1. Introduction:

1.1) Project Description:

In this project of Railway Booking Management System, we will be implementing the ability to reserve and modify railway tickets. We will use Linked List Operations, Searching & Sorting Algorithms to modify and print the data according to user's needs. This project is simple to use and very user-friendly. It has minimal hardware and software requirements, and no training is needed for using it. We have 2 modules in this scenario, where a user or the passenger, has their own options while admin has to login separately before having their own options. It works from the entering of user details, to payment, to printing of tickets and other operations are available as well.

1.2) Project Scope:

The scope of this project is to help a user reserve and modify their tickets without any hassle. This program will allow a user to reserve a ticket, edit their personal details, ask for a refund or cancel booking and view the reserved ticket. An Admin Panel will allow admins to View all the booked tickets, Add or Remove scheduled trains and Modify/Cancel a Ticket on User Request.

1.3) Modules in Project:

This program has 2 Modules:

User Module:

This module is for user or the passenger to book their ticket, make payments for ticket directly, modify their ticket, ask for a refund, and print/generate their ticket.

Admin Module:

This module allows admins to View all the booked tickets, Add or Remove Trains and Modify a ticket or remove it on a passenger's request.

1.4) Project Features:

User Module:

- **Reserve a Ticket:** Allows user to Reserve Tickets for available trains on desirable dates.
  We will be using linked list operations to insert ticket details.
- **Choose Payment Methods & Pay:** Allows user to pay for the ticket using Credit Card Details.
  We will use simply hard-coded Input/output for this feature as there is no other way to check Credit Card details i.e. No Databases used.
- **Cancel/Refund Booked Tickets:** Allows user to Cancel and Refund your tickets.
- We will be using linked list to delete ticket details. We will use searching algorithms to search and delete.
- **Edit Booked Tickets Personal Details:** Allows user to Edit Personal Details from your Booked Ticket. We will use searching algorithms to search and edit.
  We will be using linked list operations to edit ticket details.
- **Print the Tickets:** Prints on screen your ticket details for viewing and printing.
- We will be using linked list operations to display ticket details. We

will use searching algorithms to search and print.

Admin Module:

- **View All Booked Tickets:** Allows Admin to View All Booked Tickets saved.
  We will be using linked list operations to display all tickets details.
- **Add or Remove Trains:** Add or Remove Available Trains from Database.
  We will be using linked list operations to display all trains details.
- **Modify Booked Tickets (based on User Requests):** Tickets booked can be modified.
  We will be using linked list operations to edit ticket details.

2. Requirements Specification:

2.1) Hardware Specifications:

- Dual Core x86 Processor or above.
- 2GB RAM minimum or above.
- Minimum 20GB Hardware required.

2.1) Software Specification:

- Visual Studio 2015
- Microsoft Windows 7 or above required.

3. SYSTEM IMPLEMENTATION:

3.1) INTRODUCTION:

In this project of Railway Booking Management System, we implemented the ability to reserve and modify railway tickets. We used Linked List Operations, Searching & Sorting Algorithms to modify and display as needed. This project is simple to use and very user-friendly. It has minimal hardware and software requirements, and no training is needed for using it.

3.2) CODE:

```
#include<iostream>
#include<string>
#include<sstream>
#include<ctime>
#include <fstream>
#include <Windows.h>
#include <conio.h>


using namespace std;

struct node {
	int ticketID;
	string Name, Age, NIC, Contact, BookedClass, BookedTName, BookedTID,
BookedDest, BookedSource, BookedDate, DeptTime, ArrTime, BookedSeatNum;
	float Price;
	node* next;
};

struct trains
```

```
{
	string TName, TID, TDest, TSource, TDate, arriveTime, departTime,
TClasses;
	int TSeats;
};

struct SeatRecord {
	string RowA;
	string RowB;
	string RowC;
};

node* head = NULL;
node* tail = NULL;

void admin();
int main();

string Name, Age, NIC, Contact, Dest, Source, SeatNum, Class, TID, Date, ATime,
DTime, TName;
bool trainCheck = false;
float Price;
string BookedID;
int currentID;
trains availTrains[10];
int noOfTrains = 5;

void Payment()
{
	string cc, cvv, dob, payChoice;
	string accNum, accHolderFName, accHolderLName;
	cout << endl << endl;
	cout << "\n\n\t\t\t\t\t==============PAYMENT
DETIALS==============" << endl;
	cout << "\t\t\t\t\tChoose Payment Method. \n";
	cout << "\t\t\t\t\t1. JazzCash. \n";
	cout << "\t\t\t\t\t2. EasyPaisa. \n";
```

```
	cout << "\t\t\t\t\t3. Credit/Debit Card. \n";
	cout << "\n\n\t\t\t\t\t\tEnter Choice (1-3): ";
	flag:
	cin >> payChoice;
	if (payChoice == "1")
	{
	phoneCheck:
		cout << "\n\n\t\t\t\t\t\tEnter JazzCash Mobile Account Number: ";
		cin >> accNum;
		if (accNum.length() != 11 || accNum.length() > 11)
		{
			cout << endl;
			cout << "\n\n\t\t\t\t\t\tEnter a Valid 11 Digit Mobile Phone
Number!" << endl << endl;
			goto phoneCheck;
		}
		cout << "\t\t\t\t\tEnter Account Holder's First Name: ";
		cin >> accHolderFName;
		cout << "\t\t\t\t\tEnter Account Holder's Last Name: ";
		cin >> accHolderLName;
	}
	else if (payChoice == "2")
	{
		cout << "\n\n\t\t\t\t\t\tEnter EasyPaisa Mobile Account Number: ";
		cin >> accNum;
		cout << "\n\n\t\t\t\t\t\tEnter Account Holder's First Name: ";
		cin >> accHolderFName;
		cout << "\n\n\t\t\t\t\t\tEnter Account Holder's Last Name: ";
		cin >> accHolderLName;
	}
	else if (payChoice == "3")
	{
	check:
		cout << "\n\n\t\t\t\t\t\tEnter Credit/Debit Card Number (16 digits): ";
		cin >> cc;
		if (cc.length() != 16)
		{
```

```
                cout << "\n\n\t\t\t\t\tCC number must have a length of 16
only! \n";
                goto check;
        }
        else
                check2:
        cout << "\n\n\t\t\t\t\tEnter CVV (3 digits): ";
        for (int i = 0; i > -1; i++)
        {
                char temp;
                temp = _getch();
                if (temp != 13 && temp != 8)
                {
                        _putch('*');
                }
                if (temp == 13)
                {
                        break;
                }
                if (temp == 8 || temp == 127 && !cvv.empty())
                {
                        cout << "\b \b";
                        cvv.erase(cvv.size() - 1);
                }
                else
                        cvv += temp;
        }
        if (cvv.length() != 3)
        {
                cout << "\n\n\t\t\t\t\tCVV number must have a length of 3
only! \n";
                cvv = "";
                goto check2;
        }
        else
        {
                cout << "\n\n\t\t\t\t\tEnter Date Of Expiry(DD/MM/YYYY): ";
```

```
                cin >> dob;
            }
        }
        else
        {
            cout << "\t\t\t\t\tInvalid Choice. Please try again. \n";
            goto flag;
        }
        cout << "\n\n\t\t\t\t\t\t";
}

void trainSort() {
        string temp, temp2, temp3, temp4, temp5, temp6, temp7, temp9;
        int temp8, j;
        for (int i = 0; i < noOfTrains; i++)
        {
             temp = availTrains[i].arriveTime;
            temp2 = availTrains[i].departTime;
            temp3 = availTrains[i].TClasses;
            temp4 = availTrains[i].TDate;
            temp5 = availTrains[i].TDest;
            temp6 = availTrains[i].TID;
            temp7 = availTrains[i].TName;
            temp8 = availTrains[i].TSeats;
            temp9 = availTrains[i].TSource;
            j = i - 1;
            while (j >= 0 && availTrains[j].TName > temp7)
            {
                availTrains[j + 1].arriveTime = availTrains[j].arriveTime;
                availTrains[j + 1].departTime = availTrains[j].departTime;
                availTrains[j + 1].TClasses = availTrains[j].TClasses;
                availTrains[j + 1].TDate = availTrains[j].TDate;
                availTrains[j + 1].TDest = availTrains[j].TDest;
                availTrains[j + 1].TID = availTrains[j].TID;
                availTrains[j + 1].TName = availTrains[j].TName;
                availTrains[j + 1].TSeats = availTrains[j].TSeats;
                availTrains[j + 1].TSource = availTrains[j].TSource;
```

```
                j--;
            }
            availTrains[j + 1].arriveTime = temp;
            availTrains[j + 1].departTime = temp2;
            availTrains[j + 1].TClasses = temp3;
            availTrains[j + 1].TDate = temp4;
            availTrains[j + 1].TDest = temp5;
            availTrains[j + 1].TID = temp6;
            availTrains[j + 1].TName = temp7;
            availTrains[j + 1].TSeats = temp8;
            availTrains[j + 1].TSource = temp9;
        }
}

string SeatChoose()
{
        fstream Seat;
        int count = 0, delimit = 0;
        string line;
        SeatRecord Seats[10];
        Seat.open("Seat_Details.txt");
        while (getline(Seat, line))
        {
            count++;
        }
        Seat.close();
        Seat.open("Seat_Details.txt");
        for (int j = 0; j < count; j++)
        {
            string line1;
            getline(Seat, line1);
            for (int i = 0; i > -1; i++)
            {
                char temp;
                temp = line1[i];
                if (temp == '-')
                {
```

```
                delimit = i;
                break;
            }
            Seats[j].RowA += temp;
        }

        for (int i = delimit + 1; i > -1; i++)
        {
            char temp;
            temp = line1[i];
            if (temp == '-')
            {
                delimit = i;
                break;
            }
            Seats[j].RowB += temp;
        }

        for (int i = delimit + 1; i > -1; i++)
        {
            char temp;
            temp = line1[i];
            if (temp == '-')
            {
                delimit = i;
                break;
            }
            Seats[j].RowC += temp;
        }
}
Seat.close();
string RowName, SeatNum, FinalSeatNum;
bool Flag = false;
cout << "\n\n\t\t\t\t\t\t\tA" << "\t" << " B" << "\t" << " C" << "\t\n";
for (int i = 0; i < 10; i++)
{
```

```
		cout << "\n\n\t\t\t\t\t\t\t\t" << Seats[i].RowA << "\t" << Seats[i].RowB
<< "\t" << Seats[i].RowC << "\t\n";
	}

	cout << "\n\n\t\t\t\t\t\t  ====================================\n";
	for (int x = 0; x > -1; x++)
	{
		cout << "\n\n\t\t\t\t\t\tEnter the row name that you chose: ";
		cin >> RowName;
		if (RowName != "A" && RowName != "B" && RowName != "C")
		{
			cout << "\n\n\t\t\t\t\t\tInvalid row, please try again. ";
		}
		else
			break;
	}
	for (int x = 0; x > -1; x++)
	{
	check7:
		cout << "\n\n\t\t\t\t\t\tEnter the seat number that you chose: ";
		cin >> SeatNum;
		if (SeatNum == "XX")
		{
			cout << "\n\n\t\t\t\t\t\tInvalid seat, please try again! \n";
			goto check7;
		}
		for (int i = 0; i < 10; i++)
		{
			if (RowName == "A")
			{
				if (SeatNum == Seats[i].RowA)
				{
					Seats[i].RowA = "XX";
					Flag = true;
					break;
				}
			}
```

```
                else if (RowName == "B")
                {
                        if (SeatNum == Seats[i].RowB)
                        {
                                Seats[i].RowB = "XX";
                                Flag = true;
                                break;
                        }
                }
                else if (RowName == "C")
                {
                        if (SeatNum == Seats[i].RowC)
                        {
                                Seats[i].RowC = "XX";
                                Flag = true;
                                break;
                        }
                }
        }


        if (Flag == false)
        {
                cout << "\n\n\t\t\t\t\tSeat number not found, please try again.
\n";
        }
        else
                break;
    }
    FinalSeatNum = RowName + SeatNum;
    ofstream Del;
    Del.open("Seat_Details.txt", ios::trunc);
    Del.close();
    Del.open("Seat_Details.txt", ios::trunc);
    for (int i = 0; i < 10; i++)
    {
```

```
                Del << Seats[i].RowA << "-" << Seats[i].RowB << "-" << Seats[i].RowC
<< "-\n";
        }
        Del.close();
        return FinalSeatNum;
}

void iniTrain()
{
        availTrains[0].TName = "Shalimar Express";
        availTrains[0].TID = "SHE753";
        availTrains[0].TSource = "Karachi";
        availTrains[0].TDest = "Lahore";
        availTrains[0].TDate = "24-Dec-2020";
        availTrains[0].arriveTime = "20:00 (8:00 PM)";
        availTrains[0].departTime = "16:40 (4:40 PM)";
        availTrains[0].TClasses = "Economy, AC Lower, AC Business";
        availTrains[0].TSeats = 30;

        availTrains[1].TName = "Karakoram Express";
        availTrains[1].TID = "KKE694";
        availTrains[1].TSource = "Karachi";
        availTrains[1].TDest = "Faisalabad";
        availTrains[1].TDate = "26-Dec-2020";
        availTrains[1].arriveTime = "08:00 (8:00 AM)";
        availTrains[1].departTime = "04:40 (4:40 AM)";
        availTrains[1].TClasses = "Economy, AC Lower, AC Business";
        availTrains[1].TSeats = 30;

        availTrains[2].TName = "Green Line Express";
        availTrains[2].TID = "GLE400";
        availTrains[2].TSource = "Karachi";
        availTrains[2].TDest = "Islamabad";
        availTrains[2].TDate = "05-Jan-2021";
        availTrains[2].arriveTime = "12:00 (12:00 PM)";
        availTrains[2].departTime = "10:00 (10:00 AM)";
        availTrains[2].TClasses = "Economy, AC Lower, AC Business";
```

```
	availTrains[2].TSeats = 30;


	availTrains[3].TName = "Tezgam Express";
	availTrains[3].TID = "TEZ123";
	availTrains[3].TSource = "Karachi";
	availTrains[3].TDest = "Faisalabad";
	availTrains[3].TDate = "01-Jan-2021";
	availTrains[3].arriveTime = "15:00 (03:00 PM)";
	availTrains[3].departTime = "9:00 (09:00 AM)";
	availTrains[3].TClasses = "Economy, AC Lower, AC Business";
	availTrains[3].TSeats = 30;

	availTrains[4].TName = "Karachi Express";
	availTrains[4].TID = "KHE123";
	availTrains[4].TSource = "Karachi";
	availTrains[4].TDest = "Lahore";
	availTrains[4].TDate = "31-Dec-2000";
	availTrains[4].arriveTime = "12:00 (12:00 AM)";
	availTrains[4].departTime = "12:00 (09:00 PM)";
	availTrains[4].TClasses = "Economy, AC Lower, AC Business";
	availTrains[4].TSeats = 30;

}

string trainFill()
{
	bool check = false;
	bool check2 = false;
	trainCheck = true;

flag:
	cout << "\t\t\t\t\tEnter Your Departure City: ";
	cin >> Dest;
	cin.ignore();
	cout << "\t\t\t\t\tEnter Your Arrival City: ";
	cin >> Source;
```

```
	cin.ignore();
	trainSort();

	cout << "\n\n\t\t\t\t\tAVAILABLE TRAINS ON THAT DAY IN THIS ROUTE ARE
AS FOLLOWS (IF ANY): \n\n" << endl;

	for (int i = 0; i < noOfTrains; i++)
	{
		if (availTrains[i].TSource == Dest && availTrains[i].TDest == Source)
		{
			cout << "\t\t\t\t\tTrain Name: " << availTrains[i].TName <<
endl;
			cout << "\t\t\t\t\tTrain ID: " << availTrains[i].TID << endl;
			cout << "\t\t\t\t\tTrain Source: " << availTrains[i].TSource <<
endl;
			cout << "\t\t\t\t\tTrain Destination: " << availTrains[i].TDest <<
endl;
			cout << "\t\t\t\t\tTrain Departure Date: " <<
availTrains[i].TDate << endl;
			cout << "\t\t\t\t\tTrain Arrival Time: " <<
availTrains[i].arriveTime << endl;
			cout << "\t\t\t\t\tTrain Departure Time: " <<
availTrains[i].departTime << endl;
			cout << "\t\t\t\t\tAvailable Train Classes: " <<
availTrains[i].TClasses << endl;
			cout << "\t\t\t\t\tSeats Available: " << availTrains[i].TSeats <<
endl;
			cout << endl << endl;
			check = true;
		}
	}
	if (check == false) {
		cout << "\t\t\t\t\tNo trains available on this route. Re-enter your
details. \n";
		goto flag;
	}
	else {
```

```
	redo:
		cout << "\t\t\t\t\tInput Train ID that you wish to book: ";
		cin >> BookedID;
		for (int i = 0; i < noOfTrains; i++)
		{
			if (BookedID == availTrains[i].TID)
			{
				availTrains[i].TSeats--;
				return BookedID;
				check2 = true;
			}
		}
		if (check2 == false)
		{
			cout << "\t\t\t\t\tInput correct train ID! \n";
			goto redo;
		}
	}
}

int choice = 0;
	cout << "\t\t\t\t\tPrices based on classes are as follows: \n";
	cout << "\t\t\t\t\t1. Economy \t\t 2500 PKR \n";
	cout << "\t\t\t\t\t2. AC Lower \t\t 3500 PKR \n";
	cout << "\t\t\t\t\t3. AC Business \t\t 4500 PKR \n\n";
	flag:
	cout << "\t\t\t\t\tInput Choice (1-3): ";
	cin >> choice;
	if (choice == 1) {
		Price = 2500;
		Class = "Economy [No Berth]";
	}
	else if (choice == 2) {
		Price = 3500;
		Class = "AC Lower [Berth Included]";
	}
	else if (choice == 3) {
```

```
			Price = 4500;
			Class = "AC Business [Berth Included]";
		}
		else
		{
			cout << "\t\t\t\t\tInvalid Input. Try again. \n\n";
			goto flag;
		}
}
void reserveTicket()
{
		string fName, lName;
		node *obj = new node();
		node* temp = tail;
		if (head == NULL && tail == NULL) {
			obj->next = NULL;
			head = obj;
			tail = obj;
		}
		else
		{
			temp->next = obj;
			tail = obj;
		}

		cout << endl << endl << endl << endl << endl;
		cout << "\t\t\t\t\tEnter First Name of Passenger: ";
		cin >> fName;
		cout << "\t\t\t\t\tEnter Last Name of Passenger: ";
		cin >> lName;
		Name = fName + " " + lName;

		cout << "\t\t\t\t\tEnter Age: ";
		cin >> Age;

nicCheck:
		cout << "\t\t\t\t\tEnter CNIC Number: ";
```

```
	cin >> NIC;

	if (NIC.length() != 13 || NIC.length() > 13)
	{
		cout << endl;
		cout << "\t\t\t\t\tEnter a Valid 13 digit CNIC Number!" << endl <<
endl;
		goto nicCheck;
	}

phoneCheck:
	cout << "\t\t\t\t\tEnter Contact Number: ";
	cin >> Contact;

	if (Contact.length() != 11 || Contact.length() > 11)
	{
		cout << endl;
		cout << "\t\t\t\t\tEnter a Valid 11 digit Mobile Phone Number!" <<
endl << endl;
		goto phoneCheck;
	}
	cin.clear();

	trainFill();
	int seatCheck;
	for (int i = 0; i < noOfTrains; i++)
	{
		if (availTrains[i].TID == BookedID)
		{
			TName = availTrains[i].TName;
			TID = BookedID;
			Date = availTrains[i].TDate;
			ATime = availTrains[i].arriveTime;
			DTime = availTrains[i].departTime;
		}
	}
```

```
	trainPrice();

	SeatNum = SeatChoose();

	Payment();

	system("cls");

	cout << "\n\n\t\t\t\t\t Your payment is successfully processed!" << endl;
	cout << "\t\t\t\t\t PKR " << Price << " has been deducted from your
Account." << endl;

	srand(time(0));

	//Randomly Generated Ticket ID:
	obj->ticketID = (rand());
	cout << endl << endl;
	cout << "\t\t\t\t\tTicket Generated! Your ID is: " << obj->ticketID << endl;
	currentID = obj->ticketID;

	obj->Name = Name;
	obj->NIC = NIC;
	obj->Age = Age;
	obj->Contact = Contact;
	obj->BookedTName = TName;
	obj->BookedDest = Dest;
	obj->BookedSource = Source;
	obj->BookedSeatNum = SeatNum;
	obj->Price = Price;
	obj->BookedClass = Class;
	obj->BookedTID = TID;
	obj->BookedDate = Date;
	obj->DeptTime = DTime;
	obj->ArrTime = ATime;

	cout << endl << endl;
}
```

```
void viewTicket()
{
	int search;
	string choice;
	bool check = false;
	node *temp = head;
	cin.clear();
	cout << endl << endl << endl << endl << endl;
	jump:
	cout << "\t\t\t\t\tDo You Want to View Most Recent Booking? If so, Press
1\n";
	cout << "\t\t\t\t\t Do You Want to Search on Older Booking? If so, Press
2\n";
	cout << "\t\t\t\t\tEnter Choice (1-2): ";
	cin >> choice;
	cin.ignore();
	if (choice == "1")
	{
		search = currentID;
		check = true;
	}
	else if (choice == "2")
	{
		cout << "\t\t\t\t\tEnter Your Booking ID: ";
		cin >> search;
		cout << endl << endl;
		check = true;
	}
	else
	{
		cout << "\t\t\t\t\tInvalid input. Retry! \n";
		goto jump;
	}
		do
		{
			if (temp != NULL)
```

```
                {
                        if (temp->ticketID == search && check == true)
                        {
                                cout << "\t\t\t\t\tBooking ID: " << temp->ticketID
<< endl;
                                cout << "\t\t\t\t\tName: " << temp->Name <<
endl;
                                cout << "\t\t\t\t\tAge: " << temp->Age << endl;
                                cout << "\t\t\t\t\tNIC: " << temp->NIC << endl;
                                cout << "\t\t\t\t\tContact: " << temp->Contact <<
endl;
                                cout << "\t\t\t\t\tTrain ID: " << temp->BookedTID
<< endl;
                                cout << "\t\t\t\t\tTrain Name: " << temp-
>BookedTName << endl;
                                cout << "\t\t\t\t\tTrain Class: " << temp-
>BookedClass << endl;
                                cout << "\t\t\t\t\tSeat Number: " << temp-
>BookedSeatNum << endl;
                                cout << "\t\t\t\t\tDate of Booking: " << temp-
>BookedDate << endl;
                                cout << "\t\t\t\t\tSource: " << temp->BookedDest
<< endl;
                                cout << "\t\t\t\t\tDestination: " << temp-
>BookedSource << endl;
                                cout << "\t\t\t\t\tDeparture TIme: " << temp-
>DeptTime << endl;
                                cout << "\t\t\t\t\tArrival Time: " << temp-
>ArrTime << endl;
                                cout << endl << endl;
                                break;
                                main();
                        }
                        else
                        {
                                temp = temp->next;
                        }
```

```
                }
                else
                        cout << "\t\t\t\t\tNo Bookings Exist. \n";
        } while (temp);
}

void display()
{
        cout << endl << endl << endl << endl << endl;
        if (head != NULL && tail != NULL)
        {
                cout << "\t\t\t\t\tList is as follows: \n";
                node *temp = head;
                do {
                        cout << "\t\t\t\t\tTicket ID: " << temp->ticketID << endl;
                        cout << "\t\t\t\t\tName: " << temp->Name << endl;
                        cout << "\t\t\t\t\tAge: " << temp->Age << endl;
                        cout << "\t\t\t\t\tNIC: " << temp->NIC << endl;
                        cout << "\t\t\t\t\tContact: " << temp->Contact << endl;
                        cout << "\t\t\t\t\tTrain ID: " << temp->BookedTID << endl;
                        cout << "\t\t\t\t\tTrain Name: " << temp->BookedTName <<
endl;
                        cout << "\t\t\t\t\tTrain Class: " << temp->BookedClass << endl;
                        cout << "\t\t\t\t\tSeat Number: " << temp->BookedSeatNum
<< endl;
                        cout << "\t\t\t\t\tDate of Booking: " << temp->BookedDate <<
endl;
                        cout << "\t\t\t\t\tSource: " << temp->BookedSource << endl;
                        cout << "\t\t\t\t\tDestination: " << temp->BookedDest << endl;
                        cout << "\t\t\t\t\tDeparture TIme: " << temp->DeptTime <<
endl;
                        cout << "\t\t\t\t\tArrival Time: " << temp->ArrTime << endl;
                        cout << endl;
                        temp = temp->next;
                } while (temp);
        }
        else
```

```
		cout << "List is empty, nothing to display. \n";
}

void removeTicket(int remTicket) {
	node* prev = head;
	node* delNode = head;
	while (delNode != NULL) {
		if (delNode->ticketID == remTicket) {
			break;
		}
		else {
			prev = delNode;
			delNode = delNode->next;
		}
	}
	if (delNode == NULL) {
		cout << "Ticket ID Not Found!" << endl;
	}
	else {
		cout << "Deleted Ticket ID: " << delNode->ticketID << "\n";
		prev->next = delNode->next; // unlink the node you remove
		delete delNode; // delete the node
	}
}

void editDetais() {

	string fName, lName;

	cout << "\t\t\t\t\tEDIT DETAILS:" << endl << endl;
	int search;
	node *temp = head;
	cin.clear();
	cout << endl << endl << endl << endl << endl;
	cout << "\t\t\t\t\tEnter ticket ID: ";
	cin >> search;
```

```
	while (temp != NULL)
	{
		if (temp->ticketID == search)
		{
			cout << "\t\t\t\t\tEnter First Name of Passenger: ";
			cin >> fName;
			cout << "\t\t\t\t\tEnter Last Name of Passenger: ";
			cin >> lName;
			Name = fName + " " + lName;

			cout << "\t\t\t\t\tEnter CNIC Number: ";
			cin >> NIC;
			cin.ignore();
			cout << "\t\t\t\t\tEnter Contact Number: ";
			cin >> Contact;
			cin.ignore();

			temp->Name = Name;
			temp->NIC = NIC;
			temp->Age = Age;
			temp->Contact = Contact;
		}
		temp = temp->next;
	}
}

void addTrains()
{
	string choice;
	do {
		cin.ignore();
		cout << endl << endl << endl << endl << endl;
		cout << "\t\t\t\t\tEnter Train Name: ";
		getline(cin, availTrains[noOfTrains].TName);
		cout << "\t\t\t\t\tEnter Train ID: ";
		getline(cin, availTrains[noOfTrains].TID);
		cout << "\t\t\t\t\tEnter Train Source: ";
```

```
                getline(cin, availTrains[noOfTrains].TSource);
                cout << "\t\t\t\t\tEnter Train Destination: ";
                getline(cin, availTrains[noOfTrains].TDest);
                cout << "\t\t\t\t\tEnter Train Departure Date [HH:MM (MM:HH
AM/PM)]: ";
                getline(cin, availTrains[noOfTrains].TDate);
                cout << "\t\t\t\t\tEnter Train Departure Time: ";
                getline(cin, availTrains[noOfTrains].departTime);
                cout << "\t\t\t\t\tEnter Train Arrival Time: [HH:MM (MM:HH
AM/PM)]: ";
                getline(cin, availTrains[noOfTrains].arriveTime);
                cout << "\t\t\t\t\tEnter Available Train Classes: ";
                getline(cin, availTrains[noOfTrains].TClasses);
                cout << "\t\t\t\t\tEnter Seats Available: ";
                cin >> availTrains[noOfTrains].TSeats;
                noOfTrains++;
                cin.clear();
                cout << "\t\t\t\t\tDo you want to add more trains? (Y/N): ";
                cin >> choice;

                if (choice != "Y" && choice != "N")
                        cout << "\t\t\t\t\tInvalid input. Enter choice again. ";
                else if (choice == "N") {
                        system("cls");
                        cout << "\t\t\t\t\tTrain added! \n";
                        trainSort();
                        cout << "\t\t\t\t\tSession logged out. Please login again. \n";
                        main();
                }

        } while (choice != "N");
}

void admin()
{
        string choice, user, password;
        system("cls");
```

```
	cin.clear();
	cout << endl << endl << endl << endl << endl;
	cout << "\t\t\t\t\tWELCOME TO ADMIN PORTAL!\n\n";

	cout << "\t\t\t\t\tEnter your login credentials below! \n";
login:
	cout << "\t\t\t\t\tEnter your Username: ";
	cin >> user;
	cout << "\t\t\t\t\tEnter your Password: ";
	cin >> password;

	if (user == "ABDULLAH" && password == "ABDI123" || user == "FAZEEL"
&& password == "FAZ123")
	{
		cout << "\t\t\t\t\tLogged in Successfully!\n";
		cin.clear();
		system("cls");
		cout << endl << endl << endl << endl << endl;
		cout << "\t\t\t\t\tSelect 1 to View all Booked Tickets. \n";
		cout << "\t\t\t\t\tSelect 2 to add Trains. \n";
		cout << "\t\t\t\t\tSelect 3 to Exit\n";
		do
		{
			cout << "\t\t\t\t\tEnter Choice To Proceed (1-2): ";
			cin >> choice;
			if (choice == "1")
				display;
			else if (choice == "2") {
				cin.clear();
				addTrains();
				if (trainCheck == false)
					trainFill();
			}
			else if (choice == "3") {
				system("cls");
				main();
			}
```

```
                else
                        cout << "\t\t\t\t\tEnter correct choice. Try again. \n";
                } while (choice != "3");
        }
        else
        {
                cout << "\t\t\t\t\tInvalid credentials. Please login again. \n";
                goto login;
        }
}

int main()
{
        iniTrain();
relog:
        cin.clear();
        string check;
        cout << endl << endl << endl << endl << endl;
        cout << "\t\t\t\t\t WELCOME TO RAILWAY BOOKING SYSTEM!\n\n\n";
Sleep(300);
        cout << "\n\n\t\t\t\t\t\t\tProject Prepared by:"; Sleep(400);
        cout << "\n\n\t\t\t\t\t\t\t--------------------"; Sleep(500);
        cout << "\n\n\t\t\t\t     Abdullah Abdul Wahid      02-134192-015";
Sleep(1000);
        cout << "\n\n\t\t\t\t     Fazeel Zafar              02-134192-010"; Sleep(2000);
        cout << endl;
        system("cls");
log:
        cout << "\n\n\n\n\n\t\t\t\tIf you are a user looking to book a ticket, type 1
\n";
        cout << "\t\t\t\tIf you are an admin, type 2 \n";
        cout << "\n\n\t\t\t\t\t\tChoice: ";
        cin >> check;
        if (check == "1") {
                int tickID;
                string choice;
                system("cls");
```

```
cout << endl << endl << endl << endl << endl;
do
{
	cout << "\t\t\t\t    ----------------------------------------\n";
	cout << "\t\t\t\t\tSelect 1 to Reserve a Ticket. \n";
	cout << "\t\t\t\t\tSelect 2 to View your Reservation. \n";
	cout << "\t\t\t\t\tSelect 3 to Display all tickets. \n";
	cout << "\t\t\t\t\tSelect 4 to Delete a ticket. \n";
	cout << "\t\t\t\t\tSelect 5 to Edit Details. \n";
	cout << "\t\t\t\t\tSelect 6 to Log Out of Session. \n";
	cout << "\t\t\t\t\tSelect 7 to Exit\n";
	cout << endl << endl;
	cout << "\t\t\t\t\tEnter Choice To Proceed (1-7): ";
	cin >> choice;

	if (choice == "1") {
		system("cls");
		cin.clear();
		reserveTicket();
	}
	else if (choice == "2") {
		system("cls");
		viewTicket();
	}
	else if (choice == "3") {
		system("cls");
		display();
	}
	else if (choice == "4") {
		cout << "\t\t\t\t\tEnter your Ticket ID: ";
		cin >> tickID;
		removeTicket(tickID);
	}
	else if (choice == "5") {
		system("cls");
		editDetais();
	}
```

```
                else if (choice == "6") {
                        goto relog;
                }
                else if (choice == "7") {
                        Sleep(300);
                        cout << "\t\t\t\t\tTHANKYOU FOR USING OUR
SOFTWARE! \n";

                        Sleep(300);
                        exit(0);
                }
                else
                        cout << "\t\t\t\t\tEnter correct choice. Try again. \n";
        } while (choice != "7");
    }
    else if (check == "2")
        admin();
    else
    {
        cout << "\t\t\t\t\tInvalid input. Try again. \n";
        goto log;
    }
}
```

4. SYSTEM IMPLEMENTATION:

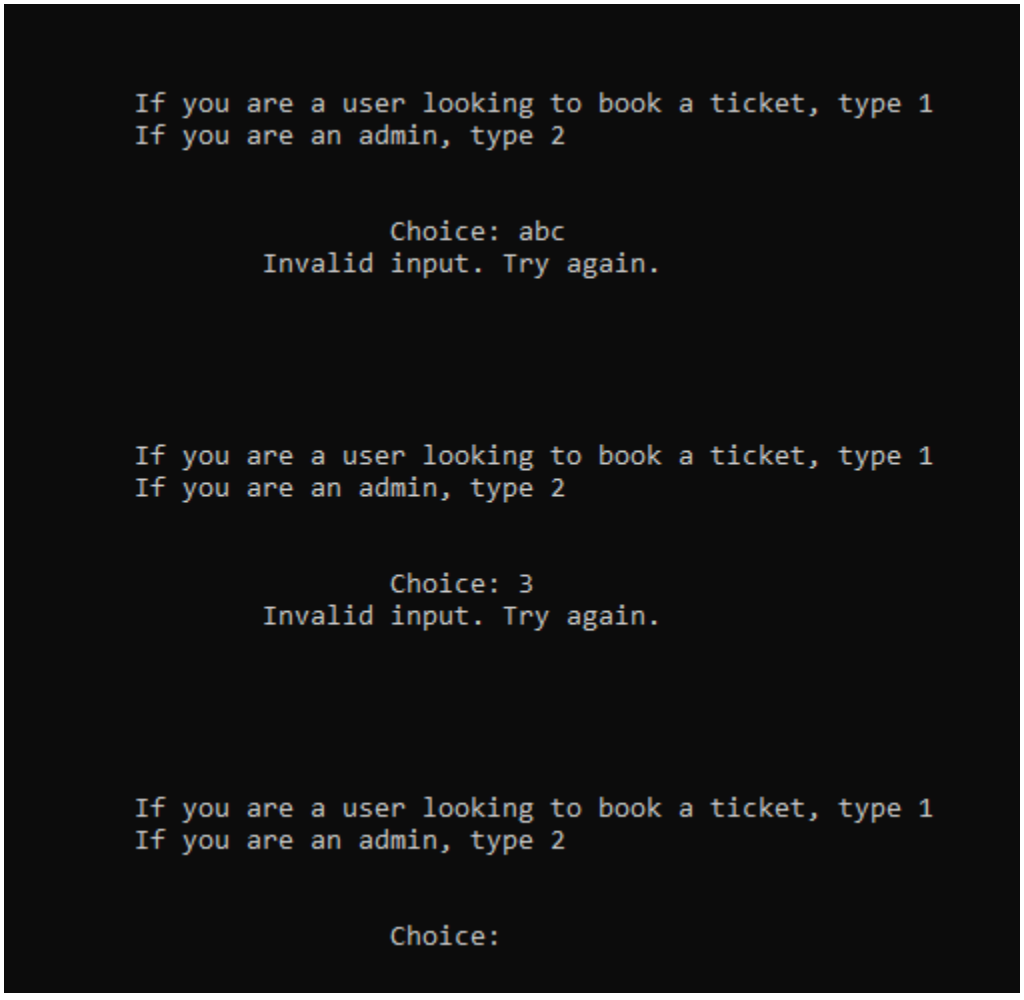
4.1 Testing Methods

Black Box Testing: Black box testing involves testing a system with no prior knowledge of its internal workings. A tester provides an input, and observes the output generated by the system under test.

White Box Testing: is software testing technique in which internal structure, design and coding of software are tested to verify flow of input-

output and to improve design, usability and security. In white box testing, code is visible to testers so it is also called Clear box testing, Open box testing, Transparent box testing, Code-based testing and Glass box testing.

Screenshots for Invalid Inputs Checking:



```
----------------------------------------
   Select 1 to Reserve a Ticket.
   Select 2 to View your Reservation.
   Select 3 to Display all tickets.
   Select 4 to Delete a ticket.
   Select 5 to Edit Details.
   Select 6 to Log Out of Session.
   Select 7 to Exit


   Enter Choice To Proceed (1-7): 8
   Enter correct choice. Try again.
----------------------------------------
   Select 1 to Reserve a Ticket.
   Select 2 to View your Reservation.
   Select 3 to Display all tickets.
   Select 4 to Delete a ticket.
   Select 5 to Edit Details.
   Select 6 to Log Out of Session.
   Select 7 to Exit


   Enter Choice To Proceed (1-7): abc
   Enter correct choice. Try again.
----------------------------------------
   Select 1 to Reserve a Ticket.
   Select 2 to View your Reservation.
   Select 3 to Display all tickets.
   Select 4 to Delete a ticket.
   Select 5 to Edit Details.
   Select 6 to Log Out of Session.
   Select 7 to Exit


   Enter Choice To Proceed (1-7):
```

```
Enter First Name of Passenger: Abdullah
Enter Last Name of Passenger: Wahid
Enter Age: 21
Enter CNIC Number: 0123456789

Enter a Valid 13 digit CNIC Number!

Enter CNIC Number: 0123456789123
Enter Contact Number: 0321457831

Enter a Valid 11 digit Mobile Phone Number!

Enter Contact Number: 01234567891
```

```
Enter Your Departure City: Karachi
Enter Your Arrival City: Lahore


AVAILABLE TRAINS ON THAT DAY IN THIS ROUTE ARE AS FOLLOWS (IF ANY):


Train Name: Karachi Express
Train ID: KHE123
Train Source: Karachi
Train Destination: Lahore
Train Departure Date: 31-Dec-2000
Train Arrival Time: 12:00 (12:00 AM)
Train Departure Time: 12:00 (09:00 PM)
Available Train Classes: Economy, AC Lower, AC Business
Seats Available: 30


Train Name: Shalimar Express
Train ID: SHE753
Train Source: Karachi
Train Destination: Lahore
Train Departure Date: 24-Dec-2020
Train Arrival Time: 20:00 (8:00 PM)
Train Departure Time: 16:40 (4:40 PM)
Available Train Classes: Economy, AC Lower, AC Business
Seats Available: 30


Input Train ID that you wish to book: ABC123
Input correct train ID!
Input Train ID that you wish to book: SHE753
Prices based on classes are as follows:
1. Economy              2500 PKR
2. AC Lower             3500 PKR
3. AC Business          4500 PKR

Input Choice (1-3):
```

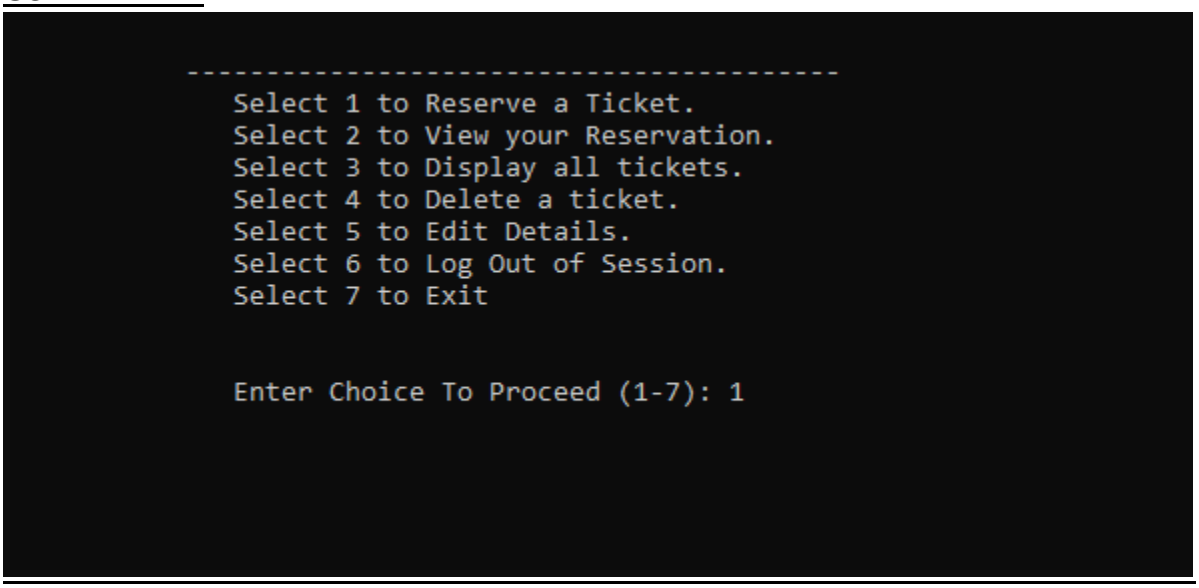
```
Enter First Name of Passenger: Abdullah
Enter Last Name of Passenger: Wahid
Enter Age: 21
Enter CNIC Number: 0123456789123
Enter Contact Number: 01234567891
Enter Your Departure City: Karachi
Enter Your Arrival City: Lahore


AVAILABLE TRAINS ON THAT DAY IN THIS ROUTE ARE AS FOLLOWS (IF ANY):


Train Name: Karachi Express
Train ID: KHE123
Train Source: Karachi
Train Destination: Lahore
Train Departure Date: 31-Dec-2000
Train Arrival Time: 12:00 (12:00 AM)
Train Departure Time: 12:00 (09:00 PM)
Available Train Classes: Economy, AC Lower, AC Business
Seats Available: 30


Train Name: Shalimar Express
Train ID: SHE753
Train Source: Karachi
Train Destination: Lahore
Train Departure Date: 24-Dec-2020
Train Arrival Time: 20:00 (8:00 PM)
Train Departure Time: 16:40 (4:40 PM)
Available Train Classes: Economy, AC Lower, AC Business
Seats Available: 30


Input Train ID that you wish to book: SHE753
Prices based on classes are as follows:
1. Economy               2500 PKR
2. AC Lower              3500 PKR
3. AC Business           4500 PKR

Input Choice (1-3): ABC
Invalid Input. Try again.

Input Choice (1-3):
```

```
Input Choice (1-3): 3

                A        B       C

                XX       XX      21

                XX       XX      22

                XX       XX      23

                XX       XX      24

                XX       15      25

                XX       16      26

                XX       17      27

                XX       18      28

                XX       19      XX

                XX       20      30

          ======================================

Enter the row name that you chose: D

Invalid row, please try again.
Enter the row name that you chose: A

Enter the seat number that you chose: 31

Seat number not found, please try again.
```

```
===============PAYMENT DETIALS===============
Choose Payment Method.
1. JazzCash.
2. EasyPaisa.
3. Credit/Debit Card.


Enter Choice (1-3): abc
Invalid Choice. Please try again.


Enter Choice (1-3): 3


Enter Credit/Debit Card Number (16 digits): 0123456781


CC number must have a length of 16 only!


Enter Credit/Debit Card Number (16 digits): 0123456789012


CC number must have a length of 16 only!


Enter Credit/Debit Card Number (16 digits): 0123456798145214


Enter CVV (3 digits): ****

CVV number must have a length of 3 only!


Enter CVV (3 digits): ***
```

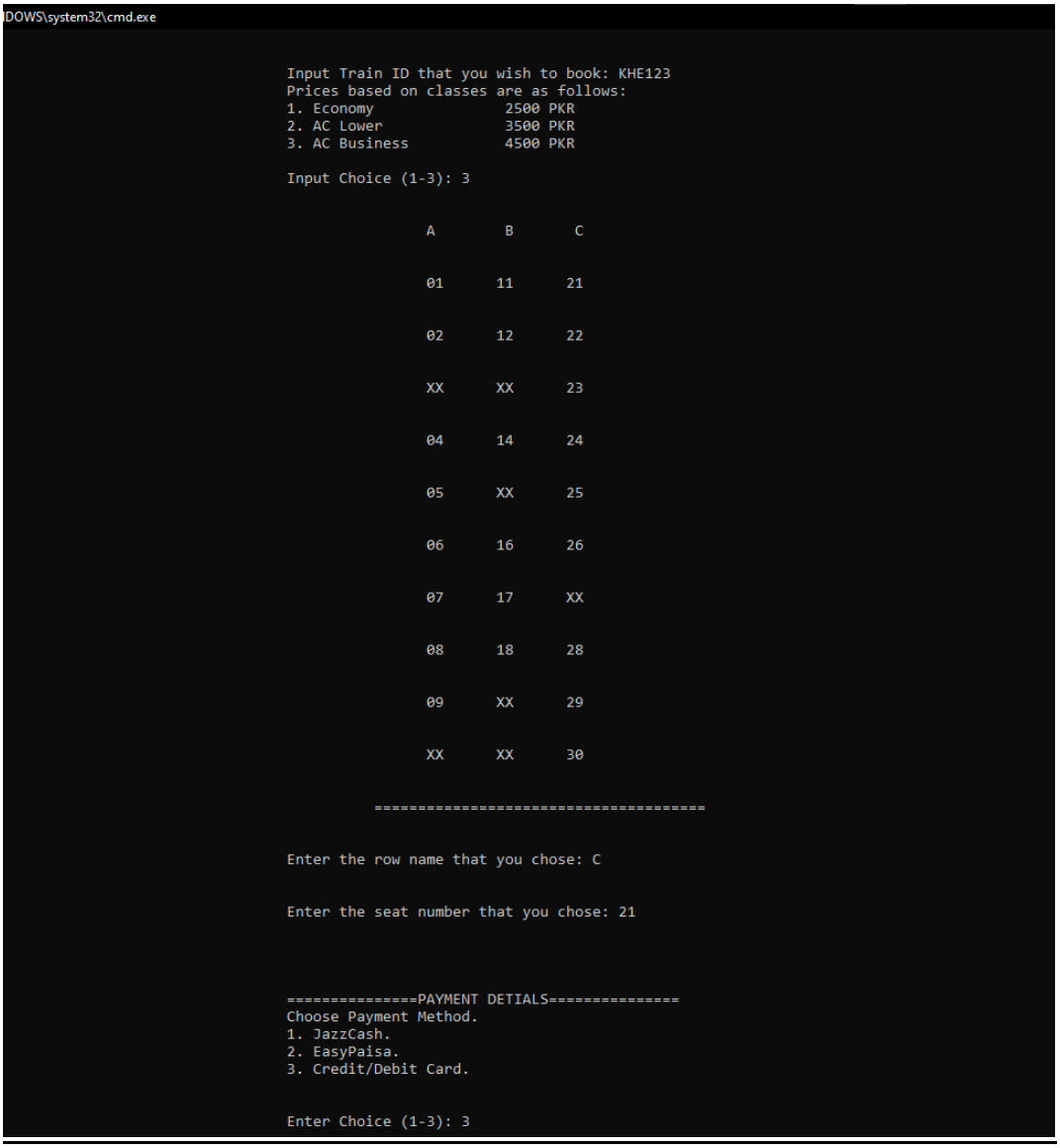
5. SAMPLE SCREEN SHOTS OF SYSTEM

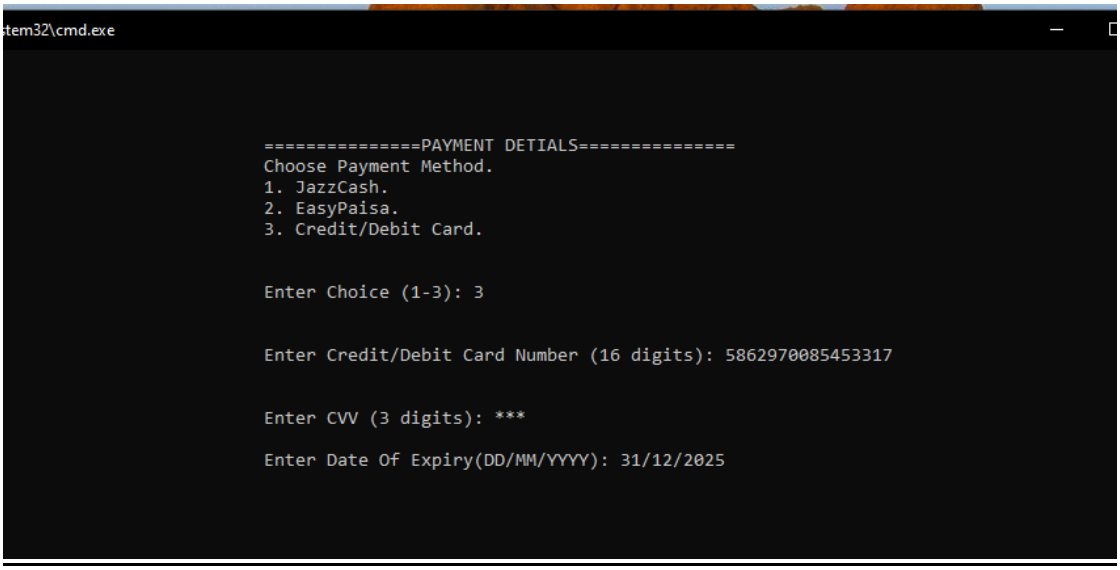
USER PANEL:



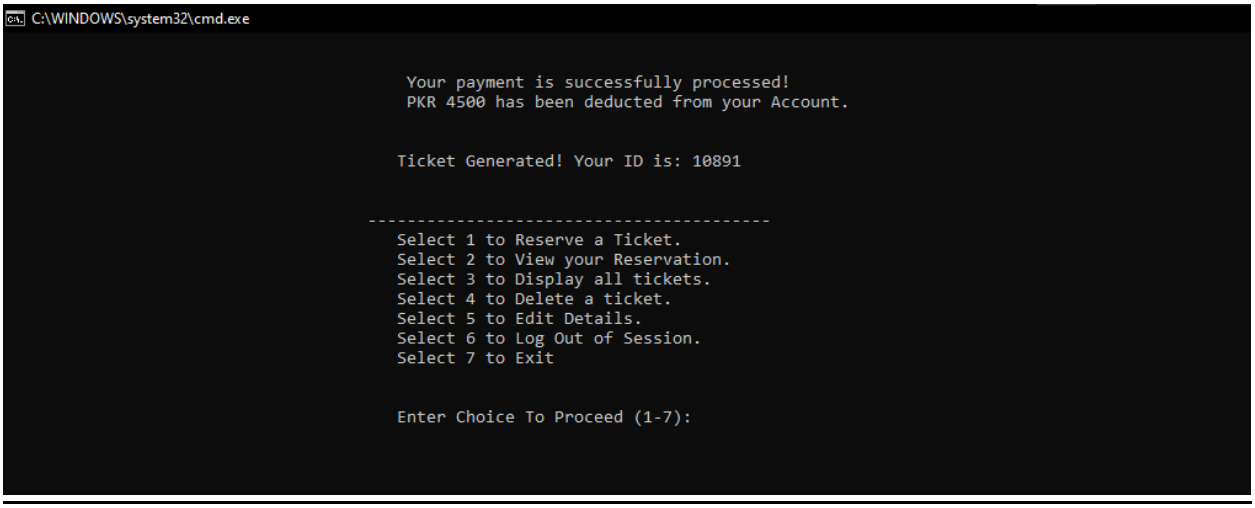
RESERVE TICKET:

```
Enter First Name of Passenger: Fazeel
Enter Last Name of Passenger: Zafar
Enter Age: 21
Enter CNIC Number: 4200025987413
Enter Contact Number: 03062655988
Enter Your Departure City: Karachi
Enter Your Arrival City: Lahore


AVAILABLE TRAINS ON THAT DAY IN THIS ROUTE ARE AS FOLLOWS (IF ANY):


Train Name: Karachi Express
Train ID: KHE123
Train Source: Karachi
Train Destination: Lahore
Train Departure Date: 31-Dec-2000
Train Arrival Time: 12:00 (12:00 AM)
Train Departure Time: 12:00 (09:00 PM)
Available Train Classes: Economy, AC Lower, AC Business
Seats Available: 30


Train Name: Shalimar Express
Train ID: SHE753
Train Source: Karachi
Train Destination: Lahore
Train Departure Date: 24-Dec-2020
Train Arrival Time: 20:00 (8:00 PM)
Train Departure Time: 16:40 (4:40 PM)
Available Train Classes: Economy, AC Lower, AC Business
Seats Available: 30


Input Train ID that you wish to book: KHE123
Prices based on classes are as follows:
1. Economy              2500 PKR
2. AC Lower             3500 PKR
3. AC Business          4500 PKR

Input Choice (1-3): 3
```

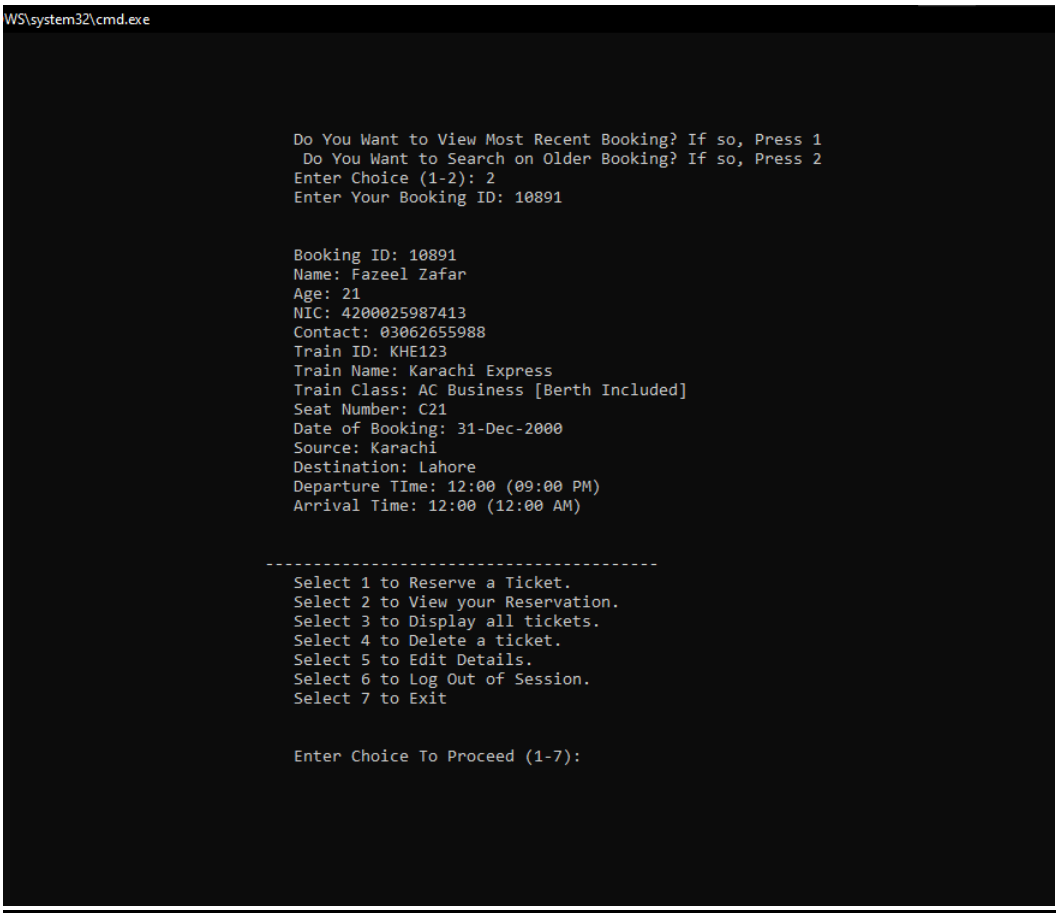

DOWS\system32\cmd.exe
Input Train ID that you wish to book: KHE123
Prices based on classes are as follows:
1. Economy 2500 PKR
2. AC Lower 3500 PKR
3. AC Business 4500 PKR
Input Choice (1-3): 3
A B C
01 11 21
02 12 22
XX XX 23
04 14 24
05 XX 25
06 16 26
07 17 XX
08 18 28
09 XX 29
XX XX 30
Enter the row name that you chose: C
Enter the seat number that you chose: 21
==========PAYMENT DETIALS==========
Choose Payment Method.
1. JazzCash.
2. EasyPaisa.
3. Credit/Debit Card.
Enter Choice (1-3): 3


stem32\cmd.exe
==========PAYMENT DETIALS==========
Choose Payment Method.
1. JazzCash.
2. EasyPaisa.
3. Credit/Debit Card.
Enter Choice (1-3): 3
Enter Credit/Debit Card Number (16 digits): 5862970085453317
Enter CVV (3 digits): ***
Enter Date Of Expiry(DD/MM/YYYY): 31/12/2025

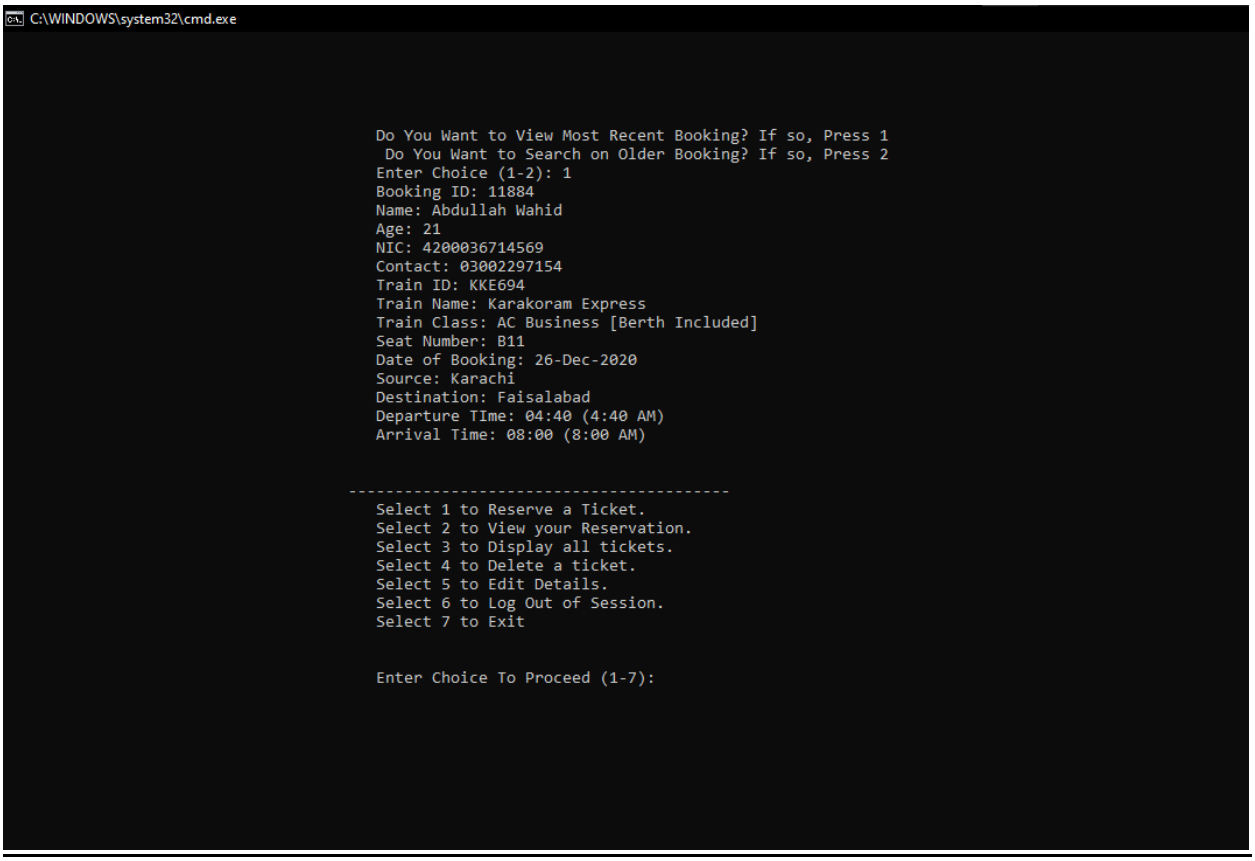
TICKET GENERATED:



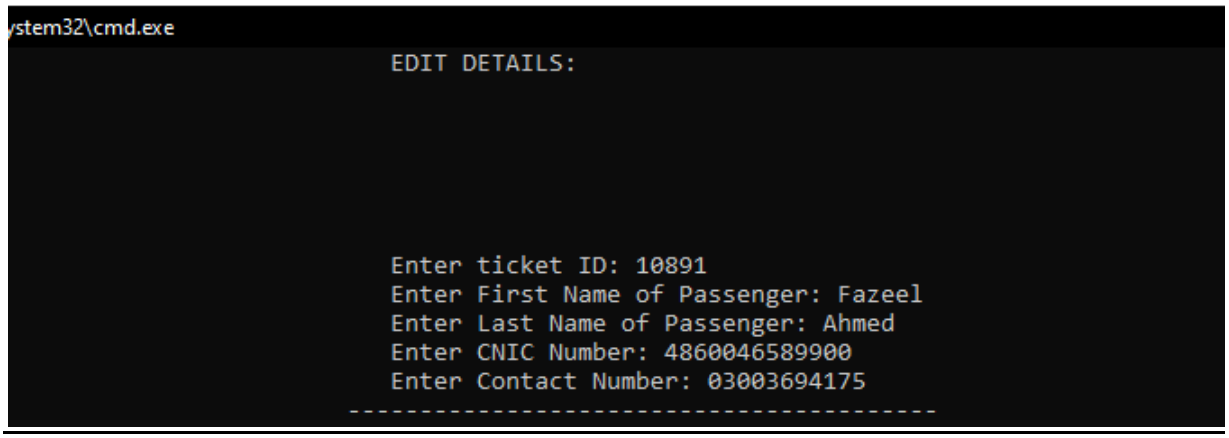
VIEW TICKET THROUGH SEARCHING:



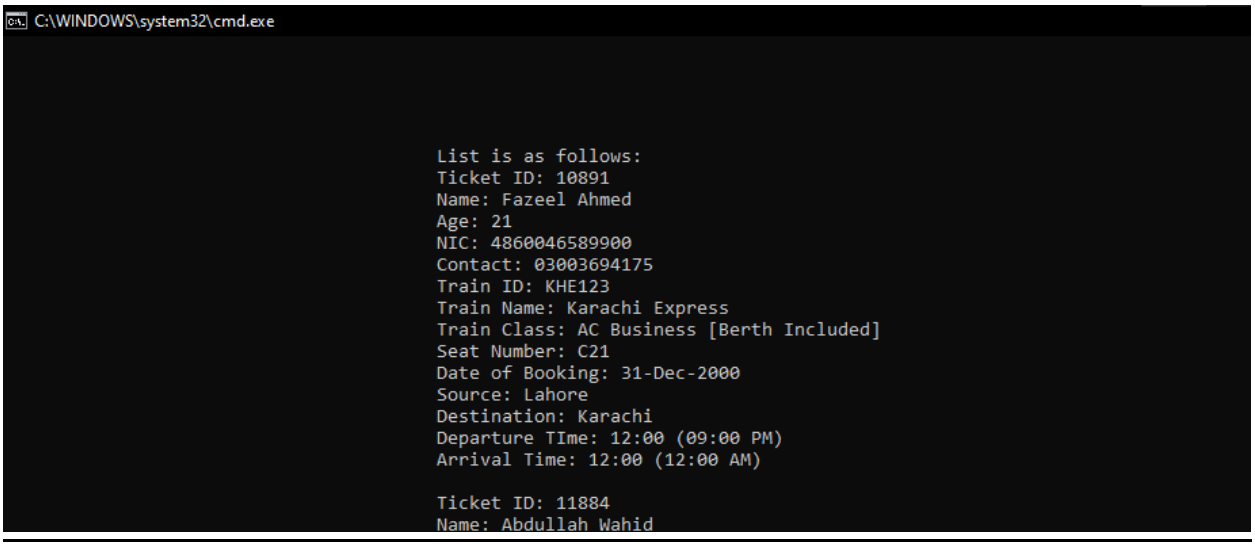
VIEW RECENT TICKET:



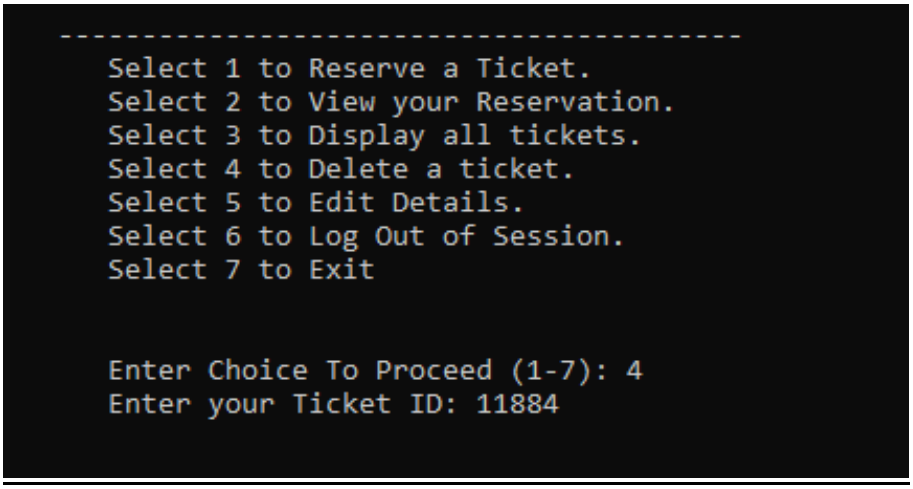
EDIT DETAILS:



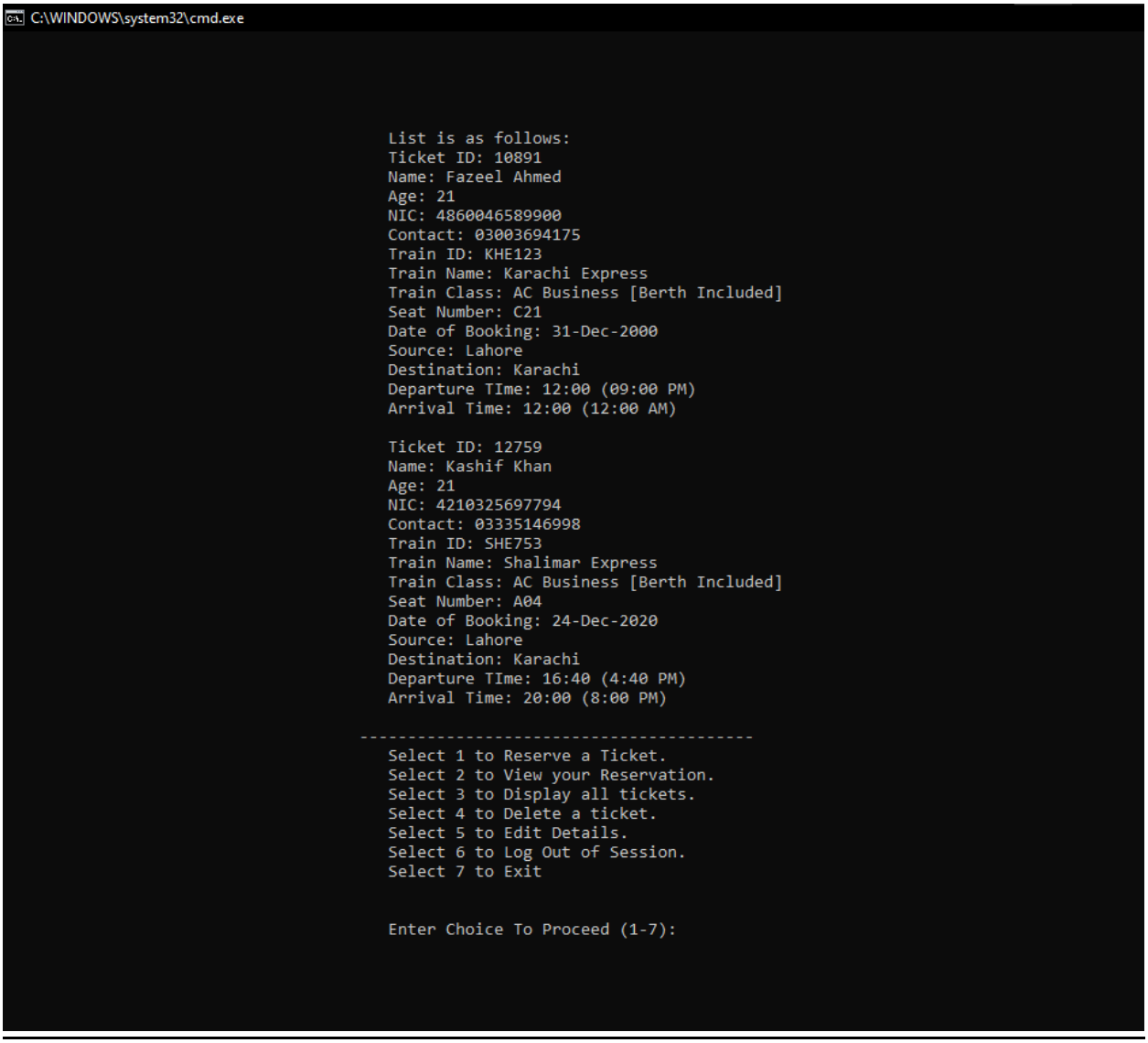
SEARCH AFTER EDITING:



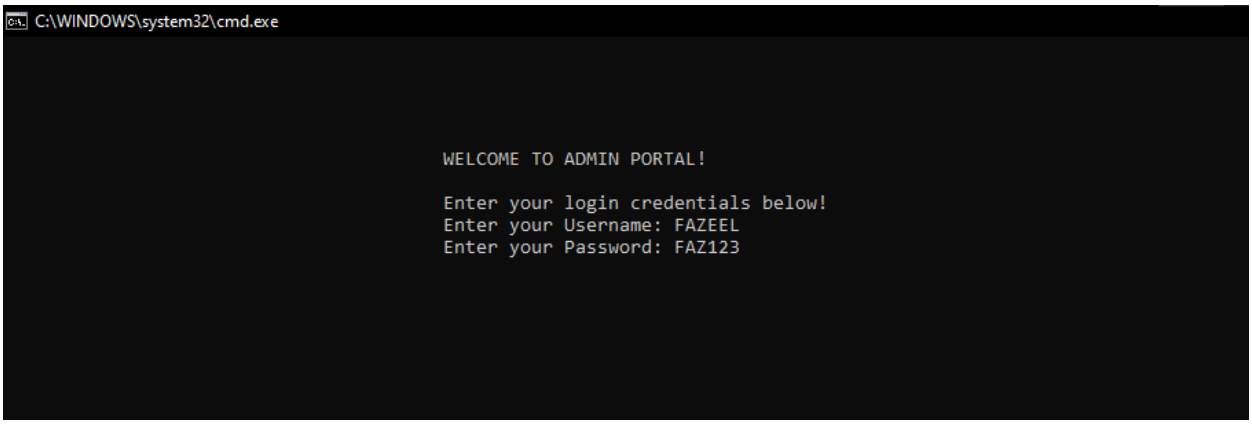
DELETION:

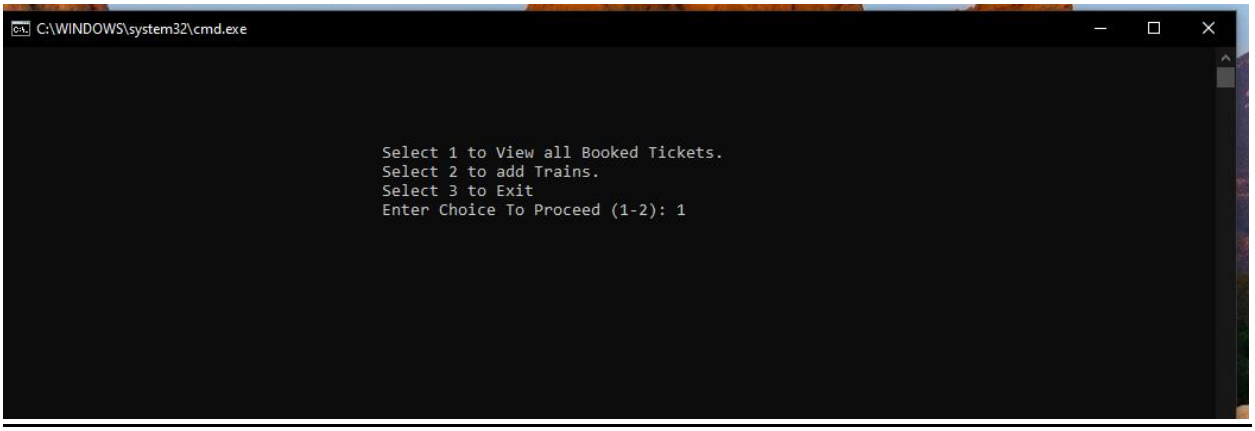


DISPLAY AFTER DELETION:

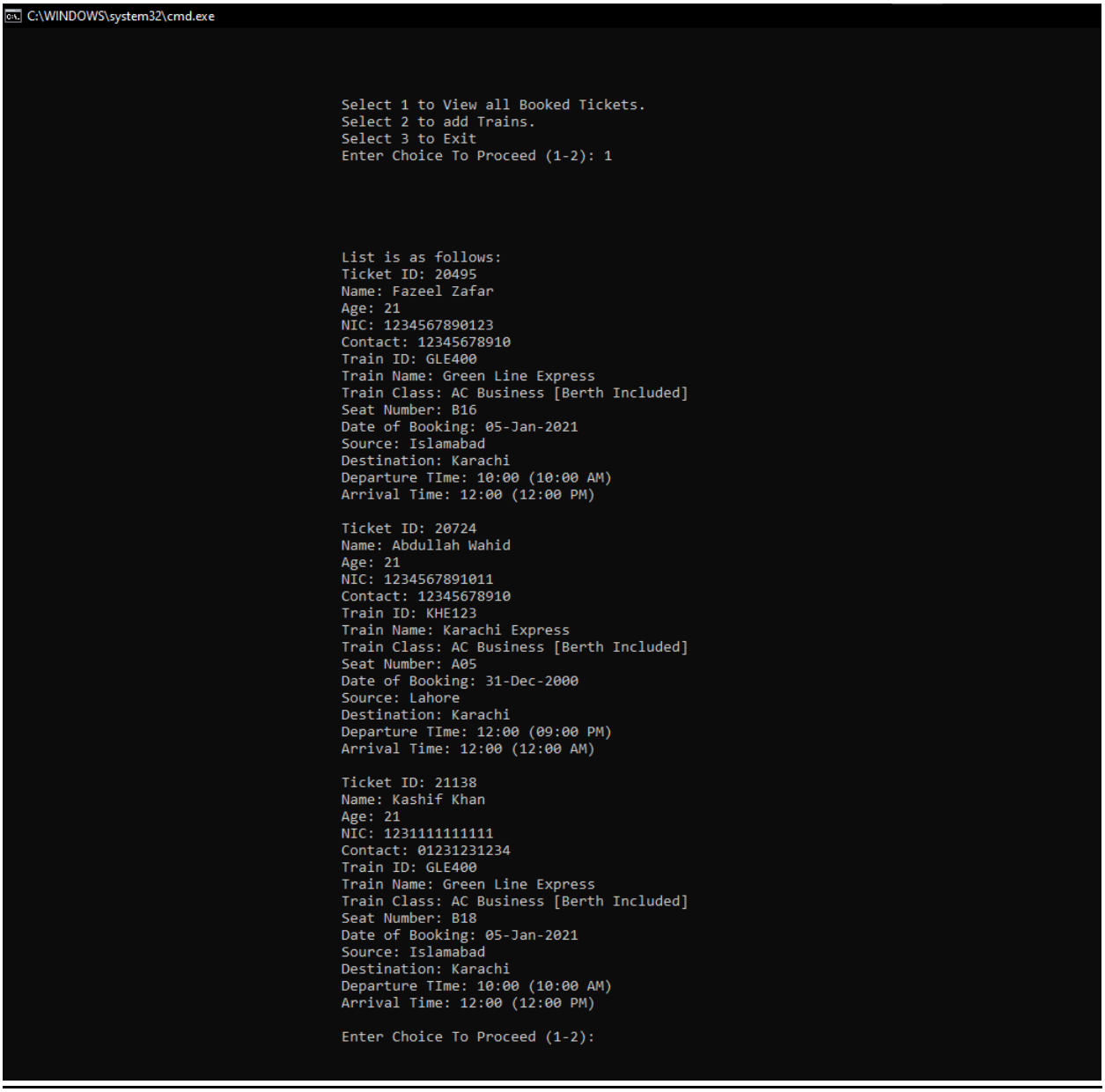


ADMIN:


C:\WINDOWS\system32\cmd.exe
WELCOME TO ADMIN PORTAL!
Enter your login credentials below!
Enter your Username: FAZEEL
Enter your Password: FAZ123


C:\WINDOWS\system32\cmd.exe
Select 1 to View all Booked Tickets.
Select 2 to add Trains.
Select 3 to Exit
Enter Choice To Proceed (1-2): 1

VIEWING TICKETS AS ADMIN:



AFTER ADDING TRAIN:

```
Train Departure Time: 16:40 (4:40 PM)
Available Train Classes: Economy, AC Lower, AC Business
Seats Available: 30


Train Name: Sindhi Express
Train ID: SND773
Train Source: Karachi
Train Destination: Lahore
Train Departure Date: 12-Jan-2021
Train Arrival Time: 22:00 (10:00 PM)
Train Departure Time: 12:00 (12:00 AM)
Available Train Classes: Economy, AC Lower, AC Business
Seats Available: 30


Input Train ID that you wish to book:
```