Project Report: Bus Reservation System

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Objective
The objective of this project is to design and implement a console-based bus reservation system using modular C programming. The system aims to simulate a real-world bus ticket booking scenario with basic user and booking management.

System Design

Modules
1. Main Module:
   - Drives the program and provides the main menu to the user.

2. Bus Functions Module:
   - Displays available buses
   - Handles seat allocation and booking

3. User Functions Module:
   - Handles user registration and validation

4. bus.h (Header File)
   -Contains shared structure definitions and function declarations used across modules

Data Handling

- `.dat` files (`bookings.dat`, `users.dat`) are used for saving and loading user and booking data.
- Data is appended or read using standard file I/O in C.

Challenges

1. The booking data was not saving permanently and getting removed after closing the terminal.

Fix:
- We realized that we needed to use file handling properly.

- We used fopen() in "ab+" or "rb+" mode to append and read data from .dat files (bookings.dat, users.dat).
- After every booking or user update, we used fwrite() to save the data.

2. Debugging the code is also most challenging part.
3. errors faced while compiling all files together
Fix:
- Initially, we tried running one file at a time which caused linker errors.
- After researching, we learned how to compile all source files together using a single command:
  gcc main.c bus_functions.c user_functions.c -o main.exe
- We also made sure that all .c files included the shared header file bus.h so that declarations were available to all files.

4. Taking clean user input, clearing buffers, and avoiding scanf issues.

Fix:
- Avoided using gets() (unsafe) and used fgets() instead.
- Used getchar() where necessary to clear the input buffer.
- Carefully managed scanf() and string inputs to avoid newline character issues

Conclusion
The Bus Reservation System was successfully developed and tested. It demonstrates effective use of file handling, structures, and modular programming in C. Further improvements can include a GUI and support for database integration.

Snapshots of Program :-

```
 ▣  C:\Users\rajan\AppData\Local   ✕      +    ⌄


+==========================================+
|        BUS RESERVATION SYSTEM            |
+==========================================+
| 1. Sign In                               |
| 2. Sign Up                               |
| 3. Exit                                  |
+==========================================+
Enter your choice (1-3): |
```

```
+=====================================================+
|          BUS RESERVATION SYSTEM                     |
| Logged in as: Sankalp                               |
+=====================================================+
| 1. View All Buses & Schedules                       |
| 2. View Seats for a Bus                             |
| 3. Book a Seat                                      |
| 4. View My Bookings                                 |
| 5. Logout                                           |
+=====================================================+
Enter your choice:
```

```
+---------------------------------------------------------------+
| BOOKING CONFIRMATION                                          |
+---------------------------------------------------------------+
| Bus: Marwar Travels                                          |
| Route: Jodhpur to Mumbai                                      |
| Departure: 10:30                                             |
| Arrival: 23:45                                               |
| Seat Number: 3                                              |
| Passenger Name: sankalp                                      |
| Contact Phone: 8107162058                                   |
| Fare: Rs1425.00                                          |
+---------------------------------------------------------------+

Press Enter to return to menu...
```