Software Requirements Specification

for

Bajaj Air

(Airline Ticket Reservation)

Prepared by
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Version 1.3

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Document Version Control:

Full Name	Date	Change Comments	New Version	Previous Version
Manvendra Singh	16.01.2024	Initial Version	V1.0	NA
Manvendra Singh	23.01.2024	Work Break Down Structure has been added	V1.1	V1.0
Manvendra Singh	28.02.2024	User Case Diagram, Class Diagram, Activity Selection Diagram and Entity Relation Diagram has been added	V1.2	V1.1
Manvendra Singh	18.03.2024	Data Flow Diagram of Level 0, 1 and 2, Sequence Diagram, State Chart Diagram, Collaboration Diagram and User Interface Diagram has been added	V1.3	V1.2

Requirements Version Control:

Full Name	Date	Change Comments	New Version	Previous Version
Manvendra Singh	16.01.2024	Initial specification of requirements	V1.0	NA
Manvendra Singh	23.01.2024	Refining initial requirements according to criteria of good requirements	V1.1	V1.0
Manvendra Singh	28.02.2024	Functional Requirement has been added	V1.2	V1.1
Manvendra Singh	18.03.2024	Solution oriented requirement has been added	V1.3	V1.2

Introduction

1.1 Purpose

This document lists the requirement specifications for an Airline Ticket Reservation System (ATRS). The document is subject the change as the project progresses. The given version of the document is the initial one. Further changes of the project will be recorded to the document.

1.2 Document Conventions

The document is formatted according to IEEE standard.

1.3 Intended Audience

The intended audience for this document consists of requirements engineers, software developers, designers, testers, and project manager.

1.4 Product Scope

Subject facet: User Interface, searching one-way flights, searching round trip flights, searching multiple destinations, Flight reservations, Reservation cancellation, Online payment, Request, and response for reservation cancellation, Displaying warning messages.

Usage facet: Searching, sorting of flights, Reservation of tickets, managing existing reservation, managing flight details, Keeping the flights up to date.

IT facet: Database, Web-based software system, Authentication and Authorization System (AAS) for logins, Performance maintenance.

Development facet: Internal policy and culture of the airlines company should be taken under consideration.

1.5 Reference Documents

1. Naveed Ali, Richard Lai, A method of software requirements specification and validation for global software development, June 2017, Volume 22, Issue 2, pp 191–214(https://link.springer.com/article/10.1007/s00766-015-0240-4).

2. Luke Paireepinart, David Keyes, Jingtao Liu, Frank Medjo and Seth Orell, Software Requirements Specification for Airline Flight Booking System, February 2009 (http://www.academia.edu/23567842/Software_Requirements_Specification_for_Airl

ine_Flight_
Booking_System_Software_Requirements_Specification_for_Airline_flight_booking_system).

3. Wikipedia (www.wikipedia.com)

1.6 Overview

The remaining part of the specification document is organized as follows.

- Section 2 defines overall description of the system which defines product perspectives and functions, use-case diagrams, classes and characteristics of involved users, the environment that the system is going to be deployed, constraints on design and implementation of the system, user documentation, assumptions, and dependencies.
- Section 3 focuses on requirements and goal modelling. Strategic dependency model, model of software-intensive system, goal and agent responsibility model are used to model goals, while class diagram, state models and sequence diagram are constructed to model requirements.
- Section 4 contains all the specific requirements such as functional requirements, performance requirements and external interface requirements, which in turn includes user, software, hardware and communication interface requirements. Attributes of the software system and non-functional requirements are also specified in this section. Solution-oriented requirements extracted from requirements modelling part are documented in this section. Prioritization and traceability of requirements are also included in Section 4.

2. Overall Description

2.1 Product Perspective

ATRS is the digitized version of the traditional manual reservation system at the airline office. Existing manual system requires every customer to come to the airline office to make a booking. Apart from the fact that not all customers have time to come to the office, existing system also causes long queues at the office. Some customers get bored from waiting in the queue and airline loses its potential customers.

In addition to that, a hard copy of the passport is required during the reservation at office. Customers who are not able to present their passports at the office for whatever reason cannot make reservations.

The new system aims to overcome the above-mentioned drawbacks of the existing system. It will allow users to make reservations according to their needs from different parts of the world without leaving their places. Furthermore, it will reduce the workload of the employees who are responsible to make reservations at the office.

The system allows customers to check the availability of flights for specific dates and routes, get information about durations of available flights. It also allows customers to check the prices and the things that are included in the ticket such as baggage allowance, meal etc. and booking the ticket. Administrator can modify, remove existing flights, also add new flights to the system. Furthermore, administrator can see customer requests about cancellation of bookings, and decide whether to accept and reject them.

2.2 Product Functions

The system will have 10 functionalities for customers and administrators, and they are listed below.

Search for flights

Using this function, a customer can search for one-way, round-trip, and multiple destination flights by choosing specific dates and destinations.

Specify Passengers

With the help of this function customer selects the number of passengers and their category, either adult, child, or infant.

Sort flights

Regarding to these functions, customer sort flights either by price or duration of the flight.

Book flights
This function allows customer to book flights by choosing ticket types and processing online payment.

Request cancellation
This function indicates that customer can request the cancellation of the reserved ticket.

Add new flights
The function grants administrator the privilege of adding new flights to the system.

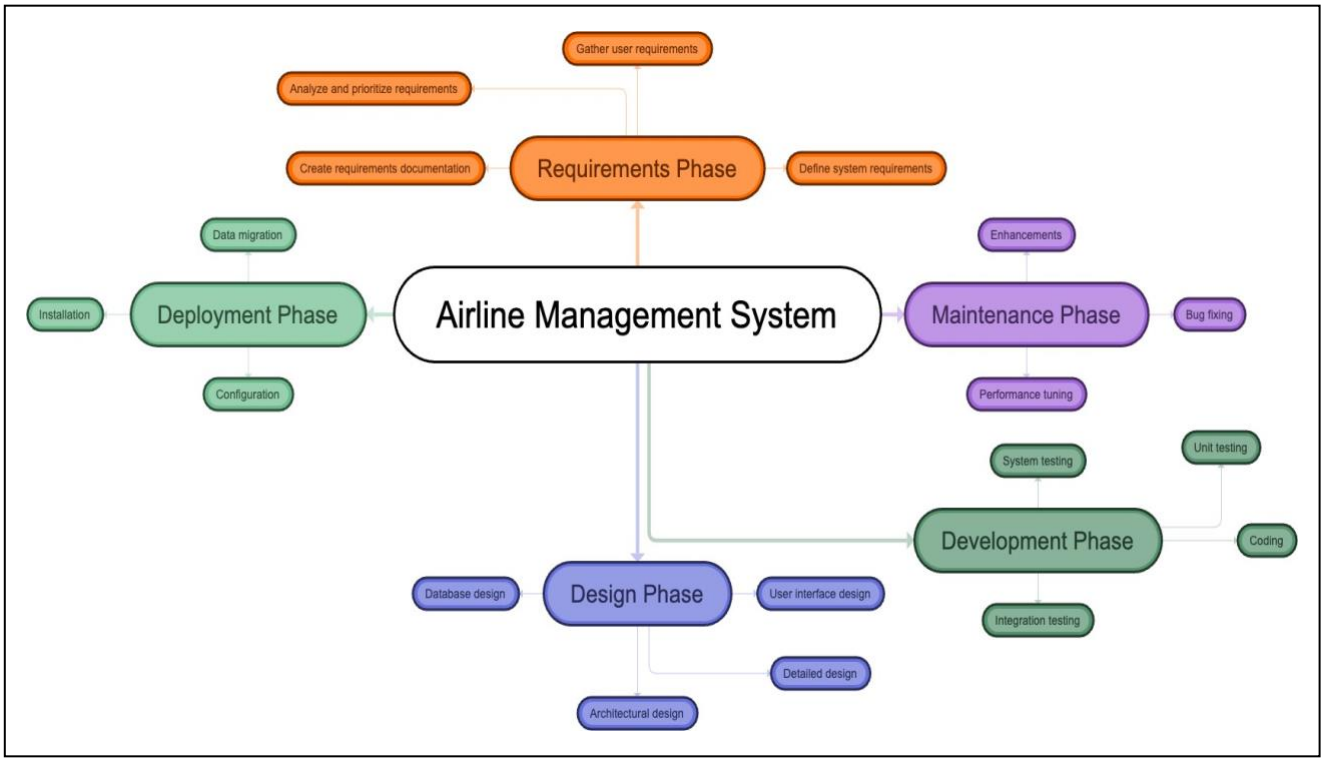
Modify flight details
Using this functionality administrator can modify the details of the existing flights.

Remove flights
With the help of this function administrator removes the flights from the system that are cancelled for whatever reason.

See cancellation requests
This functionality allows administrator to overview the cancellation requests of customers and approve or reject them.

See booking details
This functionality enables administrator to view the customers' booking details.

2.3 Work Break Down Structure



2.4 Use-case Diagram

In the use case diagram given below, we have displayed how our users interact with the system to accomplish their goals and responsibilities. Here in our diagram, we have 4 actors (Customer, Administrator, Support Staff, Bank), 3 of which are the main users (Customer, Administrator, Support Staff). In every use case mentioned in the diagram, the actions of the users are described, and how these use cases are related to one another is represented by the help of arrows. In our Use case diagram, all functionalities of the system are displayed. Customer can search for flights based on dates and destination, flights being one-way or round-trip, sort the displayed flights according to price or duration, specify the passengers (how many adults, children, or infants), request cancellation, book flight, choose the ticket type and proceed with the payment. The payment is processed by the Bank. Another actor, Administrator, is responsible for adding new flights, modifying flight details, and removing flights if needed, see thecancellation request, approve, or deny them and see booking details.

Our final actor, Support Staff, is responsible for maintenance of the system, ensuring the security of the system (by creating predefined users and maintaining AAS), safety of the system (by restoring and recovering data and assuring data integrity) and reliability of the system (by maintaining SLA).

Figure 1: Use Case

2.5 Class Diagram

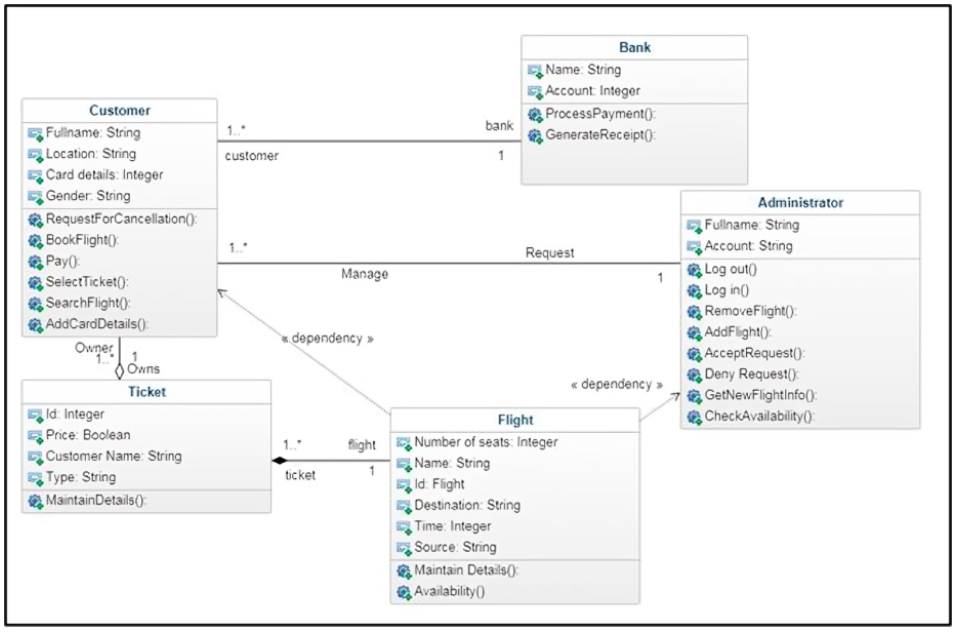


Figure 2: Class Diagram

2.6 Entity Relation Diagram

Overview of ER diagram

- *User Entity:* Represents a system user, having attributes like user ID, mobile number, email, and address.
- *Login Entity:* Contains login details such as role ID, username, and password, which likely relate to the user's ability to log into the system.
- *Roles Entity:* Defines various roles within the system with attributes like role ID, role name, and role description.
- *Permission Entity:* Describes the permissions associated with different roles, with attributes like permission name and the module it pertains to.
- *Passenger Entity:* Holds information about the passengers, with attributes like passenger ID, name, password, address, mobile number, and email.
- *Ticket Entity:* Details the tickets issued with attributes such as ticket ID, description, and date.
- *Airlines Booking Entity:* Seems to have two occurrences with slightly different attributes, which might represent different aspects of

bookings like position ID, description, date, type in one, and entry ID, description, type, and date in the other.

The relationships include:

- *Has:* Indicates ownership or possession (e.g., a User has a Login, Roles).
- Manage: Indicates a management relationship (e.g., Roles manage Permissions).
- Has: Between the entity's passenger and ticket, it's indicating that a passenger has a ticket.

From the ER diagram, it's clear that the system manages users, roles, permissions, passengers, bookings, and tickets. Users have specific roles, and these roles are associated with certain permissions. Passengers, who can be users of the system, can book flights and have tickets associated with those bookings. There are two "airlines booking" entities, which may represent different stages or types of bookings within the system.

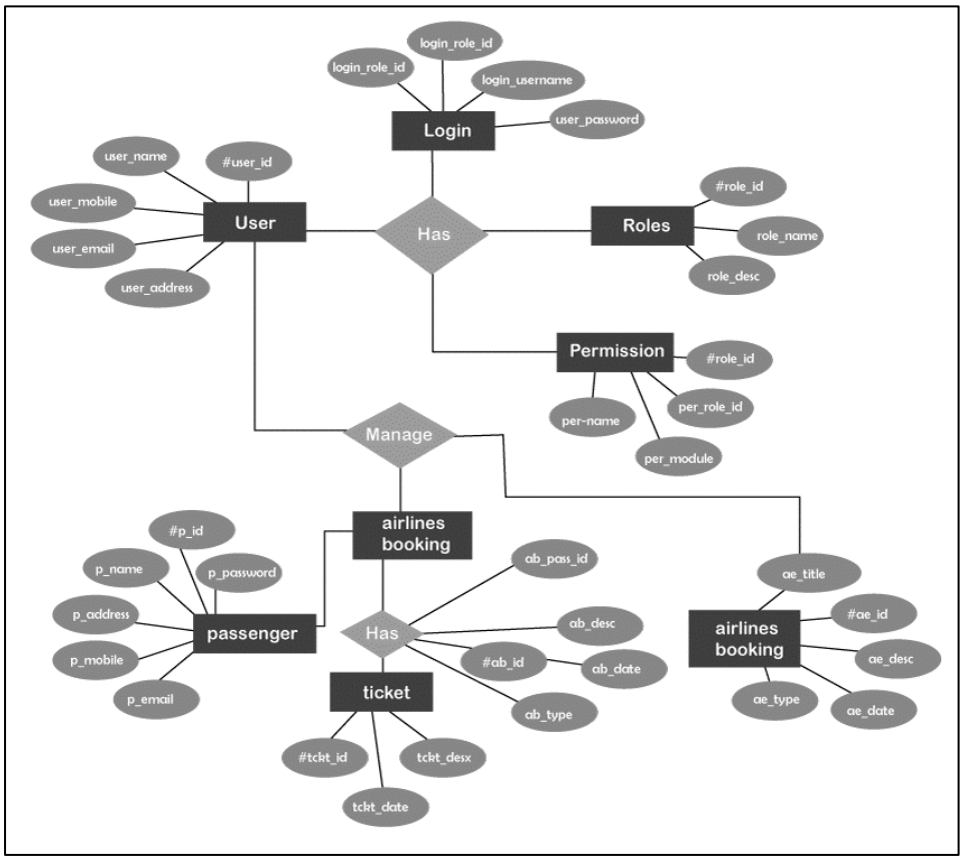


Figure 3: Entity Relation Diagram

2.7 Activity Selection Diagram

System Boundaries

The flowchart divides into two main columns, one for the "Customer" and the other for the "Reservation System". This separation indicates the boundary between the user's actions and the system's processes.

Activities and Sub-Activities

Customer Activities:

- *Search Flight:* The customer begins the process by searching for a flight.
- *Sub-Activity:* If the flight is not available, the process ends here for the customer.
- *Select Flight & Seat:* If the flight is available, the customer selects their preferred flight and seat.
- *Enter Passenger Information and Billing Details:* After selecting a flight and seat, the customer provides personal and payment information.
- *Receive Confirmation:* If the transaction is valid, the customer receives a confirmation number, completing the booking process.
- *Check Flight/Reservation Status:* The customer has the option to check their flight or reservation status later.
- *Cancel Reservation:* The customer can also cancel the reservation if needed.

Reservation System Activities:

- *Check Flight Availability:* When a customer searches for a flight, the system checks its availability.
- *Check and Provide Availability and Price to Customer:* If the flight is available, the system provides the details to the customer.

- *Ask for Passenger Information and Billing Details:* The system requests information from the customer to proceed with the booking.

- *Validate Transaction:* The system processes the customer's payment information to ensure its valid.

- *Confirm Reservation & Send Confirmation:* If the transaction is validated, the system confirms the reservation and sends a confirmation number to the customer.

- *Show Flight/Reservation Status:* The system can show the status of a flight or reservation when queried by the customer.

- *Cancel Reservation and Send Cancellation Confirmation:* If the customer decides to cancel, the system processes the cancellation and sends a confirmation

of this to the customer.

Notation Explanation:

- *Rounded Rectangle (Capsule Shape):* Represents an activity or task performed by the user or system.

- *Diamond:* Indicates a decision point where the process can follow different paths based on the conditions met (e.g., flight availability, valid transaction).

- *Arrow Lines:* Show the direction of the process flow and the sequence of activities.

- *Parallel Lines (Barriers):* Indicate the start and end points of sub-processes that occur within the main process, dividing different sections of the system.

- *Exit Symbol (Circle with a diagonal line):* Signifies the end of a process or an exit point.

In summary, this flowchart details a sequential process involving interactions between the customer and the airline reservation system. It begins with searching for a flight and can end with either the confirmation of a reservation or the cancellation of a booking, with system checks and validations in between. Each shape and line in the flowchart serve a specific purpose in guiding the understanding of the process flow.

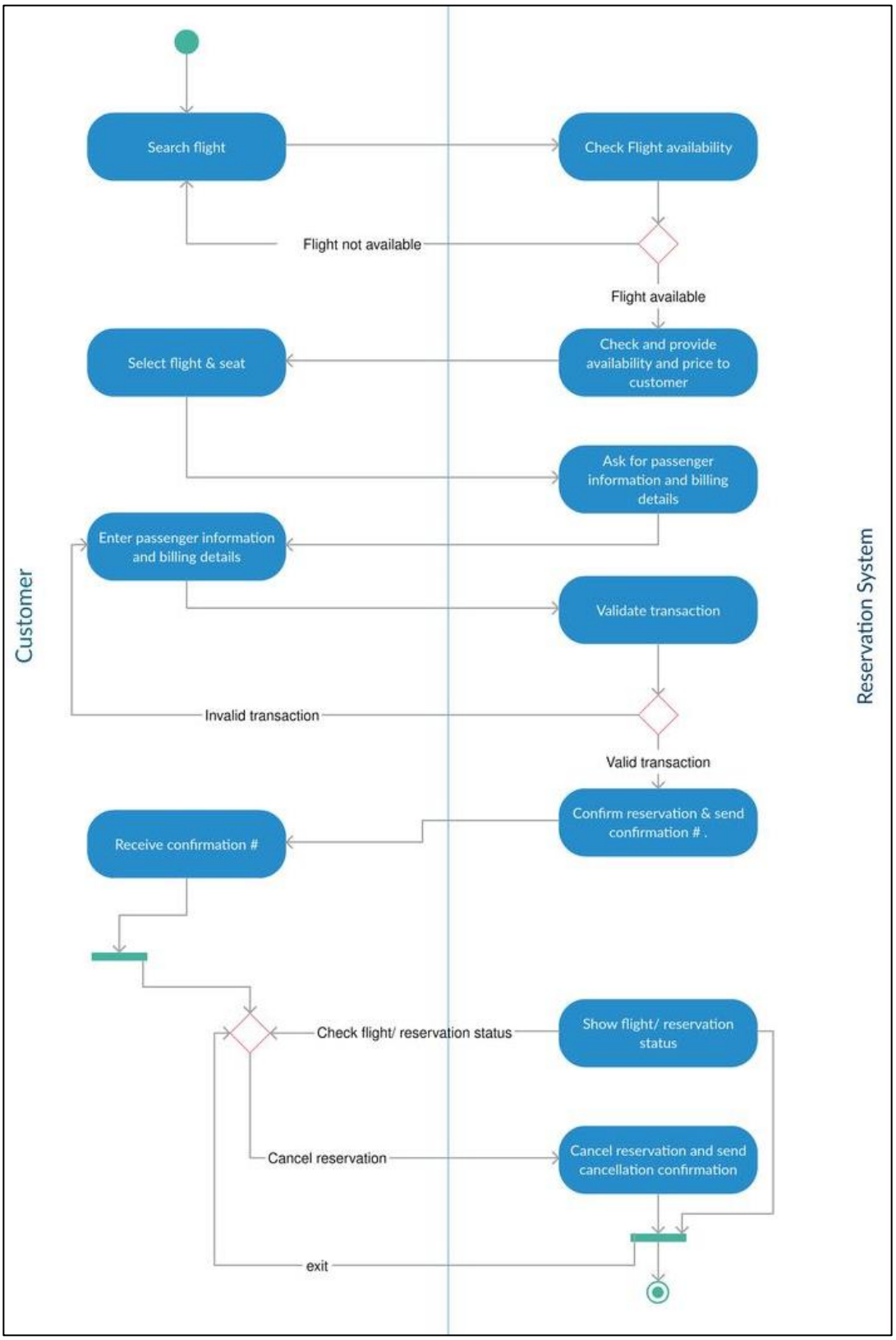


Figure 4: Activity Selection Diagram

3. Requirements and Goal Modelling

3.1 Data Flow Diagram Level 0

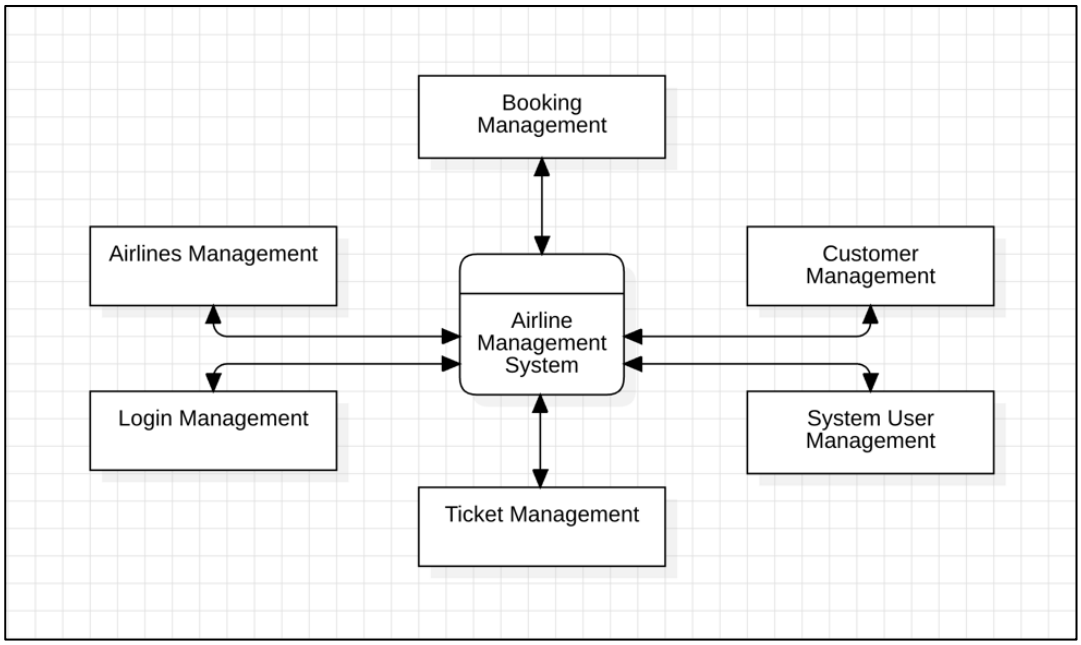


Figure 5: Data Flow Diagram Level 0

3.2 Data Flow Diagram Level 1

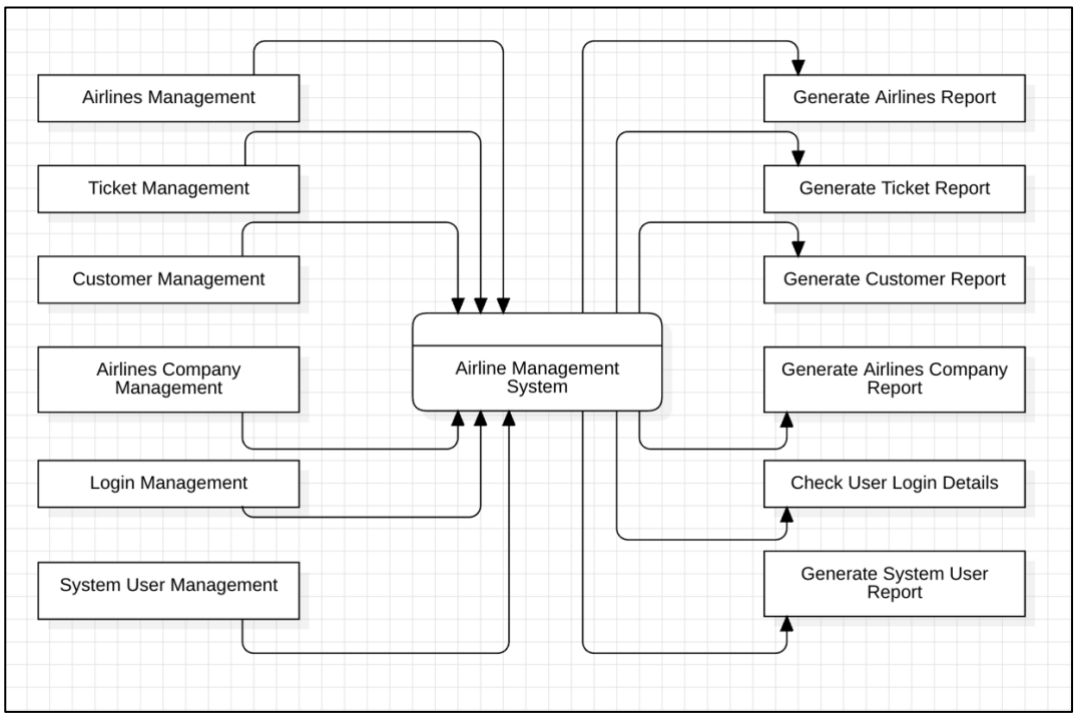


Figure 6: Data Flow Diagram Level 1

3.3 Data Flow Diagram Level 2

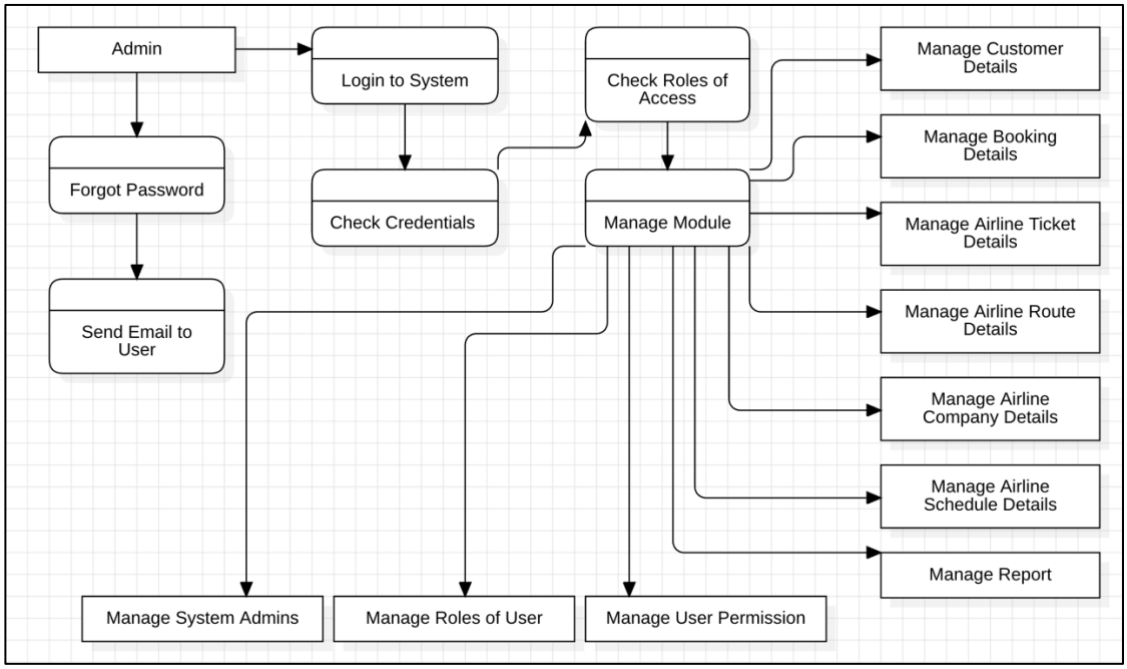


Figure 7: Data Flow Diagram Level 2

3.4 Sequence Diagram

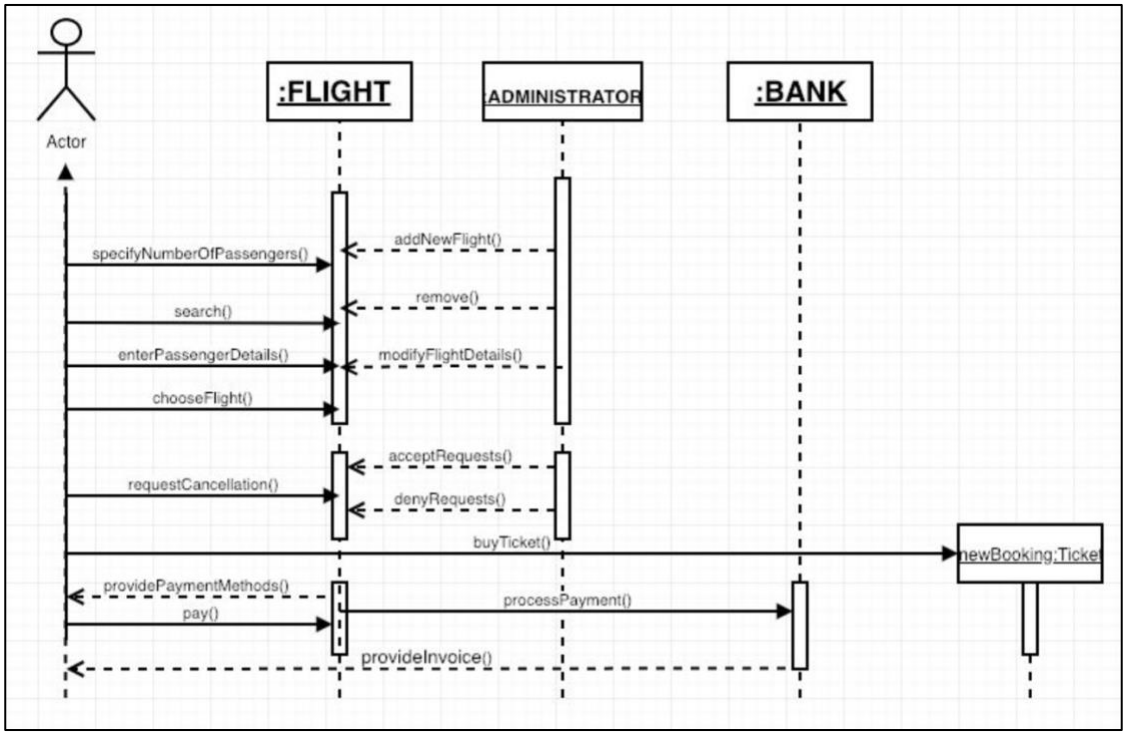


Figure 8: Sequence Diagram

3.5 State Chart Diagram

Administrator State

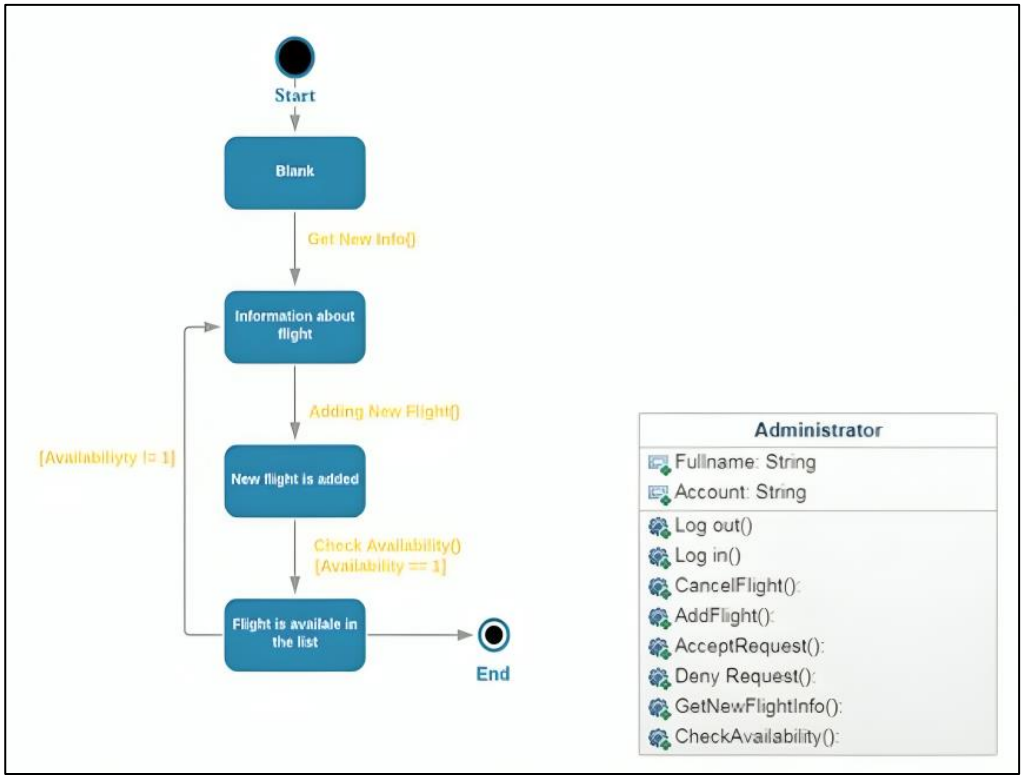


Figure 9: Adding New Flight

Administrator Diagram

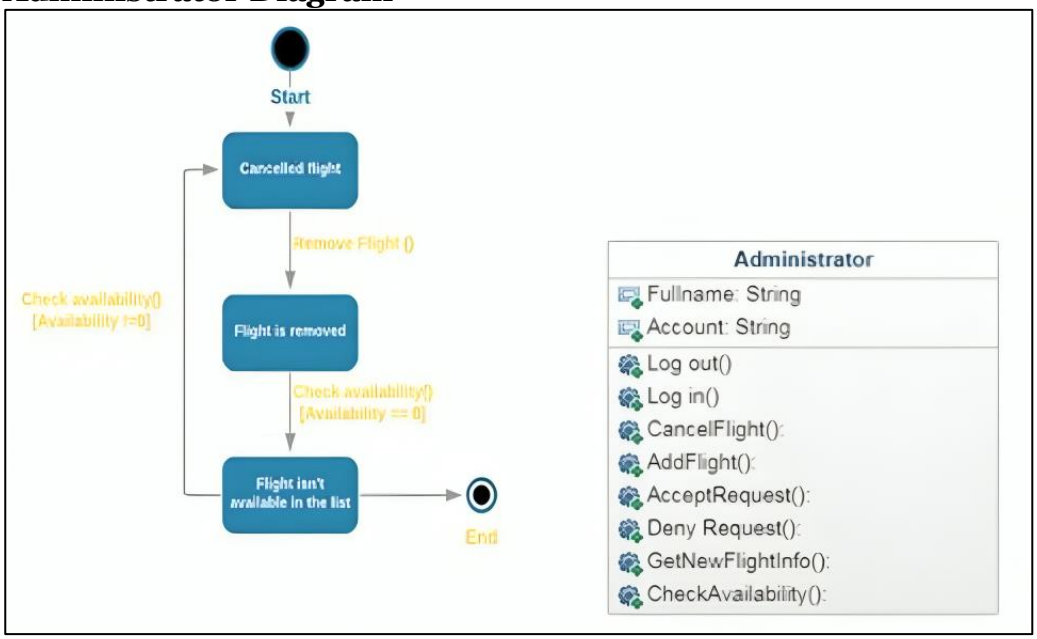


Figure 10: Removing Existing Flights

Bank Statement

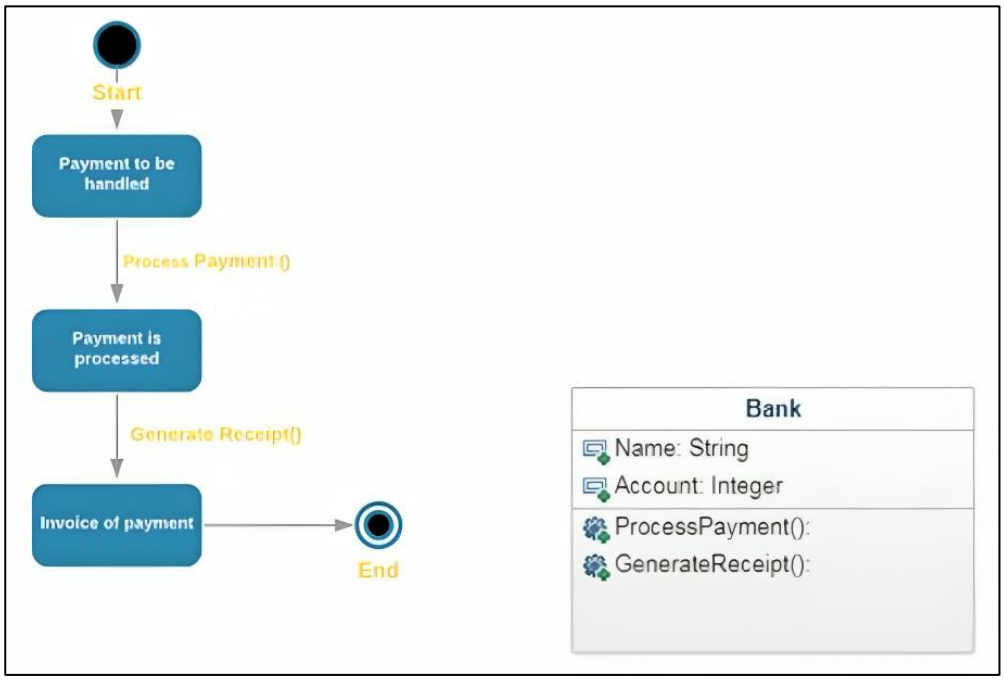


Figure 11: Processing Payment

Customer State

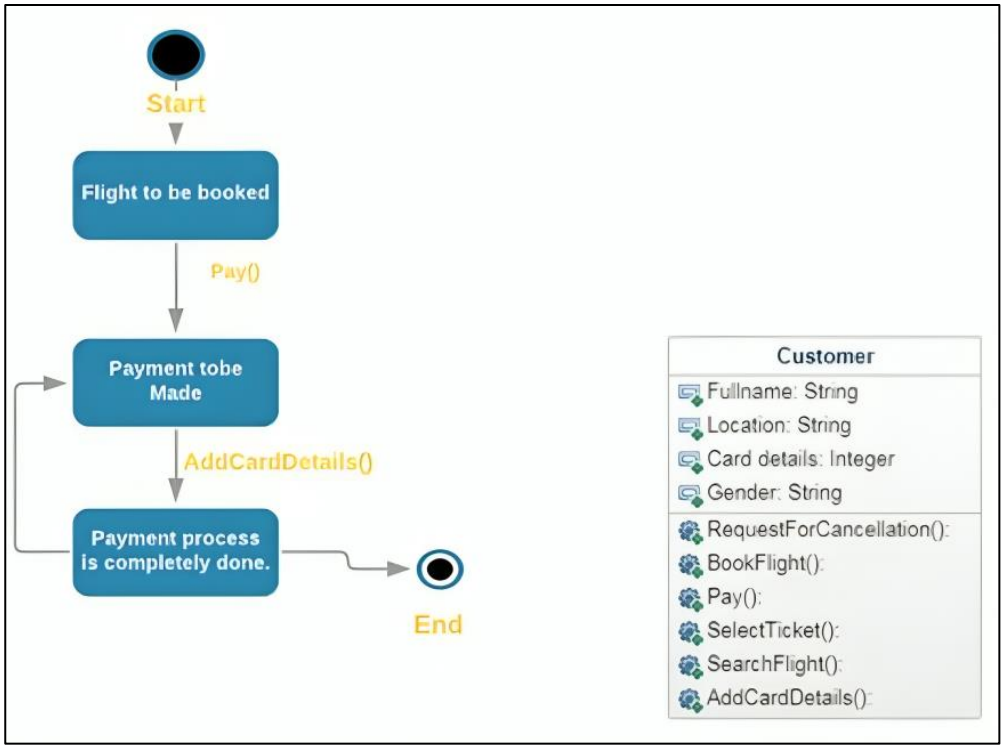


Figure 12: Paying for Booking

3.6 Collaboration Diagram

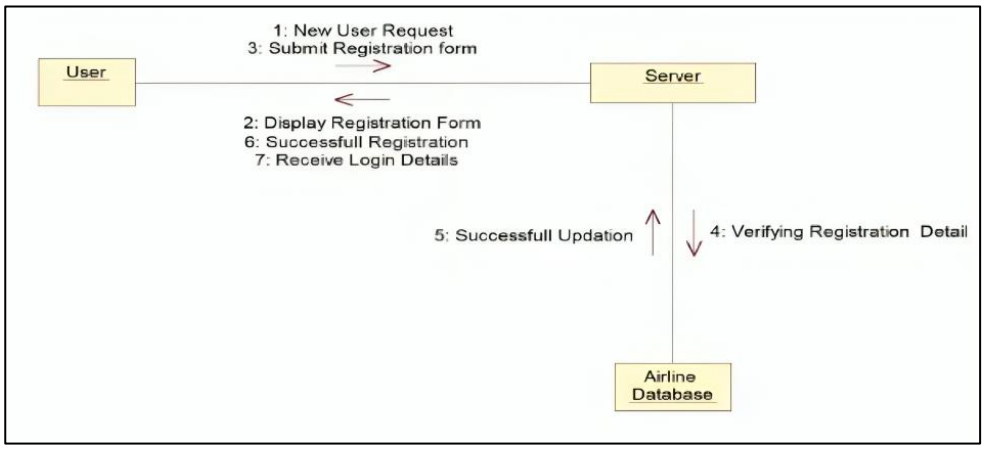


Figure 13: For User Registration

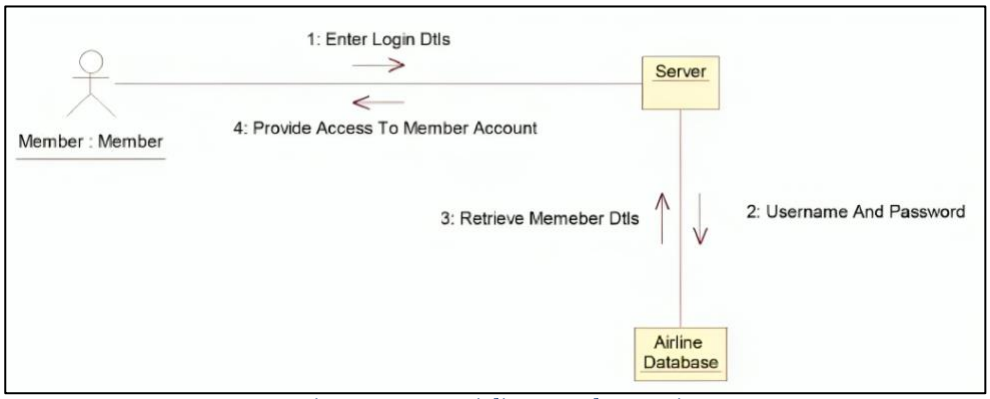


Figure 14: For Airline Member Login

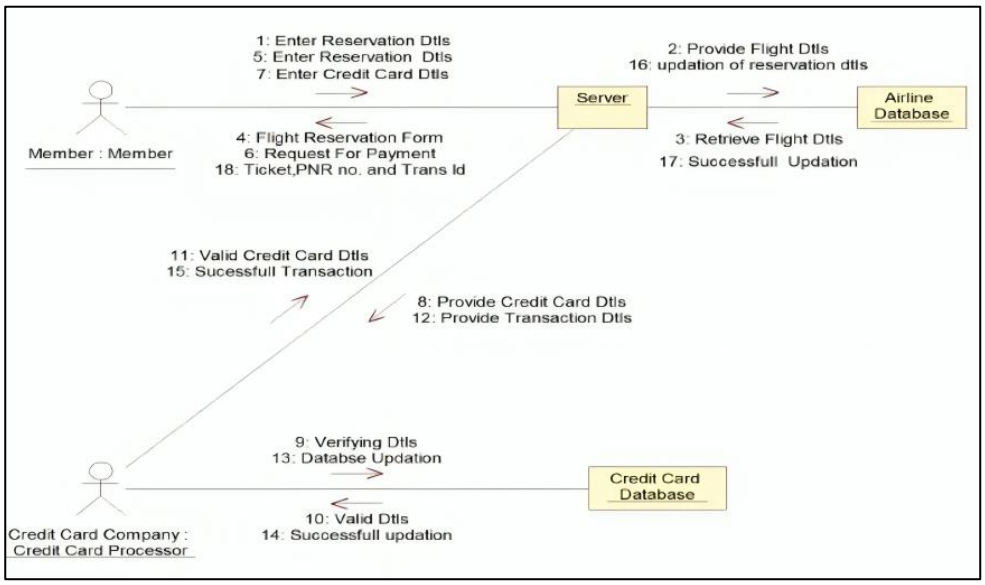


Figure 15: For Booking a Flight

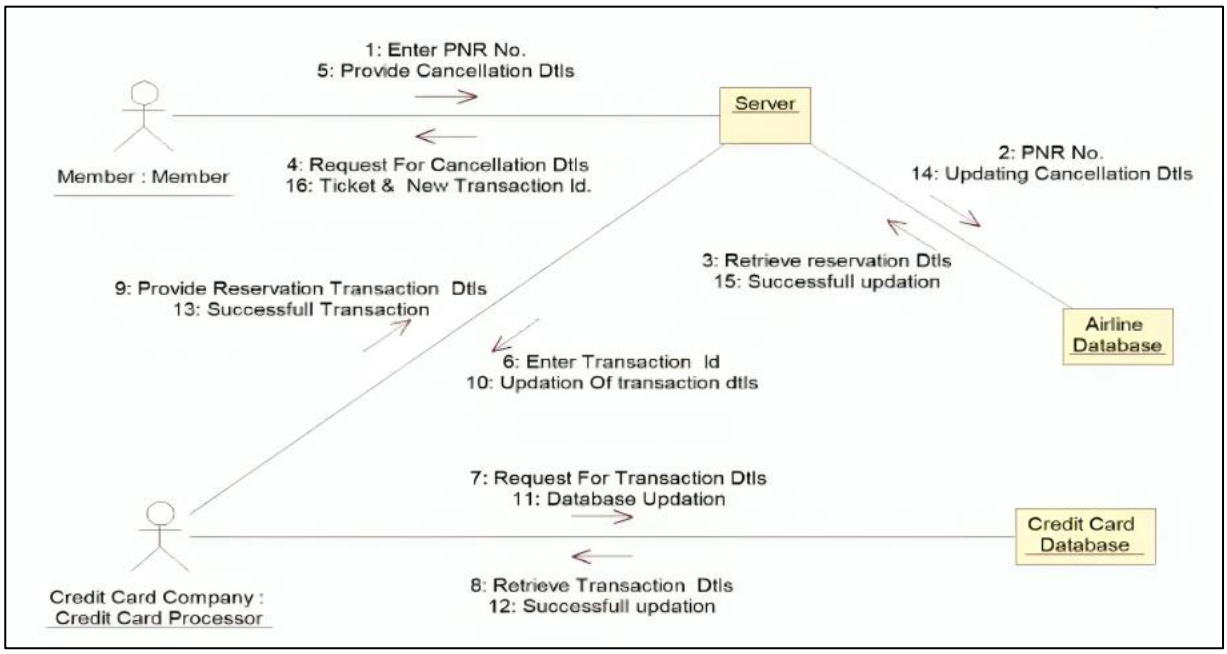


Figure 16: For Flight Cancellation

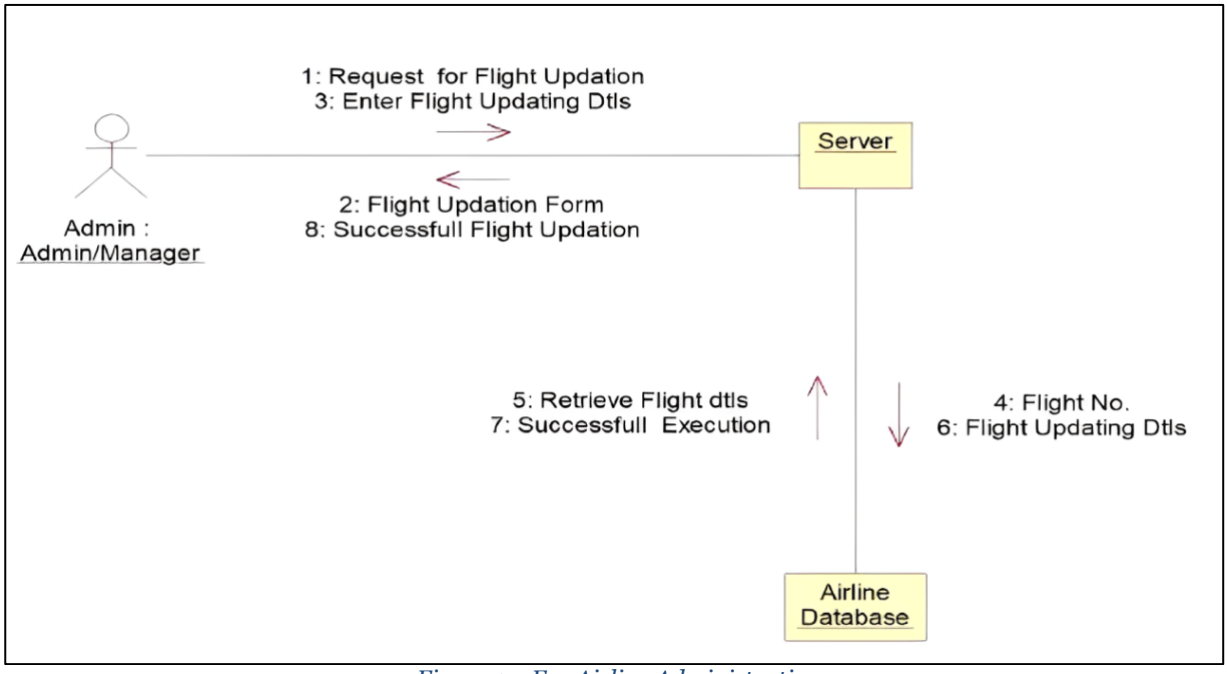
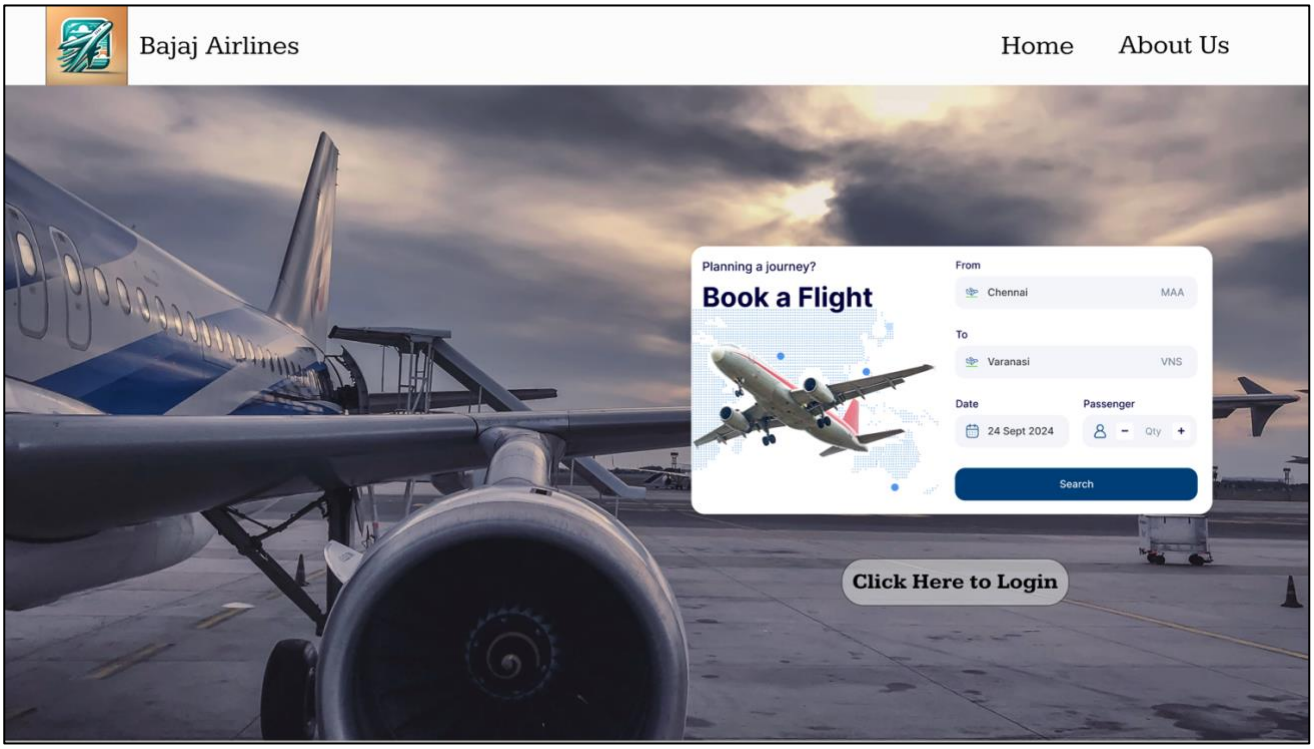
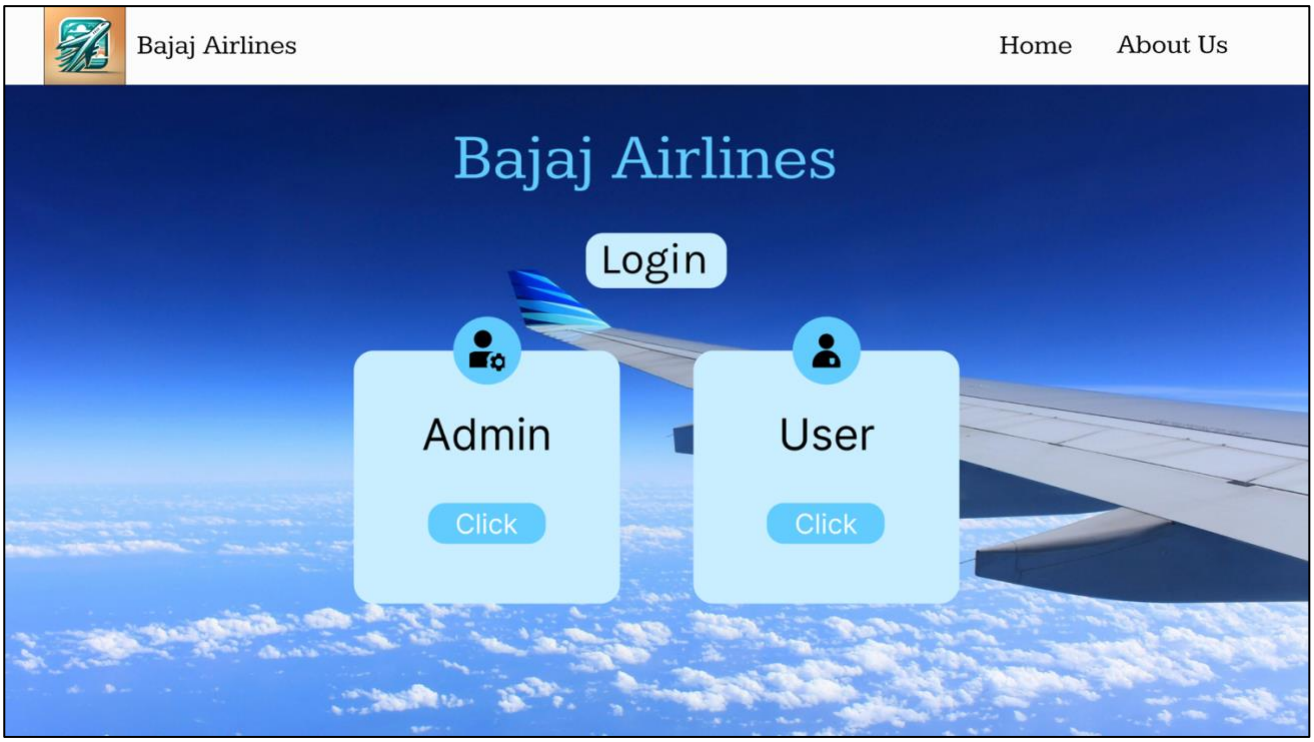
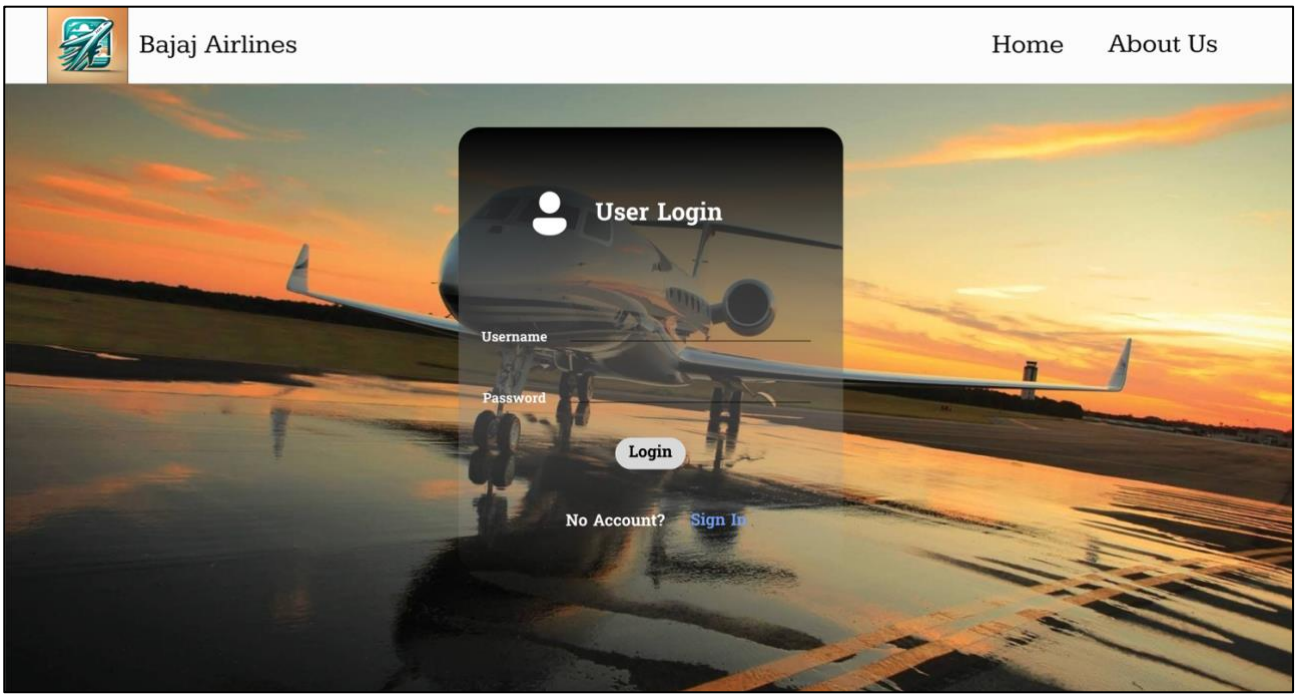


Figure 17: For Airline Administration

3.7 User Interface Diagram



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About Us
User Login
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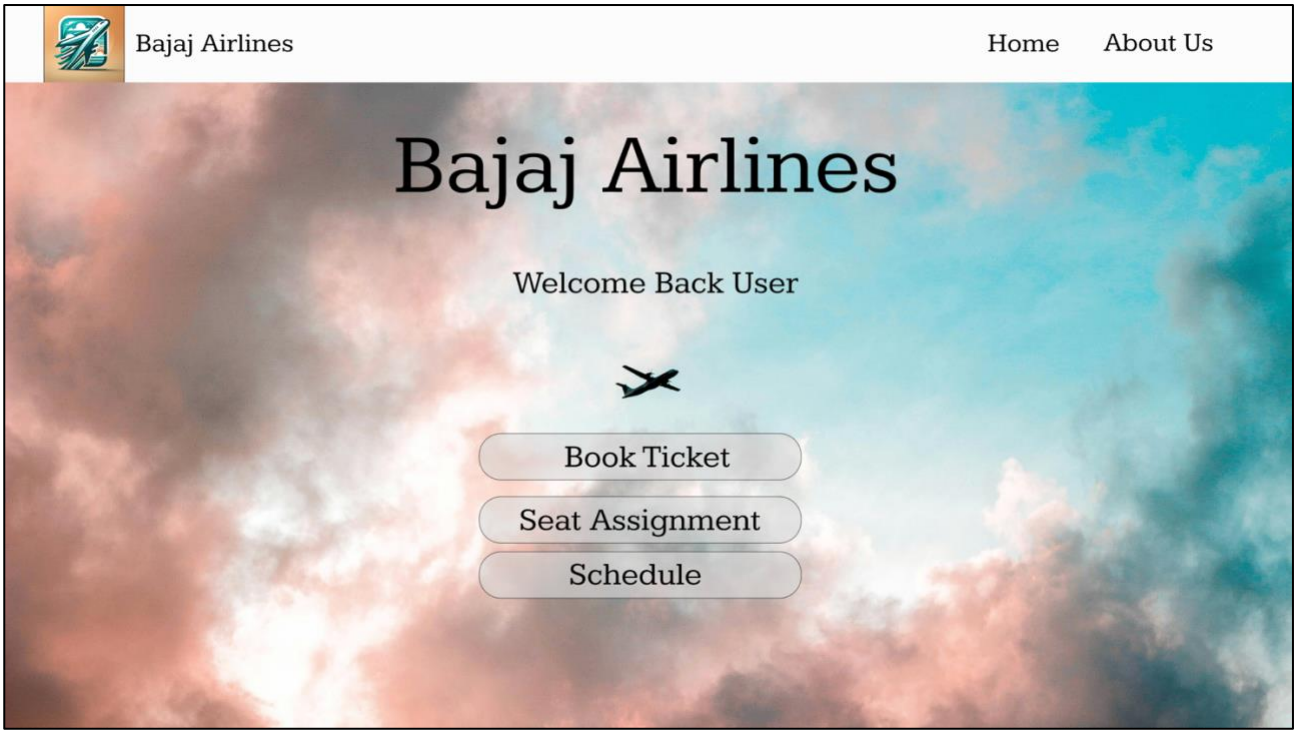
Password
Login
No Account?
Sign In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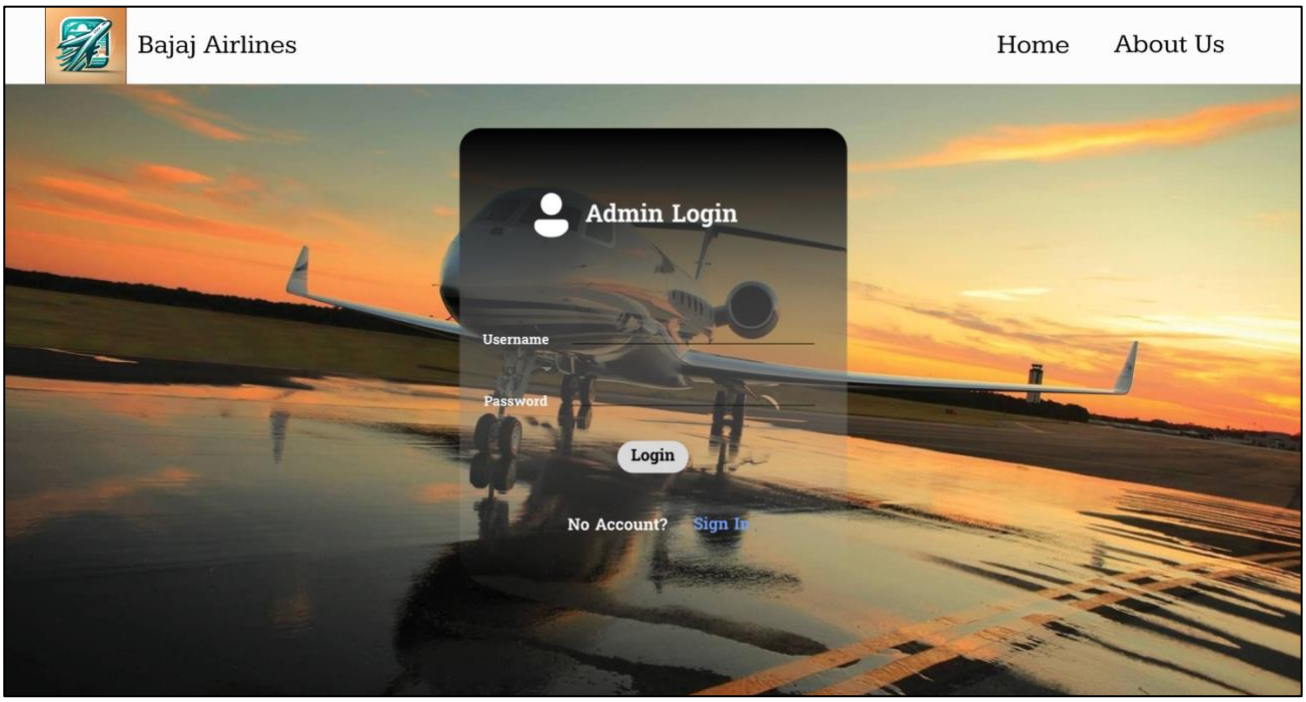
About Us
Bajaj Airlines
Welcome Back User
Book Ticket
Seat Assignment
Schedule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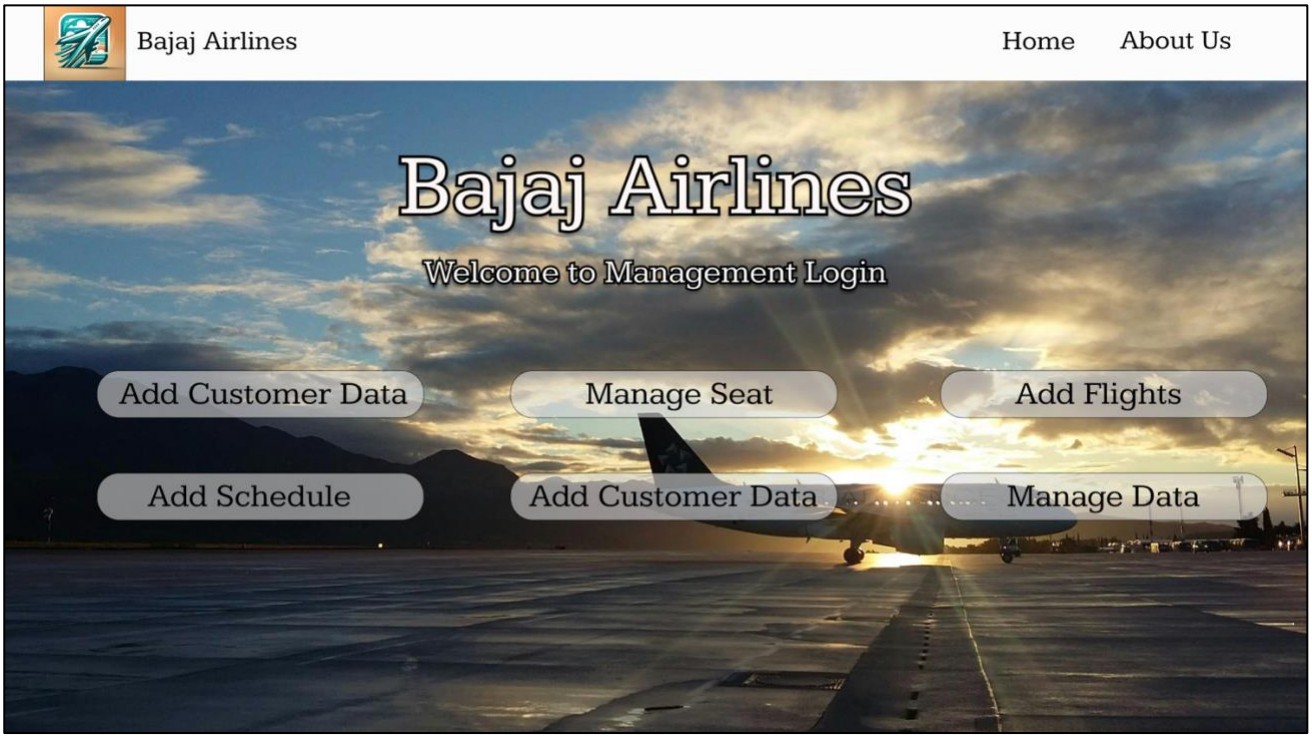
About Us
Admin Login
Username
Password
Login
No Account?
Sign In


Bajaj Airlines
Home
About Us
Bajaj Airlines
Welcome to Management Login
Add Customer Data
Manage Seat
Add Flights
Add Schedule
Add Customer Data
Manage Data