Project Title: Flight Reservation System

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Fokir Marka Airlines

LTD

Introduction

This project implements a basic Airline Reservation System, designed to handle reservations, cancellations, and display information for a fictional airline, "Fokir Marka Airlines LTD." The system stores and manages booking information, including customer details, seat assignments, and ticket prices across three classes: Economy, Business, and First Class.

Objectives

The primary objectives of this project are to:

1. Allow customers to reserve and cancel seats.
2. Provide information on available seats and revenue generated.
3. Maintain data integrity by ensuring seats are properly tracked for each class.
4. Efficiently display records of all current reservations.

Project Overview

The project is implemented in C, using structures to manage reservation details, with a linked list to store reservation data dynamically. The main functionalities include seat reservation, cancellation, checking seat availability, and calculating total revenue.

Code Structure

1. **Data Structures**:
   o `struct airline`: A structure to store customer details, including passport, name, destination, seat class, and seat number. This structure also holds a pointer to the next reservation, forming a linked list.

2. **Global Variables**:
   o `begin` and `stream`: Pointers to the head of the linked list.
   o `dummy`: A temporary pointer used in deletion operations.
   o `total_revenue`: An integer tracking cumulative revenue.
   o Arrays `seats_z`, `seats_j`, and `seats_y` (size 51 each): Track seat availability in First, Business, and Economy classes, respectively.

3. Project Inspiration and background study:

The inspiration for the **Fokir Marka Airlines Reservation System** stems from the need to simplify the booking process for airline reservations. Airlines, both large and small, rely heavily on efficient booking systems to manage reservations, track customer details, and calculate revenue. The project was conceptualized as a way to create a basic yet functional system that can simulate key features of a real-world airline reservation system using the C programming language.

Airline reservation systems have long been a staple of modern travel and aviation. These systems allow airlines to effectively manage passenger bookings, seat assignments, cancellations, and financial transactions. Traditionally, such systems are complex and highly integrated with flight scheduling, passenger databases, payment systems, and more.

SOURCE CODE: https://www.studytonight.com/c-projects/airline-booking-project-using-c-language

4. Main Functions:
- o `main()`: Displays the menu and handles user inputs.
- o `details()`: Collects user input for booking details.
- o `reserve()`: Manages reservation creation, seat assignment, and updates revenue.
- o `Display_name_by_record()`: Views a customers information
- o `cancel()`: Deletes a reservation by passport number and frees memory.
- o `display()`: Outputs all current reservations.
- o `show_available_seats()`: Displays unreserved seats in each class.
- o `check_seat_status()`: Verifies if a specified seat is reserved.
- o `apply_discount()`: Applies a discount depending on the user's age.

- `display_revenue()`: Outputs the total revenue generated.

```
********************************************************************************
          __|__                                           __|__
    --@--@--(_)--@--@--                              --@--@--(_)--@--@--
                          Welcome to Fokir Marka Airlines  LTD
********************************************************************************

    Please enter your choice from below:

    1. Reservation

    2. Cancel

    3. Display all records

    4. Show available seats

    5. Check seat status

    6. Display total revenue

    7. Display customer record by name

    8. EXIT

    Enter your choice :
```

5. **Helper Functions**:
   - `remove_newline()`: Removes trailing newline from strings.
   - `get_price()`: Returns the ticket price based on the seat class.
   - `is_seat_taken()`: Checks if a seat in a specific class is occupied.

Features

1. **Reservation**:
   - Collects customer details and assigns the next available seat in the chosen class.
   - Dynamically allocates memory for each reservation and appends it to the linked list.
   - Updates the seat availability array and total revenue.

```
C:\Windows\system32\cmd.e    X

Enter the number of seats you would like to reserve: 3

        Enter your passport number: 123

        Enter your name: Ishmam Hussain

        Enter your email address (without @gmail.com): ishmamhussain003

        Enter the Destination: Nepal

        Seat Class Options:
        - Economy (Y): $60
        - Business (J): $150
        - First Class (Z): $300
        Enter seat class (Z for First Class, J for Business, Y for Economy): z

        Are you a 'student', 'senior', or 'regular' customer? :student

        Applied 20% student discount. Discounted price: $240
        Seat booking successful for reservation 1!
        Seat: Z-1
        Class: Z
        Price: $240
Waiting for input......

        Enter your passport number: 321

        Enter your name: Talha

        Enter your email address (without @gmail.com): talha007

        Enter the Destination: kazakhstan

        Seat Class Options:
        - Economy (Y): $60
        - Business (J): $150
        - First Class (Z): $300
        Enter seat class (Z for First Class, J for Business, Y for Economy): j

        Are you a 'student', 'senior', or 'regular' customer? :senior

        Applied 15% senior discount. Discounted price: $127
        Seat booking successful for reservation 2!
        Seat: J-1
        Class: J
        Price: $127
Waiting for input......

        Enter your passport number: 1234

        Enter your name: Sakib

        Enter your email address (without @gmail.com): sakib

        Enter the Destination: Kathmandu

        Seat Class Options:
        - Economy (Y): $60
        - Business (J): $150
        - First Class (Z): $300
        Enter seat class (Z for First Class, J for Business, Y for Economy): y

        Are you a 'student', 'senior', or 'regular' customer? :regular

        No discount applied. Full price: $60
        Seat booking successful for reservation 3!
        Seat: Y-1
        Class: Y
        Price: $60
Waiting for input......
|
```

2. **Cancellation**:
   o updates seat availability, and decreases total revenue.

```
Enter the passport number for the reservation to cancel: 123

Reservation cancelled for Ishmam Hussain.
```

3. **Display Functions**:
   o `display()` lists all reservations, showing details like passport, name, email, seat number, class, destination, and price.
   o `show_available_seats()` lists seats that are still available in each class.

o   `check_seat_status()` checks if a specific seat is taken or available.

```
++==================== Available Seats ====================++

First Class (Z)    Business Class (J) Economy Class (Y)

Z-2                     J-2                     Y-2
Z-3                     J-3                     Y-3
Z-4                     J-4                     Y-4
Z-5                     J-5                     Y-5
Z-6                     J-6                     Y-6
Z-7                     J-7                     Y-7
Z-8                     J-8                     Y-8
Z-9                     J-9                     Y-9
Z-10                    J-10                    Y-10
Z-11                    J-11                    Y-11
Z-12                    J-12                    Y-12
Z-13                    J-13                    Y-13
Z-14                    J-14                    Y-14
Z-15                    J-15                    Y-15
Z-16                    J-16                    Y-16
Z-17                    J-17                    Y-17
Z-18                    J-18                    Y-18
Z-19                    J-19                    Y-19
Z-20                    J-20                    Y-20
Z-21                    J-21                    Y-21
Z-22                    J-22                    Y-22
Z-23                    J-23                    Y-23
Z-24                    J-24                    Y-24
Z-25                    J-25                    Y-25
Z-26                    J-26                    Y-26
Z-27                    J-27                    Y-27
Z-28                    J-28                    Y-28
Z-29                    J-29                    Y-29
Z-30                    J-30                    Y-30

++========================================================++
|
```

```
Enter seat class (Z for First, J for Business, Y for Economy): Z
Enter seat number to check status (1-50): 1

Seat Z-1 is taken.
|
```

```
++======================= Reservations ========================++
Name: Ishmam Hussain | Passport: 123 | Destination: Nepal | Seat: Z-1 | Class: Z | Price: $240
Name: Talha | Passport: 321 | Destination: kazakhstan | Seat: J-1 | Class: J | Price: $127
Name: Sakib | Passport: 1234 | Destination: Kathmandu | Seat: Y-1 | Class: Y | Price: $60

++============================================================++
```

4. **Revenue Tracking**:
   - Calculates and displays total revenue from all current reservations.


```
Total Revenue: $427
```

Error Handling

- **Invalid Input**: If an invalid seat class or number is entered, the program prompts the user accordingly.
- **Memory Management**: Allocated memory is freed upon cancellation, preventing memory leaks.
- **Seat Assignment**: If no seats are available in a specified class, a message notifies the user, and memory is deallocated.

Limitations and Future Improvements

- **Static Seat Arrays**: Seat arrays are fixed at size 51. Increasing the seat capacity for larger aircraft would require modifying these arrays.
- **Basic UI**: The console-based interface could be enhanced to be more user-friendly and interactive.
- **Database Integration**: Currently, data is not persistent; integration with a database would allow for data retention beyond runtime.
- **Error Checking**: Further validation could be added for seat assignment and reservation cancellation processes.

Conclusion

This project demonstrates a functional Airline Reservation System with essential features for managing bookings, cancellations, and seat availability in C. The linked list approach allows dynamic memory management for reservations, while separate arrays track seat availability across different classes. This foundation could be expanded to create a more sophisticated reservation system in a real-world application.