```
package newoasis;
import java.util.*;
import java.util.stream.IntStream;
//Admin Name : admin,Password : 12345;
//User Mobile No : 123456789,User Password : 12345;
class User{
   String name;
   String password;
   int phoneNo;
   User(String name,String password,int phoneNo){
      this.name=name;
      this.password=password;
      this.phoneNo=phoneNo;
   }

}
class ApprovalUser{
   String name;
   String password;
   int phoneNo;

   ApprovalUser(String name,String password,int phoneNo){
      this.name=name;
      this.password=password;
      this.phoneNo=phoneNo;
   }
}
class Train{
   String TrainName;
   String startPoint;
   String endPoint;
```

```
    int noOfStation;
    int noOfSeat;
    List<String> station;
    int noOfSeatAlotted;
    int[][] seatAlotted;

    Train(String TrainName,String startPoint,String endPoint,int noOfStation,int noOfSeat,List<String>
station,int noOfSeatAlotted,int[][] seatAlotted){
        this.TrainName=TrainName;
        this.startPoint=startPoint;
        this.endPoint=endPoint;
        this.noOfStation=noOfStation;
        this.noOfSeat=noOfSeat;
        this.station=station;
        this.noOfSeatAlotted=noOfSeatAlotted;
        this.seatAlotted=seatAlotted;
    }
}
class waitingList{
    Train train;
    int noOfPassengers;
    int st;
    int en;

    waitingList(Train train, int noOfPassengers, int st, int en){
        this.train=train;
        this.noOfPassengers=noOfPassengers;
        this.st=st;
        this.en=en;
        //this.availableTicket=availableTicket;
    }
```

```
}
public class Railway {
    static Scanner sc = new Scanner(System.in);
    static ArrayList<Train> trains = new ArrayList<>();
    static ArrayList<User> user = new ArrayList<>();
    static ArrayList<ApprovalUser> appUser = new ArrayList<>();
    static ArrayList<waitingList> waitingLis = new ArrayList<>();

    // <---------------- ADMIN ---------------->
    // To approve/reject user login request,approved details will be added to userList,rejected details will be deleted from waitingLList
    static void approveUser(){
        int i=0;
        while (true) {
            if (i >= appUser.size()) break;
            System.out.println("User Name : "+appUser.get(i).name);
                System.out.println("1.Approve or 2.Reject");
                int approval = sc.nextInt();
            if (approval == 1) {
                User us2 = new User(appUser.get(i).name,appUser.get(i).password,appUser.get(i).phoneNo);
                user.add(us2);
                System.out.println("Approved Successfully");
            } else {
                if(approval==2){
                    appUser.remove(i);
                }
                else System.out.println("Invalid Input");
            }
            i++;
        }
        System.out.println("No more Pending Approvals");
```

```
    }
// To add Train
static void addTrain() {
    System.out.println("Enter Train Name : ");
    sc.nextLine();String tName = sc.nextLine();
    System.out.println("Enter Train Boarding Station Name : ");
    sc.nextLine();String bName = sc.nextLine();
    System.out.println("Enter Train Destination Station Name : ");
    sc.nextLine();String dName = sc.nextLine();
    System.out.println("Enter No Of Station : ");
    int noOfStation = sc.nextInt();
    System.out.println("Enter No Of Seat Available : ");
    int noOfSeat = sc.nextInt();
    int[][] seatAlotted = new int[noOfSeat][noOfStation];
    List<String> st = new ArrayList<>();
    System.out.println("Enter Stations Names : ");
    int i = 0;
    while (i < noOfStation) {
        System.out.println("Enter "+(i+1)+"  Station : ");
        String sn=sc.nextLine();
        st.add(sn);
        i++;
    }
    Train newTrain = new Train(tName,bName,dName,noOfStation,noOfSeat,st,0,seatAlotted);
    trains.add(newTrain);
}
// To declare Seat availability
static void decSeat() {
    System.out.println("Train Name");
    int i = 0;
    while (i<trains.size()) {
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        System.out.println(i+1+"."+trains.get(i).TrainName);
        i++;
    }
    System.out.println("Enter Choice : ");
    int n = sc.nextInt();
    if(n<=trains.size()){
        System.out.println("No of Seat Allotted : "+trains.get(n-1).noOfSeatAlotted);
        System.out.println("Enter No Of Available Seats");
        int noOfS = sc.nextInt();
        trains.get(n - 1).noOfSeat = noOfS;
        trains.get(n-1).seatAlotted=new int[noOfS][trains.get(n-1).noOfStation];
    }else System.out.println("Invalid Input!");
}
// To Display train details
static void trainDetails(){
    viewTrains();
    System.out.println("Enter Train Name : ");
    sc.nextLine();String tName = sc.nextLine();
    for (Train train : trains) {
        if (train.TrainName.equals(tName)) {
            System.out.println(String.format("Train Name : %s\nTrain Boarding Station Name : %s\n" +
                    "Train Destination Station Name : %s\n" +
                    "No Of Seat : %s\nNo Of Seat Allotted : %s\n",
                train.TrainName, train.startPoint, train.endPoint,
                train.noOfSeat, train.noOfSeatAlotted));

        }
        System.out.println("Seat Allotment : ");
        for (int i = 0; i < train.noOfSeat; i++) {
            for (int j = 0; j < train.noOfStation; j++) {
                System.out.print(train.seatAlotted[i][j]);
```

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            }
            System.out.println();
        }
        break;
    }
}

// <---------------- USER ---------------->
// Return available ticket Count
static int availTic(Train train, int noOfPassengers, int st, int en){
    int availableTicket = 0;
    for (int k = 0; k < noOfPassengers; k++) {
        int seat = 0;
        if(k<train.noOfSeat) {
            for (int i = 0; i < train.noOfSeat; i++) {
                for (int i1 = st; i1 < en; i1++) {
                    if (train.seatAlotted[i][i1] != 0 ) {
                        break;
                    } else seat++;
                }
                if (seat == en - st) {
                    ++availableTicket;
                    for (int i1 = st - 1; i1 < en; i1++) {
                        train.seatAlotted[i][i1] = 99;
                    }
                    break;
                }
            }
        }else break;
    }
    for (int i = 0; i < train.noOfSeat; i++) {
```

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        for (int j = 0; j < train.noOfStation; j++) {
            if(train.seatAlotted[i][j]==99) train.seatAlotted[i][j]=0;
        }
    }
    return availableTicket;
}
// allot ticket
static void allotTicket(Train train, int noOfPassengers, int st, int en, int availableTicket){
    int allotted = train.noOfSeatAlotted;
    if(allotted==0) allotted++;
    if(availableTicket>0) {
        int k = 0;
        while (k < noOfPassengers) {
            int seat = 0;
            for (int i = 0; i < train.noOfSeat; i++) {
                for (int i1 = st; i1 < en; i1++) {
                    if (train.seatAlotted[i][i1] != 0) {
                        break;
                    } else seat++;
                }
                if (seat == en - st) {

                    for (int i1 = st - 1; i1 < en; i1++) {
                        train.seatAlotted[i][i1] = allotted;
                    }
                    System.out.println("Your Seat No is : " + (i + 1) + "\nYour Ticket No : " + allotted++);
                    break;
                }
            }
            k++;
        }
```

```
        train.noOfSeatAlotted = allotted;
        for (int i = 0; i < train.noOfSeat; i++) {
            for (int j = 0; j < train.noOfStation; j++) {
                System.out.print(train.seatAlotted[i][j]);
            }
            System.out.println();
        }
    }
    if(noOfPassengers-availableTicket>0){
        waitingList wl = new waitingList(train,(noOfPassengers-availableTicket),st,en);
        waitingLis.add(wl);
    }
}
// allot ticket for waiting list passengers
static void WaitingLisAllot(Train train, int noOfPassengers, int st, int en, int availableTicket){
    int allotted = train.noOfSeatAlotted;
    if(availableTicket>0) {
        for (int k = 0; k < noOfPassengers; k++) {
            int seat = 0;
            for (int i = 0; i < train.noOfSeat; i++) {
                for (int i1 = st; i1 < en; i1++) {
                    if (train.seatAlotted[i][i1] != 99) {
                        break;
                    } else seat++;
                }
                if (seat == en - st) {
                    ++allotted;
                    for (int i1 = st - 1; i1 < en; i1++) {
                        train.seatAlotted[i][i1] = allotted;
                    }
                    break;
```

```
            }
          }
        }
        train.noOfSeatAlotted = allotted;
    }

    if(noOfPassengers!=availableTicket){
        waitingList wl = new waitingList(train,(noOfPassengers-availableTicket),st,en);
        waitingLis.add(wl);
    }
}
//User Sign up
static void userSignup() {
    System.out.println("Enter Your Mobile No : ");
    int uPhoneNo = sc.nextInt();
    boolean flag=true;
    int i = 0;
    while (true) {
        if (i >= user.size()) break;
        if(uPhoneNo==user.get(i).phoneNo){
            flag = false;
            break;
        }
        i++;
    }
    if(flag) {
        System.out.println("Enter Your Name : ");
        String uName = sc.nextLine();
        System.out.println("Enter Your Password : ");
        String uPassword = sc.next();
```

```
        ApprovalUser aU = new ApprovalUser(uName, uPassword, uPhoneNo);
        appUser.add(aU);
        System.out.println("Account Created Successfully! \nWaiting for Approval! ");
    }else System.out.println("User Mobile No is Already Exist!");
}
//User Sign in
public static void userSigning() {
    System.out.println("----- You Have Chosen User Login ----- ");
    System.out.println("Enter User Mobile No : ");
    int usMobileNo = sc.nextInt();
    System.out.println("Enter User Password : ");
    String usPassword = sc.next();
    int pro=0;
    for(int i=0;i<user.size();i++){
        if(user.get(i).phoneNo==usMobileNo && user.get(i).password.equals(usPassword)){
            UserFunction(i);
            pro++;
            break;
        }
    }
    if(pro==0) System.out.println("User ID and Password Mismatch! \nRetry!");
}
// User actions
static void UserFunction(int u){
    int usCh=0;
    do{
        System.out.println("1.View Trains and Availability");
        System.out.println("2.Book Tickets");
        System.out.println("3.Ticket Cancellation");
        System.out.println("4.Exit");
        System.out.println("Enter Choice : ");
```

```
            usCh = sc.nextInt();
            if(usCh == 1) {
               viewTrains();
            } else if (usCh == 2) {
               viewTrains();
               bookTicket();
            } else if (usCh == 3) {
               viewTrains();
               ticketCancel();
            } else if (usCh==4){
               break;
            }else {
               System.out.println("Invalid Input");
            }
         }while (usCh!=4);
      }
      // To view available train's
      static void viewTrains() {
         System.out.println("SNo  Train_Name         Boarding_Point     Destination_Point");
         IntStream.range(0, trains.size()).mapToObj(i -> String.format("%-4s %-20s %-18s %-19s", (i + 1),
trains.get(i).TrainName, trains.get(i).startPoint, trains.get(i).endPoint)).forEach(System.out::println);
      }
      // To book train
      static void bookTicket(){
         System.out.println("----- Ticket Booking -----");
         System.out.println("Enter Train Name : ");
         sc.nextLine();String tName = sc.nextLine();
         for (Train train : trains) {
            if (train.TrainName.equals(tName)) {
               System.out.println("Enter No Of Passengers : ");
               int noOfPassengers = sc.nextInt();
```

```
            for (int s = 0; s < train.station.size(); s++) {
                System.out.println(train.station.get(s));
            }
            System.out.println("Enter Boarding Station No : ");
            int st = sc.nextInt();
            System.out.println("Enter Destination Station No : ");
            int en = sc.nextInt();


            int availableTicket = availTic(train, noOfPassengers, st, en);
            if (noOfPassengers != availableTicket) {
                if (availableTicket>0) System.out.println(availableTicket +" : Seats are Available "+
                        (noOfPassengers-availableTicket)+" : Seat Will be in WaitingList!");
                else if(availableTicket==0) System.out.println("Ticket's are Not Available");
            } else {
                System.out.println(availableTicket+" : Seats are Available ");
            }

            System.out.println(" 1.Continue  2.Exit\nEnter Your choice : ");
            if (sc.nextInt() == 1) {
                allotTicket(train, noOfPassengers, st, en, availableTicket);
            }
            break;
        }
    }
}
// To cancel train
static void ticketCancel() {
    System.out.println("Enter Train Name : ");
    sc.nextLine();String tName = sc.nextLine();
    for (Train train : trains) {
```

```
        if (train.TrainName.equals(tName)) {
            System.out.println("Enter Ticket No : ");
            int ticNo = sc.nextInt();
            System.out.println("Enter Seat No : ");
            int seatNo = sc.nextInt();
            for (int j = 0; j < train.noOfStation; j++) {
                if (train.seatAlotted[seatNo - 1][j] == ticNo) {
                    train.seatAlotted[seatNo - 1][j] = 0;
                }
            }
            break;
        }
    }
    System.out.println("Ticket Canceled Successfully!");
    waitingAllot();
}
// waiting list function
static void waitingAllot(){
    if(waitingLis.size()>0) {
        for (waitingList waitingLi : waitingLis) {
            int n = availTic(waitingLi.train, waitingLi.noOfPassengers, waitingLi.st, waitingLi.en);
            if (n > 0) {
                WaitingLisAllot(waitingLi.train, waitingLi.noOfPassengers, waitingLi.st, waitingLi.en, n);
                waitingLis.remove(waitingLi);
            }
        }
    }
}

//Admin actions
static void admin(){
```

```
    System.out.println("Enter Your Name : ");
    String aName = sc.nextLine();
    System.out.println("Enter Your Password : ");
    String aPassword = sc.nextLine();
    if(aName.equals("admin")&&aPassword.equals("12345")) {
        int adCh = 0;
        do {
            System.out.println("1.Username authentication");
            System.out.println("2.Add Trains, Routes and Stations");
            System.out.println("3.Declare Seats Availability");
            System.out.println("4.View Train Details");
            System.out.println("5.Exit");
            System.out.println("Enter Choice : ");
            adCh = sc.nextInt();
            if (adCh == 1) {
                approveUser();
            } else if (adCh == 2) {
                addTrain();
            } else if (adCh == 3) {
                decSeat();
            } else if (adCh == 4) {
                trainDetails();
            } else if (adCh == 5) {
                break;
            } else {
                System.out.println("Invalid Input");
            }
        } while (adCh != 5);
    }else System.out.println("Incorrect Admin Name and Password!");
}
//User actions
```

```
static void user(){
    int usOp=0;
    do {
        System.out.println("----- You Have Chosen User Login -----");
        System.out.println("1.User Signup");
        System.out.println("2.User Signing");
        System.out.println("3.Exit");
        System.out.println("Enter Choice : ");
        usOp = sc.nextInt();
        if (usOp == 1) {
            userSignup();
        } else if (usOp == 2) {
            userSigning();
        } else if (usOp == 3) {
        } else {
            System.out.println("Invalid Input!");
        }
    }while(usOp!=3);
}

public static void main(String[] args) {
    User u1 = new User("admin","12345",123456789);
    user.add(u1);
    int[][] seat=new int[5][5];
    ArrayList<String> s = new ArrayList<String>();
    s.add("1.Kovai");s.add("2.Tanjur");s.add("3.Kabul");s.add("4.Sikim");s.add("5.Chennai");
    Train t1 = new Train("Kovai Express","Kovai","Chennai",5,5,s,0,seat);
    trains.add(t1);
    int ch=0;
    do{
        System.out.println("----- Welcome To Railway Reservation System -----");
```

```
            System.out.println("1.Admin Login");
            System.out.println("2.User Login");
            System.out.println("3.Exit");
            System.out.println("Enter Choice : ");
            ch = sc.nextInt();
            if (ch == 1) {
               admin();
            } else if (ch == 2) {
               user();
            } else if (ch == 3) {
               System.out.println("Thanks for Using!");
            } else {
               System.out.println("Invalid Input");
            }
         }while (ch!=3);
      }
}
```