Project Title:

Railway Reservation System using Java

Objective:

To develop a basic railway reservation system in Java, which allows users to view available trains, check seat availability, book tickets, cancel bookings, and display booked tickets. The system will manage reservations and offer simple functionality to help users interact with a train reservation platform.

Features:

1. Display Available Trains:

Users can see a list of available trains, including train names, departure times, passenger capacity, and train numbers.

2. Check Seat Availability:

Users can input a train number to check how many seats are available for booking in that particular train.

3. Book Tickets:

Users can book a ticket by providing their name and selecting the train they wish to travel on, as long as seats are available.

4. Cancel Tickets:

Users can cancel their ticket by providing their name. The system will remove their name from the list of booked passengers.

5. Display Booked Tickets:

The system allows users to view the list of all passengers who have booked seats.

6. **Exit**:

The system allows users to exit the program when finished.

Implementation:

- The project will be implemented in **Java** using classes and objects.
- It will utilize a simple **console-based interface** to interact with users.
- **ArrayLists** will be used to manage the available trains and booked tickets.

Key Classes:

1. Train Class:

Stores information about each train, such as train name, departure time, passenger capacity, and train number.

2. ReservationSystem Class:

Handles the main operations like booking tickets, checking availability, and cancelling bookings.

3. Main Class:

Provides a user-friendly interface to interact with the system, offering options through a menu-driven approach.

Tools & Technologies:

- **Java** as the programming language.
- ArrayList for storing train and booking information.
- **Scanner** for user input.

Conclusion:

This railway reservation system will provide users with essential features to manage train bookings efficiently. It is an ideal system for demonstrating basic object-oriented programming concepts and user interaction in Java.

Source code

import java.util.ArrayList;
import java.util.Scanner;
class Train {
String name;
String time;
int passengerStrength;
int trainNumber;
public Train(String name, String time, int passengerStrength, int trainNumber) {
this.name = name;
this.time = time;
this.passengerStrength = passengerStrength;
this trainNumber – trainNumber

```
}
class ReservationSystem {
  private ArrayList<Train> availableTrains = new ArrayList<>();
  private ArrayList<String> bookedSeats = new ArrayList<>();
  public ReservationSystem() {
    availableTrains.add(new Train("Mumbai - Delhi", "13:05", 50, 1010));
    availableTrains.add(new Train("Delhi - Jaipur", "7:00", 50, 2013));
    availableTrains.add(new Train("Prayagraj - Delhi", "10:00", 50, 3045));
  }
  public void displayAvailableTrains() {
    System.out.println("Available Trains:");
    System.out.println("Train Name\tTime\tPassenger Strength\tTrain Number");
    for (Train train : availableTrains) {
       System.out.println(train.name + "\t" + train.time + "\t" + train.passengerStrength + "\t" +
train.trainNumber);
     }
  }
  public void checkSeatAvailability(int trainNumber) {
    for (Train train: availableTrains) {
```

```
if (train.trainNumber == trainNumber) {
         int availableSeats = train.passengerStrength - bookedSeats.size();
         System.out.println("Available seats on Train " + train.trainNumber + ": " +
availableSeats);
         return;
       }
    System.out.println("Train not found.");
  }
  public void bookTicket(int trainNumber, String passengerName) {
    for (Train train : availableTrains) {
       if (train.trainNumber == trainNumber) {
         if (bookedSeats.size() < train.passengerStrength) {</pre>
            bookedSeats.add(passengerName);
            System.out.println("Ticket booked successfully for " + passengerName);
          } else {
            System.out.println("Sorry, the train is fully booked.");
         return;
       }
    System.out.println("Train not found.");
  }
```

```
public void cancelTicket(String passengerName) {
    if (bookedSeats.remove(passengerName)) {
       System.out.println("Ticket canceled successfully for " + passengerName);
     } else {
       System.out.println("Passenger not found or no booking exists for this passenger.");
    }
  }
  public void displayBookedTickets() {
    System.out.println("Booked Tickets:");
    for (String passenger : bookedSeats) {
       System.out.println(passenger);
public class Main {
  public static void main(String[] args) {
    ReservationSystem reservationSystem = new ReservationSystem();
    Scanner scanner = new Scanner(System.in);
    while (true) {
```

```
System.out.println("\nRailway Reservation System Menu:");
System.out.println("1. Display Available Trains");
System.out.println("2. Check Seat Availability");
System.out.println("3. Book a Ticket");
System.out.println("4. Cancel a Ticket");
System.out.println("5. Display Booked Tickets");
System.out.println("6. Exit");
System.out.print("Enter your choice: ");
int choice = scanner.nextInt();
scanner.nextLine(); // Consume the newline character
switch (choice) {
  case 1:
    reservationSystem.displayAvailableTrains();
    break;
  case 2:
    System.out.print("Enter Train Number: ");
    int trainNumber = scanner.nextInt();
    reservationSystem.checkSeatAvailability(trainNumber);
    break;
  case 3:
    System.out.print("Enter Train Number: ");
    trainNumber = scanner.nextInt();
```

```
System.out.print("Enter Passenger Name: ");
           String passengerName = scanner.nextLine();
           reservationSystem.bookTicket(trainNumber, passengerName);
           break;
         case 4:
           System.out.print("Enter Passenger Name to Cancel: ");
           passengerName = scanner.nextLine();
           reservationSystem.cancelTicket(passengerName);
           break;
         case 5:
           reservationSystem.displayBookedTickets();
           break;
         case 6:
           System.out.println("Exiting Railway Reservation System. Thank you!");
           System.exit(0);
         default:
           System.out.println("Invalid choice. Please try again.");
       }
}
```

scanner.nextLine(); // Consume the newline character

Outlook

```
import java.util.ArrayList;
import java.util.Scanner;
                                                                        Railway Reservation System Menu:
                                                                           Display Available Trains
Check Seat Availability
Book a Ticket
    class Train {
        String name;
String time;
        int passengerStrength;
int trainNumber;
                                                                           Cancel a Ticket
Display Booked Tickets
                                                                           Exit
        public Train(String name, String time, int
   passengerStrength, int trainNumber) {
             this.name = name;
this.time = time;
             this.passengerStrength = passengerStrength;
this.trainNumber = trainNumber;
    class ReservationSystem {
    private ArrayList<Train> availableTrains = new ArrayList
            <>(>);
vate ArrayList<String> bookedSeats = new ArrayList
20
             <>():
                                                                         Railway Reservation System Menu:
        public ReservationSystem() {
                                                                         1. Display Available Trains
             availableTrains.add(new Train("Mumbai - Delhi", "13
                                                                         2. Check Seat Availability
                                                                        3. Book a Ticket
             availableTrains.add(new Train("Delhi - Jaipur", "7
24
                                                                        4. Cancel a Ticket
                                                                        5. Display Booked Tickets
             availableTrains.add(new Train("Prayagraj - Delhi",
                                                                       6. Exit
                                                                         Enter your choice: 1
26
                                                                         Available Trains:
                                                                         Train Name Time
                                                                                              Passenger Strength Train Number
        public void displayAvailableTrains() {
                                                                         Mumbai - Delhi 13:05 50 1010
             System.out.println("Available Trains:");
29
                                                                         Delhi - Jaipur 7:00 50 2013
             System.out.println("Train Name\tTime\tPassenger
                                                                         Prayagraj - Delhi 10:00 50 3045
                 Strength\tTrain Number");
             for (Train train : availableTrains) {
                                                                         Railway Reservation System Menu:
                 System.out.println(train.name + "\t" + train
                                                                         1. Display Available Trains
                     .time + "\t" + train.passengerStrength +
                                                                         Check Seat Availability
                      "\t" + train.trainNumber);
                                                                         3. Book a Ticket
33
                                                                         4. Cancel a Ticket
34
                                                                         5. Display Booked Tickets
                                                                         6. Exit
        public void checkSeatAvailability(int trainNumber) {
                                                                         Enter your choice:
                (Train train : availableTrains) {
         public void checkSeatAvailability(int trainNumber) {
                                                                          Mumbai - Delhi 13:05 50 1010
                                                                         Delhi - Jaipur 7:00 50 2013
             for (Train train : availableTrains) {
                                                                         Prayagraj - Delhi 10:00 50 3045
                  if (train.trainNumber == trainNumber) {
                      int availableSeats = train.passengerStrength
                           bookedSeats.size();
                                                                         Railway Reservation System Menu:
                      System.out.println("Available seats on Train
                                                                         1. Display Available Trains
                                                                          2. Check Seat Availability
                            + train.trainNumber + ": " +
                                                                        3. Book a Ticket
                          availableSeats);
                                                                         4. Cancel a Ticket
                                                                         5. Display Booked Tickets
43
                                                                        6. Exit
             System.out.println("Train not found.");
                                                                          Enter your choice: 2
44
                                                                          Enter Train Number: 1010
                                                                         Available seats on Train 1010: 50
         public void bookTicket(int trainNumber, String
             passengerName) {
                                                                         Railway Reservation System Menu:
                                                                         1. Display Available Trains
48
              for (Train train : availableTrains) {
                  if (train.trainNumber == trainNumber) {
                                                                         2. Check Seat Availability
                      if (bookedSeats.size() < train</pre>
                                                                         3. Book a Ticket
50
                           .passengerStrength) {
                                                                         4. Cancel a Ticket
                                                                         5. Display Booked Tickets
                          bookedSeats.add(passengerName);
                          System.out.println("Ticket booked
                                                                         6. Exit
                               successfully for " + passengerName);
                                                                         Enter your choice:
```

```
Enter Train Number: 1010
        public void bookTicket(int trainNumber, String
                                                                   Available seats on Train 1010: 50
            passengerName) {
48
            for (Train train : availableTrains) {
                                                                   Railway Reservation System Menu:
                if (train.trainNumber == trainNumber) {
49
                                                                   1. Display Available Trains
                   if (bookedSeats.size() < train</pre>
                                                                   2. Check Seat Availability
                        .passengerStrength) {
                                                                   3. Book a Ticket
                       bookedSeats.add(passengerName);
                                                                   4. Cancel a Ticket
                        System.out.println("Ticket booked
                                                                   5. Display Booked Tickets
                            successfully for " + passengerName);
                                                                   6. Exit
                    } else {
                                                                   Enter your choice: 3
                       System.out.println("Sorry, the train is
                                                                   Enter Train Number: 1010
                           fully booked.");
                                                                  Enter Passenger Name: biva
                                                                   Ticket booked successfully for biva
56
                                                                   Railway Reservation System Menu:
                                                                   1. Display Available Trains
            System.out.println("Train not found.");
59
                                                                   2. Check Seat Availability
60
                                                                   3. Book a Ticket
                                                                   4. Cancel a Ticket
        public void cancelTicket(String passengerName) {
                                                                   5. Display Booked Tickets
            if (bookedSeats.remove(passengerName)) {
                                                                   6 Exit
64
                System.out.println("Ticket canceled successfully
                                                                   Enter your choice:
                   for " + passengerName);
```

```
public void cancelTicket(String passengerName) {
                                                                   Enter Passenger Name: biva
            if (bookedSeats.remove(passengerName)) {
                                                                   Ticket booked successfully for biva
               System.out.println("Ticket canceled successfully
                  for " + passengerName);
                                                                   Railway Reservation System Menu:
            } else {
                                                                   1. Display Available Trains
                System.out.println("Passenger not found or no
66
                                                                   2. Check Seat Availability
                   booking exists for this passenger.");
                                                                   3. Book a Ticket
                                                                   4. Cancel a Ticket
68
                                                                   5. Display Booked Tickets
69
                                                                   6. Exit
        public void displayBookedTickets() {
                                                                   Enter your choice: 4
            System.out.println("Booked Tickets:");
                                                                   Enter Passenger Name to Cancel: biva
            for (String passenger : bookedSeats) {
                                                                   Ticket canceled successfully for biva
               System.out.println(passenger);
74
                                                                  Railway Reservation System Menu:
                                                                   1. Display Available Trains
                                                                   2. Check Seat Availability
                                                                  3. Book a Ticket
78 public class Main {
                                                                  4. Cancel a Ticket
        public static void main(String[] args) {
                                                                   5. Display Booked Tickets
80
           ReservationSystem reservationSystem = new
                                                                   6. Exit
               ReservationSystem();
                                                                   Enter your choice:
            Scanner scanner = new Scanner(System.in);
```

```
Enter Train Number: 1010
                                                                   Enter Passenger Name: biva
69
                                                                   Ticket booked successfully for biva
        public void displayBookedTickets() {
            System.out.println("Booked Tickets:");
                                                                   Railway Reservation System Menu:
            for (String passenger : bookedSeats) {
                System.out.println(passenger);
                                                                   1. Display Available Trains
73
                                                                   2. Check Seat Availability
                                                                   3. Book a Ticket
                                                                   4. Cancel a Ticket
                                                                   5. Display Booked Tickets
                                                                   6. Exit
    public class Main {
       public static void main(String[] args) {
                                                                   Enter your choice: 5
79
                                                                   Booked Tickets:
80
            ReservationSystem reservationSystem = new
               ReservationSystem();
                                                                  biva
            Scanner scanner = new Scanner(System.in);
                                                                   Railway Reservation System Menu:
82
                                                                   1. Display Available Trains
            while (true) {
                                                                   2. Check Seat Availability
                System.out.println("\nRailway Reservation System
84
                                                                   3. Book a Ticket
                System.out.println("1. Display Available Trains"
                                                                   4. Cancel a Ticket
                                                                   5. Display Booked Tickets
                                                                   6. Exit
                System.out.println("2. Check Seat Availability"
86
                                                                   Enter your choice:
```

```
System.out.print("Enter Train Number: "
                                            Railway Reservation System Menu:
                                            1. Display Available Trains
                                            2. Check Seat Availability
int trainNumber = scanner.nextInt();
reservation {\tt System.check Seat Availability}
                                            3. Book a Ticket
                                            4. Cancel a Ticket
   (trainNumber);
                                            5. Display Booked Tickets
                                            6. Exit
                                            Enter your choice: 5
Booked Tickets:
System.out.print("Enter Train Number: "
trainNumber = scanner.nextInt();
scanner.nextLine(); // Consume the
                                            Railway Reservation System Menu:
System.out.print("Enter Passenger Name:
                                            1. Display Available Trains
                                            2. Check Seat Availability
                                            3. Book a Ticket
String passengerName = scanner.nextLine
                                            4. Cancel a Ticket
                                            5. Display Booked Tickets
reservation System.book Ticket (train Number\\
    , passengerName);
                                           Enter your choice: 6
                                            Exiting Railway Reservation System. Thank you!
System.out.print("Enter Passenger Name
                                             === Code Execution Successful ===
```