National University of Modern Languages, Islamabad Campus

Department of Software Engineering

Course Title

Object Oriented Programming

Project Title

Railway Reservation System

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Submission Date: May 25, 2025

Introduction

The Railway Reservation System is a Java-based application designed to manage train ticket bookings. It provides a user-friendly graphical interface built with Java Swing, allowing users to book tickets, cancel bookings, search for passenger details, view the reservation chart, check the availability of unbooked tickets, and exit the application. The system supports three travel classes—AC, First, and Sleeper—each with distinct fare rates and seat capacities.

Main Menu

Upon starting the application, the main menu presents the following options:

- **Book Ticket:** Initiate the ticket booking process.

- **Cancel Ticket:** Cancel an existing booking.

- **Search Passenger:** Look up passenger details using a passenger number.

- **Reservation Chart:** View the list of booked passengers by class.

- **Unbooked Tickets:** Check the number of available tickets in each class.

- **Exit:** Close the application with a farewell message.

Booking a Ticket

To book a ticket:

1. Click the "Book Ticket" button on the main menu.

2. A booking form will appear with these fields:

    o **Class:** Select from AC, First, or Sleeper.

    o **Departure:** Choose the departure station (e.g., Karachi, Hyderabad).

    o **Destination:** Choose the destination station.

    o **Distance (km):** Automatically calculated based on station selections.

    o **Fare per Ticket:** Automatically computed based on class and distance.

    o **Name:** Enter the passenger's name.

    o **Age:** Enter the passenger's age.

    o **Phone Number:** Enter the passenger's phone number.

    o **Number of Tickets:** Select a number between 1 and 10.

3. Fill in all fields, ensuring departure and destination stations differ.

4. Click "Book" to submit the booking.

5. A confirmation message will display booking details and the total fare (fare per ticket × number of tickets).

6. If insufficient tickets are available in the selected class, an error message will appear.

Canceling a Ticket

To cancel a ticket:

1. Click the "Cancel Ticket" button on the main menu.

2. Enter the passenger number of the ticket to cancel.

3. Click "Cancel Ticket."

4. If the passenger number exists:

    o The ticket is canceled.

    o A refund is calculated based on the class:

        ▪ AC: 80% of the fare.

        ▪ First: 75% of the fare.

        ▪ Sleeper: 70% of the fare.

    o A confirmation message shows the cancellation details and refund amount.

5. If the passenger number is invalid, an error message is displayed.

Searching for a Passenger

To search for a passenger:

1. Click the "Search Passenger" button on the main menu.

2. Enter the passenger number in the provided field.

3. Click "Search."

4. If found, the passenger's details are displayed, including:

    o Passenger number, name, class, phone number, age, journey details (departure to destination), distance, and fare.

5. If not found, a "No such passenger found" message is shown.

Viewing the Reservation Chart

To view the reservation chart:

1. Click the "Reservation Chart" button on the main menu.

2. A tabbed interface appears with three tabs:

    o **AC Class:** Lists all AC class passengers.

    o **First Class:** Lists all First class passengers.

    o **Sleeper Class:** Lists all Sleeper class passengers.

3. Each tab displays passenger details in a table format: passenger number, name, age, departure, destination, distance, and fare.

Checking Unbooked Tickets

To check available tickets:

1. Click the "Unbooked Tickets" button on the main menu.

2. The screen displays the current number of available tickets:

    o AC Class: Remaining out of 75.

    o First Class: Remaining out of 125.

    o Sleeper Class: Remaining out of 175.

Exiting the Application

To exit:

1. Click the "Exit" button on the main menu.

2. A farewell message appears, crediting the project contributors:

    o Abdul Gaffar

    o Hassaan Ahmad

    o Abdullah Nadeem

    o Muhammad Rahat

3. The application closes.

Additional Information

- **Station Distances:** Predefined distances (in km) are used:

    o Karachi: 0

    o Hyderabad: 210

    o Sadiqabad: 670

- o   Multan: 925

- o   Lahore: 1270

- o   Rawalpindi: 1440

- o   Distance is the absolute difference between departure and destination distances.

- **Fare Calculation:** Based on class and distance:

  - o   AC: 6.0 per km

  - o   First: 5.0 per km

  - o   Sleeper: 4.0 per km

- **Seat Availability:** Initial capacities are:

  - o   AC: 75 seats

  - o   First: 125 seats

  - o   Sleeper: 175 seats

  - o   Bookings reduce availability; cancellations increase it.

Conclusion

The Railway Reservation System offers a simple yet effective solution for managing train ticket bookings. It demonstrates Java Swing for GUI development and basic data handling with collections, providing a practical example of a reservation system.