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COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

MINI PROJECT

C PROGRAMMING LABORATORY

(191GES213L)

PROJECT TITLE

BUS RESERVATION SYSTEM

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PROJECT DESCRIPTION:

A bus reservation system is a software application or platform designed to facilitate the booking and management of bus tickets for passengers. It automates the process of reserving seats on buses, providing a convenient and efficient way for travelers to plan their journeys. Bus reservation systems are commonly used by bus operators, travel agencies, and passengers to streamline the booking process and improve the overall travel experience.

PROJECT IMPLEMENTATION:

The Bus Reservation System is implemented using the following components:

1. Data Structures:

- `Bus` Structure: Holds information about each bus, including bus number, driver's name, arrival and departure times, origin and destination cities, and seat occupancy.
- `bus[MAX_BUSES]`: An array of `Bus` structures to store information about multiple buses.

2. Functions:

- `readBusDetailsFromFile()`: Reads bus and driver details from the file "bus_details.txt" and initializes the `bus` array.
- `allotment()`: Handles the seat reservation process. It prompts users to input their details, origin and destination cities, and

displays available buses between those cities. Users can then choose a bus and reserve seats.

- `show()`: Displays detailed information about a specific bus when the user enters a bus number.
- `avail()`: Displays a list of all available buses along with their details.
- `install()`: Allows administrators to add new buses to the system by inputting relevant information.
- `main()`: Provides a menu-driven interface for users to select different functionalities. Users can reserve seats, view bus details, check available buses, and exit the application.

3. File Handling:

- The project reads bus details from the "bus_details.txt" file during initialization.
- Reserved seat information is stored in the `seat` array within the `Bus` structure. Whenever a seat is reserved, the corresponding seat in the array is updated with the passenger's name.

4. User Interface:

- The main menu presents options for reservation, viewing bus details, and checking available buses.
- Users are prompted to input their details, origin and destination cities, and desired number of seats for reservation.
- The system displays available buses, allowing users to select a bus and reserve seats.
- Reserved seat numbers and passenger names are displayed upon successful reservation.

5.Advantages:

- Simplifies the process of bus ticket reservation for passengers.
- Provides users with information about available buses and their details.
- Helps administrators manage and update bus information.

6.Future Enhancements:

- Implement user authentication to distinguish between passengers and administrators.
- Include the option to cancel reservations.
- Add support for online payment for reserved seats.

The Bus Reservation System project streamlines the bus reservation process by offering an easy-to-use interface for passengers and administrators. It demonstrates the practical use of C programming and file handling to create a functional and efficient system for managing bus reservations.

SOURCE CODE:

```
#include    <stdio.h>
#include   <string.h>
#include <stdlib.h>

#define MAX_BUSES 30
#define MAX_ROWS 8
#define MAX_COLS 4
```

```
#define MAX_NAME_LEN 50
#define MAX_CITY_LEN 20

typedef struct {
    char busn[5]; char driver[20]; char arrival[6]; char depart[6]; char
    from[20]; char to[20]; char seat[MAX_ROWS][MAX_COLS]
    [MAX_NAME_LEN];




} Bus;

Bus bus[MAX_BUSES];
int p = 0;
void position(int l) {
    int s = 0, emptySeats = 0;
    printf("\n");
    for (int i = 0; i < MAX_ROWS; i++) {
        printf("\n");
        for (int j = 0; j < MAX_COLS; j++) {
            s++;
            if (strcmp(bus[l].seat[i][j], "Empty") == 0) {
                printf("%d. %-30s", s, "Empty");
                emptySeats++;
            } else {
```

```
            printf("%d. %-30s", s, bus[l].seat[i][j]);
        }
    }
}
printf("\n\nThere are %d seats empty in Bus No: %s\n", emptySeats,
bus[l].busn);
}



// Function to read bus and driver details from the file
void readBusDetailsFromFile() {
    FILE *file;
    char line[100];

    file = fopen("bus_details.txt", "r");
    if (file == NULL) {
        printf("Error opening file 'bus_details.txt'.\n");
        exit(1);
    }

    while (fgets(line, sizeof(line), file)) {
        sscanf(line, "%s %s %s %s %s %s",
               bus[p].busn, bus[p].driver, bus[p].arrival,
               bus[p].depart, bus[p].from, bus[p].to);
        for (int i = 0; i < MAX_ROWS; i++) {
            for (int j = 0; j < MAX_COLS; j++) {
```

```
                strcpy(bus[p].seat[i][j], "Empty");
            }
        }
        p++;
    }
    fclose(file);
}

// Function to reserve a seat
void allotment() {
    char name[MAX_NAME_LEN];
    int age;
    char gender[MAX_NAME_LEN];
    printf("Enter your name: ");
    scanf("%s", name);
    printf("Enter your age: ");
    scanf("%d", &age);
    printf("Enter your gender: ");
    scanf("%s", gender);
    int selectedSeats[MAX_BUSES][MAX_ROWS][MAX_COLS];
    char fromCity[MAX_CITY_LEN];
    char toCity[MAX_CITY_LEN];
    printf("Enter your city of departure: ");
    scanf("%s", fromCity);
    printf("Enter your city of arrival: ");
    scanf("%s", toCity);
```

```
    printf("\nAvailable Buses between %s and %s:\n", fromCity, toCity);
    int count = 0;
    for (int n = 0; n < p; n++) {
        if (strcmp(bus[n].from, fromCity) == 0 && strcmp(bus[n].to,
toCity) == 0) {
            printf("%d. Bus no: %s\tDriver: %s\tDeparture time:
%s\tArrival time: %s\n",
                count + 1, bus[n].busn, bus[n].driver, bus[n].depart,
bus[n].arrival);
            count++;
        }
    }

    int busChoice;
    if (count > 0) {
        printf("\nEnter the bus number of your choice (1 to %d): ", count);
        scanf("%d", &busChoice);
        if (busChoice < 1 || busChoice > count) {
            printf("Invalid bus number. Reservation canceled.\n");
            return;
        }
    } else {
        printf("No buses available for the selected cities. Reservation
canceled.\n");
        return;
    }
```

```
    int actualBusIndex = 0;
    count = 0;
    for (int n = 0; n < p; n++) {
        if (strcmp(bus[n].from, fromCity) == 0 && strcmp(bus[n].to,
toCity) == 0) {
            count++;
            if (count == busChoice) {
                actualBusIndex = n;
                break;
            }
        }
    }

    int numSeats;
    printf("Enter the number of seats you want to reserve (1 to 32): ");
    scanf("%d", &numSeats);

    int seat,seatarr[32];
    for (int i = 0; i < numSeats; i++) {
        while (1) {
            printf("Seat Number (1 to 32): ");
            scanf("%d", &seat);
            seatarr[i]=seat;
            if (seat < 1 || seat > 32) {
                printf("Invalid seat number. Please choose a seat between 1
and 32.\n");
```

```
            } else if (strcmp(bus[busChoice].seat[seat / 4][(seat % 4) - 1],
"Empty") != 0) {
                printf("The seat no. is already reserved. Please choose
another seat.\n");
            } else {
                strcpy(bus[actualBusIndex].seat[(seat - 1) / 4][(seat - 1) % 4],
name);



                break;
            }
        }
    }


    printf("\nReservation Successful!\n");
    printf("Bus no: %s\nDriver: %s\tArrival time: %s\tDeparture time:
%s\nFrom: %s\tTo: %s\n",
        bus[actualBusIndex].busn,          bus[actualBusIndex].driver,
bus[actualBusIndex].arrival,
        bus[actualBusIndex].depart,          bus[actualBusIndex].from,
bus[actualBusIndex].to);
    printf("Reserved seat numbers:\n");
    for (int i = 0; i < numSeats; i++) {
        printf("%d. Seat no: %d\tPassenger Name: %s\n", i + 1, seatarr[i],
name);
    }
}
```

```
void show() {
    char number[5];
    printf("Enter bus no: ");
    scanf("%s", number);

    int n;
    for (n = 0; n < p; n++) {
        if (strcmp(bus[n].busn, number) == 0) {
            break;
        }
    }

    if (n < p) {
        printf("\n");
        for (int i = 0; i < 80; i++) {
            printf("*");
        }
        printf("\nBus no: %s\t\tDriver: %s\t\tArrival time: %s\tDeparture time: %s\nFrom: %s\t\tTo: %s\n",
               bus[n].busn, bus[n].driver, bus[n].arrival, bus[n].depart, bus[n].from, bus[n].to);
        for (int i = 0; i < 80; i++) {
            printf("*");
        }

        printf("\n");
        position(n); // Call the position() function for correct seat display
```

```
    } else {
        printf("Enter correct bus no: ");
    }
}

void avail() {
    printf("Buses Available:\n");
    for (int n = 0; n < p; n++) {
        printf("\n");
        for (int i = 0; i < 80; i++) {
            printf("*");
        }
        printf("\nBus no: %s\t\tDriver: %s\t\tArrival time: %s\tDeparture
Time: %s\nFrom: %s\t\tTo: %s\n",
                bus[n].busn, bus[n].driver, bus[n].arrival, bus[n].depart,
bus[n].from, bus[n].to);
        for (int i = 0; i < 80; i++) {
            printf("*");
        }
    }
}


void install() {
    printf("Enter bus no: ");
    scanf("%s", bus[p].busn);
    printf("Enter Driver's name: ");
```

```
 scanf("%s", bus[p].driver);
    printf("Arrival time: ");
    scanf("%s", bus[p].arrival);
    printf("Departure: ");
    scanf("%s", bus[p].depart);
    printf("From: ");
    scanf("%s", bus[p].from);
    printf("To: ");
    scanf("%s", bus[p].to);
    for (int i = 0; i < MAX_ROWS; i++) {
        for (int j = 0; j < MAX_COLS; j++) {
            strcpy(bus[p].seat[i][j], "Empty");
        }
    }
    p++;
}

int main() {
    readBusDetailsFromFile();

    int w;
    while (1) {
        printf("\n\n\n\n\n");
        printf("\t\t\t1.Reservation\n\t\t\t2.Show\n\t\t\t3.Buses
Available.\n\t\t\t4.Exit\n");
        printf("\t\t\tEnter your choice:-> ");
        scanf("%d", &w);
```

```
        switch (w) {
            case 1:
                allotment();
                break;
            case 2:
                show();
                break;
            case 3:
                avail();
                break;
            case 4:
                exit(0);
        }
    }
    return 0;
}
```

TEXT FILE:

bus_details.txt

```
101 ABC 08:00 12:00 cityA cityB
102 DEF 09:30 14:30 cityC cityD
103 GHI 10:45 15:15 cityB cityA
104 JKL 11:30 16:00 cityD cityC
105 MNO 12:15 17:45 cityA cityC
```

106 PQR 14:00 19:30 cityB cityD

107 STU 16:30 22:00 cityC cityA

108 VWX 17:45 23:30 cityD cityB

109 YZA 18:30 00:15 cityA cityC

110 BCD 19:15 01:00 cityB cityD

111 EFG 20:00 01:45 cityC cityA

112 HIJ 20:45 02:30 cityD cityB

113 KLM 21:30 03:15 cityA cityC

114 NOP 22:15 04:00 cityB cityD

115 QRS 23:00 04:45 cityC cityA

116 TUV 00:30 06:15 cityD cityB

117 WXY 01:15 07:00 cityA cityC

118 ZAB 02:00 07:45 cityB cityD

119 CDE 02:45 08:30 cityC cityA

120 FGH 03:30 09:15 cityD cityB

121 IJK 04:15 10:00 cityA cityC

122 LMN 05:00 10:45 cityB cityD

123 OPQ 05:45 11:30 cityC cityA

124 RST 06:30 12:15 cityD cityB

125 UVW 07:15 13:00 cityA cityC

126 XYZ 08:00 13:45 cityB cityD

127 ABC 08:45 14:30 cityC cityA

128 DEF 09:30 15:15 cityA cityB

129 GHI 10:15 16:00 cityB cityD

130 JKL 11:00 16:45 cityC cityA

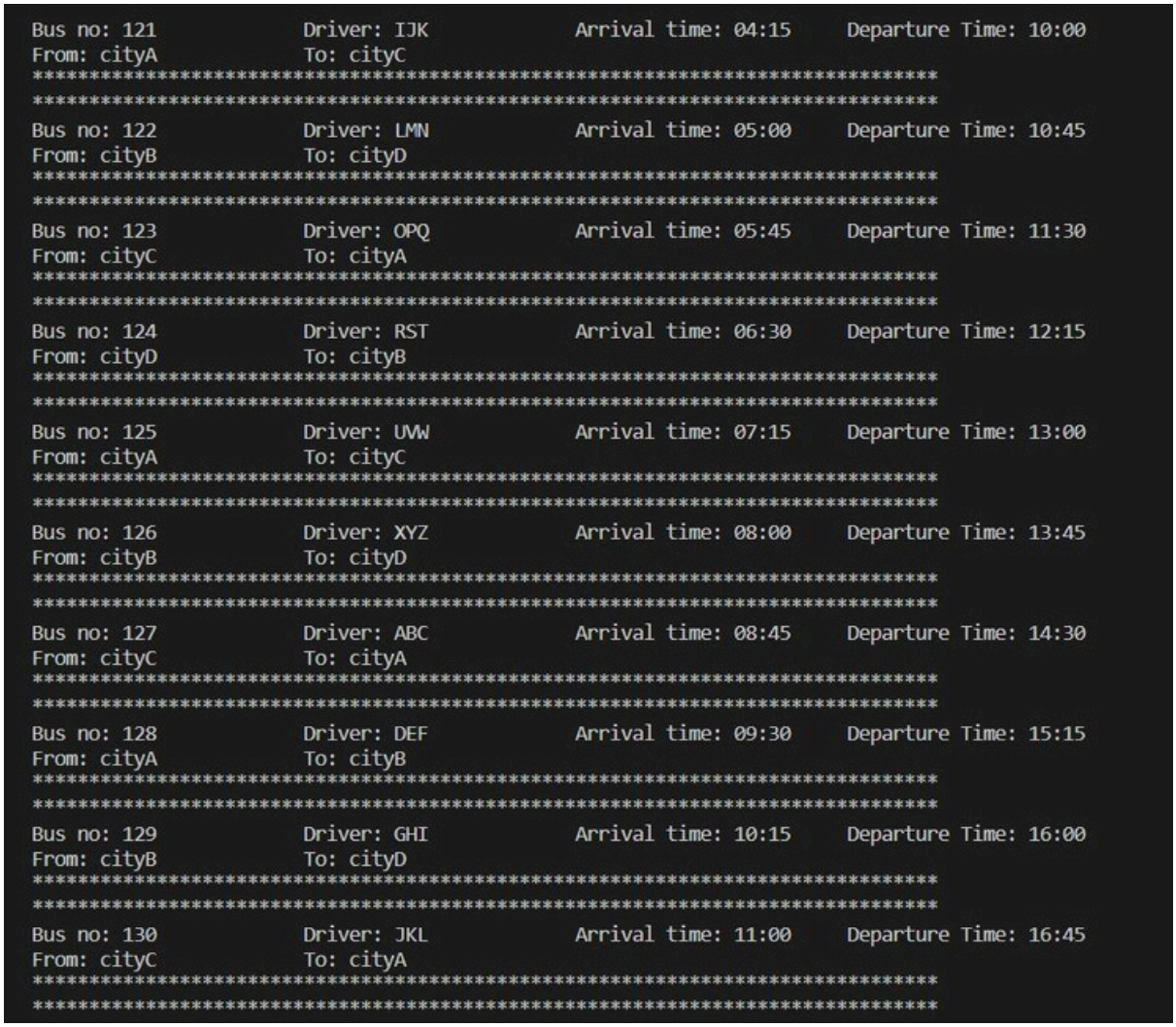
OUTPUT:

```
                    1.Reservation
                    2.Show
                    3.Buses Available.
                    4.Exit
                    Enter your choice:-> 1
Enter your name: Ravi
Enter your age: 34
Enter your gender: Male
Enter your city of departure: cityA
Enter your city of arrival: cityC

Available Buses between cityA and cityC:
1. Bus no: 105  Driver: MNO     Departure time: 17:45   Arrival time: 12:15
2. Bus no: 109  Driver: YZA     Departure time: 00:15   Arrival time: 18:30
3. Bus no: 113  Driver: KLM     Departure time: 03:15   Arrival time: 21:30
4. Bus no: 117  Driver: WXY     Departure time: 07:00   Arrival time: 01:15
5. Bus no: 121  Driver: IJK     Departure time: 10:00   Arrival time: 04:15
6. Bus no: 125  Driver: UVW     Departure time: 13:00   Arrival time: 07:15

Enter the bus number of your choice (1 to 6): 4
Enter the number of seats you want to reserve (1 to 32): 3
Seat Number (1 to 32): 2 3 4
Seat Number (1 to 32): Seat Number (1 to 32):
Reservation Successful!
Bus no: 117
Driver: WXY     Arrival time: 01:15     Departure time: 07:00
From: cityA     To: cityC
Reserved seat numbers:
1. Seat no: 2   Passenger Name: Ravi
2. Seat no: 3   Passenger Name: Ravi
3. Seat no: 4   Passenger Name: Ravi
```

```
                    1.Reservation
                    2.Show
                    3.Buses Available.
                    4.Exit
                    Enter your choice:-> 2
Enter bus no: 117

********************************************************************************
Bus no: 117           Driver: WXY           Arrival time: 01:15     Departure time: 07:00
From: cityA           To: cityC
********************************************************************************


1. Empty                    2. Ravi                     3. Ravi                     4. Ravi
5. Empty                    6. Empty                    7. Empty                    8. Empty
9. Empty                    10. Empty                    11. Empty                    12. Empty
13. Empty                    14. Empty                    15. Empty                    16. Empty
17. Empty                    18. Empty                    19. Empty                    20. Empty
21. Empty                    22. Empty                    23. Empty                    24. Empty
25. Empty                    26. Empty                    27. Empty                    28. Empty
29. Empty                    30. Empty                    31. Empty                    32. Empty

There are 29 seats empty in Bus No: 117
```

```
Bus no: 110             Driver: BCD             Arrival time: 19:15     Departure Time: 01:00
From: cityB             To: cityD
**************************************************************************
**************************************************************************
Bus no: 111             Driver: EFG             Arrival time: 20:00     Departure Time: 01:45
From: cityC             To: cityA
**************************************************************************
**************************************************************************
Bus no: 112             Driver: HIJ             Arrival time: 20:45     Departure Time: 02:30
From: cityD             To: cityB
**************************************************************************
**************************************************************************
Bus no: 113             Driver: KLM             Arrival time: 21:30     Departure Time: 03:15
From: cityA             To: cityC
**************************************************************************
**************************************************************************
Bus no: 114             Driver: NOP             Arrival time: 22:15     Departure Time: 04:00
From: cityB             To: cityD
**************************************************************************
**************************************************************************
Bus no: 115             Driver: QRS             Arrival time: 23:00     Departure Time: 04:45
From: cityC             To: cityA
**************************************************************************
**************************************************************************
Bus no: 116             Driver: TUV             Arrival time: 00:30     Departure Time: 06:15
From: cityD             To: cityB
**************************************************************************
**************************************************************************
Bus no: 117             Driver: WXY             Arrival time: 01:15     Departure Time: 07:00
From: cityA             To: cityC
**************************************************************************
**************************************************************************
Bus no: 118             Driver: ZAB             Arrival time: 02:00     Departure Time: 07:45
From: cityB             To: cityD
**************************************************************************
**************************************************************************
Bus no: 119             Driver: CDE             Arrival time: 02:45     Departure Time: 08:30
From: cityC             To: cityA
**************************************************************************
**************************************************************************
Bus no: 120             Driver: FGH             Arrival time: 03:30     Departure Time: 09:15
From: cityD             To: cityB
**************************************************************************
**************************************************************************
```

```
                    1.Reservation
                    2.Show
                    3.Buses Available.
                    4.Exit
                    Enter your choice:-> 3
Buses Available:

**************************************************************************
Bus no: 101             Driver: ABC             Arrival time: 08:00     Departure Time: 12:00
From: cityA             To: cityB
**************************************************************************
**************************************************************************
Bus no: 102             Driver: DEF             Arrival time: 09:30     Departure Time: 14:30
From: cityC             To: cityD
**************************************************************************
**************************************************************************
Bus no: 103             Driver: GHI             Arrival time: 10:45     Departure Time: 15:15
From: cityB             To: cityA
**************************************************************************
**************************************************************************
Bus no: 104             Driver: JKL             Arrival time: 11:30     Departure Time: 16:00
From: cityD             To: cityC
**************************************************************************
**************************************************************************
Bus no: 105             Driver: MNO             Arrival time: 12:15     Departure Time: 17:45
From: cityA             To: cityC
**************************************************************************
**************************************************************************
Bus no: 106             Driver: PQR             Arrival time: 14:00     Departure Time: 19:30
From: cityB             To: cityD
**************************************************************************
**************************************************************************
Bus no: 107             Driver: STU             Arrival time: 16:30     Departure Time: 22:00
From: cityC             To: cityA
**************************************************************************
**************************************************************************
Bus no: 108             Driver: VWX             Arrival time: 17:45     Departure Time: 23:30
From: cityD             To: cityB
**************************************************************************
**************************************************************************
Bus no: 109             Driver: YZA             Arrival time: 18:30     Departure Time: 00:15
From: cityA             To: cityC
**************************************************************************
**************************************************************************
```



CONCLUSION:

In conclusion, a bus reservation system is a crucial technological solution that simplifies the booking process for passengers and streamlines operations for bus operators. By offering convenient online booking, seat selection, real-time tracking, and efficient management of reservations, the system enhances the overall travel experience, saves time, and improves the operational efficiency of bus services. It passenger satisfaction, optimizes resource utilization.