**Course**: Cse215.7

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**Topic**: Flight Booking Application Report

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**Introduction**

This report outlines the implementation of a Flight Booking Application. The application is designed to handle user account management, flight reservations, and booking reviews while maintaining data persistence. The code incorporates fundamental concepts such as file I/O, object-oriented programming, multithreading, and basic input validation.

**Features**

**1. User Account Management**

* Users can create an account with a username and password.
* User credentials are validated during login.

**2. Flight Selection and Booking**

* Five destinations are available:
  + - Chittagong
    - Rajshahi
    - Khulna
    - Sylhet
    - Barishal
* Flights are offered on five specific dates:
  + - 1st January
    - 8th January
    - 20th January
    - 2nd February
    - 10th February
* Three time slots are available for each date:
  + - 8:00 AM
    - 2:00 PM
    - 8:00 PM
* Seat availability is tracked for each flight.

**3. Booking Review**

* Users can view all their confirmed bookings.
* If no bookings are available, a message indicates this.

**Key Classes and Their Responsibilities**

**1. FlightBookingApp**

* The main class that initializes the application.
* Handles the main menu, user login, and account creation.
* Manages the flow between booking flights and viewing bookings.

**2. UserManager**

* Handles user data, including login and account creation.
* Uses file I/O to persist user data, including their bookings.
* Validates username and password during login.

**3. User**

* Represents a user account, including username, password, and bookings.
* Stores bookings in an array (up to 10 bookings).
* Includes methods to add and retrieve bookings.

**4. Booking**

* Encapsulates details of a booking: destination, date, and time.
* Overrides the toString method for easy display of booking details.

**5. FlightManager**

* Manages seat availability for flights.
* Tracks seats for each destination, date, and time combination.
* Uses a 3D array to store available seats for all possible flight combinations.

**Multithreading Implementation**

* Ensures thread-safe operations during the flight booking process.
* Uses the synchronized keyword to prevent race conditions when multiple threads access seat availability.

**Data Persistence**

* User data and bookings are saved in a file named users.txt.
* Data is retrieved during login, and updates are made after each booking.

**Input Validation**

* Validates user input for usernames and passwords during account creation and login.
* Restricts flight date selection to five predefined options.
* Ensures correct time slot selection using a switch case.

**Sample Execution Flow**

1. **Login or Account Creation**:
   * Users are prompted to log in or create an account.
   * Successful login directs users to the main menu.
2. **Booking a Flight**:
   * Users select a destination, date, and time.
   * The system checks seat availability and confirms the booking.
3. **Viewing Bookings**:
   * Displays all user bookings or a message if no bookings are found.
4. **Logout**:
   * Returns to the main menu for new logins or exits the application.

**Conclusion**

The Flight Booking Application successfully handles user authentication, flight reservations, and booking management while ensuring data persistence and thread safety. The design prioritizes simplicity and clarity, adhering to the project requirements.