CAPSTONE PROJECT

AIR TRANSPORT SYSTEM (ATS)

You are required to write a software solution for an Air Transport System which allows administrators to manage various bookings for passengers, airport details and plane details.

The application has to be implemented using Spring Boot as the backend. This application stores details of airports, planes, and bookings for passengers.

The application has to be implemented with microservices architecture using Spring Boot and Spring cloud with AWS.

This software needs to address the following requirements:

Business Requirements:

The project is for administrators who use the system to perform the following operations.

The Administrator module should allow administrators perform:

A. Login and authentication.

B. Saving details of airports, planes and bookings for passengers.

C. Viewing the details of planes, airports and bookings.

D. Updating booking details.

E. Search for booking details and display them.

F. Deleting booking details.

G. New administrators to register.

User Stories:

US01: Login

As an Administrator, I want to login to the application; so that I can get access to the welcome screen and application menu.

- The login id will be a valid email address.

- Password should be a combination of at least an uppercase alphabet, lowercase alphabets, a digit, and a special character.

- The email id and password cannot be blank.

- The account should get disabled for 30 minutes on three invalid login attempts.

- Proper messages should be displayed in case of errors and exceptions.

Acceptance criteria

Given that I am an administrator,

When I enter correct User Id with Password in the Login screen

Then I should be able access the application menu

And navigate the menu to view the details

Given that I am an administrator,

When I enter incorrect User Id with Password in the Login screen

Then I should be able prompted for a maximum of three times to renter the credentials.

Given that I am an administrator,

When I enter incorrect User Id with Password in the Login screen consecutively for three times

Then my account should get disabled for 30 minutes.

US02: View airports

As an Administrator, I want to view the details of various airports across the globe, so that I can share relevant information to the passengers.

- The details that can be viewed are airport code, airport name and country id.

Acceptance criteria

Given that I am an administrator,

     When I select the option to "Display Airports"

     Then I should be able to view all the airports

US03: Manage airports

As an Administrator, I want to manage the details of various airports across the globe, so that I can add new airports.

- The details to be entered for a new airport is the airport name.
- The airport code should be 5 characters in the format "A0001" where the last 4 characters are running numbers
- The airport code should be autogenerated.
- The country code should be minimum 1 character and maximum 5 characters

Acceptance criteria

Given that I am an administrator,

     When I select the option to add airport

     And enter the airport name along with country code

     Then I should be able to autogenerate the airport code

     And save the new airport details.

US04: View Planes

As an Administrator, I want to view the details of various planes that are in service, so that I can share relevant information to the passengers.

- The details that can be viewed are registration number, plane maker, model, image and seating capacity.

Acceptance criteria

Given that I am an administrator,

When I select the option to "Display Planes"

Then I should be able to view the details of all the planes.

US05: Manage planes

As an Administrator, I want to manage the details of various planes in active service across the globe, so that I can add new planes.

- The details to be entered for a new plane the model and seating capacity.
- The registration numbers should be 5 characters in the format "R0001" where the last 4 characters are running numbers
- The registration number should be autogenerated.
- The seating capacity should be 50,100,150 or 500.
- The path of the plane image should be stored.

Acceptance criteria

Given that I am an administrator,

When I select the option to add plane

And enter the model and seating capacity

Then I should be able to autogenerate the registration number

And save the new plane details.

US06: View Bookings

As an Administrator, I want to view the details of various bookings, so that I can share relevant information to the passengers

- The details that can be viewed are booking id, passenger id, schedule id, booking date, seat number, ticket cost and total amount.
- The booking can be searched by booking id
- The booking can be searched by booking date.

Acceptance criteria

Given that I am an administrator,

> When I select the option to "Search Booking by Booking Id"

> And enter the booking id

> Then I should be able to view the details of the booking with the matching booking id.

Given that I am an administrator,

> When I select the option to "Search Schedule by Booking Date"

> And enter the date of booking

> Then I should be able to view the details of the bookings on the specified date

US07: Manage Bookings

As an Administrator, I want to manage the details of various bookings of passengers, so that I can add new bookings, modify the details and delete bookings no longer needed.

- The details to be entered for a new booking are passenger name, booking date, seat number, cost, total amount, departure date and time and arrival date and time.
- The departure date and time and arrival date and time should be valid time periods.
- The passenger id should be selected from a list of existing passengers.
- The booking id should be 5 characters in the format "B0001" where the last 4 characters are running numbers
- The booking id number should be autogenerated.
- The booking once created cannot be modified
- The booking can be deleted based on the booking id.

Acceptance criteria

Given that I am an administrator,

When I select the option to add booking

And enter the the passenger's name, booking date, seat number, ticket cost and total amount.

Then I should be able to autogenerate the booking id

And save the new schedule details.

Given that I am an administrator,

When I select the option to delete a booking

And enter the booking id

Then I should be able to delete the booking.

US08: New Admin Registration

As a New Administrator, I should be able to register myself to keep track and work on the sporting event systems database.

- An error message is displayed if all the details are not filled
- An error message is displayed if the email id is already in use by some other user
- An error message is displayed if the name contains numbers or special characters
- Password should be a combination of at least an uppercase alphabet, lowercase alphabets, a digit, and a special character.
- An error message is displayed if the password entered by the customer is not in the expected format
- An error message is displayed if the phone number is already in use by some other user
- A new account is created if all the fields that have been entered by the user are proper.
- The user should be able to login with his/her emailId and password

Acceptance criteria

Given that I am an administrator,

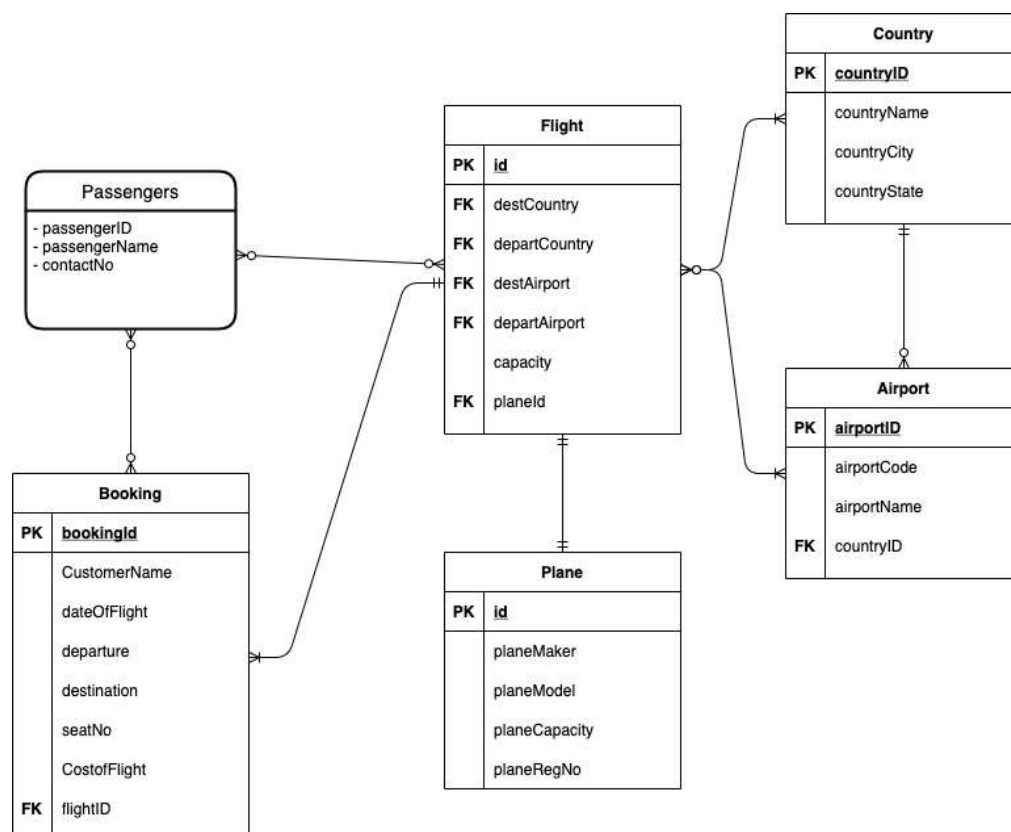When I select the option to register a new admin

And enter all the required details

Then I should be able to save the register the administrator.

Database Design:

- Create the actual ER Diagram that mirror implementation of your own solution.

  Sample ER Diagram for reference

Functional Requirements:

A. The Application should be implemented using Spring boot and Microservices architecture.

B. The microservices should be registered in a Service Registry.

C. The Eureka Server should run on AWS EC2 instance.

D. The REST APIs should be tested with Postman

E. Perform ORM using the Spring Data JPA and Hibernate framework.

F. The backend to be used is MySQL.

G. You should provide access to microservices using a dynamic API gateway

H. Perform client-side load balancing

I. Appropriate validations and exception handling should be performed in the relevant layers of the application.

J. The relevant Design principles and practices should be applied.

K. Perform code quality checks with Sonarlint.

L. Write effective java code.

Best Practices

A. Follow proper naming conventions and ensure code quality

B. Use StringBuilder for concatenating large strings

C. Enforce Compile-Time Type Checking using Generics

D. Validate Parameter Preconditions

E. Proper handling of NullPointerException and other relevant exceptions.

F. Perform validations across the different layers of the project

G. The code should have modularity.

Submission Requirements:

A. Submit a single archive containing all the artefacts

B. The artefacts are Project Source Code, Presentation, Postman Test Collection and Database Scripts.

C. Along with the code you are also required to submit a documentation that mentions

    a. Project Name

b. Application Name of your Microservices

c. Port number assigned to that microservice

Project Presentation Requirements:

A. The Project should be presented individually with execution and presentation.

B. Explain the details of API used, processes involved, workflows and frameworks utilized.