

System Description

Introduction

The Flight Reservation Web Application is a robust and user-friendly platform designed to streamline the process of booking flights. It serves various user roles, including travelers who wish to book flights, airline staff managing passenger lists, and administrators maintaining flight-related data.

System Components and Functionalities

User Interface (UI) - A web-based graphical user interface (GUI) that is intuitive and responsive, allowing users to interact with the system across different devices. This interface will be realized through using React.

Backend Server - A Django-based server that processes all logic, interfaces with the MySQL database, and integrates with external services like Stripe for payment processing and Mail Chimp email services for notifications.

Database - A MySQL database that reliably stores all data, including flight details, reservations, user accounts, seat maps, and promotions.

Functionalities

Web-based Access - Accessible through a web browser, providing platform independence.

Graphical User Interface - A well-designed, intuitive GUI that enhances user experience.

Flight Management

Browse Flights - Users can view available flights with detailed information.

Select Flight - Users can choose flights based on their preferences.

Seat Selection - An interactive seat map allows users to select their preferred seat.

Payment and Reservation

Make Payment - Secure payment processing with Stripe for flight bookings.

Payment Receipt and Ticket Notification - Automated email notifications providing payment receipts and ticket information.

User Features

User Registration - Allows new users to create an account.

Registered User Login - Secure login functionality for returning users.

Manage Promos - Special promotions are available for registered users to utilize.

Cancellation and Notifications

Cancel Flight - Users can cancel their flights.

Cancellation Notification - Immediate notifications upon flight cancellation.

Browse Passenger List - Airline staff can view the list of passengers for flights.

Admin Features

Maintain Aircrafts - Admins can manage aircraft information.

Maintain Flights - Admins can create, update, and delete flight schedules.

Maintain Crews - Admins can assign and manage crew members for flights.

Security and Performance

Security - The system uses SSL encryption for data transfer and follows best security practices for user authentication and data protection.

Scalability - The architecture supports scaling to accommodate growth in user traffic and data volume.

Performance - Optimized for quick response times and smooth user interactions, even under heavy load.

Conclusion

The Flight Reservation Web Application is designed to meet and exceed the criteria set forth in the project rubric. Its robust backend, intuitive frontend, and comprehensive set of features ensure a seamless and efficient flight booking experience for users while providing airline staff and administrators with powerful tools for managing flight operations.

Use Case Scenarios

Customer Use Cases

Register User

The "Register User Scenario"

John decides to take advantage of a flight booking service and starts by registering on the company's website. Upon visiting the site, he is directed to the registration page where the system prompts him for personal details, including his name, address, and contact information. John fills out the form with the required information, and upon submission, the system conducts a validation check to ensure all entered details are correct and adhere to the format standards. Once validation is confirmed, John's information is securely stored in the company's database. The system then signals the successful completion of the registration process, and John is now a registered user.

Login User

The "Login User Scenario"

Having registered previously, John returns to the website to log in. He navigates to the login page where the system requests his username and password. John enters his credentials, and the system performs a check against the stored data in the company's database. Upon successful verification of John's credentials, the system logs him into the website and displays a message confirming the successful login. John now has access to his user account and the website's booking services.

Browse Flights

The "Browse Flights Scenario"

John, intent on planning his trip, uses the website to explore available flight options. He selects the 'Flights' option and is taken to the search page, where he inputs his desired departure and arrival cities along with his travel dates. The system verifies the validity of John's inputs and proceeds to search through the flight database. It successfully retrieves a list of available flights that match John's criteria and presents the options to him, completing the flight browsing activity.

Select Flight

The "Select Flight Scenario"

From the list of available flights, John reviews the options and selects one that best fits his schedule and budget. As he confirms his choice, the system accesses the database to fetch the final details of the flight, including pricing, departure, and arrival times. The system displays a summary of the selected flight, ensuring John has all the necessary information before proceeding with his booking.

Browse Seats

The "Browse Seats Scenario"

With a flight selected, John needs to decide a seating arrangement for all passengers in his party. The system responds by displaying a graphical seat map of the aircraft for the chosen flight. This map shows all available seats, allowing John to visualize where he and the people with him will sit during their journey.

Select Seat Type

The "Select Seat Type Scenario"

After browsing through the seat map, John selects a window seat towards the front of the aircraft, aiming for comfort. The system checks the current reservation status of the seat to ensure it's still available. Once confirmed, the system reserves

the seat for John and provides him with a confirmation notification, confirming his seat choice for the flight.

Select Insurance

The "Select Insurance Scenario"

With his seat selected, the system then prompts John about the optional flight insurance. John reviews the insurance options provided and decides to add insurance to his booking for added peace of mind. The system updates his reservation to reflect the insurance selection and includes the insurance details in his flight itinerary.

Make Payment

The "Make Payment Scenario"

John, having selected his flight, chosen his seat, and decided on ticket cancellation insurance, is now poised to make a payment. The System acknowledges the completion of these steps and securely guides John to the payment page. John selects his preferred payment method and proceeds to fill in the required payment details on the provided form. Once John submits this information, the System processes the transaction. Upon successful verification, the System presents John with a payment confirmation.

Email Payment Confirmation

The "Email Payment Confirmation Scenario"

Following the selection of his flight, seat, and insurance, along with the completion of the payment process, the System begins its confirmation routine. It checks the database for the transaction associated with John's email address. Once the System verifies that John's payment has been received, it compiles an email that confirms the payment. This email, containing all necessary details of the transaction, is sent to the email address John provided earlier, ensuring he has a record of the payment.

Email Flight Details Use-Case Scenario

The "Email Flight Details Scenario"

With the payment confirmed and the payment confirmation email received, John moves on to the final step of his booking. The System searches its database for the transaction tied to John's email and payment details. It then gathers all pertinent flight information and assembles an email to John, which mirrors the details of the payment confirmation email. This email serves as John's comprehensive flight itinerary and completes his reservation process.

Airline Agents Use-Case Scenarios

Staff Login

The "Staff Login Scenario"

John, an airline agent, accesses the staff login portal and enters his credentials. The system verifies the credentials against the staff database. Upon successful validation, the system authorizes John to access the admin panel and provides him with a token to maintain his session. This token ensures that John's interactions with the system are secure and authenticated during his session.

Browse Flight Passengers

The "Browse Flights Passengers Scenario"

After authenticating, John uses the admin panel to browse passengers. He inputs the flight ID into the system. The system validates the flight ID and checks for an existing passenger list associated with that flight. Upon successful validation, the system retrieves the passenger list from the flight database and displays it to John. John can now perform various actions such as updating passenger details.

System Admin Use-Case Scenarios

Admin Login

The "Admin Login Scenario"

Alex, a system admin, navigates to the admin login portal and submits his credentials. The system validates Alex's credentials and, after successful validation, he is given access to the admin panel. A token is provided to Alex for session management. The system then redirects Alex to the admin panel, where he can manage various administrative tasks.

Edit Crew

The "Edit Crew Scenario"

Within the admin panel, Alex selects the 'Crew Management' option. He is presented with the ability to add a new crew member by entering their personal and professional details into the crew database. Alex can also browse through a list of crew members. After selecting a crew member, he is redirected to the crew details page where he can update their qualifications, schedule, or delete the crew member if they are no longer employed.

Edit Flights

The "Edit Flights Scenario"

Alex chooses the 'Flight Management' section in the admin panel. He can create a new flight entry, inputting details such as departure times, destinations, and aircraft assignments to flights. He can also see a list of all flights and choose one to view more details on. On the flight details page Alex can update scheduling information, seating arrangements, or remove the flight entry if the flight is canceled or rescheduled.

Edit Destinations

The "Edit Destinations Scenario"

In the admin panel, Alex selects the 'Destinations Directory'. He can add a new destination with details such as airport codes, gate information, and city names. He can also view a list of

destinations and select a specific one to manage. On the destination details page, Alex can update information related to airport facilities, or delete the destination if it's no longer serviced.

Print Registered Users

The "Print Registered Users Scenario"

For admin records, Alex needs to print a list of registered users. In the admin panel, he selects the 'User Records' section and initiates a print job. The system compiles the user data into a printable format, fetching the data from the user database, and sends it to the printer.

Browse Flight Crews

The "Browse Flight Crews Scenario"

To oversee crew assignments, Alex navigates to the 'Crew Scheduling' section within the admin panel. He can view a list of aircraft crews and select a specific crew to view. This displays which crew members are assigned to which aircraft. In the crew details page, Alex reviews the crew information, and he can update scheduling or crew composition, or delete the crew record if needed.

Browse Aircrafts

The "Browse Aircrafts Scenario"

Alex enters the 'Aircraft Inventory' section to review the airline's fleet. He views a list of aircraft and selects one to access more detailed information. On the aircraft details page, Alex reviews specifications, maintenance records, and schedules. He can edit aircraft details or decommission an aircraft from the fleet if it's out of service.