Airline Ticketing Requirements Specification

Version 1.0

2025

Use this Requirements Specification template to document the requirements for your product or service, including priority and approval. Tailor the specification to suit your project, organizing the applicable sections in a way that works best, and use the checklist to record the decisions about what is applicable and what isn't.

The format of the requirements depends on what works best for your project.

This document contains instructions and examples which are for the benefit of the person writing the document and should be removed before the document is finalized.

To regenerate the TOC, select all (CTL-A) and press F9.

Table of Contents

[YOURPROJECT] REQUIREMENTS SPECIFICATION 1

VERSION 1.0 1

APRIL 19, 2021 1

1. EXECUTIVE SUMMARY 3

1.1 PROJECT OVERVIEW 3
1.2 PURPOSE AND SCOPE OF THIS SPECIFICATION 3

2. PRODUCT/SERVICE DESCRIPTION 3

2.1 PRODUCT CONTEXT 3
2.2 USER CHARACTERISTICS 3
2.3 ASSUMPTIONS 3
2.4 CONSTRAINTS 3
2.5 DEPENDENCIES 4

3. REQUIREMENTS 4

3.1 FUNCTIONAL REQUIREMENTS 5
3.2 NON-FUNCTIONAL REQUIREMENTS 5
3.2.1 Product Requirements *5*
3.2.1.1 User Interface Requirements 6
3.2.1.2 Usability 6
3.2.1.3 Efficiency 6
3.2.1.3.1 Performance Requirements 6
3.2.1.3.2 Space Requirements 6
3.2.1.4 Dependability 6
3.2.1.5 Security 7
3.2.2 Organizational Requirements *7*
3.2.2.1 Environmental Requirements 7
3.2.2.2 Operational Requirements 7
3.2.2.3 Development Requirements 7
3.2.3 External Requirements *7*
3.2.3.1 Regulatory Requirements 7
3.2.3.2 Ethical Requirements 7
3.2.3.3 Legislative Requirements 7
3.2.3.3.1 Accounting Requirements 7
3.2.3.3.2 Security Requirements 7
3.3 DOMAIN REQUIREMENTS 7

4. USER SCENARIOS/USE CASES 7

1.

Executive Summary

1.1 Project Overview

This project focuses on creating an all-in-one airline ticket booking software aimed at simplifying the flight reservation process for passengers while offering powerful management tools for airline staff. The software will feature a range of functionalities such as ensuring seamless booking, secure payment handling etc.

1.2 Purpose and Scope of this Specification

The purpose of this document is to outline the requirements for an airline ticketing system. This system aims to provide seamless booking, payment, and management of airline tickets for customers while allowing airline administrators to oversee operations efficiently. Additionally, software maintenance technicians will be able to ensure the system runs smoothly by addressing any technical issues.

Scope

- The airline ticketing system will enable users to search for flights, book tickets, and manage their travel plans. Airline administrators will be responsible for managing flight schedules, ticket availability, and customer bookings. The software maintenance technician will handle system maintenance, updates, and troubleshooting.

2. Product/Service Description

This airline ticket booking software is tailored to meet the dynamic demands of the airline industry and its passengers. With the travel sector rapidly embracing digital transformation, there is an increasing need for streamlined, intuitive, and secure booking systems. The software seeks to improve passengers' travel experiences while equipping airline teams and departments with powerful management tools.

2.1 Product Context

The airline ticket booking software can function as an independent, self-contained system with its primary purpose being to facilitate the booking of airline tickets for passengers.

2.2 User Characteristics

Customers: Individuals booking airline tickets online.
Airline Administrators: Administrators managing flights, schedules, and bookings.
Software Maintenance Technicians: IT professionals ensuring system reliability and security.

2.3 Constraints

- Must comply with GDPR and IATA regulations.
- High availability with 99.99% uptime.
- Secure payment processing via PCI DSS-compliant gateways.

3. Requirements

Priority Definitions

The following definitions are intended as a guideline to prioritize requirements.

- Priority 1 – The requirement is a “must have” as outlined by policy/law
- Priority 2 – The requirement is needed for improved processing, and the fulfillment of the requirement will create immediate benefits
- Priority 3 – The requirement is a “nice to have” which may include new functionality

A good requirement is:

- Correct
- Unambiguous (all statements have exactly one interpretation)
- Complete (where TBDs are absolutely necessary, document why the information is unknown, who is responsible for resolution, and the deadline)
- Consistent
- Ranked for importance and/or stability
- Verifiable (avoid soft descriptions like “works well”, “is user friendly”; use concrete terms and specify measurable quantities)

Functional Requirements

ID	Requirement	Comments	Priority
1	Users must be able to register and authenticate via email and password with MFA support.	Includes social media login (Google, Apple ID).	1
2	Users can search for flights based on departure/arrival cities, travel dates, class, and passengers.	Advanced filters include direct vs. layover, airline preferences, and baggage allowance.	1
3	Users can book flights, enter passenger details, and make secure payments.	Payment options include credit/debit cards, PayPal, Apple Pay, and Google Pay.	1
4	Seat selection must be available during booking.	Interactive seating map for seat preference.	2
5	Users should receive booking confirmations and e-tickets via email.	Includes ticket reference number and invoice.	1
6	Online check-in should be available within the airline's check-in window.	Boarding passes generated with QR codes.	2
7	Admins must be able to manage flights, ticket prices, and seat availability.	Includes modifying flight schedules and processing refunds.	1
8	Notifications should be sent via email and SMS for booking confirmation and flight updates.	Users can opt in/out of promotional messages.	2
9	A customer support system with live chat and ticket submission must be integrated.	24/7 chatbot and FAQ section included.	2
10	Loyalty program allowing users to earn and redeem points must be available.	Includes discount codes and membership tiers.	3

Non-Functional Requirements

1. **Performance:**
o System should handle up to 10,000 concurrent users without performance degradation.
o Flight search results should be displayed within 1-2 seconds.
o Response time for booking and payment processing should be within 3 seconds.

2. **Scalability:**
o The system should be scalable to support increased traffic and global expansion.
o Cloud-based hosting with auto-scaling capabilities should be implemented.
o Support for multiple airlines and additional service providers.

3. **Security:**
o All user data should be encrypted using AES-256 encryption.
o Compliance with PCI DSS for payment security and GDPR for data privacy.
o Implementation of role-based access control (RBAC) for different user levels.
o Two-factor authentication (2FA) for user and admin logins.
o Protection against SQL injection, cross-site scripting (XSS), and DDoS attacks.

4. **Usability:**
o The system should have an intuitive and user-friendly interface.
o Accessible on desktop, tablet, and mobile devices with responsive design.
o Multi-language support for international users.
o Dark mode and high-contrast modes for better accessibility.

5. **Reliability and Availability:**
o System uptime should be at least 99.99% with failover mechanisms.
o Automatic daily backups with a 30-day retention period.
o Disaster recovery plan in place with real-time data replication.

6. **Maintainability:**
o Modular architecture for easy updates, bug fixes, and feature enhancements.
o Detailed documentation for developers and administrators.
o Version control system (Git) for tracking changes.
o Automated testing and CI/CD pipeline for rapid deployments.

7. **Compliance:**
o GDPR compliance for handling user data and consent management.
o Adherence to airline industry regulations and IATA standards.
o Compliance with country-specific aviation policies.

Use Case Diagram for Airline Ticketing System

Actors:

1. User (Passenger)
2. Administrator (Airline Staff)

3. System
4. Customer Support Agent

Use Cases:

1. User Registration & Authentication

- Register a new account
- Login/logout
- Reset password

2. Flight Search & Filtering

-Search flights by destination, date, and class
-Apply filters (direct flights, layover duration, baggage policy, etc.)
-Sort flight results (price, duration, departure time)

3. Flight Booking & Payment

-Select a flight and enter passenger details
-Choose seat and additional services (extra baggage, meals, insurance)
-Process payment via payment gateway
-Generate an e-ticket and send confirmation email
-View booking history
-Cancel or modify booking (if applicable)

4. Seat Selection & Additional Services

-Choose seat from seating map
-Add extra services (baggage, meals, lounge access, insurance)

5. Online Check-in & Boarding Pass Generation

-Check-in online before departure
-Generate digital boarding pass
-Add boarding pass to mobile wallet

6. Loyalty Program & Discounts

-Enroll in frequent flyer program
-Earn and redeem points for discounts

7. Admin Panel for Flight Management

-Add/update/delete flights
-Manage pricing and discounts
-View and modify bookings
-Process refunds and cancellations
-Generate sales and performance reports

8. Notifications & Alerts

-Send booking confirmations
-Flight delay or cancellation alerts
-Promotional offers
-Check-in reminders

9. Customer Support System

-Provide live chat support
-Submit and track support tickets
-Access FAQ and help center

10. Security & Compliance

-Encrypt sensitive user data
-Ensure GDPR & PCI DSS compliance
-Implement role-based access control (RBAC)

Use cases:

1. **User/Passenger Registration & Authentification:**

The system shall enable users (Passengers) to initiate the creation of new accounts.

UC Name	**User/Passenger Registration** **UC-101**
Summary	**Enabling passengers to register & create new accounts within the system.**
Dependency	**None**
Actors	**Primary Actor: User (Passenger)** **Secondary Actor: System**
Preconditions	**1.The user attempts to sign up using personal information.** **2.The user's unique account identifiers (email) do not match with another user's in the system.** **3.The user agrees to the terms and conditions of service before proceeding with the sign-up process.** **4. The user provides all required information fields (such as name, email, password) during the sign-up attempt.**
Description of the Main Sequence	**Step 1: The user navigates to the sign-up page on the system.** **Step 2: The user fills in the required personal information such as name, email address, and password.** **Step 3: The system validates the entered information to ensure all required fields are filled correctly.** **Step 4: The system checks if the provided email address is unique and not already associated with an existing account.** **Step 5: If the email address is unique, the system sends a verification email to the provided address.** **Step 6: The user receives the verification email and clicks on the verification link to confirm their email address.** **Step 7: Upon email verification, the system creates a new account for the user.** **Step 8: The user receives a confirmation message indicating successful account creation.** **Step 9: The user can now log in to the system using their email address and password.**

Description of the Alternative Sequence	1. **Aternative sequence 1-*Email already in use:* If the email is already registered, the system notifies the user and prevents registration.** 2. **Aternative sequence 2-*Missing required fields:* If any required field is left blank, the system prompts the user to fill it.** 3. **Aternative sequence 3-*Verification link expired or invalid:* If the link is not used within a certain time, the user must request a new one.**
Non functional Requirements	**Security: The security requirement for the sign-up process ensures the protection of user accounts and sensitive information from unauthorized access and potential breaches.** **Performance: The authentication process is expected to conclude within a specified duration of seconds.** **Scalability: The authentication database system should be capable of handling a large number of accounts.**
Postconditions	• **A new user account is created and stored in the system.** • **The user is authenticated and redirected to the dashboard (or login page).** • **User's email is marked as verified in the system.**

Login-The system shall allow users and passengers to securely authenticate themselves and gain access to their accounts.

UC Name	***User Account Log-In*** ***UC-102***
Summary	**Enabling passengers to securely access their accounts within the system.**
Dependency	**User Registration (UC-101)**
Actors	**Primary Actor: User/Passenger** **Secondary Actor: System**
Preconditions	**1.The user(passenger) has already created an account with the system or has been given one by the Administrator of the Airline.** **2.The user possesses valid credentials: registered email address &password.** **3.The user has agreed to the terms and conditions before attempting log in.** **4.The system is operational and functional in order to allow login.**
Description of the Main Sequence	**Step 1: The user enters their credentials to log in to the system.** **Step 2: The system verifies the provided credentials against the stored user data.** **Step 3: If the credentials match an existing user account, the system grants access to the user.**
Description of the Alternative Sequence	**Alternative Sequence 1: If the credentials do not match or are invalid, the system denies access and prompts the user to try again or reset their password.** **Alternative Sequence 2: If any errors occur during the log-in process, such as invalid information or technical issues, the system provides appropriate error messages and prompts the user to correct the issues and try again.**
Non functional requirements	**Security: The security requirement for the login process ensures the protection of user accounts and sensitive information from unauthorized access and potential breaches.** **Performance: The authentication process is expected to conclude within a specified duration of seconds.** **Scalability: The authentication database system should be capable of handling a large number of accounts.**
Postconditions	**1. If the user's credentials are valid, they gain access to their account.** **2. Upon successful login, the system may redirect the user to their account dashboard.** **3. Invalid credentials result in access denial with error messages.** **4. After multiple failed login attempts (maybe 3 or 4) , the system may lock the account for security.**

System shall allow passengers/users to reset their account password

UC Name	***User Password Reset*** ***UC-103***
Summary	***Enabling passengers to securely reset their accounts within the system.***
Dependency	***User Account Creation (UC-101)***
Actors	**Primary Actor: User** **Secondary Actor: System**
Preconditions	1. **The user has a registered account in the system.** 2. **The user initiates reset process from the login or help screen.** 3. **The user provides a valid, registered email address.** 4. **The system must be able to send emails to the user's address.**
Description of the Main Sequence	Step 1: **The user clicks the "Forgot Password" button.** Step 2: **The system verifies that the user email exists in the user database.** Step 3: **The system sends a password reset email containing a secure, time-limited link.** Step 4: **The user receives the email and clicks the password reset link.** Step 5: **The system prompts the user to enter and confirm a new password.** Step 6: **The system validates the new password (e.g., complexity rules, matching confirmation).** Step 7: **The system updates the user's password in the database.** Step 8: **The user receives confirmation that their password has been successfully reset.** Step 9: **The user can now log in using the new password.**
Description of the Alternative Sequence	**Alternative Sequence**: **Invalid Email:** **Step 1:** The user enters a new password and submits the form. **Step 2:** The system checks the password against the defined policy. **Step 3:** The system detects that the password **does not comply** with the rules. **Step 4:** The system **rejects** the password and displays a descriptive validation message. **Step 5:** The user remains on the same form and is prompted to re-enter a stronger password. **Step 6:** If the new password still does not meet requirements, the system repeats Steps A2–A5. **Step 7:** Once the user enters a password that meets the criteria, the system proceeds to the next step in the **Main Sequence (Step 4).**
Non functional requirements	**Security: The security requirement for the reset process ensures the protection of user accounts and information from unauthorized access and potential breaches.** **Usability: Maintain an intuitive user interface.**

Postconditions	**1. The user has a registered account in the system.** **2. The user initiates the password reset process from the login or help screen.** **3. The user provides a valid, registered email address.** 4. **The system must be able to send emails to the user's address.**

2. Flight Search & Filtering:

The system shall enable users (Passengers) to initiate the creation of new accounts.

UC Name	***Filter Flights*** ***UC-201***
Summary	***The system must enable users to search for different flights efficiently. This feature allows users to specify their travel preferences and find relevant flight options based on criteria such as origin, destination, departure date, price, and class. By providing robust flight search functionality, the system enhances user experience and facilitates seamless flight booking.***
Dependency	***User Registration (UC 101)***
Actors	***Primary Actor: Passengers***
Preconditions	***Before utilizing the flight search functionality, users must be authenticated and logged into their account within the airline software, ensuring that only authorized users can access and utilize the search feature.***
Description of the Main Sequence	**Step 1: User Input** **Users input their flight preferences, such as departure city, destination, travel dates, price, and class, into the search interface.** **Step 2: Query Submission** **Upon inputting preferences, users submit their search query by clicking a search button or similar action.** **Step 3: Search Processing** **The system processes the search query, analyzing the user's input criteria to retrieve relevant flight options from the database.** **Step 4: Flight Retrieval** **Based on the search criteria, the system retrieves available flight options that match the user's preferences, including flight schedules, fares, and availability.** **Step 5: Display Results** **The system displays the retrieved flight options in a clear and organized manner, presenting essential details such as departure times, arrival times, airlines, and ticket prices.**

	Step 6: Refinement Options **Users may have options to refine their search results further, such as filtering by airline, price range, departure time, or number of stops.** **Step 7: Selection** **Users review the displayed flight options and select the one that best fits their preferences and requirements.** **Step 8: View Details** **Upon selecting a flight, users may have the option to view additional details, such as seat availability, aircraft type, in-flight amenities, and fare conditions.** **Step 9: Return to Search** **Users have the option to return to the flight search interface to perform additional searches or explore alternative flight options if needed.**
Description of the Alternative Sequence	**Step 1: User Input** **Users input their flight preferences, such as departure city, destination, travel dates, and class, into the search interface.** **Step 2: Query Submission** **Upon inputting preferences, users submit their search query by clicking a search button or similar action.** **Step 3: Search Processing** **The system processes the search query, analyzing the user's input criteria to retrieve relevant flight options from the database.** **Step 4: Flight Retrieval** **The system checks the database for available flight options that match the user's preferences.** **Step 5: No Matching Flights Found** **If there are no flights that match the user's input criteria, the system informs the user that no matching flights were found.** **Step 6: Error Handling** **The system may provide suggestions to the user, such as adjusting the search criteria, selecting alternative travel dates, or considering nearby airports.** **Step 7: Return to Search** **Users have the option to return to the flight search interface to modify their search criteria and perform a new search.**
Nonfunctional requirements	**Performance: Ensure fast response times.** **Usability: Maintain an intuitive user interface.** **Accessibility: Comply with accessibility standards.** **Reliability: Provide accurate and reliable search results.** **Scalability: Handle increasing user load without performance degradation.** **Security: Protect user data during search queries.**
Postconditions	**After selecting a flight, users are seamlessly guided through the booking process, where they can confirm their flight selection, provide necessary passenger information, and complete the reservation. Upon successful booking, users receive a confirmation of their flight reservation along with relevant booking details.**

3. Flight Booking and Payment:

The system shall allow the user to book a selected flight

UC Name	***Book Flight*** ***UC-301***
Summary	***The system must enable users to book a selected flight seamlessly. This feature allows users to confirm their flight selection, provide passenger details, and complete the reservation process efficiently within the airline software. By providing robust flight booking functionality, the system enhances user experience and facilitates bookings***
Dependency	***User Registration & Login (UC 101&102)*** ***Filter Flights (UC 201)***
Actors	***Primary Actor: Passenger***
Preconditions	***Passenger has searched the flight and selected to see the details for that flig***
Description of the Main Sequence	**Step 1:** ***Flight Selection*** ***After searching for and selecting a desired flight, users proceed to book the chosen flight.*** **Step 2:** ***Flight Details Review*** ***Users review the details of the selected flight, including departure and arrival times, fares, and other relevant information.*** **Step 3:** ***Passenger Information*** ***Users provide necessary passenger details such as names, contact information, and any special requirements.*** **Step 4:** ***Seat Selection (if applicable)*** ***If seat selection is available, users may choose their preferred seats or seating options for the flight.*** **Step 5:** ***Additional Services (if applicable)*** ***Users may have the option to select additional services such as baggage allowance, meal preferences, or seat upgrades.*** **Step 6: Booking** ***Users finalize the flight booking***
Description of the Alternative Sequence	**Flight Unavailability** **Step 1: If the selected flight becomes unavailable due to real-time updates, the system notifies the user.** **Step 2: User is taken back to the Flight Filtering tab where he/she searches for similar alternative flights.**

Nonfunctional requirements	**Performance:** ***Ensure fast response times during the booking process.*** **Usability:** ***Maintain an intuitive and user-friendly interface for seamless booking.*** **Accessibility:** ***Comply with accessibility standards to accommodate users with disabilities.*** **Reliability:** ***Provide reliable booking functionality with minimal downtime.*** **Scalability:** ***Handle concurrent booking requests from multiple users without performance degradation.*** **Error Handling:** ***Effectively handle errors and edge cases during booking to ensure a smooth user experience.*** **Availability:** ***Ensure the booking system is available 24/7 to accommodate users.***
Postconditions	**After successfully completing the booking process, users receive a summary of their booking and proceed to the payment step**

The system shall allow the user to pay for a booked flight

UC Name	***Flight Payment Processing*** ***UC-302***
Summary	***The system must enable users to book a selected flight seamlessly. This feature allows users to confirm their flight selection, provide passenger details, and complete the reservation process efficiently within the airline software. By providing robust flight booking functionality, the system enhances user experience and facilitates hassle-free flight reservations.***
Dependency	***Secure Payment Transactions***
Actors	***Primary Actor: Passenger***
Preconditions	***Passenger has booked the particular flight.*** ***(Optionally- has reedemeed loyalty points)***
Description of the Main Sequence	**Step 1: User selects the preferred payment method (credit/debit card).** **Step 2: User enters payment details (e.g., card number, expiry date, CVV, billing address).** **Step 3: System validates the payment details and checks for sufficient funds.** **Step 4: System processes the payment through the payment gateway.** **Step 5: If payment is successful, the system generates a booking confirmation and sends a receipt via email/SMS.** **Step 6: User is redirected to the confirmation page with booking details and generated ticket from those details.**

Description of the Alternative Sequence	**Alternative Sequence: Payment Failure Due to Insufficient Funds** **Step 1: User selects the preferred payment method and enters payment details.** **Step 2: System attempts to process the payment but detects insufficient funds in the user's account.** **Step 3: System displays an error message informing the user of the failed transaction**. **Step 4: User is prompted to either:** • **Try another payment method** • **Pay later** **Step 5: If the user selects a different payment method and successfully completes the payment, they return to the** main sequence **at Step 5 (confirmation).** **Step 6**: **If the user does not complete the payment, the system cancels the booking attempt after a specified time (e.g., 15 minutes).**
Nonfunctional requirements	**Performance: Ensure fast response times during the payment process.** **Usability: Maintain an intuitive and user-friendly interface.** **Accessibility: Comply with accessibility standards to accommodate users with disabilities.** **Reliability: Provide reliable payment functionality.** **Scalability: Handle concurrent requests from multiple users without performance degradation.** **Security: Safeguard user payment and personal information.** **Error Handling: Effectively handle errors and edge cases.** **Availability: Ensure the booking system is available 24/7 to accommodate users from different time zones.**
Postconditions	**After successfully completing the booking process, users receive a confirmation of their flight reservation along with relevant booking details. The system generates electronic tickets or booking references, which users can use for check-in and boarding. Optionally, users may receive an email confirmation of their booking for their records.**

4. Loyalty Program:

User enrolls in loyalty program

UC Name	**Loyalty Program (UC 401)**
Summary	**Allows users to enroll in a frequent flyer program and earn points for redemption.**
Dependency	***User Registration & Login (UC 101&102)*** ****Optionally (Loyalty Program UC 401)***
Actors	**Primary actor:** User/Passenger **Secondary actors:** System
Preconditions	**1. The user must have a valid account.** **2. The user must agree to the program's terms.**
Description of the Main Sequence	**Step 1. User accesses the frequent flyer program enrollment page.** **Step 2. User provides necessary information and submits.** **Step 3. System validates the information and enrolls the user.** **Step 4. Points are earned for eligible purchases or flights.** **Step 5. User redeems points for discounts or benefits.**
Description of the Alternative Sequence	**Step 1. If the user fails to provide valid information, the system denies enrollment and displays an error message** **Step 2. User retries with correct information.**
Non-functional Requirements	**Performance: Ensure fast response of the program** **Usability: Maintain an intuitive and user-friendly interface.** **Accessibility: Comply with accessibility standards to accommodate users with disabilities.** **Reliability: Provide reliable payment functionality.** **Scalability: Handle concurrent requests from multiple users without performance degradation.** **Security: Safeguard user personal information.** **Availability: Ensure the booking system is available 24/7 to accommodate users from different time zones.**
Postconditions	**The user is enrolled in the frequent flyer program and can earn/redeem points successfully.**

5. Airline Admin Panel:

Adds new flights.

UC Name	**Add Flights (UC 501)**
Summary	**This use case allows administrators to add new flight details, including route, schedule, and capacity.**
Dependency	
Actors	**Primary actor: Administrator** **Secondary actors: System (flight database platform)**
Preconditions	**Necessary permissions must be assigned to admin.**
Description of the Main Sequence	**Step 1: Administrator accesses the flight management interface by logging in using their credentials.** **Step 2: Administrator navigates to the "Add Flight" section and enters new flight details such as flight number, route, schedule, capacity, and pricing.** **Step 3: System validates the entered flight details, checking for missing fields or invalid formats, and ensures the flight number is unique.** **Step 4: System saves the new flight details in the database once validation is successful.** **Step 5: Administrator receives a confirmation message, and the new flight is made available on user-facing platforms for booking.**
Description of the Alternative Sequence	**Step 1:** Administrator provides incorrect or incomplete flight details, prompting the system to display an error message. **Step 2:** Administrator corrects the information and resubmits the details. **Step 3:** If the system fails during the saving process (e.g., due to a network issue), the system notifies the administrator to retry or seek support.
Non-functional Requirements	**Performance-System must handle flight additions within 5 seconds.** **Usability & Accesability-Interface must be intuitive and accesible.** **Security-Data must be stored securely to prevent unauthorized access.**
Postconditions	**New flight is added and made available for users to view and book.**

Admin authorizes Flight Cancelation (Extreme cases only)(Optional)

UC Name	**Cancel Flights (UC 502)**
Summary	**This use case allows administrators to cancel flights affected by natural disasters and notify passengers.**
Dependency	**(UC 501)**
Actors	**Primary actor:** Administrator **Secondary actors:** System
Preconditions	1. Natural disaster impacts flight safety or viability. 2. Administrator has proper access rights.
Description of the Main Sequence	**Step 1:** Administrator navigates to the "Cancel Flight" section and searches for affected flight. **Step 2:** Administrator selects the flight(s) to cancel and specifies the reason (e.g., natural disaster). **Step 3:** System prompts for confirmation with flight details and cancellation reason. **Step 4:** Upon confirmation, the system cancels the flight(s) and updates user-facing platforms **Step 5 :** System notifies affected passengers about the cancellation and provides refund or rebooking options. **Step 6:** System logs the cancellation for auditing and compliance purposes.
Description of the Alternative Sequence	**Step 1:** Administrator cannot find the flight in the database, prompting the system to display an error or suggest similar matches. **Step 2:** Admin chooses the correct flight and process continues as in the main sequence
Non-functional Requirements	**Performance-System must handle flight deletions quickly (within 5 seconds).** **Usability & Accesability-Interface must be intuitive and accesible.** **Security-Data must be stored and then deleted to securely to prevent unauthorized access.**
Postconditions	**Flight is successfully canceled, passengers are notified, and the system reflects updated flight schedules.**

Airline Admin modifies existing bookings

UC Name	**Modify Flight and Issue Compensation (UC 503)**
Summary	**This use case allows administrators to modify existing flight details and compensate affected clients with active bookings.**
Dependency	**(UC** 101,102, 201, 301**, 501)**
Actors	**Primary actor:** Administrator **Secondary actors:** System
Preconditions	**The flight must already exist in the system.** **The administrator must have modification rights.**
Description of the Main Sequence	**Step 1:** Administrator accesses the flight management interface. **Step 2:** Administrator selects the flight to modify by searching the flight database. **Step 3:**Administrator edits the required flight details (e.g., schedule, route, or aircraft type). **Step 4:**System validates the changes and checks for conflicts **Step 5:** System applies the modifications and updates related systems **Step 6:** System identifies all affected clients, if any, with active bookings and allocates the compensation fee based on the policy. **Step 7:** System notifies affected clients about the modification and compensation via email or SMS. **Step 8:** System processes the compensation fee and credits it to the affected clients.
Description of the Alternative Sequence	**Step 1:** If the flight cannot be located in the database, the system displays an error message or suggests similar flights. **Step 2:** Administrator abandons the process or searches for another flight. **Step 3:** If compensation processing fails (e.g., payment gateway issue), the system logs the failure and notifies the administrator for follow-up.
Non-functional Requirements	**Performance-System must handle flight deletions quickly (within 5 seconds).** **Usability & Accesability-Interface must be intuitive and accesible.** **Security-Data must be stored and then deleted to securely to prevent unauthorized access.**
Postconditions	**Flight details are successfully updated, affected clients are compensated, and the system reflects the modifications.**

The system shall grant admins access to comprehensive analytics, aiding informed decision-making.

UC Name	*Analytics Access (UC 504)*
Summary	**This use case allows administrators to access detailed analytics within the system, facilitating informed decision-making processes.**
Dependency	
Actors	***Primary Actor:*** Airline Administrator ***Secondary Actor:*** System
Preconditions	• **The system must be operational and accessible.** • **The administrator must be authenticated and logged into the system.** • **Detailed analytics must be generated and available within the system.** • **The admin must have the necessary permissions to access analytics.**
Description of the Main Sequence	***Step 1:*** The admin navigates to the analytics section within the system. ***Step 2:*** The system presents a list of available analytics options. ***Step 3:*** The admin selects the desired analytics to view. ***Step 4:*** The system generates and displays the selected analytics data. ***Step 5:*** The admin analyzes it to gain insights and make informed decisions. ***Step 6:*** The use case concludes, returning the admin to the main interface or allowing them to continue accessing additional analytics as needed.
Description of the Alternative Sequence	***Step 1:*** In case of system errors or unavailability, the admin receives a notification and is prompted to retry accessing analytics later. ***Step 2:*** If the selected analytics data is not available or cannot be generated, the system displays an error message and prompts the admin to choose another option. ***Step 3:*** Should there be discrepancies or inconsistencies in the analytics data, the system provides additional explanations or guidance. ***Step 4:*** The use case concludes, either returning the administrator to the main interface or allowing them to continue accessing and analytics.
Non functional requirements	***Performance:*** Ensure prompt response and scalability of the performance management system. ***Security:*** Restrict access to authorized personnel, encrypt data, and maintain audit trails for accountability. ***Reliability:*** Maintain high availability and perform regular backups for data recovery. ***Usability:*** Provide an intuitive interface and allow customization options to enhance user experience. ***Compliance:*** Adhere to data privacy regulations and retention policies to ensure legal compliance.
Postconditions	**The admin has successfully accessed and utilized the desired analytics, enabling them to make informed decisions based on the presented information.**

The system shall produce monthly statistical reports covering the entire flight booking process, incorporating insights from client reviews and flight frequency data.

UC Name	***Generate Monthly Statistical Reports (UC 505)***
Summary	**This use case entails the system's ability to produce monthly statistical reports regarding the maintenance of the flight booking process. These reports encompass the entire booking process, from initiation to completion, and provide valuable insights derived from client reviews and flight frequency data.**
Dependency	
Actors	***Primary Actor:*** Airline Admin ***Secondary Actor:*** System
Preconditions	• **The system is operational and accessible.** • **The administrator must be authenticated and logged into the system.** • **Sufficient data related to the flight booking process, including client reviews and flight frequency data, is available for analysis.** • **The Administrator has access to the statistical reports and intends to utilize the data, including flight frequency information, for analysis and decision-making purposes** • **There are no ongoing system maintenance activities or technical issues that hinder report generation.** • **The designated time period for generating monthly statistical reports has commenced (e.g., beginning of a new month).**
Description of the Main Sequence	***Step 1:*** The Admin accesses the system and selects the option to generate a monthly statistical report. ***Step 2:*** The system collects data on the flight booking process, including client reviews and flight frequency. ***Step 3:*** Using the collected data, the system generates a comprehensive report. ***Step 4:*** The Admin reviews and finalizes the report. ***Step 5:*** The system compiles and presents the report in a suitable format.
Description of the Alternative Sequence	***Step 1:*** The Admin selects the option to generate a monthly statistical report. ***Step 2:*** The system encounters an error while collecting data on the flight booking process. ***Step 3:*** The system prompts the Admin with an error message indicating the issue. ***Step 4:*** The Admin attempts to troubleshoot the error by reinitiating the data collection process. ***Step 5:*** The system successfully collects the necessary data and proceeds with generating the report. ***Step 6:*** The Admin reviews and finalizes the report as usual. **Step 7:** The system compiles and presents the report in a suitable format.
Non functional requirements	***Performance:*** Fast response time, scalable for growth. ***Reliability:*** High uptime, quick recovery from failures. ***Security:*** Secure authentication, encrypted data. ***Maintainability:*** Modular design, comprehensive documentation.
Postconditions	The monthly statistical report for the flight booking process has been generated and is available for review by the Admin.

The system shall allow administrators to access financial reports.

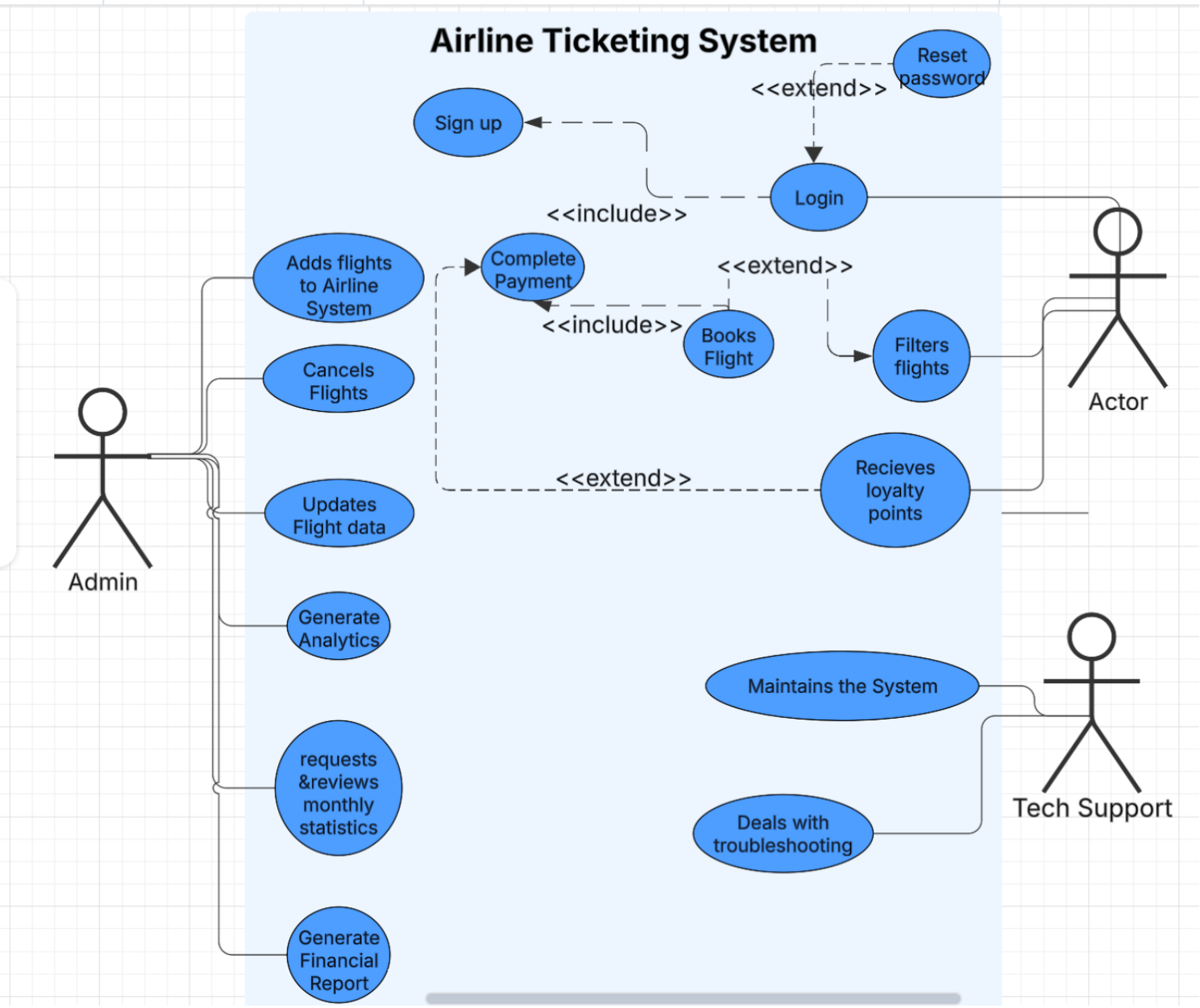
UC Name	***Financial Reports (UC 506)***
Summary	This use case involves administrators accessing financial reports
Dependency	
Actors	***Primary Actor:*** Administrator ***Secondary Actor:*** System
Preconditions	• The system must be operational and accessible. • The administrator must be authenticated and logged into the system.
Description of the Main Sequence	***Step 1:*** Administrators are directed to the financial reports interface. ***Step 2:*** They request the needed financial data ***Step 3:*** The system retrieves the requested financial data and generates the report. ***Step 4:*** The system presents the report in a table/chart format. ***Step 5:*** Administrators analyze the presented data to gain insights in financial health.
Description of the Alternative Sequence	***Step 1:*** If the system encounters an error and is unable to retrieve the required data, it displays an error message and administrators notify of the issue.
Non functional requirements	***Security:*** Access to financial reports should be restricted to authorized shareholders to maintain data confidentiality. ***Usability:*** The system interface for accessing financial reports should be intuitive and easy to navigate for shareholders.
Postconditions	Administrators have successfully accessed financial reports

6. Tech Support :

Tech Support Ensuring Software Functionality

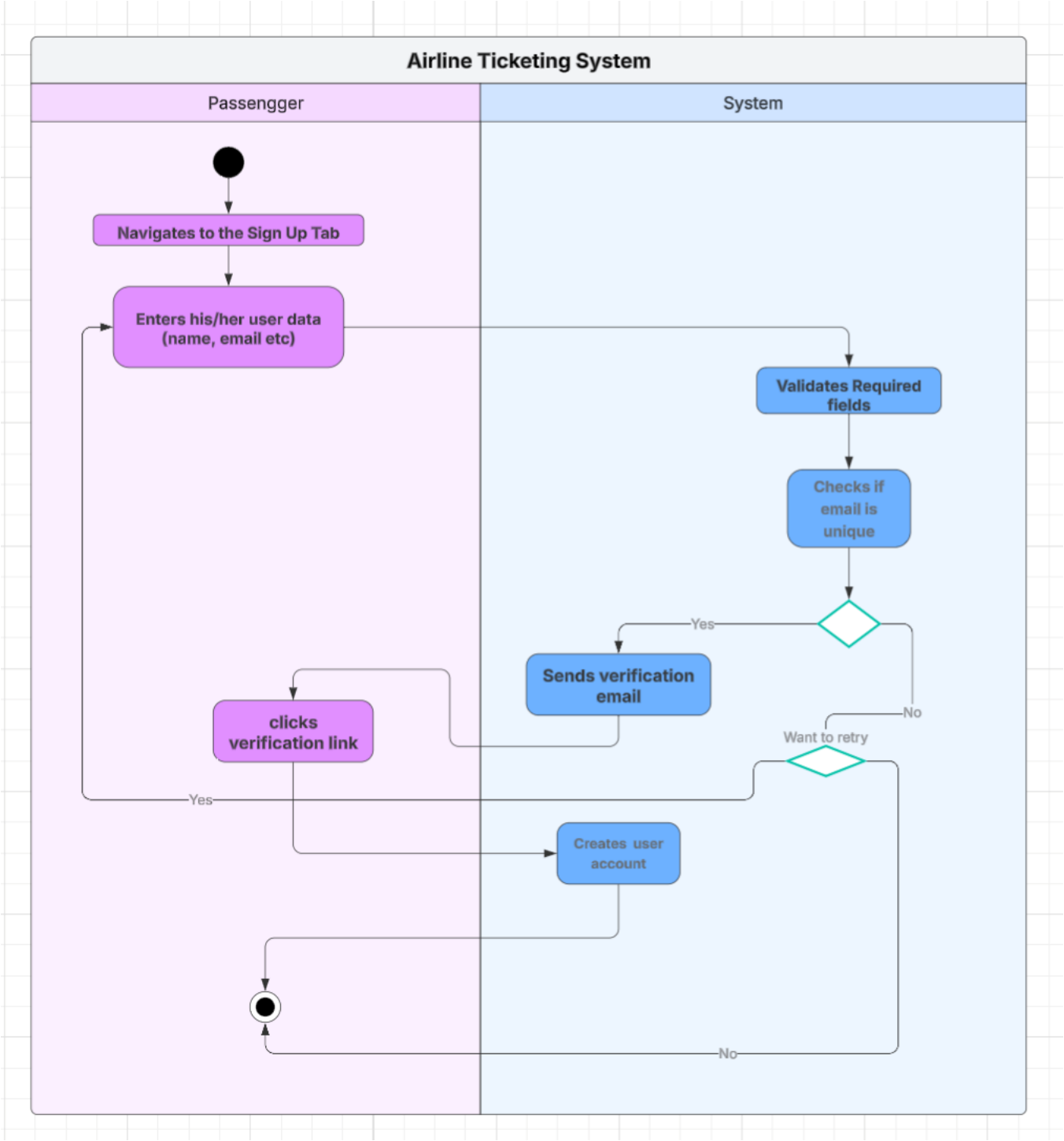
UC Name	**Software Functionality (UC 601)**
Summary	**This use case enables the tech support team to identify, troubleshoot, and resolve software issues to ensure smooth operation.**
Dependency	
Actors	**Primary actor:** Tech Support **Secondary actors:** System
Preconditions	1. Software must be deployed and operational. 2. Tech support team must have appropriate access credentials and tools.
Description of the Main Sequence	**Step 1:** Tech support receives an issue report or identifies a potential problem through monitoring tools. **Step 2:** Tech support analyzes the issue using diagnostic tools and software logs. **Step 3:** Root cause is identified, and a solution is developed (e.g., patch, configuration update, or user guidance). **Step 4:** Solution is applied to the software, and the system is tested to ensure the issue is resolved. **Step 5:** End users or administrators are notified of the resolution and provided with any necessary follow-up instructions.
Description of the Alternative Sequence	**Step 1:** If the issue cannot be resolved immediately, tech support escalates it to the development or engineering team. **Step 2:** Temporary workarounds are provided to minimize user impact while the issue is being addressed. **Step 3:** If the diagnostic tools fail or provide inconclusive results, the team employs manual investigation methods or consults with external experts.
Non-functional Requirements	Issues must be identified and acknowledged within 5 minutes of detection or reporting. Resolutions must be implemented with minimal downtime for end users. All actions must be logged for auditing and future reference.

USE CASE DIAGRAM

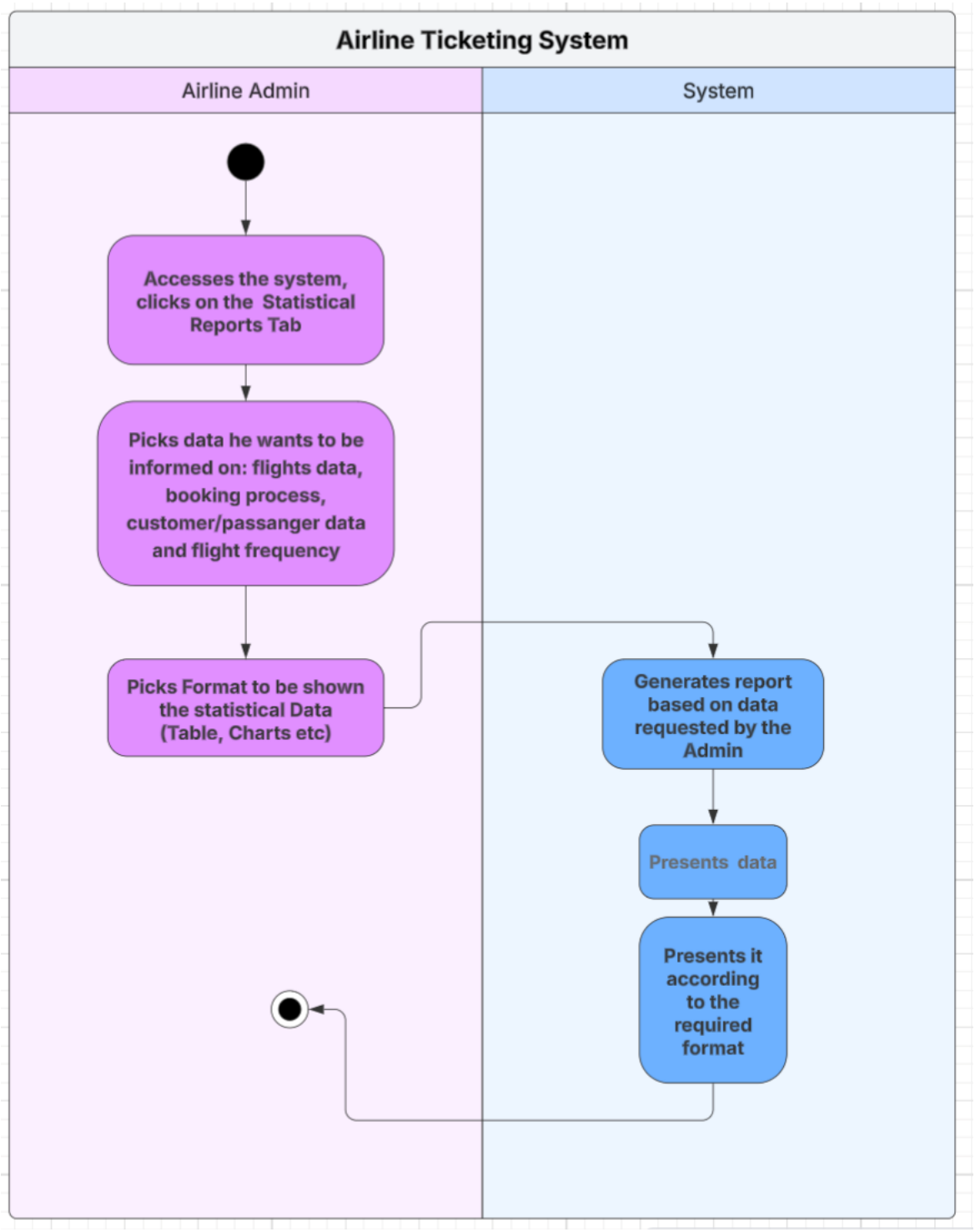


Activity Diagrams

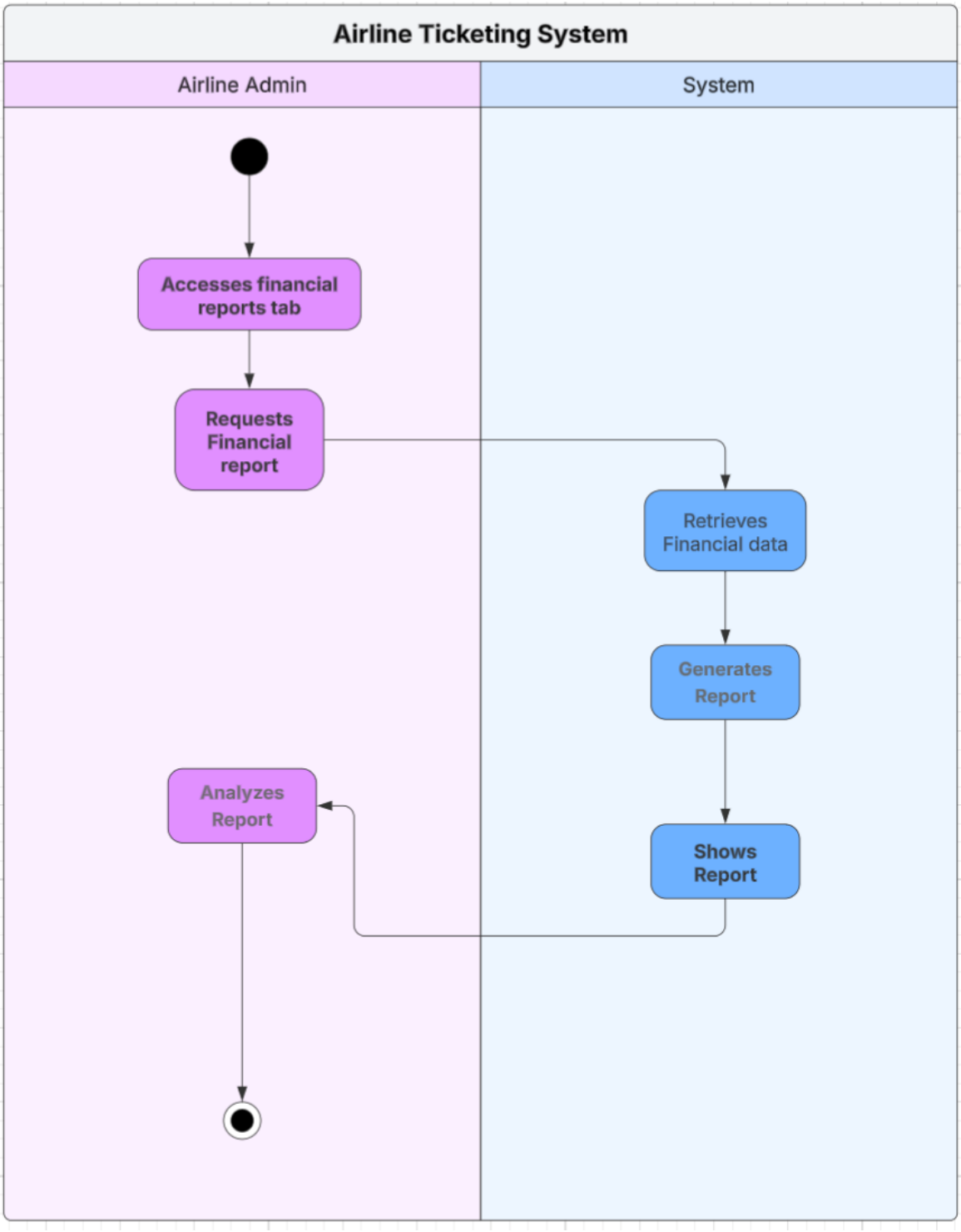
User Registration



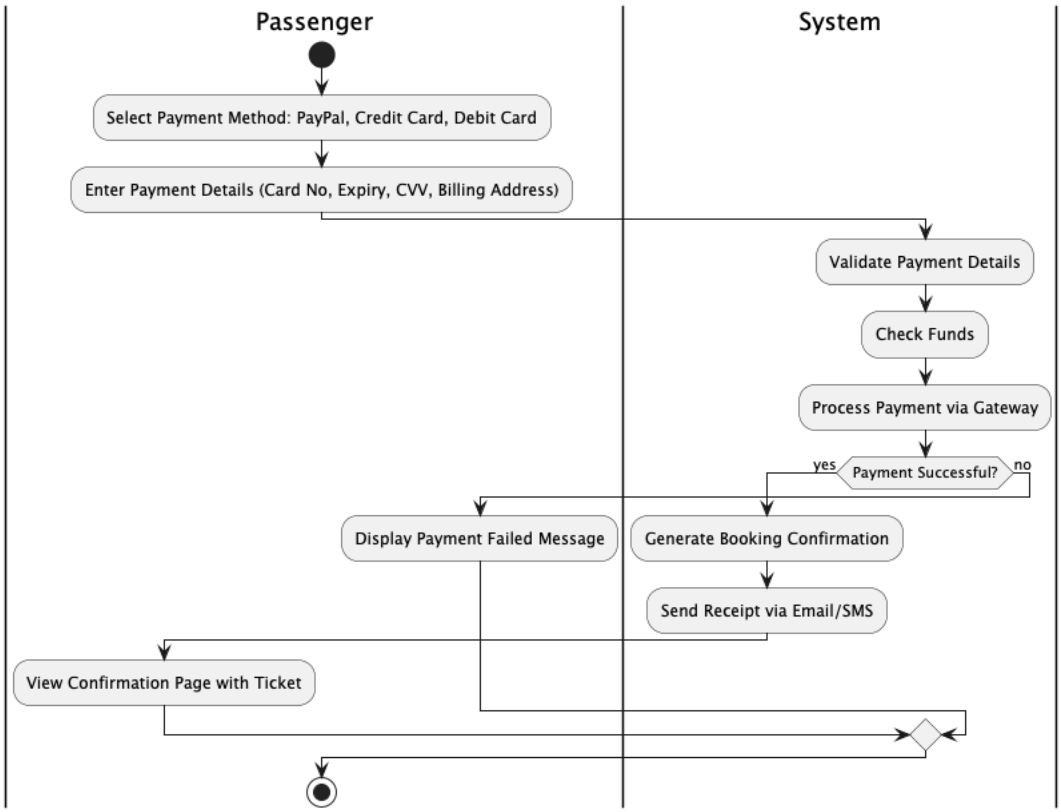
Monthly Statistical Report generation



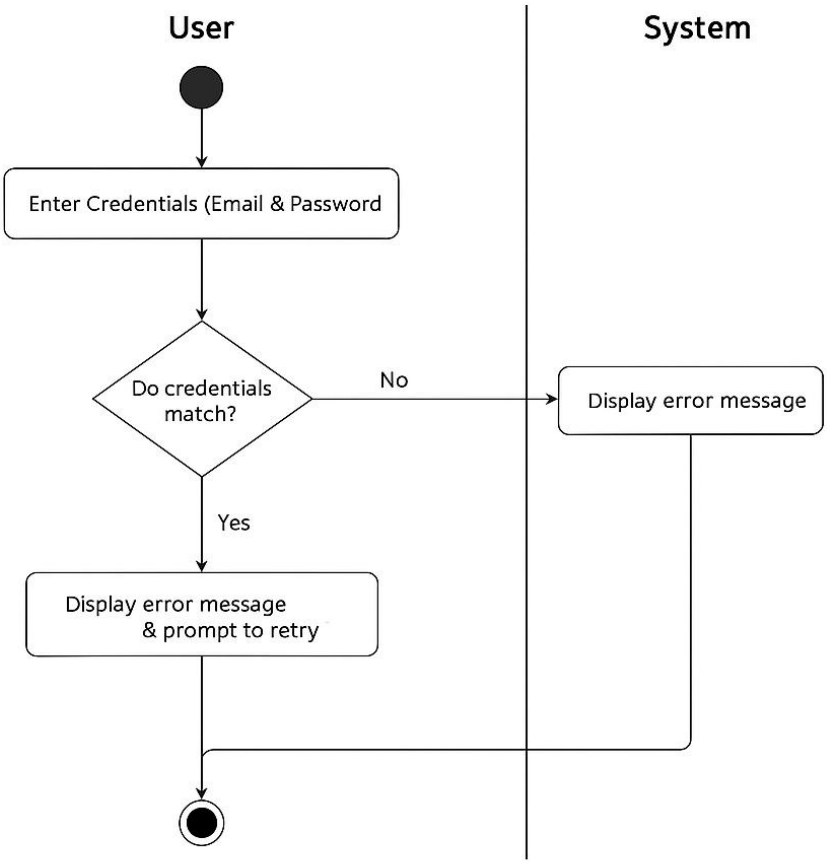
Financial Report



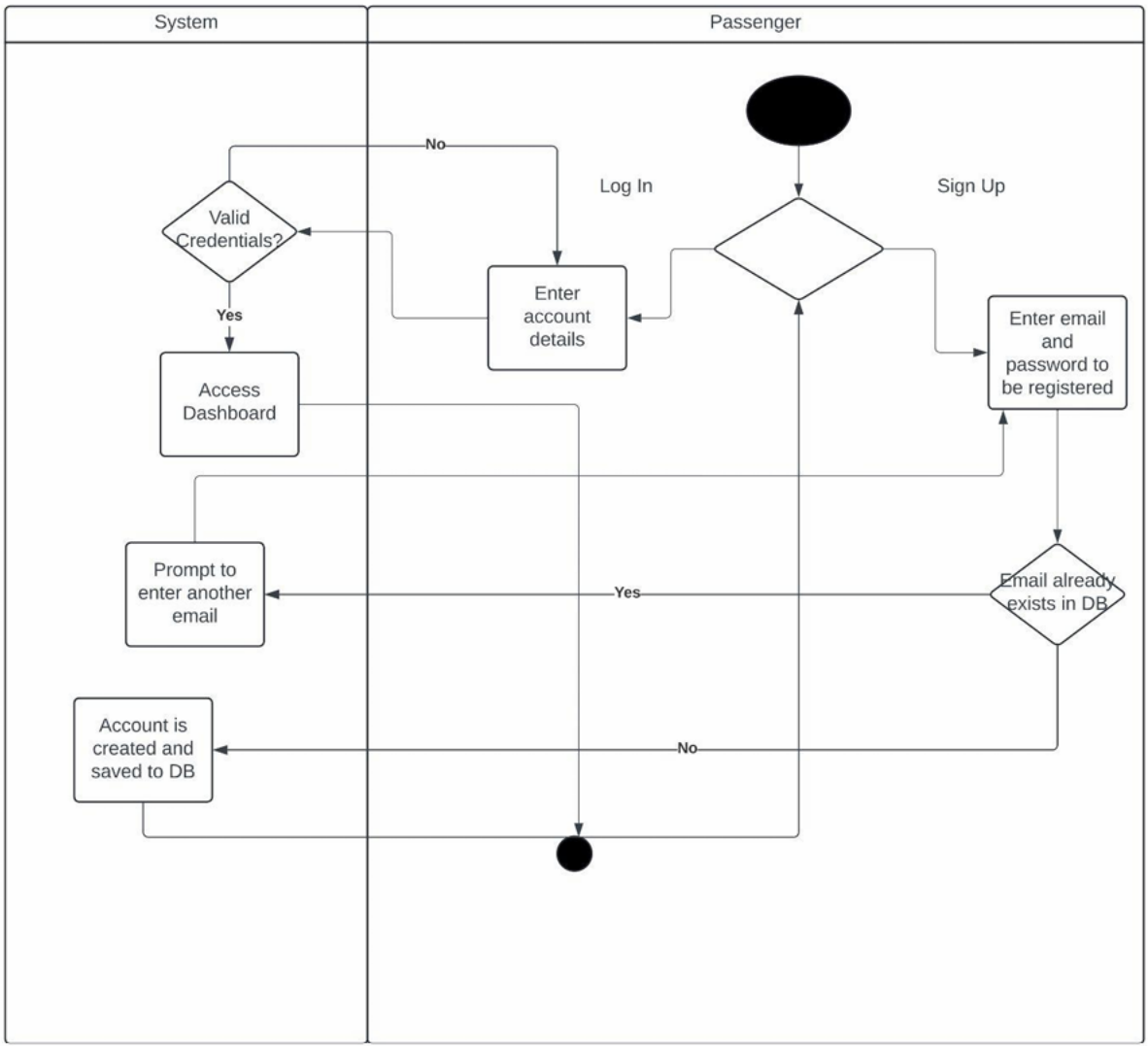
Passenger/Client Payment Processing



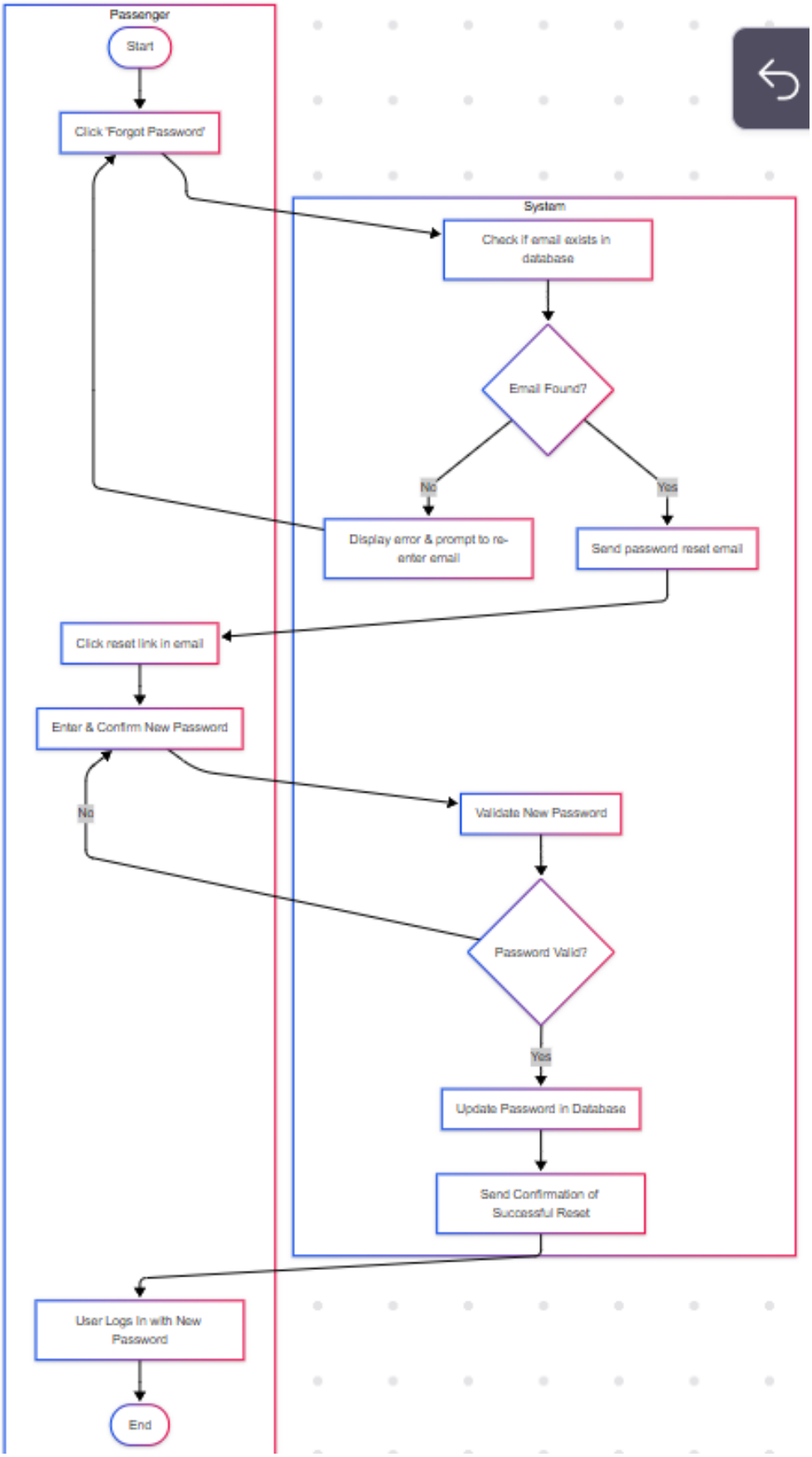
User Account Log-In



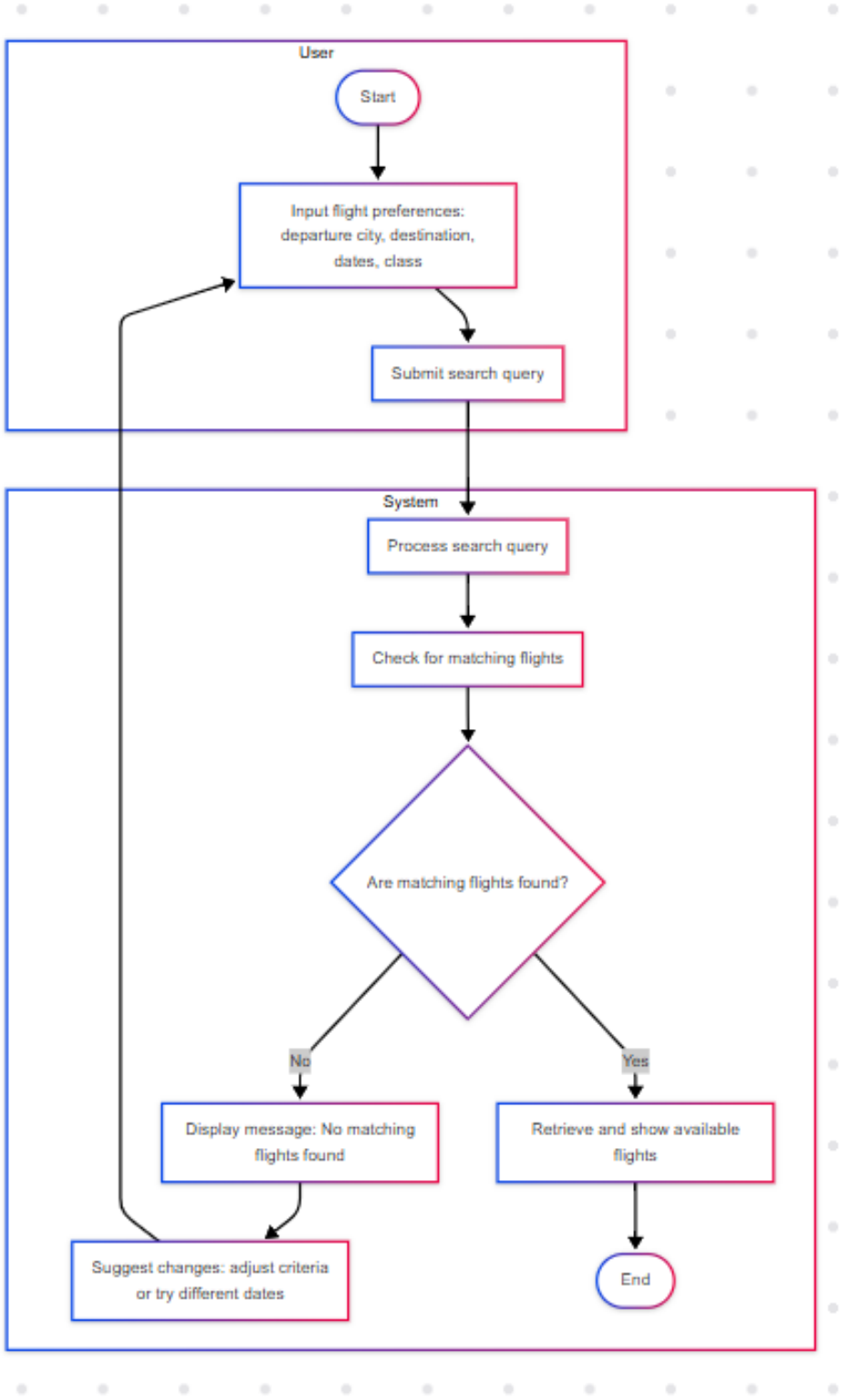
Log in/Sign up

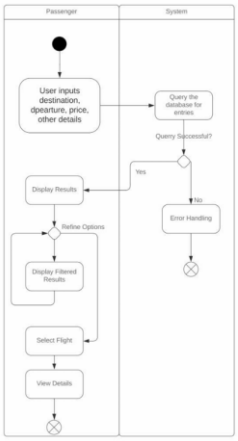


User Password Reset

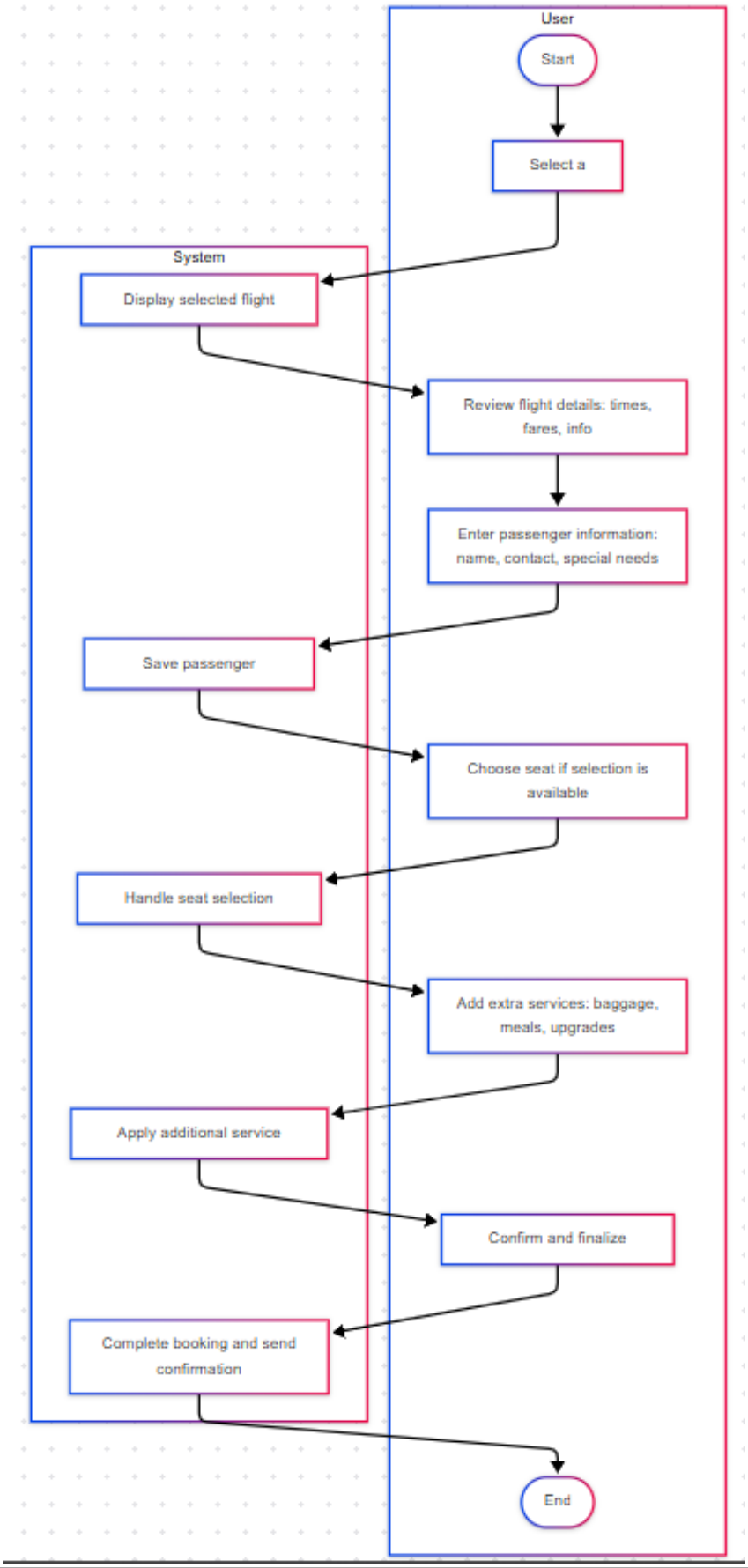


Filter Flights

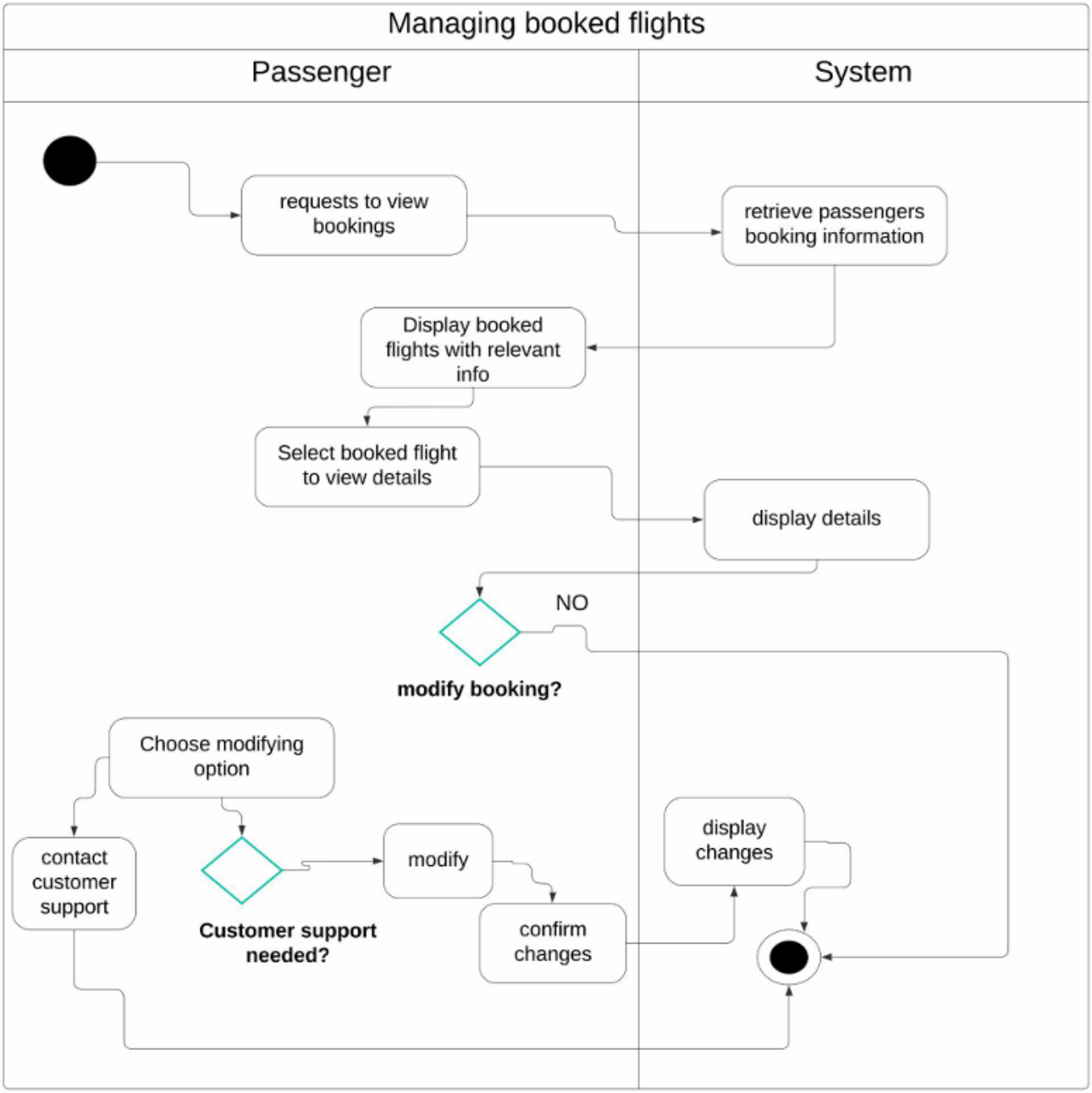


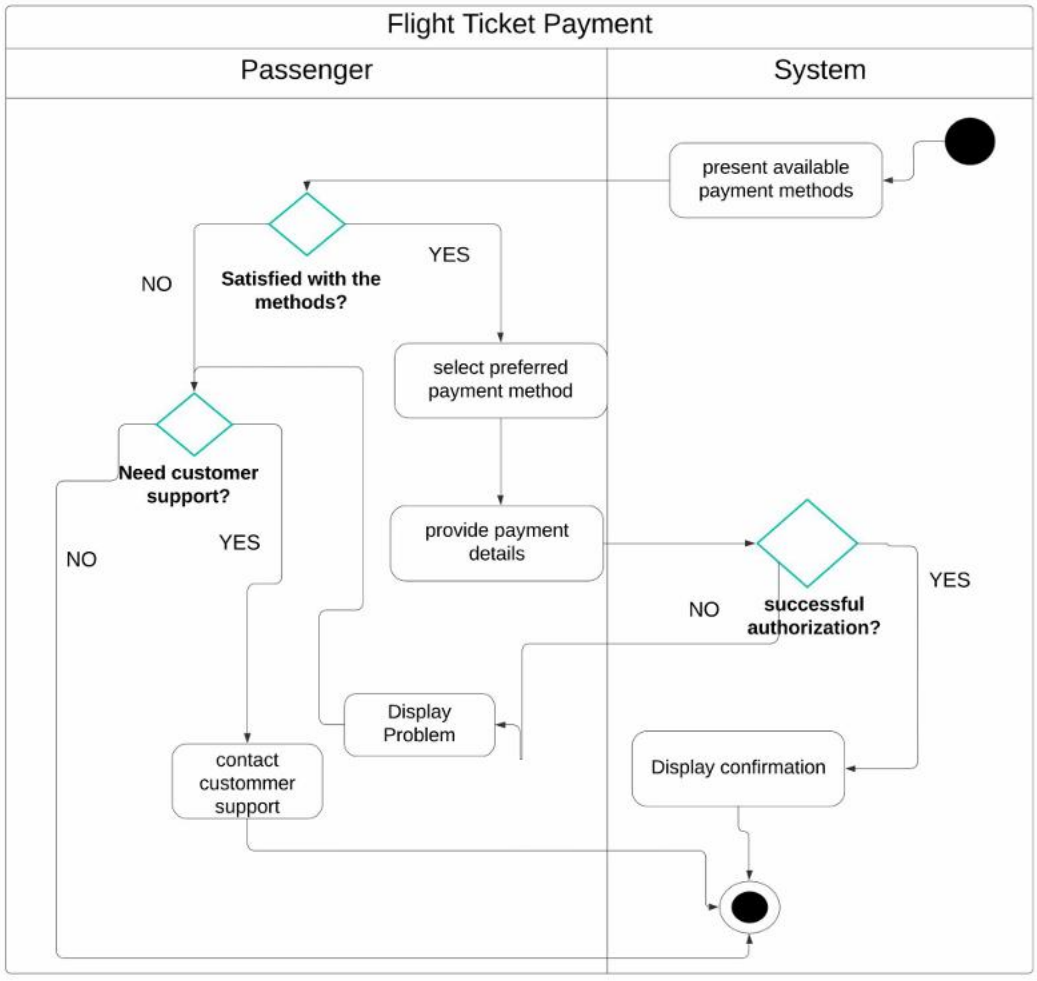

Passenger
System
User inputs destination, dpearture, price, other details
Query the database for entries
Query Successful?
Yes
No
Display Results
Error Handling
Refine Options
Display Filtered Results
Select Flight
View Details

Book flight

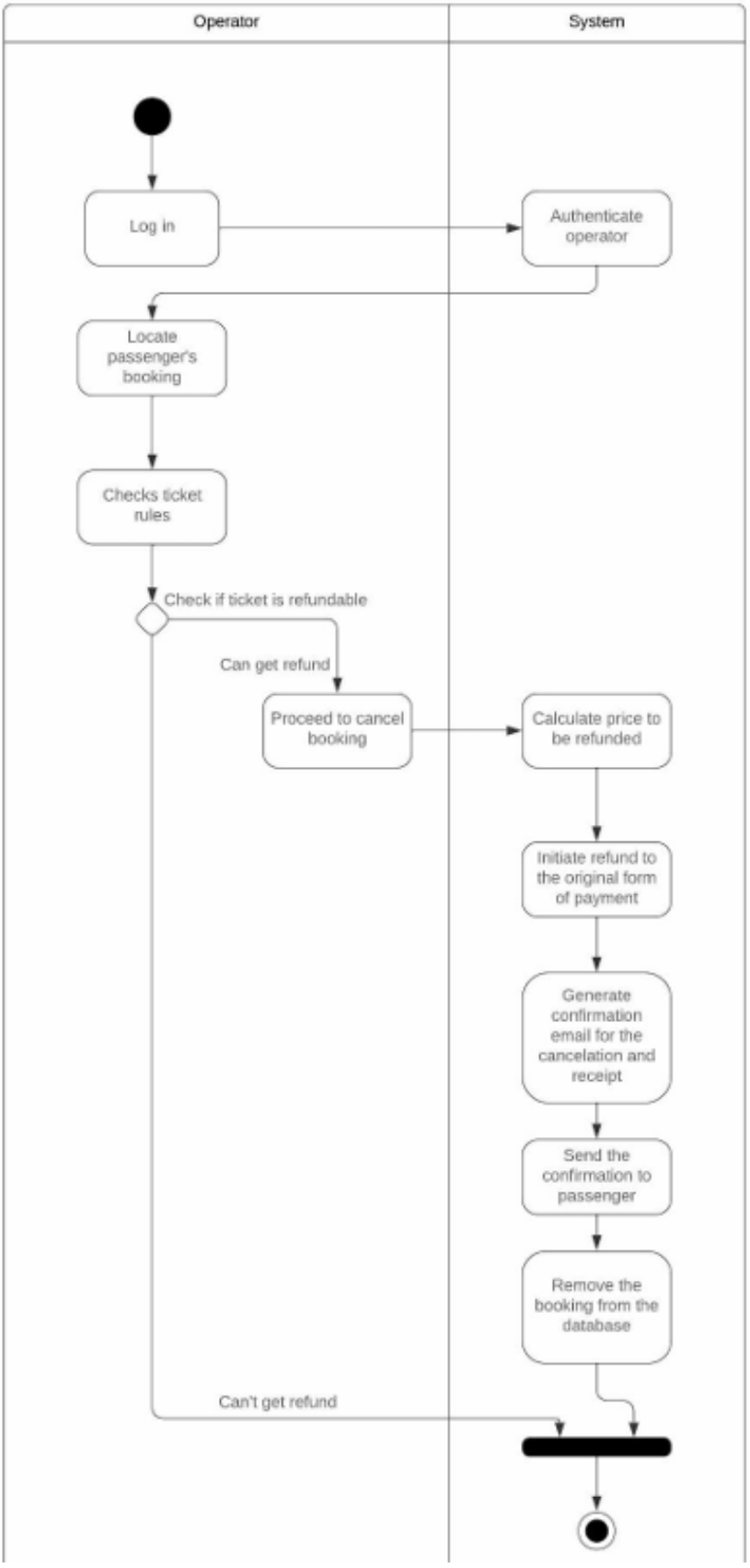

User
Start
Select a
System
Display selected flight
Review flight details: times, fares, info
Enter passenger information: name, contact, special needs
Save passenger
Choose seat if selection is available
Handle seat selection
Add extra services: baggage, meals, upgrades
Apply additional service
Confirm and finalize
Complete booking and send confirmation
End

Managing Booked flights

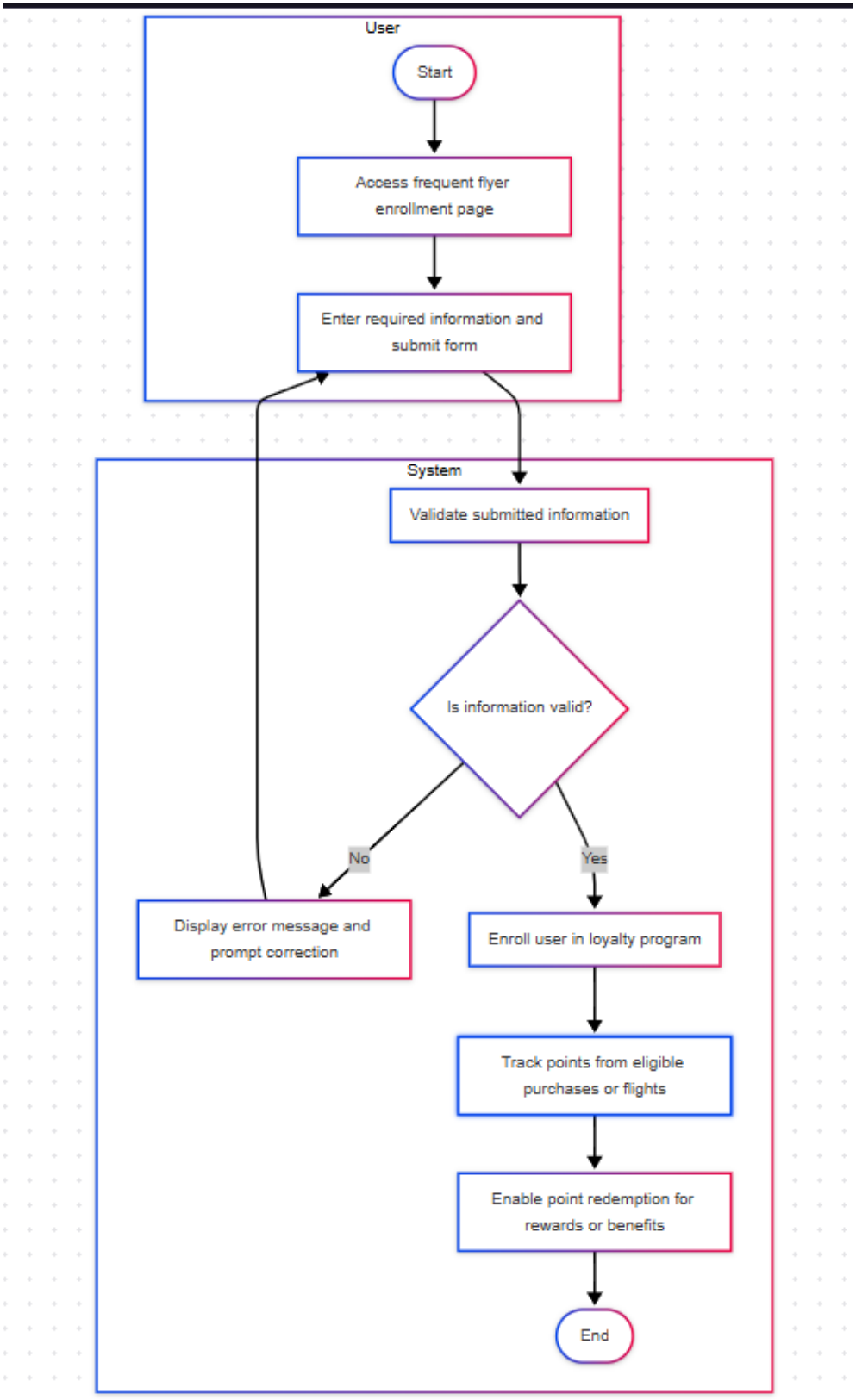



Flight Ticket Payment
Passenger
System
present available payment methods
Satisfied with the methods?
YES
NO
select preferred payment method
Need customer support?
YES
NO
provide payment details
successful authorization?
NO
YES
Display Problem
contact custommer support
Display confirmation

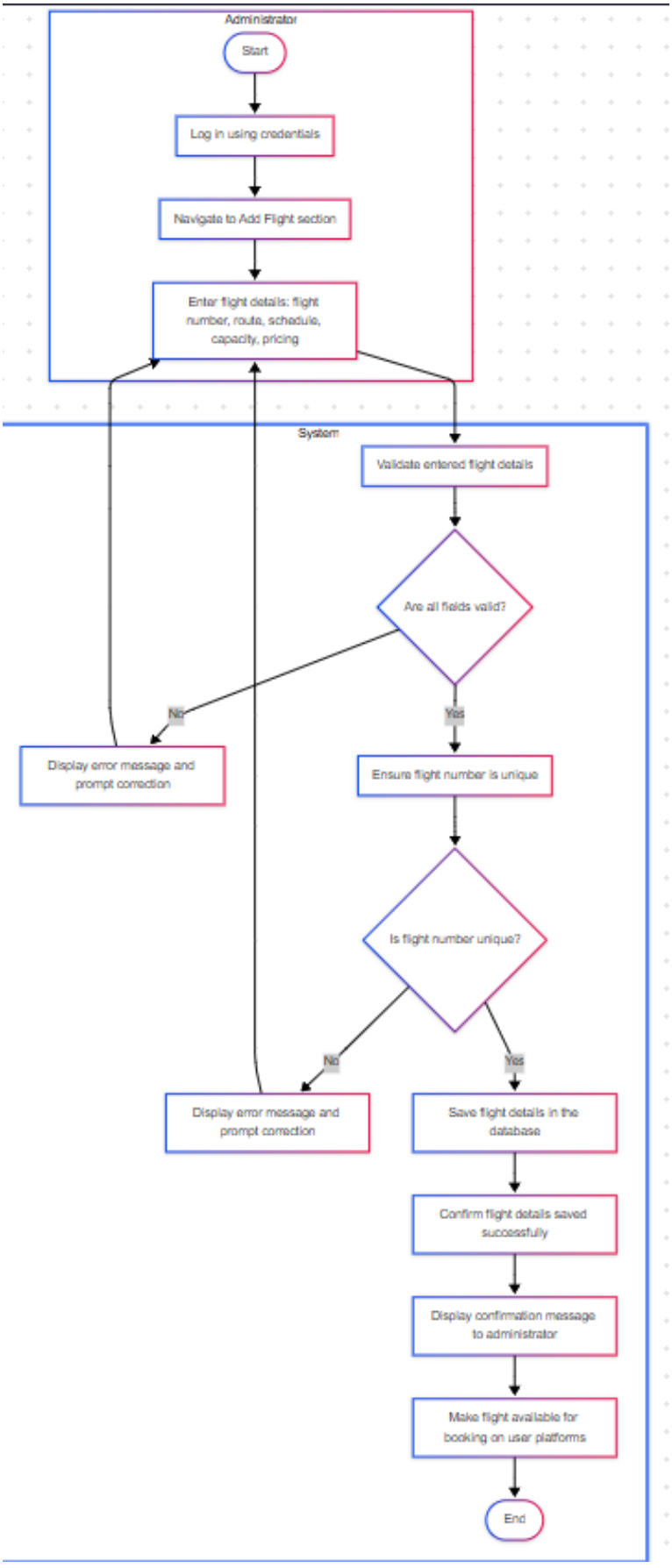
Cancel Booking



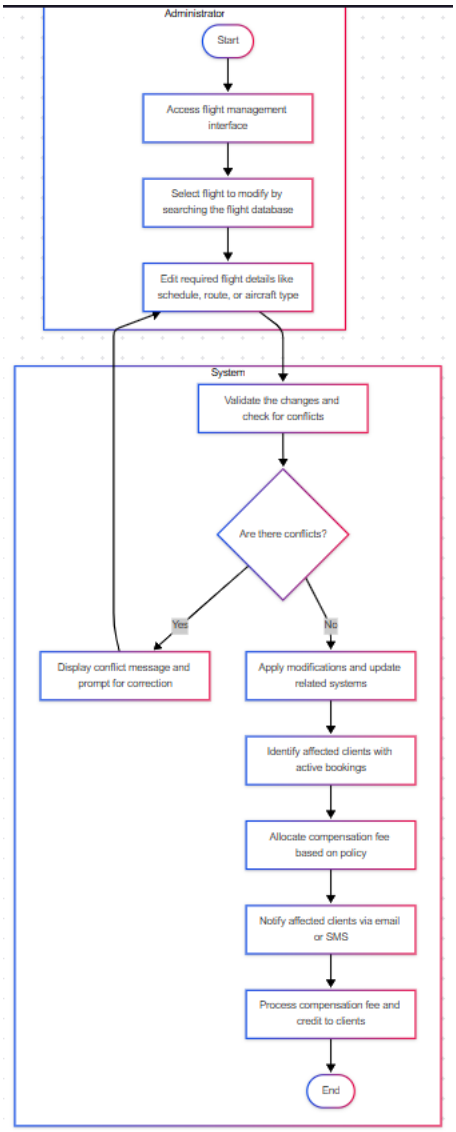
Loyalty Program



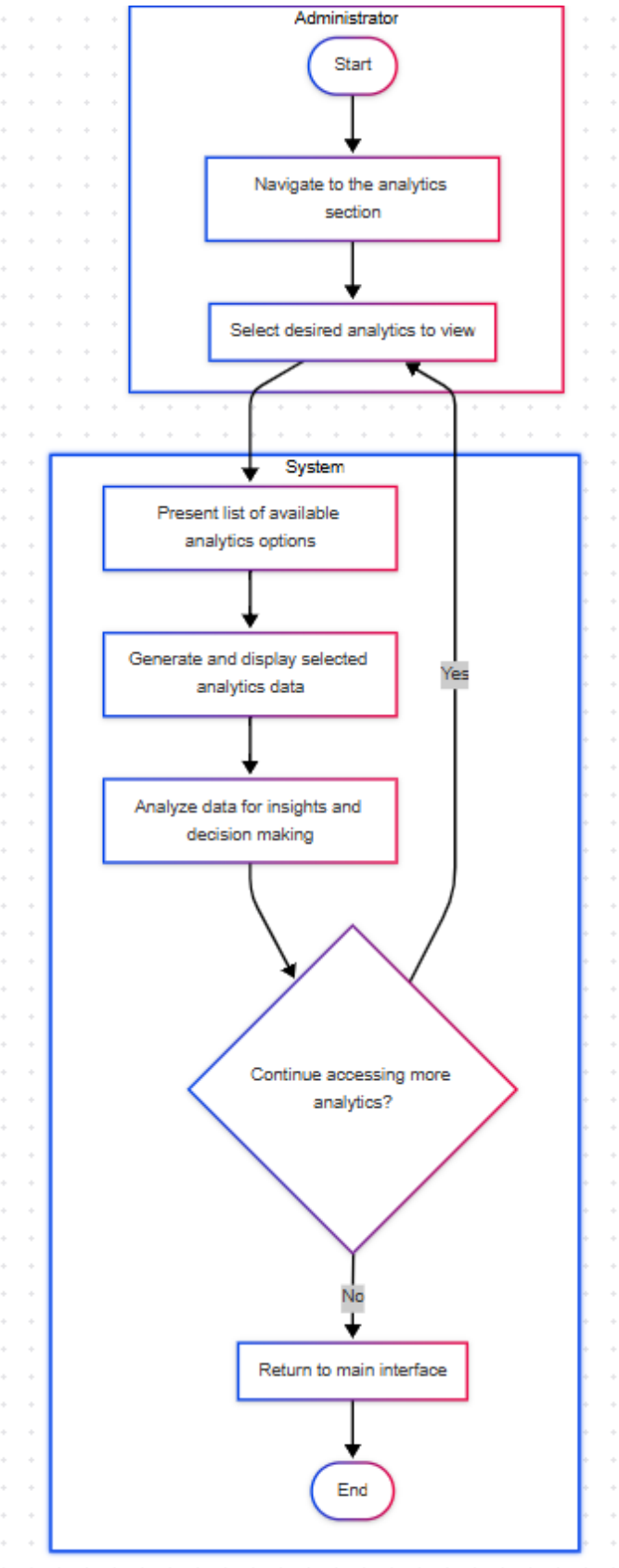
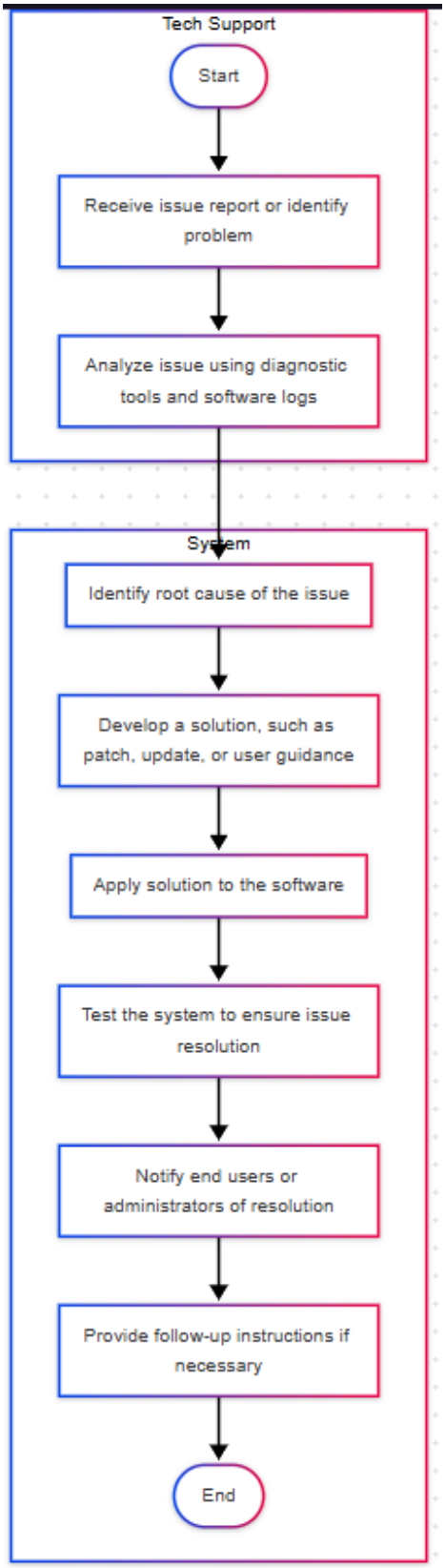
Add flight


Administrator
Start
Log in using credentials
Navigate to Add Flight section
Enter flight details: flight number, route, schedule, capacity, pricing
System
Validate entered flight details
Are all fields valid?
No
Yes
Display error message and prompt correction
Ensure flight number is unique
Is flight number unique?
No
Yes
Display error message and prompt correction
Save flight details in the database
Confirm flight details saved successfully
Display confirmation message to administrator
Make flight available for booking on user platforms
End

Modify Flight and Issue Compensation



Analytics Access



Software Function