Bus Reservation System

Group-2

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Introduction

A bus reservation service is a system that allows passengers to book seats on buses for a specific journey. This service enables users to choose their preferred travel dates, bus routes, seat numbers, and pay for tickets, all through an online or offline platform. The system ensures that available seats are booked efficiently and provides real-time updates on seat availability, making the entire process smooth for both the passengers and the bus operators. In traditional bus reservation systems, customers typically need to visit the bus station or call the operator to make a reservation, while modern systems, such as the one developed in this project, provide a digital solution to streamline the booking process.

Why It Is Necessary

A bus reservation service is necessary for several reasons, some of which include:

1. Convenience and Time-saving
2. Reduced Overbooking and Seat Management
3. Efficient Resource Management
4. Cost Management
5. Customer Experience

How It Was Made

This project implements a Bus Reservation System using C programming, designed to manage user registrations, bus reservations, and route management. It features a text-based interface where admins can add buses, routes, and view ticket availability, while users can make reservations, check seat availability, and view their bookings. The system uses file handling to store data about users, buses, routes, and reservations in text mode, with seat availability tracked through bitwise operations. Additionally, fare adjustments are made based on bus type (AC or Non-AC). Overall, the project provides a simple yet functional system for managing bus tickets and reservations efficiently

Function	Description	Developer
main()	The main function.	Faieq
registeruser()	Allows new users to register by entering a username and password. The role is set as "user" by default. The user data is stored in the users.dat file.	Siam
loginuser()	Authenticates users by verifying the username and password against the stored data. Admin users have special privileges.	Siam
addbus()	addbus(): Admin adds new buses by providing bus ID, company name, bus type, and seat count. The information is stored in the buses.dat file.	Siam
viewbuses()	Displays all buses available in the system, including bus ID, company name, type (AC/Non-AC), and seat count.	Sopnil
addroute()	Admin adds new routes with route ID, start and end locations, and fare. The route data is saved in the routes.dat file.	Sopnil
viewroutes()	Displays all available routes, including the route ID, start point, destination, and fare.	Sopnil
makereservation()	Users can make reservations by selecting a bus, route, seat and date. The reservation ID is generated randomly, and the details are stored in the reservations.dat file.	Faieq
viewreservations()	Users can view their past reservations, including bus ID, route ID, seat number, and travel date.	Faieq
viewavailabletickets()	viewavailabletickets(): Displays available seats for each bus based on existing bookings. Seats are tracked using a bitmask for efficient management.	Faieq/Siam

Implementation Details

Libraries used:

- stdio.h
- stdlib.h
- string.h
- time.h

Data Structures:

- struct USER: Represents a user with username, password, and role.
- struct BUS: Represents a bus with busid, company, type (AC or Non-AC), and seats.
- struct ROUTE: Represents a bus route with routeid, start, end, and fare.
- struct RESERVATION: Represents a reservation with reservationid, username, busid, routeid, seatnum, and date.

File Management:

- User data (users.dat): Stores user credentials and roles.
- Bus data (buses.dat): Stores details about the buses, such as bus ID, company name, bus type, and seat count.
- Route data (routes.dat): Stores route information like route ID, start and end locations, and fare.
- Reservation data (reservations.dat): Stores user reservations, including reservation ID, username, bus ID, route ID, seat number, and travel date.

Demonstration

```
---- WELCOME TO SSF BUS TICKETING SERVICE ----
1.Login
2.Register
3.Exit

Enter your choice:
```

This is the welcome screen.

```
---- WELCOME TO SSF BUS TICKETING SERVICE ----
1.Login
2.Register
3.Exit

Enter your choice: 1
Enter username: admin
Enter password: 123admin
Admin login successful!
Press any key to continue . . .
```

Logging in with fixed admin credentials.

```
----- Admin Menu -----

1.Add Bus
2.View Buses
3.Add Route
4.View Routes
5.View Available Tickets
6.Logout
Enter your choice:
```

This is the admin menu.

```
----- Admin Menu -----

1.Add Bus
2.View Buses
3.Add Route
4.View Routes
5.View Available Tickets
6.Logout
Enter your choice: 1
Enter bus ID: 1020
Enter Company Name: United
Enter Bus Type (AC/Non-AC): Non-Ac
Enter Number of Seats: 40
```

Adding busses.

```
----- Admin Menu -----

1.Add Bus
2.View Buses
3.Add Route
4.View Routes
5.View Available Tickets
6.Logout
Enter your choice: 3
Enter route ID: 101
Enter starting point: Dhaka
Enter destination: Mymensingh
Enter Fare: 310
```

Adding routes.

```
Available Buses:
-------------------------------------------------
Bus ID | Company Name      | Type     | Seats
-------------------------------------------------
1020   | United            | Non-AC   | 40
1021   | United            | AC       | 40
1030   | Imperial          | Non-Ac   | 40
1031   | Imperial          | AC       | 36
1040   | Rajib             | Non-Ac   | 40
Press any key to continue . . .
```

Showing available buses.

```
Available Routes:
-------------------------------------------------
Route ID | Start Point      | Destination   | Fare
-------------------------------------------------
101      | Dhaka            | Mymensingh    | 310.00
102      | Dhaka            | Jamalpur      | 500.00
103      | Dhaka            | Coxs Bazar    | 600.00
Press any key to continue . . .
```

Showing available routes.

```
Available Buses:
Bus ID | Company           | Type     | Seats
-------------------------------------------------
1020   | United            | Non-AC   | 40
1021   | United            | AC       | 40
1030   | Imperial          | Non-Ac   | 40
1031   | Imperial          | AC       | 36
1040   | Rajib             | Non-Ac   | 40

Available Routes:
Route ID | Source          | Destination   | Price
-------------------------------------------------
101      | Dhaka           | Mymensingh    | 310.00
102      | Dhaka           | Jamalpur      | 500.00
103      | Dhaka           | Coxs Bazar    | 600.00

Enter Bus ID for reservation: 1020

Choose your seat: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 1
Enter Seat Number: 4
Enter Route ID for reservation: 101
Enter Date of Travel (DD-MM-YYYY): 06-12-2024
Reservation made successfully! Your Reservation ID is: 1342
Total price for your ticket: 310.00
Press any key to continue . . .
```

Making a reservation.

```
Reservations for User: ishmum
-------------------------------------------------------------
Reservation ID | Bus ID | Route ID | Seat Number | Date
-------------------------------------------------------------
5859             | 1020   | 101      | 3           | 06-12-2024
1342             | 1020   | 101      | 4           | 06-12-2024
Press any key to continue . . .|
```

Showing the reservations of the user

```
Available Tickets:
------------------------------------------------------
Bus ID: 1020 | Company: United | Type: Non-AC | Total Seats: 40
Total Fare: 310.00
Available Seats: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
------------------------------------------------------
Bus ID: 1021 | Company: United | Type: AC | Total Seats: 40
Total Fare: 465.00
Available Seats: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
------------------------------------------------------
Bus ID: 1030 | Company: Imperial | Type: Non-Ac | Total Seats: 40
Total Fare: 310.00
Available Seats: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
------------------------------------------------------
Bus ID: 1031 | Company: Imperial | Type: AC | Total Seats: 36
Total Fare: 465.00
Available Seats: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
------------------------------------------------------
Bus ID: 1040 | Company: Rajib | Type: Non-Ac | Total Seats: 40
Total Fare: 310.00
Available Seats: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
------------------------------------------------------
Press any key to continue . . .|
```

Showing the available tickets

Challenges and solutions

File Handling and Data Persistence:

- Challenge: Ensuring data persists across program executions.
- Solution: Data is stored in text files (users.dat, buses.dat, routes.dat, and reservations.dat), which are read and written during each operation.

User Role and Access Control:

- Challenge: Implementing different functionalities for admin and users.
- Solution: User roles (admin and user) are assigned during login, and different menus are displayed based on the user's role.

Error Handling in File Operations:

- Challenge: Handling errors when opening files (e.g., file not found or read errors).
- Solution: Each file operation includes error checks to ensure that the program handles file access issues properly.

Possible Future Enhancements

- Better error handling.
- Better handling of booked seats.
- Better input handling.

Conclusion

This Bus Reservation System meets the core requirements of managing bus schedules and reservations efficiently, providing both administrative control and user access to a seamless ticketing experience.