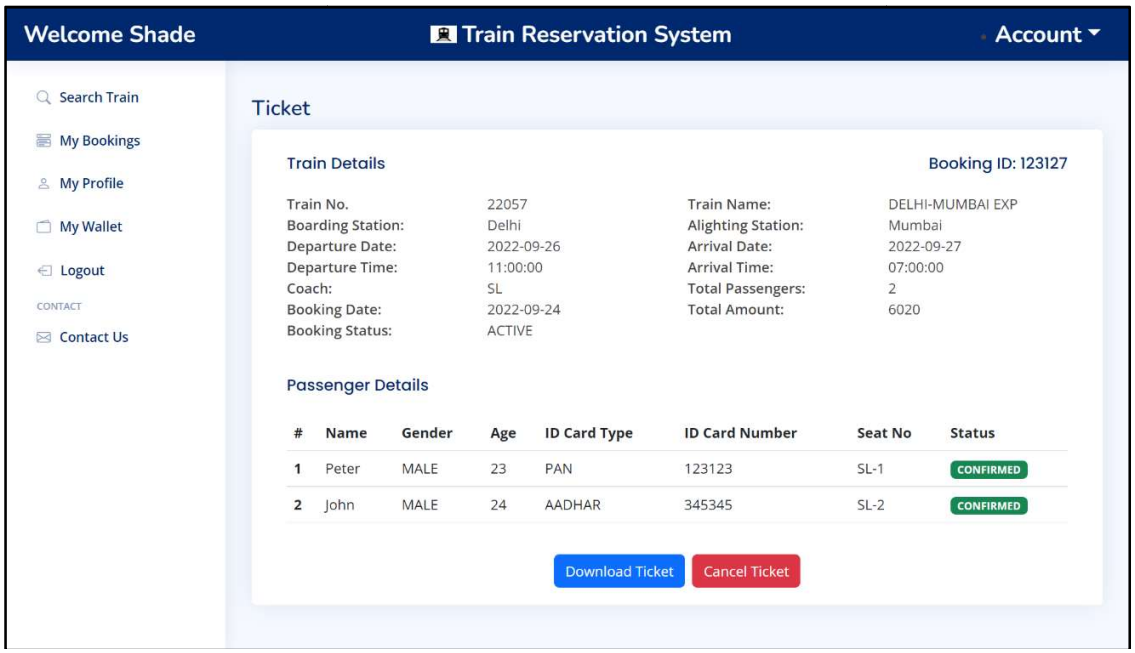
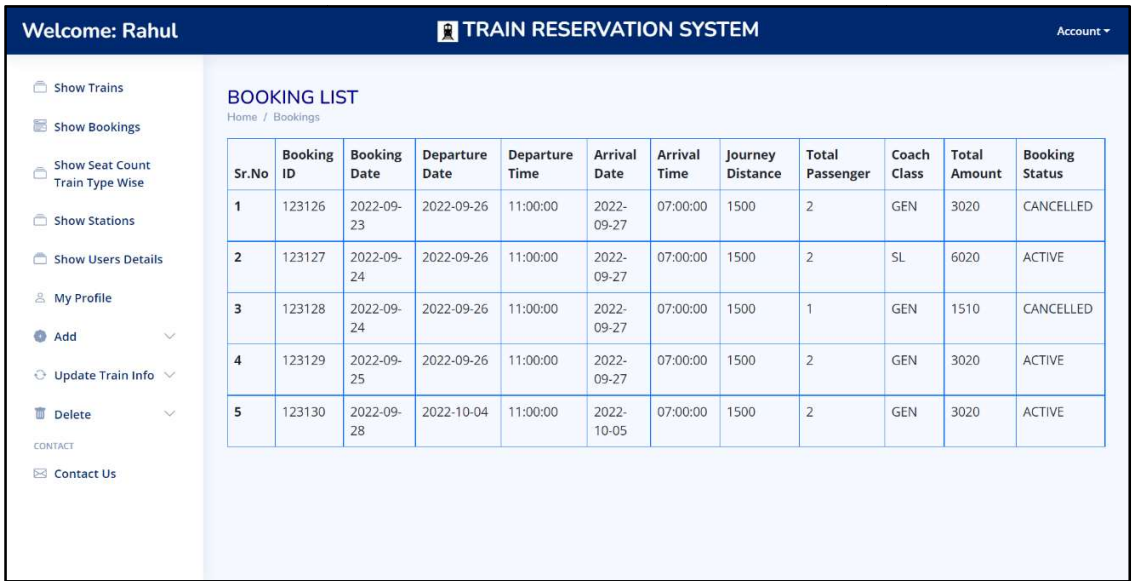


ROLE: ADMIN

Available Trains:

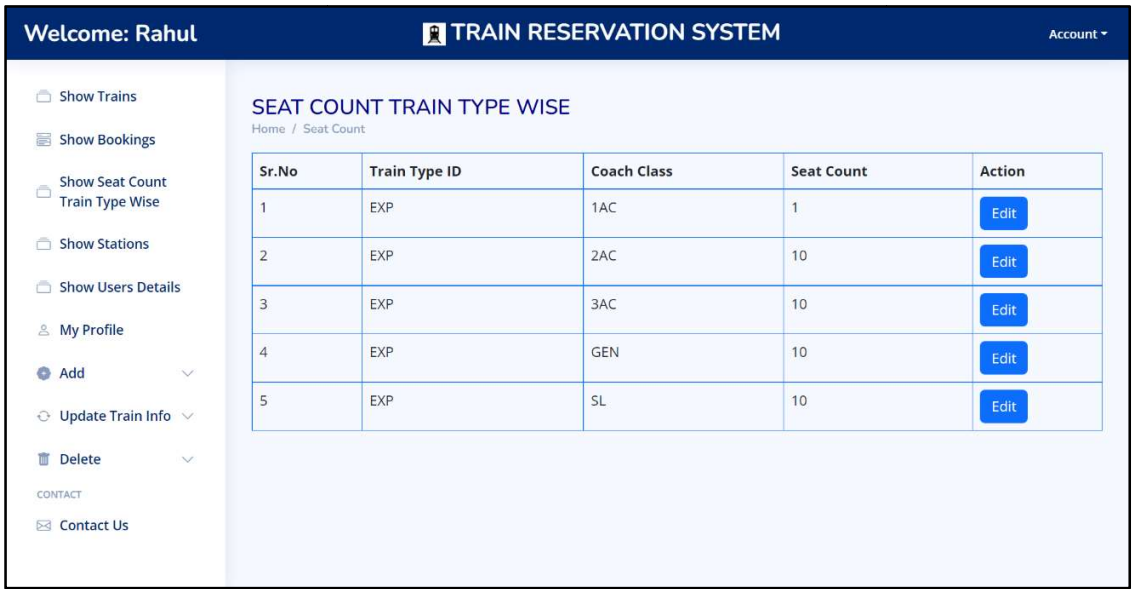
Sr.No	Train No.	Train Name	Arrival Time	Destination Time	Source Station ID	Destination Station ID	Train Type ID	Action
1	2158	AGRA-PUNE EXP	10:00:00	20:00:00	AGR	PUN	EXP	Edit
2	22057	DELHI-MUMBAI EXP	11:00:00	05:00:00	DEL	MUM	EXP	Edit
3	22235	KOTA-MUMBAI EXP	12:00:00	17:00:00	KOT	MUM	RDJ	Edit

Bookings List:



Sr.No	Booking ID	Booking Date	Departure Date	Departure Time	Arrival Date	Arrival Time	Journey Distance	Total Passenger	Coach Class	Total Amount	Booking Status
1	123126	2022-09-23	2022-09-26	11:00:00	2022-09-27	07:00:00	1500	2	GEN	3020	CANCELLED
2	123127	2022-09-24	2022-09-26	11:00:00	2022-09-27	07:00:00	1500	2	SL	6020	ACTIVE
3	123128	2022-09-24	2022-09-26	11:00:00	2022-09-27	07:00:00	1500	1	GEN	1510	CANCELLED
4	123129	2022-09-25	2022-09-26	11:00:00	2022-09-27	07:00:00	1500	2	GEN	3020	ACTIVE
5	123130	2022-09-28	2022-10-04	11:00:00	2022-10-05	07:00:00	1500	2	GEN	3020	ACTIVE

Train Type + Coach + Seat Count:



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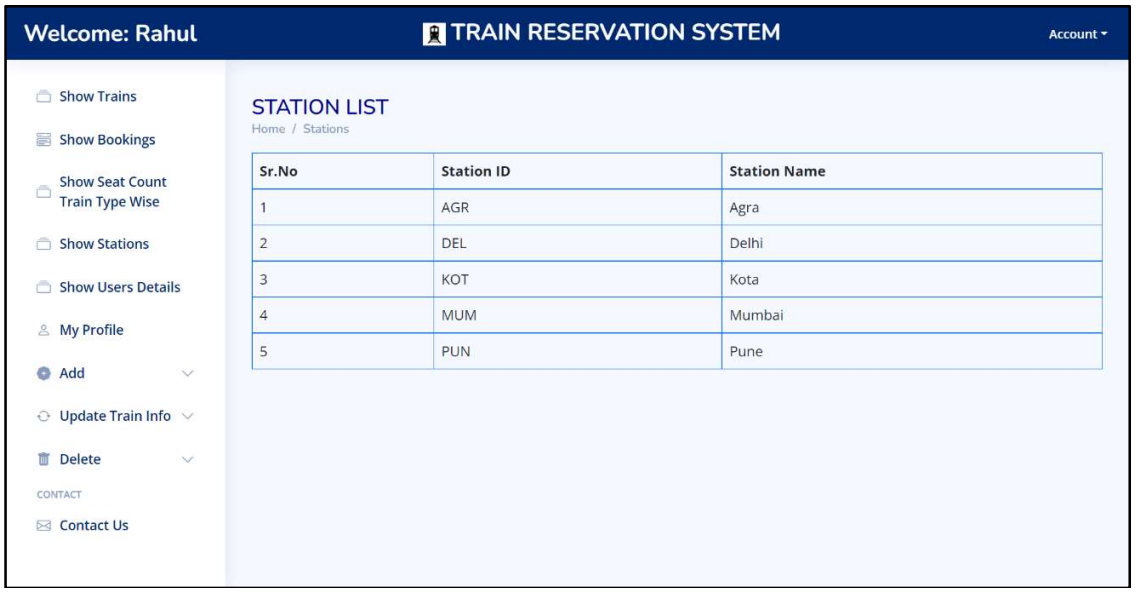
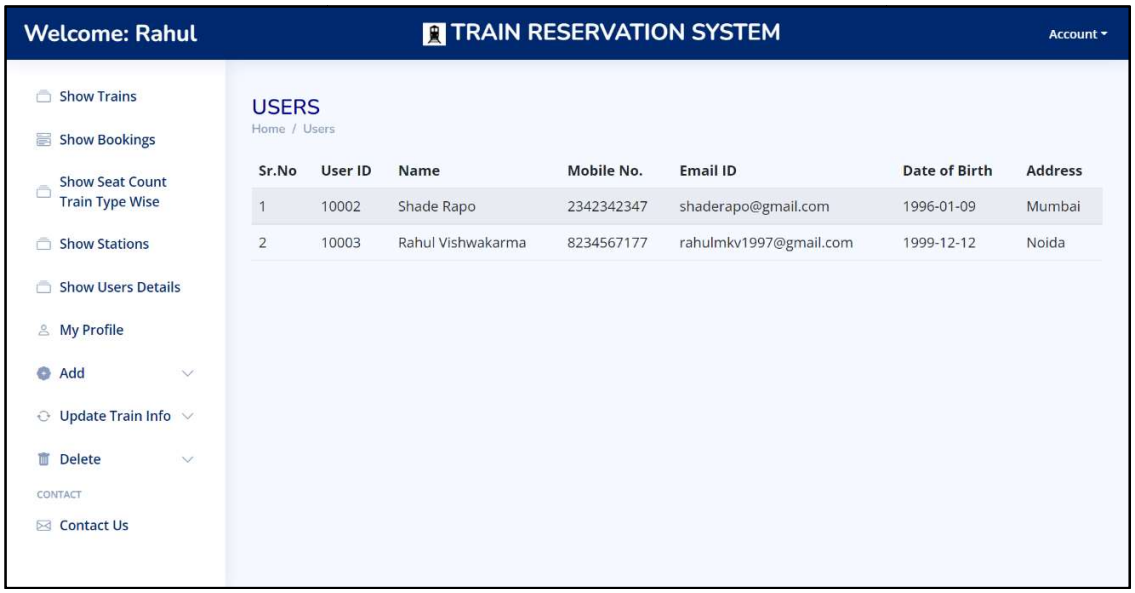
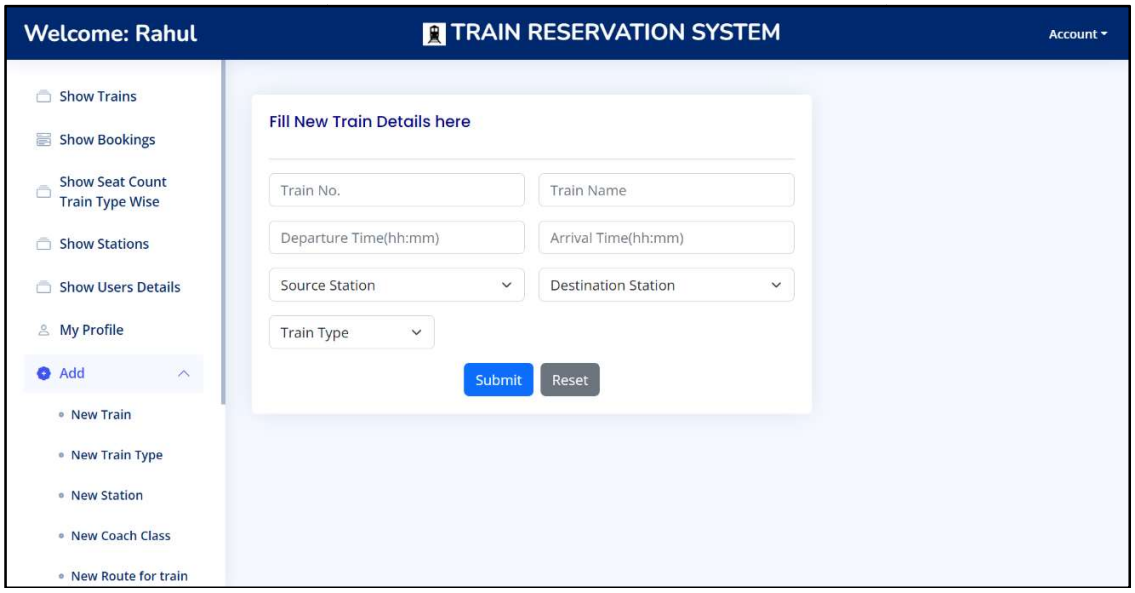


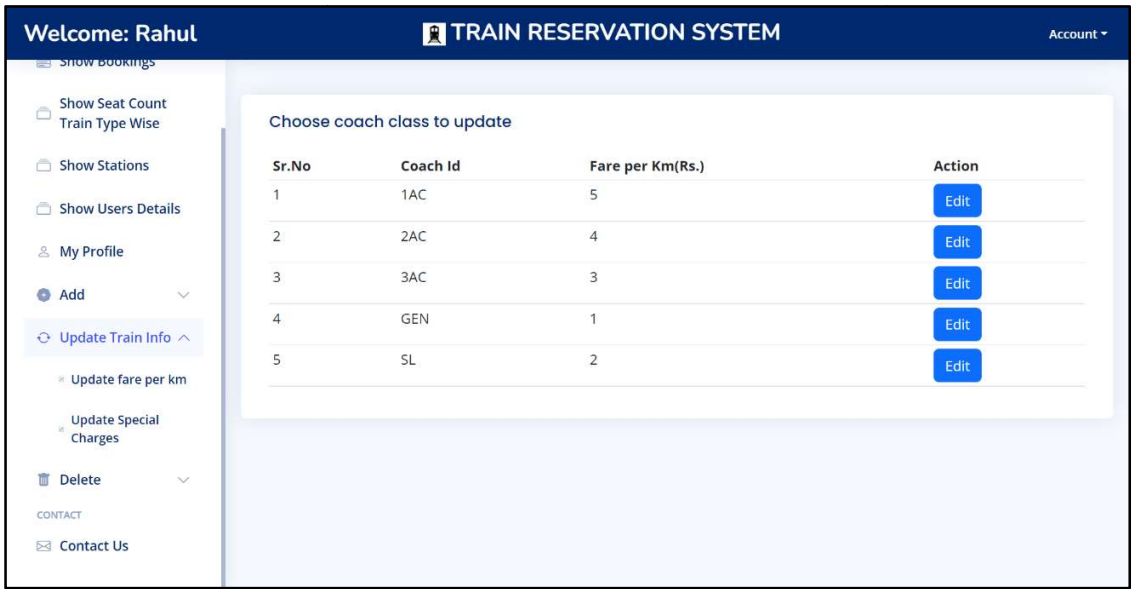
Users List:



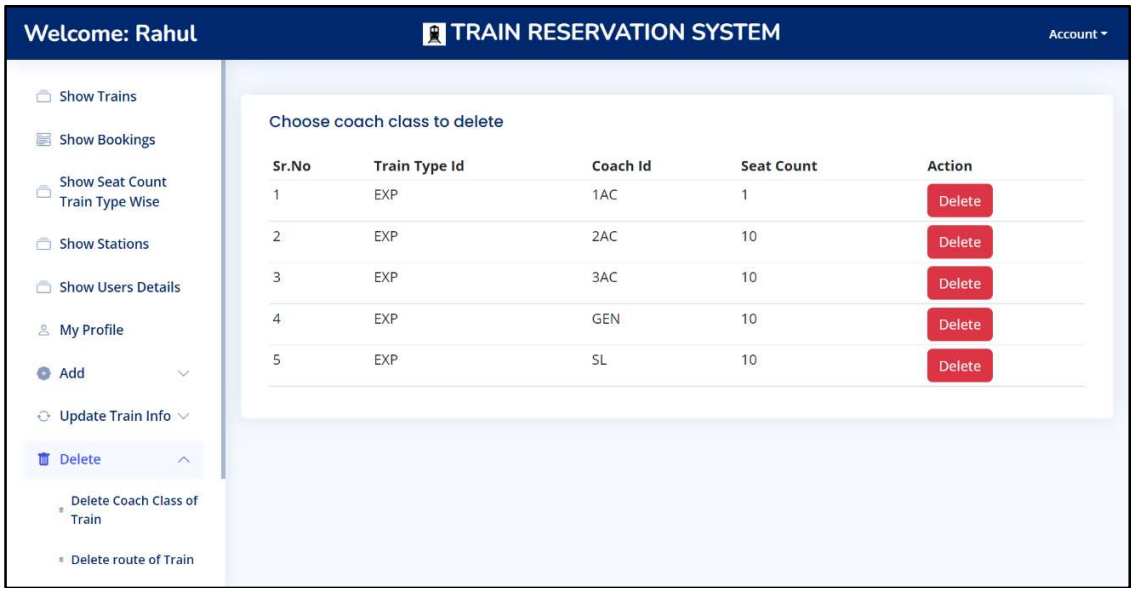
Add Train + Other Details:



Update Fare + Other Details:



Delete Coach Class + Other Details:



7. REFERENCES

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