Class and Method Description:

DTO Layer:

1. **User:** This class stores the user type (admin or the customer) and all user information.

    Attributes:

        userType: String.
        userId: BigInteger
        userName: String
        userPassword: Password
        userPhone:BigInteger
        userEmail: String

    Methods: -

2. **Passenger**: This class stores all the details of the travelling passenger.

    Attributes:

        pnrNumber: BigInteger
        passengerName: String
        passengerAge: Integer
        passengerUIN: BigInteger
        Luggage: Double

    Methods: -

3. **Booking**: This class stores the details of a booking made by a particular userId. Every booking stores a list of passengers travelling in it as well as the flight details.

    Attributes:

        bookingId: BigInteger
        userId: User
        bookingDate: Date
        passengerList: List<Passenger>
        ticketCost: BigDouble
        flight: Flight
        noOfPassengers: Integer

    Methods: -

4. **ScheduledFlight**: This class stores a flight that is scheduled along with its schedule and the vacancy.

Attributes:
flight: Flight
availableSeats: Integer
schedule: Schedule
Methods: -

5. **Flight**: This class stores all the details of a flight.

Attributes:
flightNumber: BigInteger
flightModel: String
carrierName: String
seatCapacity: Integer
Methods: -

Service Layer:

8. **UserServiceImpl**:
Attributes: -
Methods:
addUser(User):User :-
Adds a new user.

viewUser(BigInteger):User :-
Shows the details of a user identifiable by the user id.

viewUser(): List<User> :-
Shows the details of all users.

updateUser(User):User :-
Updates the details of a user.

deleteUser(BigInteger):void
Removes a user as per the user id.

validateUser(User): void :-
Validates the attributes of a user.

6. **Schedule**: This class stores a flight schedule.

    Attributes:
        sourceAirport: Airport
        destinationAirport: Airport
        arrivalTime: DateTime
        departureTime: DateTime
    Methods: -

7. **Airport**: This class stores the details of an airport.
    Attributes:
        airportName: String
        airportCode: String
        airportLocation: String
    Methods: -

9. **BookingServiceImpl:**

Attributes: -

Methods:

addBooking(Booking):Booking :- Creates a new booking.

modifyBooking(Booking): Booking :- Modifies a previous booking. All information related to the booking except the booking id can be modified.

viewBooking(BigInteger): List<Booking> :- Retrieves a booking made by the user based on the booking id.

viewBooking(): List<Booking> :- Retrieves a list of all the bookings made.

deleteBooking(BigInteger): void :-
Deletes a previous booking identifiable by the 'bookingId'.

validateBooking(Booking): void :-
Validates the attributes of a booking.

validatePassenger(Passenger): void :-
Validates the attributes of a passenger.

10. **FlightServiceImpl:**

Attributes: -

Methods:

addFlight(Flight): Flight :-

Adds a new flight which can be scheduled.

modifyFlight(Flight): Flight :-
Modify the details of a flight.

viewFlight(BigInteger): Flight :-
Shows the details of a flight specified by the flight number.

viewFlight(): List<Flight> :-
View the details of all flights.

deleteFlight(BigInteger): void :-
Removes a flight.

validateFlight(Flight): void :-
Validates the attributes of a flight.

11. **ScheduleFlightServicesImpl:**

Attributes: -

Methods:

scheduleFlight(ScheduledFlight): ScheduledFlight :-
Schedules a flight alongwith its timings, locations and capacity

viewScheduledFlights(Airport, Airport, LocalDate): List<Scheduled Flight> :-
Returns a list of flights between two airports on a specified date.

viewScheduledFlights(BigInteger):Flight :-
Returns a list of a scheduled flight identifiable by flight number.

viewScheduledFlight(): List<ScheduledFlight> :-
Shows all the details and status of all flights.

modifyScheduledFlight(Flight,Schedule, Integer): ScheduledFlight :-
Modifies the details of a scheduled flight.

deleteScheduledFlight(BigInteger): void :-
Removes a flight from the available flights.

validateScheduledFlight(ScheduledFlight): void :-
Validates the attributes of a scheduled Flight.

12. AirportServiceImpl:

Attributes: -
Methods :

viewAirport(): List<Airport> :-
Returns the list of all airports.

viewAirport(String): Airport :-
Returns the details of an airport identifiable by the airport code.

DAO Layer:

13. UserDaoImpl:

Attributes:

userList: List<User>

Methods:

addUser(User):User :-
Adds a new user.

viewUser(BigInteger):User :-
Shows the details of a user identifiable by the user id.

viewUser(): List<User> :-
Shows the details of all users.

updateUser(User):User :-
Updates the details of a user.

deleteUser(BigInteger):void
Removes a user as per the user id.

14. BookingDaoImpl:

Attributes:

bookingList: List<Booking>

Methods:

addBooking(Booking):Booking :- Creates a new booking.

modifyBooking(Booking): Booking :- Modifies a previous booking. All information related to the booking except the booking id can be modified.

viewBooking(BigInteger): List<Booking> :- Retrieves a booking made by the user based on the booking id.

viewBooking(): List<Booking> :- Retrieves a list of all the bookings made.

deleteBooking(BigInteger): void :-
Deletes a previous booking identifiable by the 'bookingId'.

15. FlightDaoImpl:

Attributes:

flightList: List<Flight>

Methods:

addFlight(Flight): Flight :-
Adds a new flight which can be scheduled.

modifyFlight(Flight): Flight :-
Modify the details of a flight.

viewFlight(BigInteger): Flight :-
Shows the details of a flight specified by the flight number.

viewFlight(): List<Flight> :-
View the details of all flights.

deleteFlight(BigInteger): void :-
Removes a flight.

16. ScheduledFlightDaoImpl:

Attributes:

scheduledFlightList: List<ScheduledFlight>

Methods:

scheduleFlight(ScheduledFlight): ScheduledFlight :-
Schedules a flight alongwith its timings, locations and capacity

viewScheduledFlights(Airport, Airport, LocalDate): List<Scheduled Flight> :-
Returns a list of flights between two airports on a specified date.

viewScheduledFlights(BigInteger):Flight :-
Returns a list of a scheduled flight identifiable by flight number.

viewScheduledFlight(): List<ScheduledFlight> :-
Shows all the details and status of all flights.

modifyScheduledFlight(Flight,Schedule,int): ScheduledFlight :-
Modifies the details of a scheduled flight.

deleteScheduledFlight(BigInteger): void :-
Removes a flight from the available flights.

17. AirportDaoImpl:

Attributes:

airportList: List<Airport>

Methods:

viewAirport(): List<Airport> :-
Returns the list of all airports.

viewAirport(String): Airport :-
Returns the details of an airport identifiable by the airport code.

Validations:

1. The 'userPhone' should have an exact 10 digit number and the number should not start with zero.
2. Date and Time should be valid i.e date and time that has already elapsed shouldn't be entered
3. 'noOfPassenger' should always be less than equal to that of available seats.
4. The local part of the email should contain alphanumeric characters only. No special characters are to be present as the first character of the id.
5. The chosen airport's name should be present inside the Airport database.
6. The Unique Identification Number should be of 12 digits.

Assumptions:

However, we have made a few assumptions with respect to the application, which are:

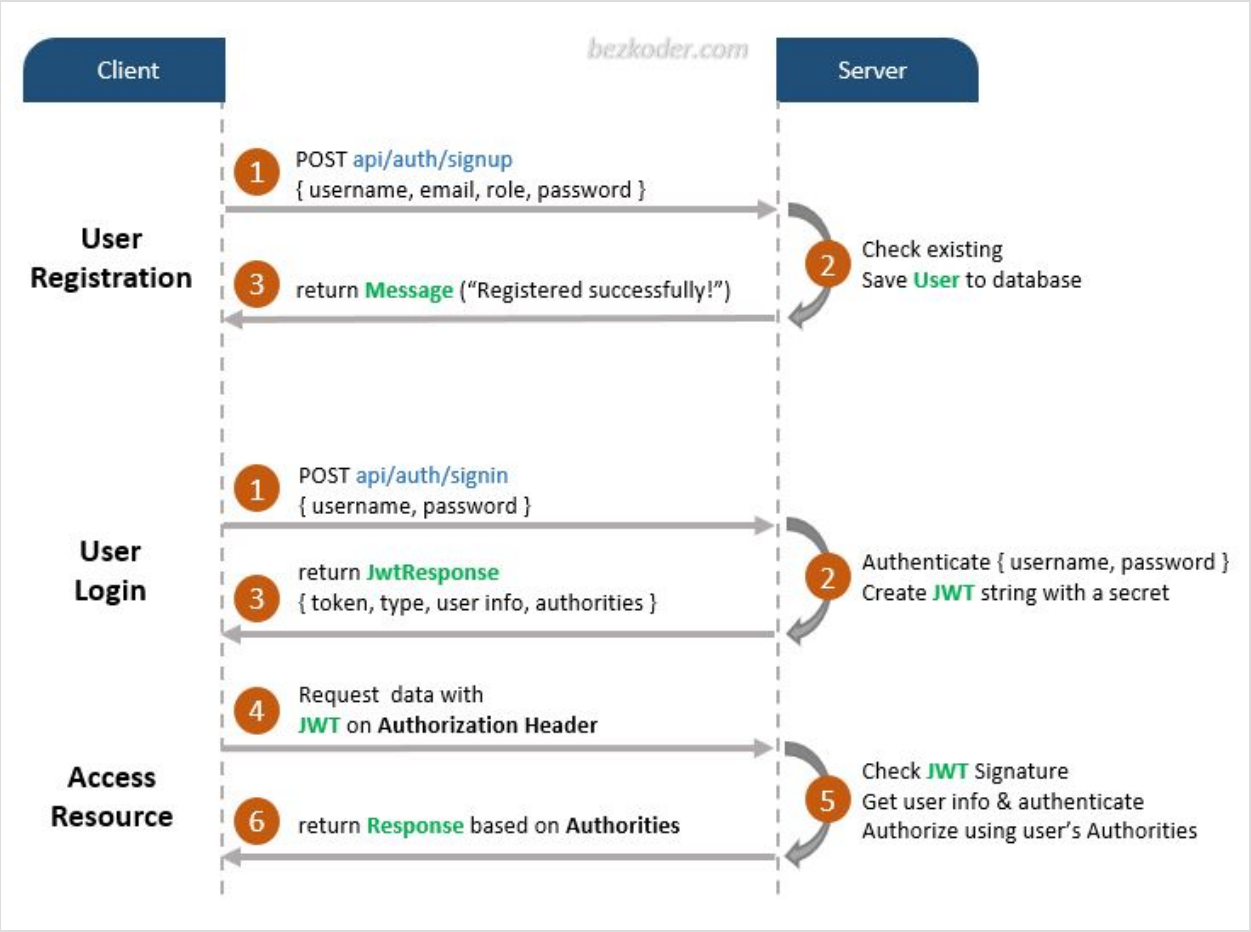
1. Administrator and customer are both Users. They are differentiated by a variable 'userType' in the User class.
2. Every passenger needs to enter a Unique Identification Number while booking is being made. For simplicity, we assume it to be a 12-digit Aadhaar Number.
3. All flights are direct flights.
4. No flight gets cancelled.
5. Number of airports is fixed and stored in database.
6. All the flights are considered to be domestic.

JWT (JSON Web Token) → JWT based Authentication

JWT is popular for Authentication and Information Exchange. Server encodes data into a JSON Web Token and send it to the Client. The Client saves the JWT, then every Request from Client to protected routes or resources should be attached that JWT (commonly at header). The Server will validate that JWT and return the Response.

\Spring Boot Signup & Login with JWT Authentication Flow

The diagram shows flow of how we implement User Registration, User Login and Authorization process.



Spring Boot Server Architecture with Spring Security

You can have an overview of our Spring Boot Server with the diagram below: