ENSF 614 - Fall 2023

Term Project

Flight Reservation Web Application

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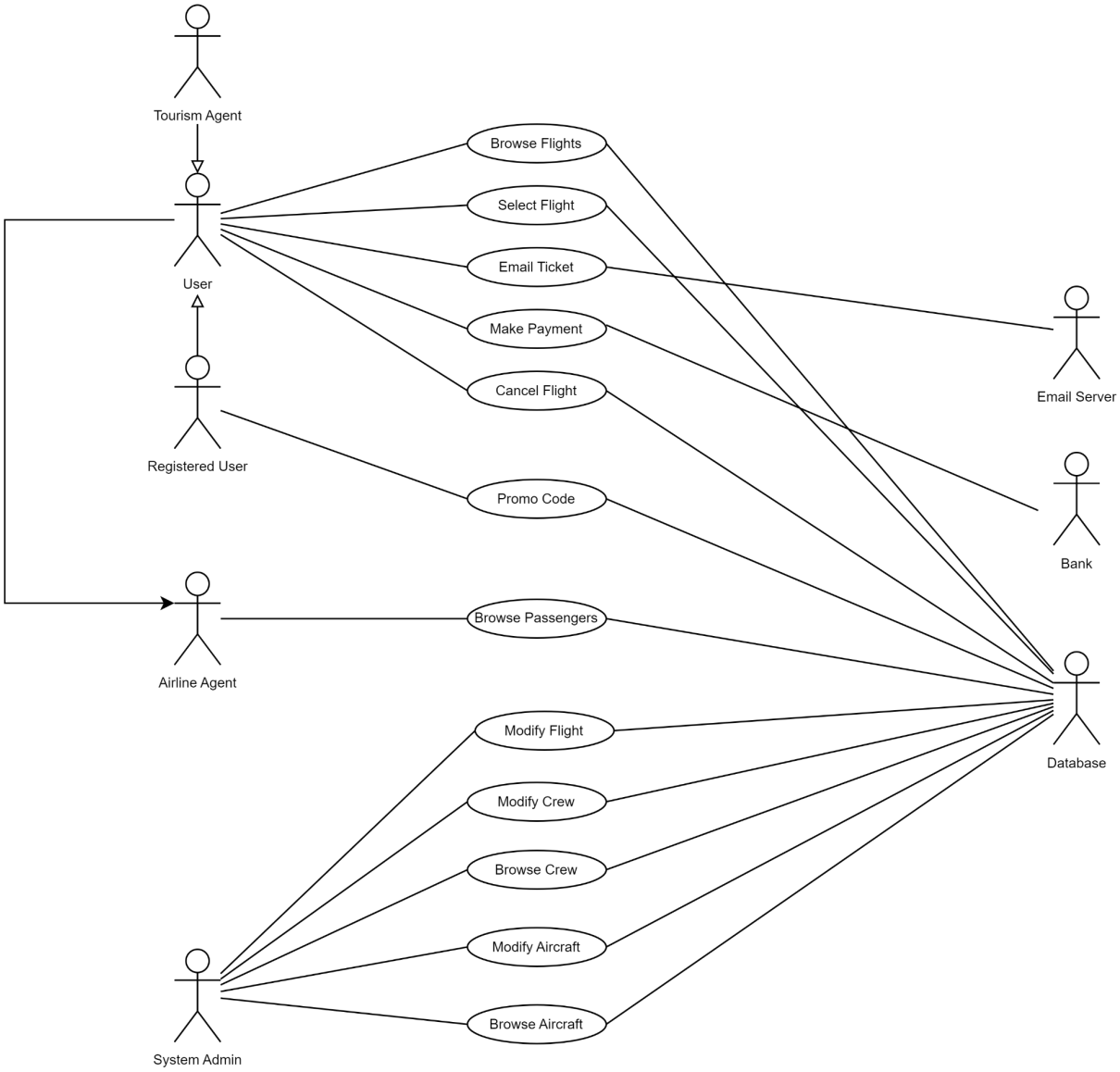
I. Part One - System Analysis:

a. System Description

The System being developed in this project is a web-based system that facilitates flight reservations and management for a single airline company. The system will have various users such as regular users, tourism agents and system administrators. Some of the system's primary needs for users includes browsing the available flights to a specific destination, choosing the preferred flight, visually perusing the seat map, choosing the seat they want and if interested, choosing the preferred ticket cancellation insurance. They must then proceed to payment with a credit card and get the ticket by email. Flight Attendants and Airline Agents are able to browse the list of passengers. Lastly, the Admin is able to manage flight data and other database information. This includes examining the list of flights, the crew list for a particular flight, the list of aircraft that the company owns, changing the information about flights, adding or removing crew, adding or removing aircraft, adding or removing flight destinations, and printing a list of people who have registered with the airline.

b. Use-Case Diagram



c. Scenarios for Use-Cases

Use Case 1	Booking a Flight
Actor	User
Basic Flow	The User browses available flights to a specific destination, and selects a desired flight. They are also able to browse the seat map graphically from all available seats, select their desired seat and ticket cancellation insurance. The system confirms this information and prompts the user for payment. The User provides payment details using a credit card. The payment is processed and the system indicates ticket booking has been confirmed. The ticket and booking confirmation is sent via email.

Noun	Filtering Decisions
User	Filtered (actor)
Available Flights	Candidate objects
Destination	Filtered (state - when browse apply)
Seat map	Filtered (used to select available seats)
Available seats	Candidate objects
Ticket cancellation insurance	Candidate objects
System	Filtered (what is being built)
User	Filtered (same as registered user)
Payment Details	Candidate objects

Credit card	Filtered (what is being used for payment)
ticket	Candidate Objects
Email	Filtered (what is being used for confirmation)

Use Case 2	Canceling a Flight
Actor	Registered User
Basic Flow	The Registered User logs into the system using their login ID and password. The User uses their confirmation number to find their booked flight. The system checks if their ticket has ticket cancellation insurance. If they do not, then the system notifies the User they cannot proceed with the cancellation. If they do, the system confirms the cancellation. The system indicates ticket booking has been canceled. The ticket and booking cancellation confirmation is sent via email.

Noun	Filtering Decisions
Registered User	Filtered (actor) & Candidate Object
Login ID	Filtered (property of registered user)
Password	Filtered (property of registered user)
Confirmation Number	Filtered (property of registered user)

Booked Flights	Candidate objects
System	Filtered (what is being built)
User	Filtered (same as registered user)
Ticket Cancellation Insurance	Candidate objects
Credit card	Filtered (what is being used for payment)
Ticket	Candidate Objects
Email	Filtered (what is being used for confirmation)

Use Case 3	Browsing List of Passengers
Actor	Airline Agent
Basic Flow	The Airline Agent logs into the airline system portal using their login ID and password. The Agent uses the flight number to browse the list of passengers in the flight.

Noun	Filtering Decisions
Airline Agent	Filtered (actor) & Candidate Object
Login ID	Filtered (property of airline agent)
Password	Filtered (property of airline agent)
Flight Number	Candidate Object

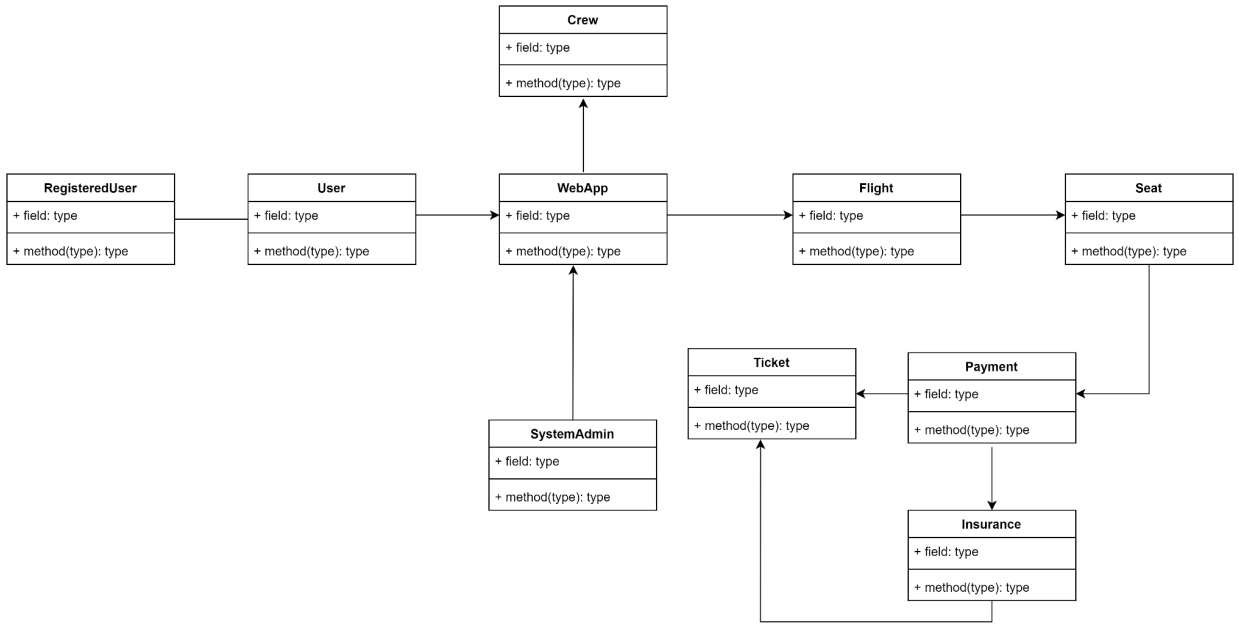
System	Filtered (what is being built)
Agent	Filtered (same as airline agent)
List of Passengers	Filtered (property of user)

Use Case 4	Manage Flight Information
Actor	System Admin
Basic Flow	The System Admin logs into the system using their login ID and password. The Admin browses list flights with their origin and destination along with the date. They are also able to browse the list crews in a specific flight. They can lastly browse the list aircrafts the company owns. The system is used to add or remove a crew, add or remove an aircraft, add or remove a flight destination, and add, remove or modify flight information. The system can also print a list of users registered with the airline.

Noun	Filtering Decisions
System Admin	Filtered (actor) & Candidate Object
Login ID	Filtered (property of system admin)
Password	Filtered (property of system admin)

Flights	Candidate objects
Destination	Filtered (state - when browse apply)
Origin	Filtered (state - when browse apply)
Date	Filtered (state - when browse apply)
Crews	Candidate objects
Aircrafts	Candidate objects
System	Filtered (what is being built)
Admin	Filtered (same as system admin)
Add or remove crew	Filtered (what is being done)
Add or remove aircraft	Filtered (what is being done)
Add or remove flight destination	Filtered (what is being done)
Add, remove, or modify flight destination	Filtered (what is being done)
Print	Filtered (what is being used for list of users)
Users registered	Candidate Objects

d. Conceptual Model

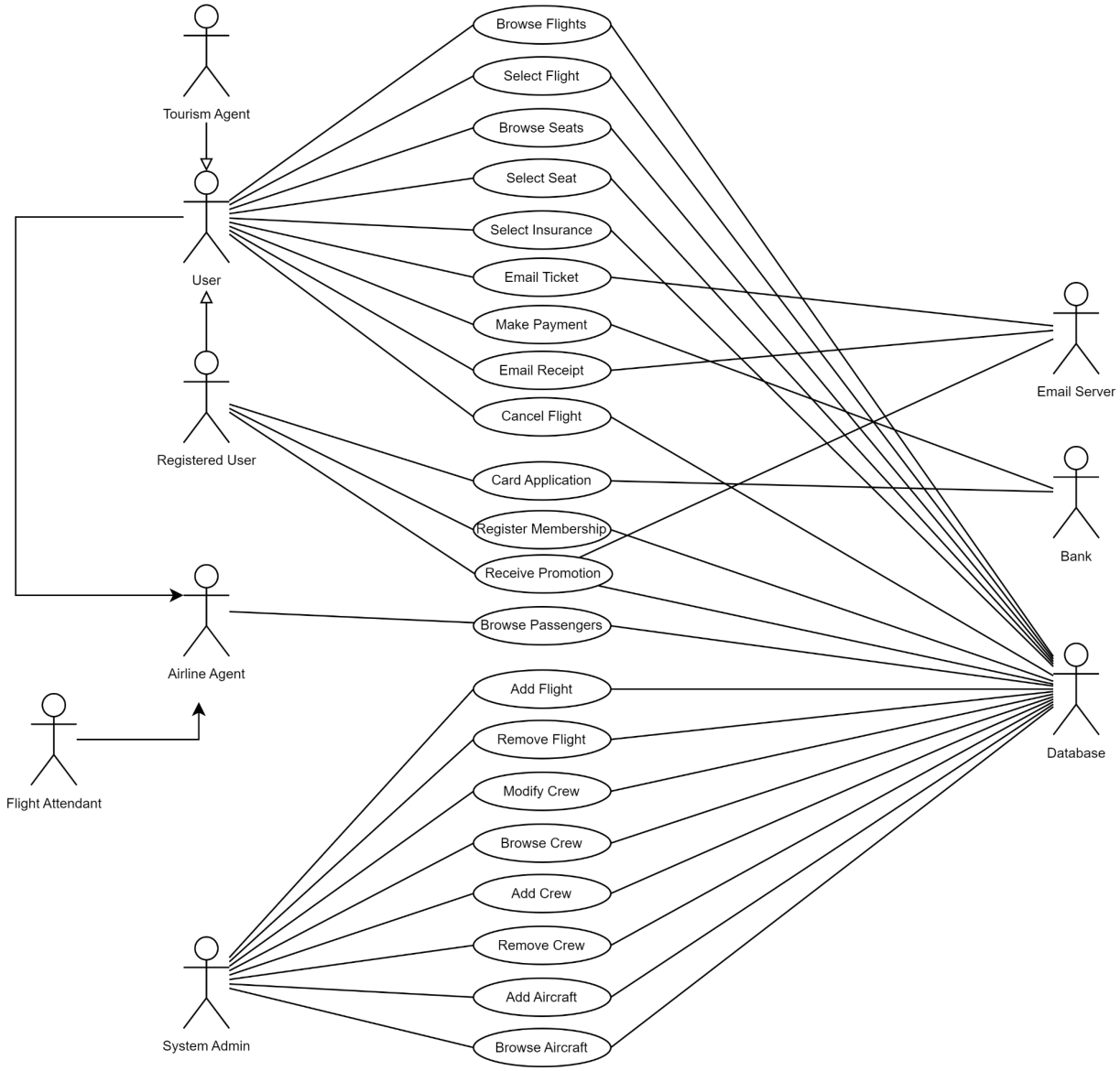


II. Part Two - Domain Diagrams:

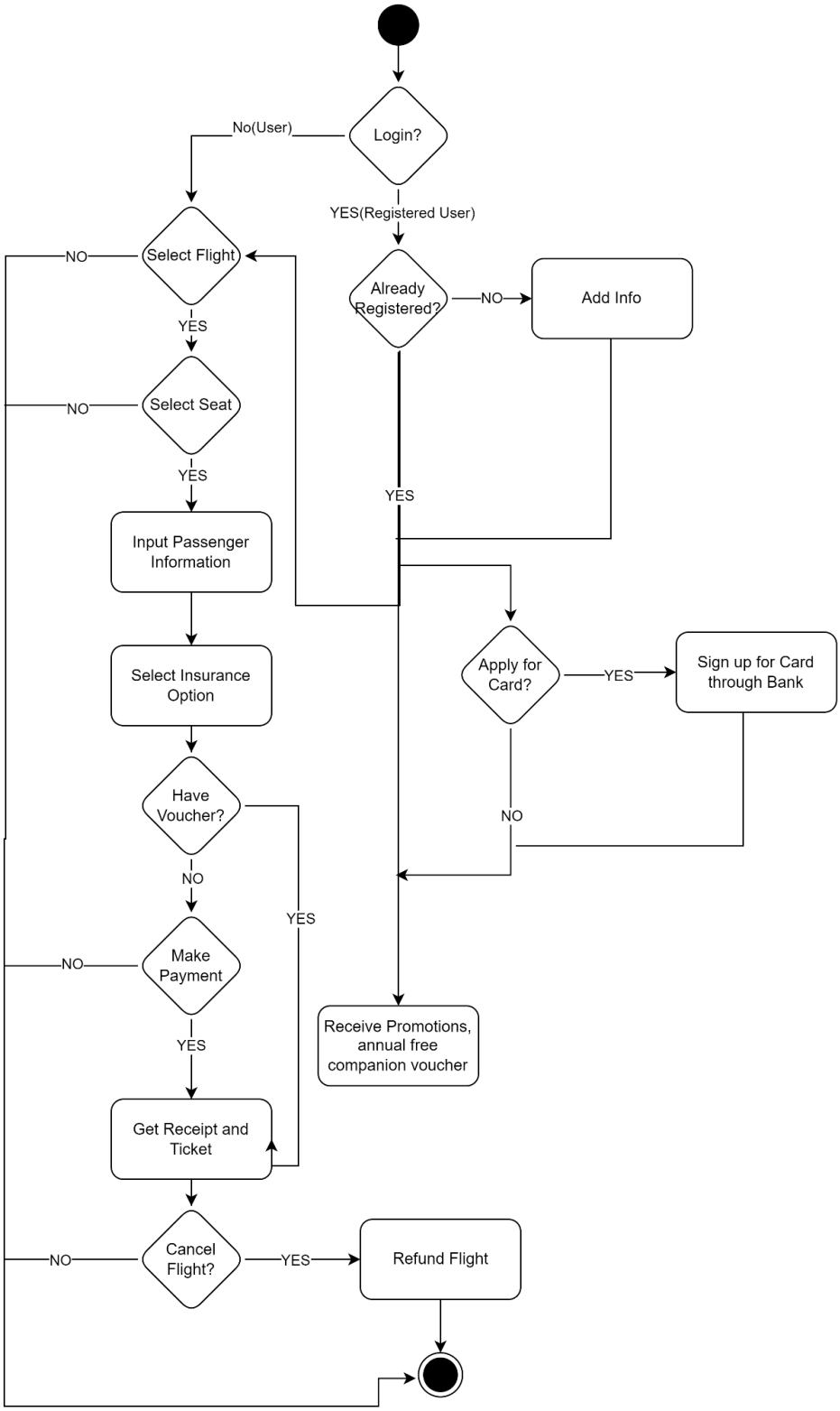
a. Highlights of the System's Architecture

The logical view of the architecture including the functional requirements of the system which can be displayed using the class diagrams. These diagrams include information such as Domain, Boundary and Controller Classes with functions, relations and multiplicities. The process view of the architecture shows the system's availability, reliability, scalability, integrity, performance, system management, and synchronization. These independent tasks grouped into processes can be visualized through both the use-case diagrams and the use-case scenarios. The development view of architecture shows the software organization of the system. This is displayed using the use-case diagrams, system activity diagrams, sequence diagrams, state transition diagrams, and UML class diagrams. The physical view of architecture addresses the software to processing nodes and includes the deployment diagram. Lastly, the scenarios demonstrate and validate the logical, process, development, and physical views of the architecture and can be shown in the use-case scenarios.

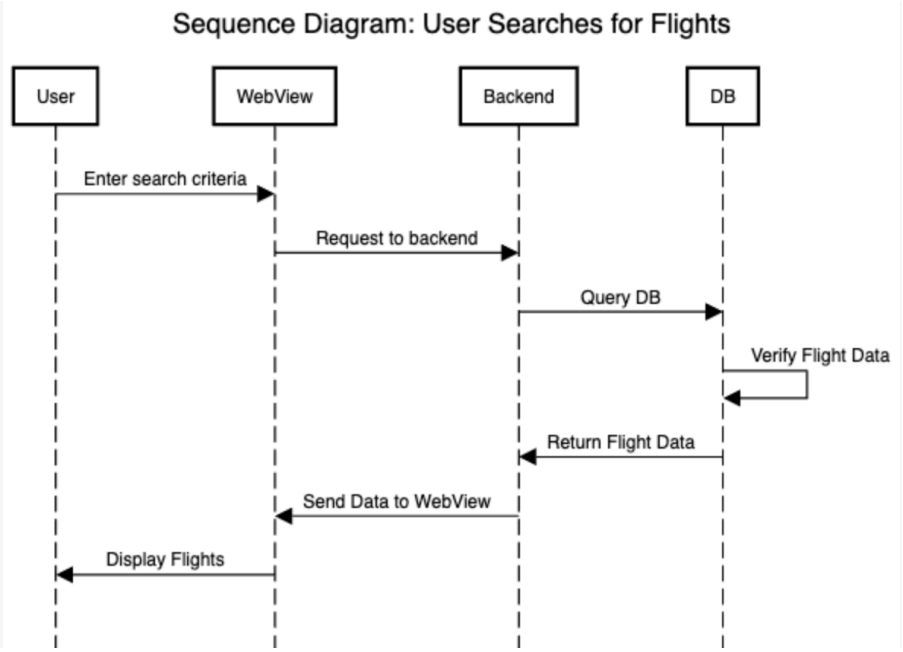
b. Updated use Case Diagram

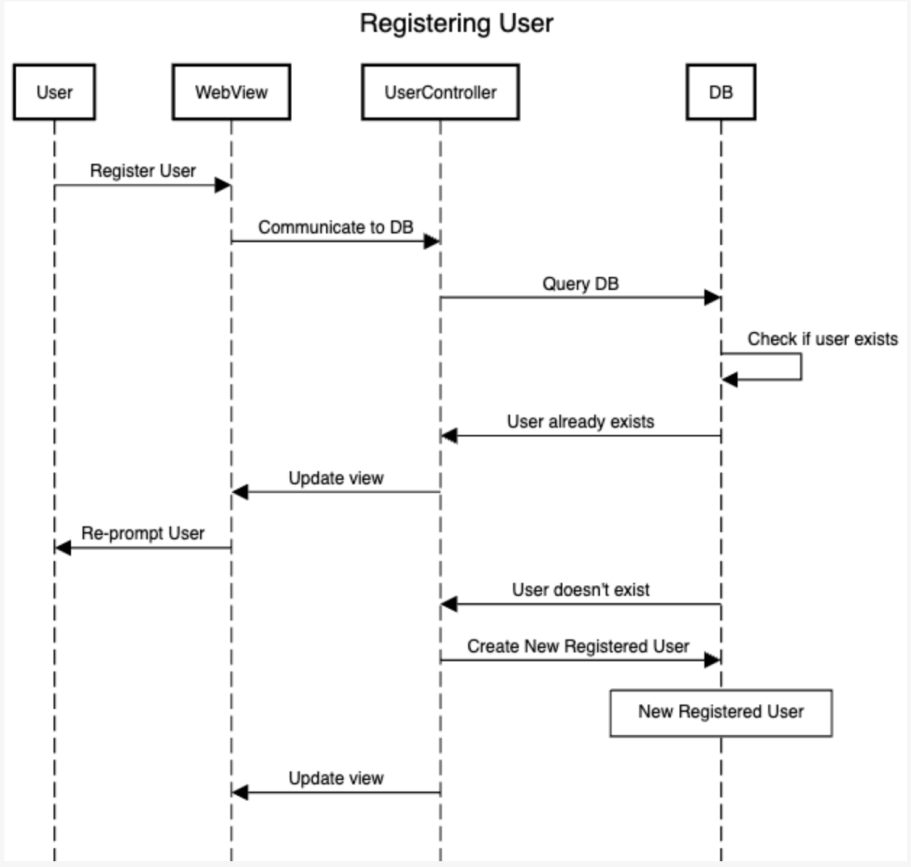


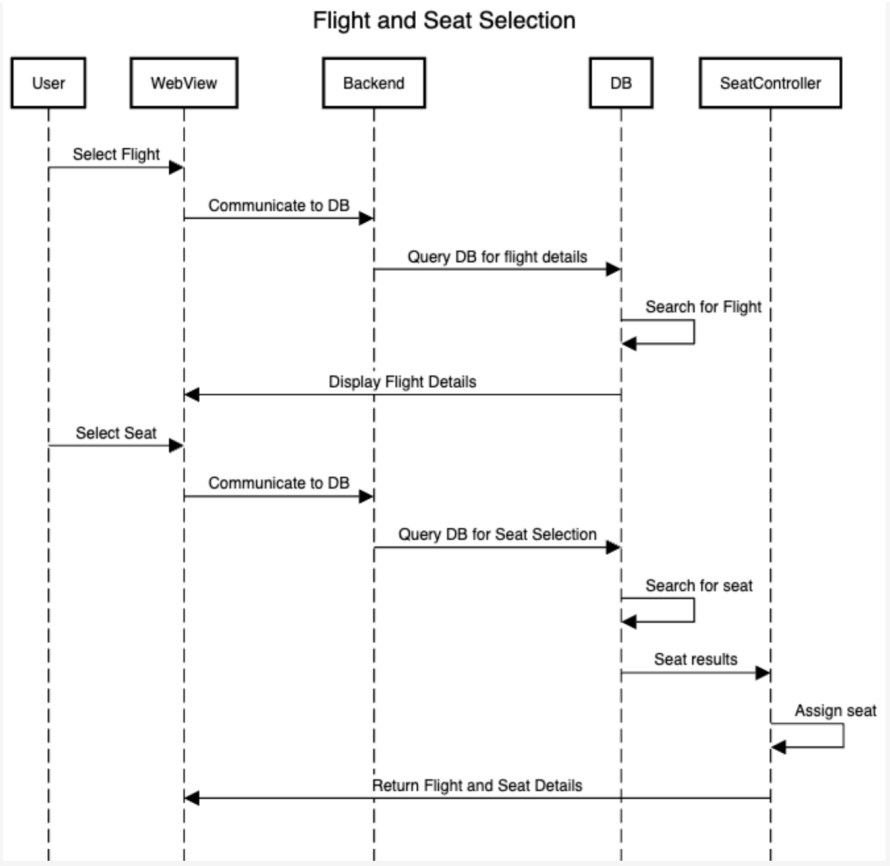
c. Systems Activity Diagram

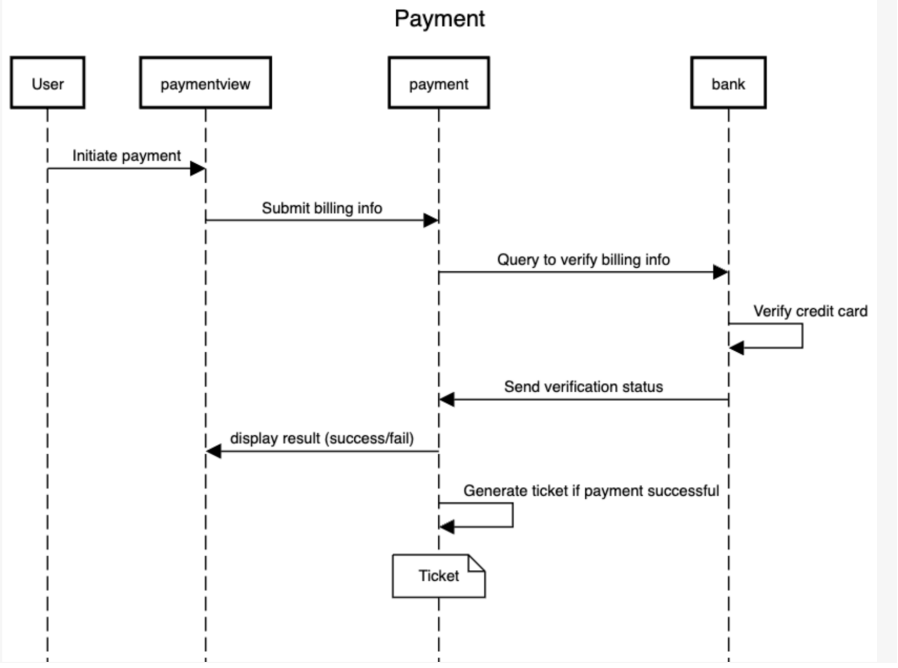


d. Sequence Diagram

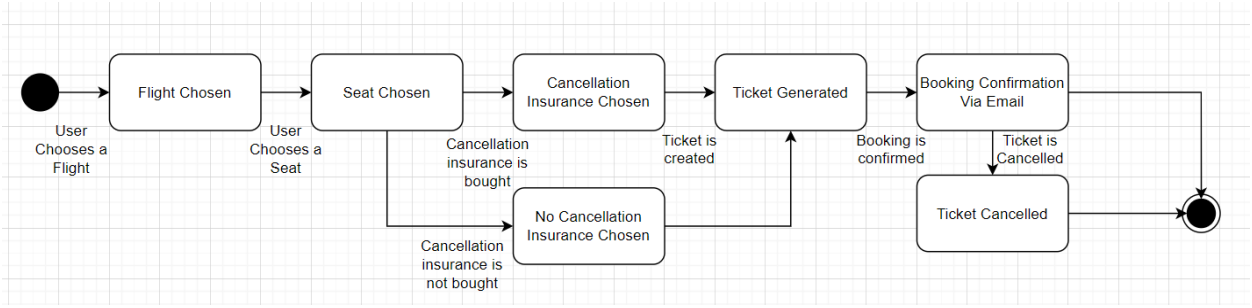


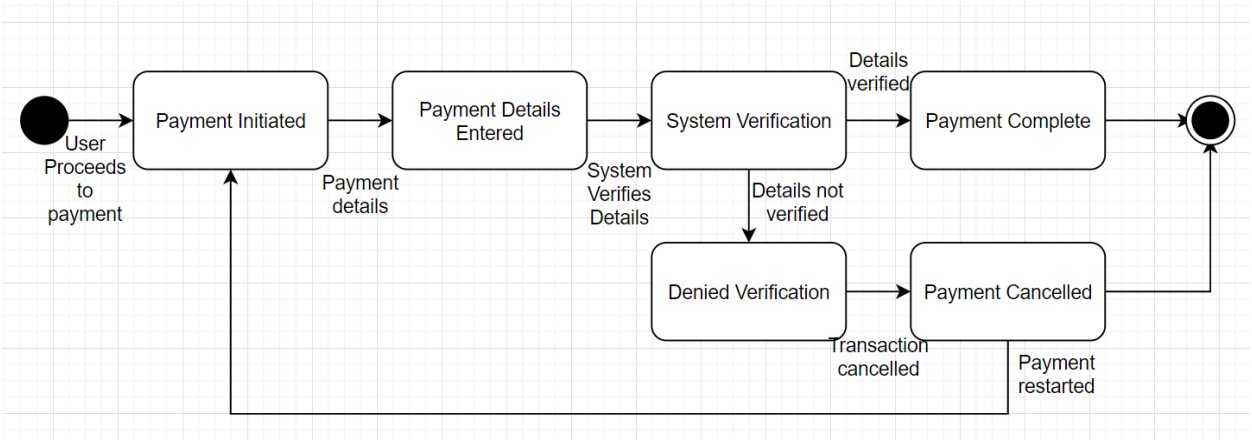


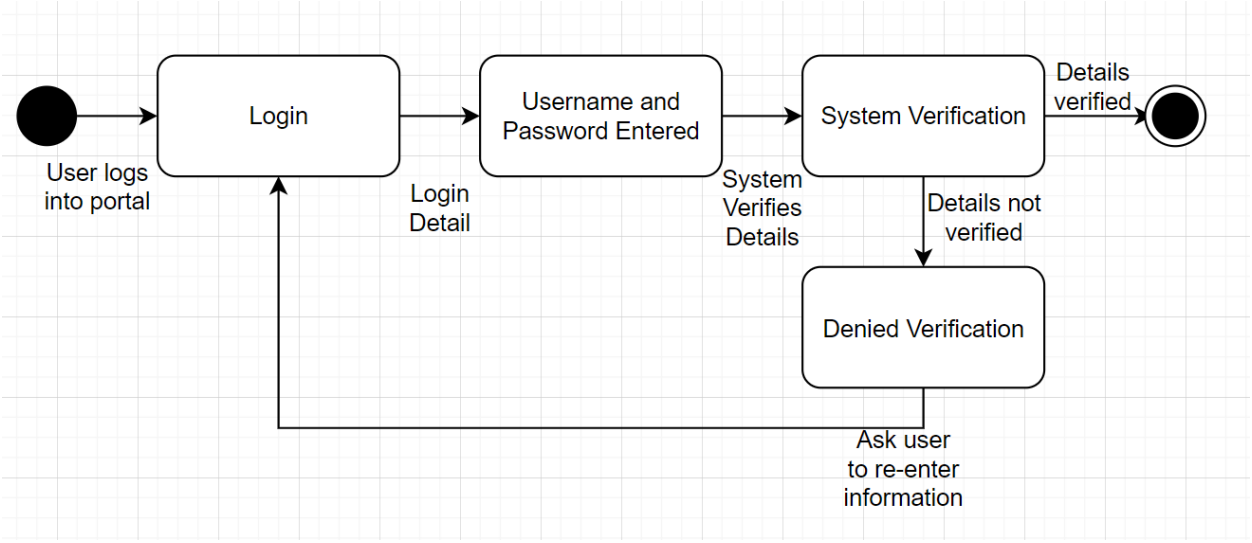

Flight and Seat Selection
User
WebView
Backend
DB
SeatController
Select Flight
Communicate to DB
Query DB for flight details
Search for Flight
Display Flight Details
Select Seat
Communicate to DB
Query DB for Seat Selection
Search for seat
Seat results
Assign seat
Return Flight and Seat Details

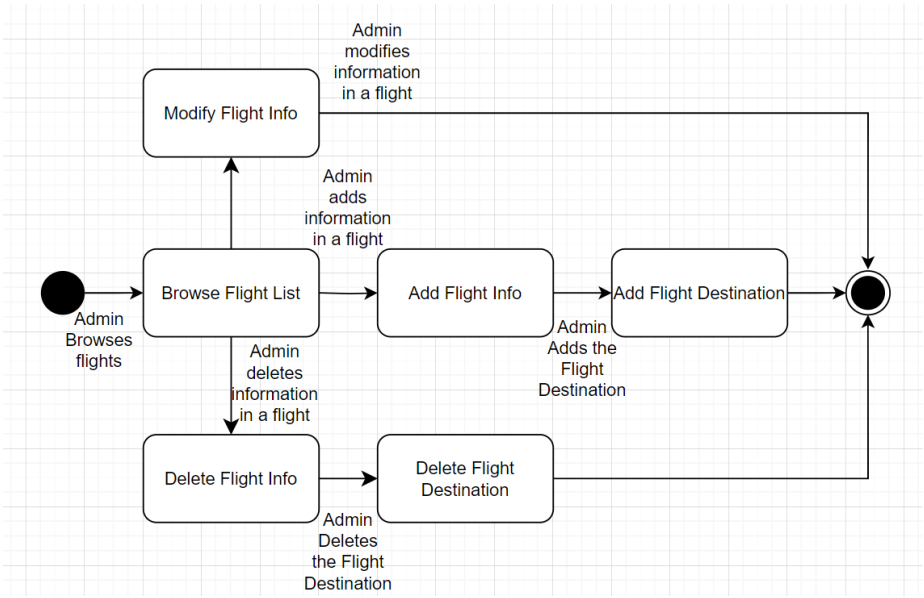

Payment
User
paymentview
payment
bank
Initiate payment
Submit billing info
Query to verify billing info
Verify credit card
Send verification status
display result (success/fail)
Generate ticket if payment successful
Ticket

e. State Transition Diagram

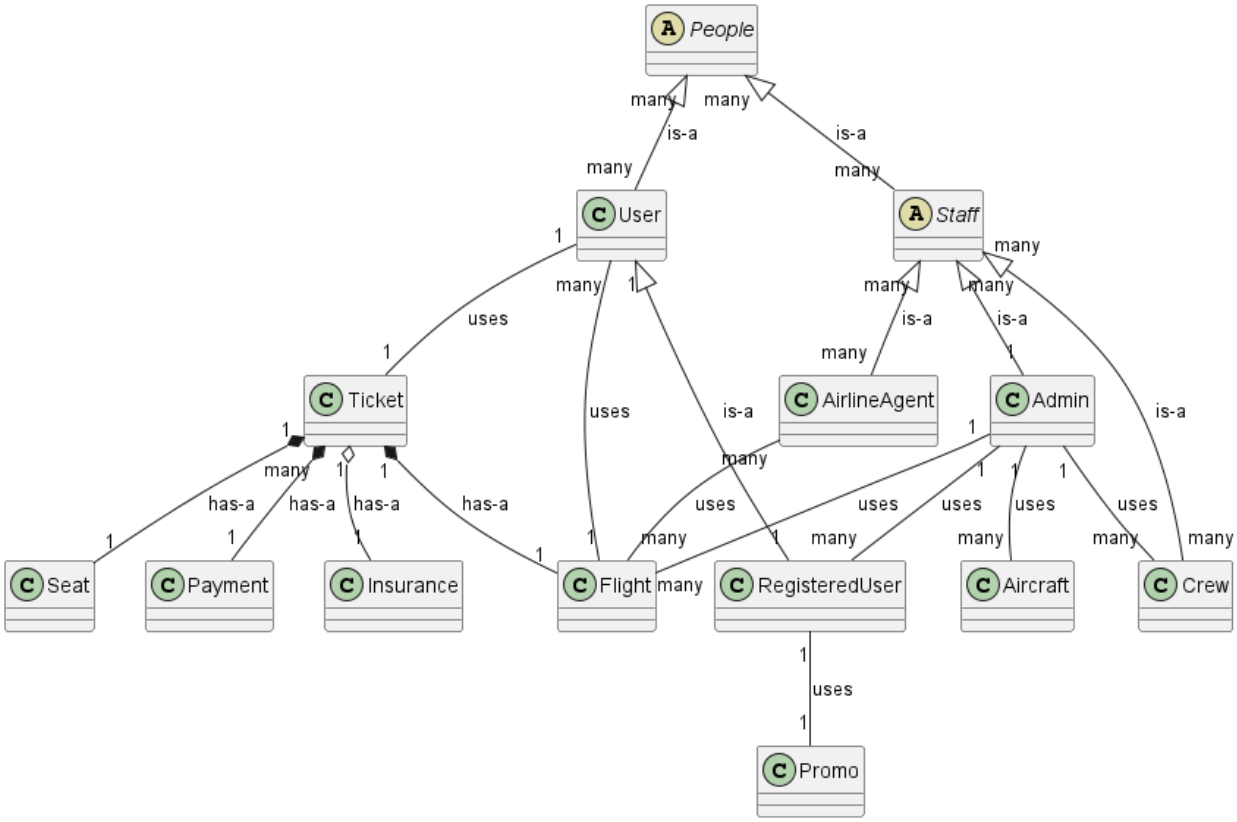




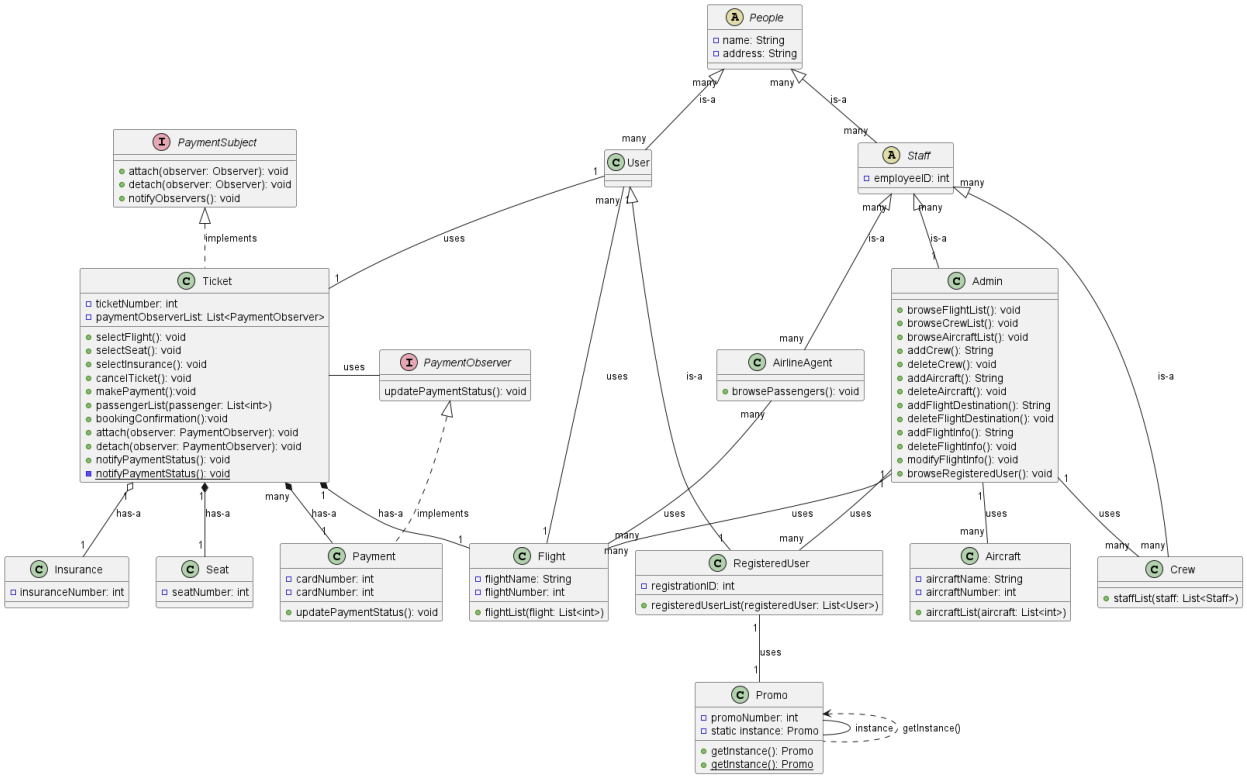




f. System's Domain Class Diagram

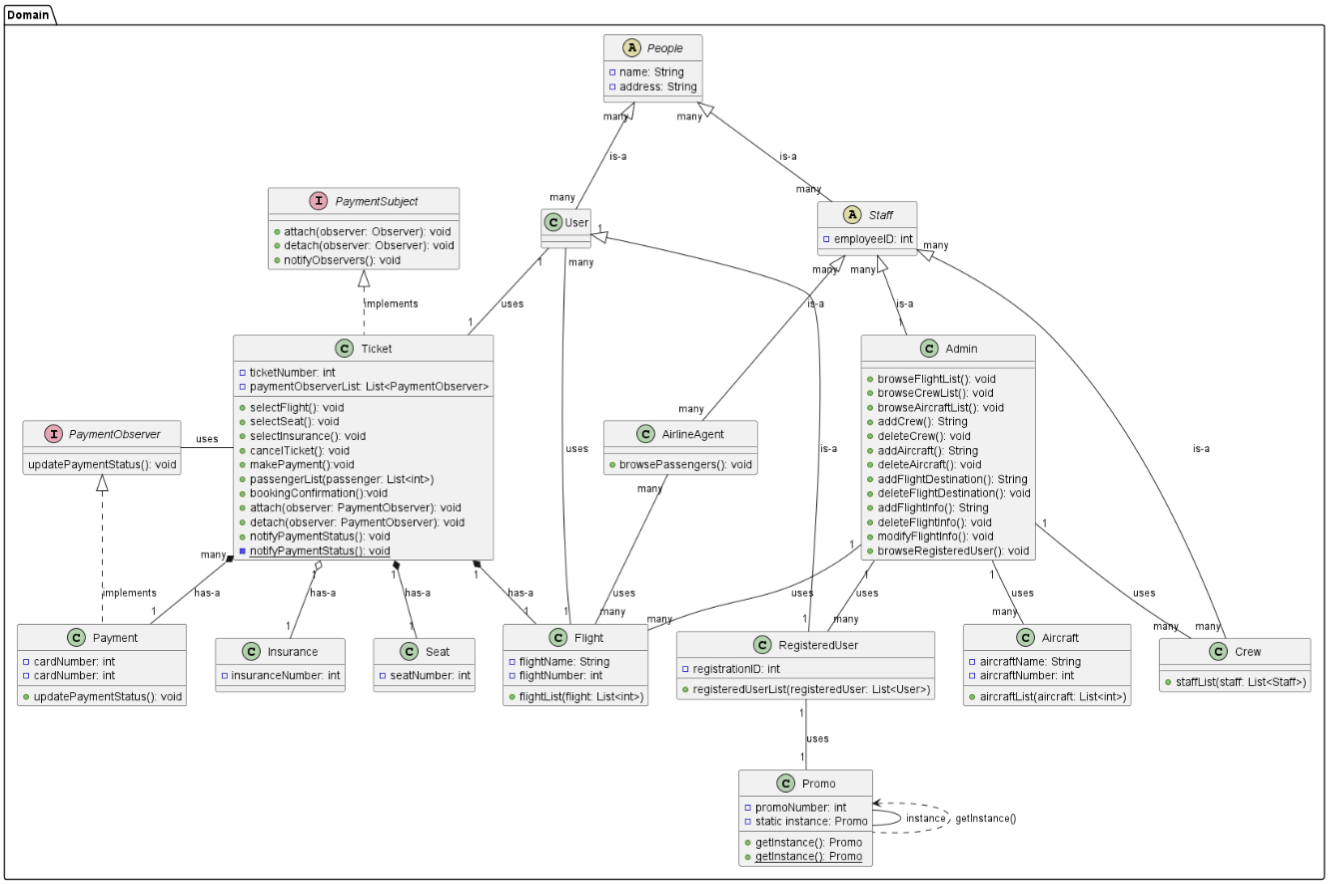


g. System's Domain class diagram (attributes, functionalities, and relationships/multiplicities)

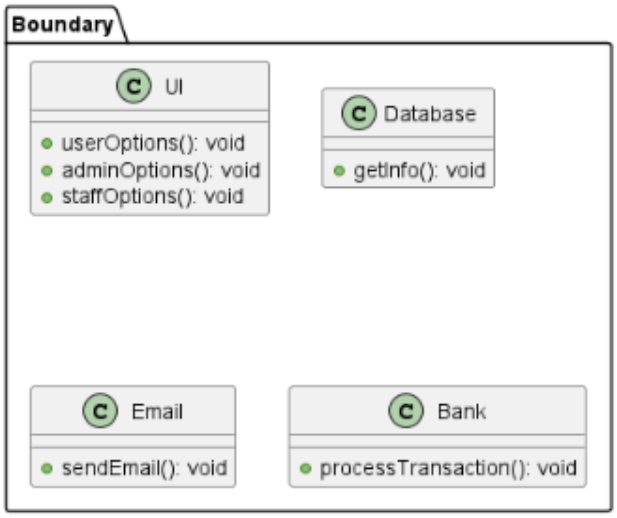


III. Part Three - Detailed Design-Class Diagrams:

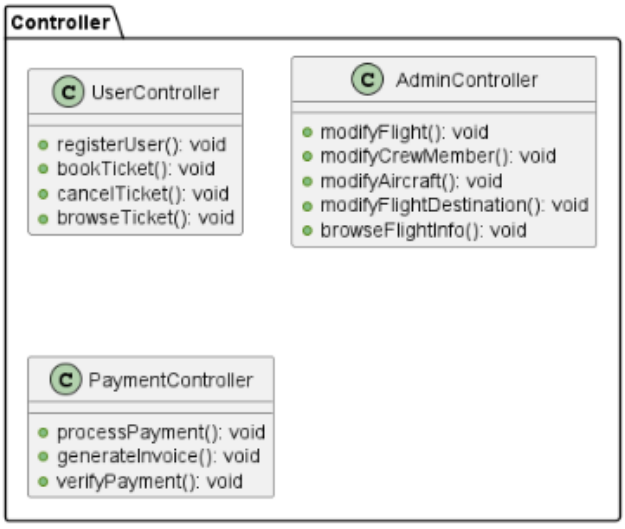
a. Domain classes



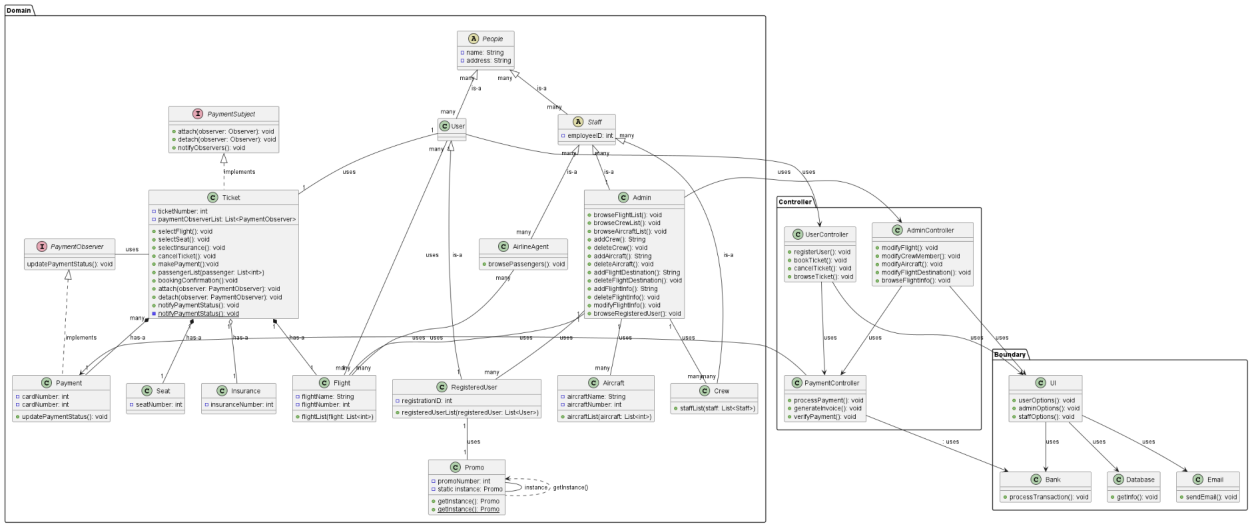
b. Boundary classes



c. Controller classes

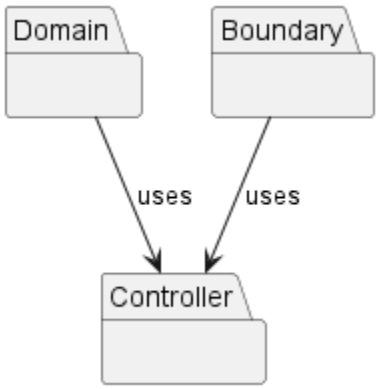


d. Complete Diagram with Relationships



IV. Part Four - High Level Architecture:

a. A Package Diagram



b. A Deployment Diagram