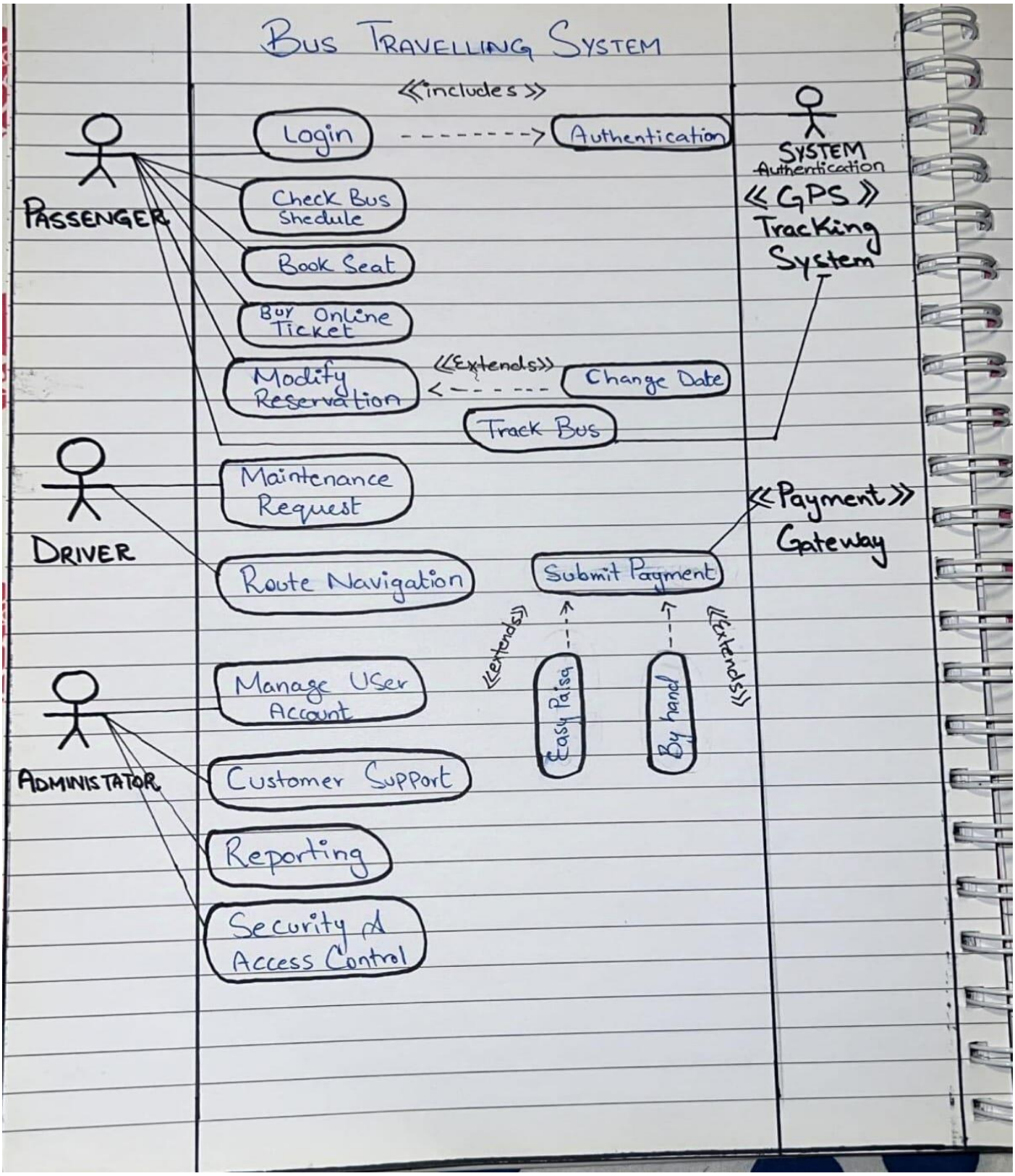
❖ Software Design and Architecture

❖ Bus Travelling system

- ***Submitted By*: *Noman Shakir***
- ***Submitted To*: *Sir Mukhtiar Zamin***
- ***Reg No*: *FA22-BSE-115***
- ***Class* = *BSE-5A***

Use Case Diagram:



NOMAN SHAKIR
FA22-BSE-115

Fully Dressed Use Case: Book Seat

1. Use Case Name:

- **Book Seat**

2. Primary Actor:

- **Passenger** (An individual who wishes to book a seat on the bus)

3. Stakeholders and Interests:

- **Passenger**: Wants to book a bus seat easily and quickly based on their travel plans.
- **System Administrator**: Ensures that the system performs seat booking efficiently without overloading the system and preventing double bookings.
- **Bus Operator**: Wants to manage bookings effectively to ensure proper seat allocation and avoid overbooking.

4. Preconditions:

- The user is logged in to the system (if login is required).
- The bus schedule and seating availability data are up to date.
- The user has access to the booking system.

5. Postconditions:

- **Success Postcondition**: The seat is successfully booked, and a confirmation is displayed to the user.
- **Failure Postcondition**: The user is informed of any issues preventing seat booking (e.g., seat unavailable, payment failure).

6. Main Success Scenario (Basic Flow):

- The Passenger selects the "Book Seat" option on the system interface.
- The system displays available buses and seating options.
- The Passenger selects a bus, date, and seat from the available options.
- The system checks the seat availability for the selected bus and date.
- The system prompts the Passenger to confirm booking details.
- The Passenger confirms the seat booking.
- The system processes the payment for the booking (if applicable).
- The system successfully books the seat and generates a booking confirmation.
- The Passenger is provided with a booking reference and travel details.

7. Extensions (Alternative Flows):

- **3a. Passenger Enters Invalid Details**:
  - 3a1. The system detects invalid inputs such as invalid bus date or seat number.
  - 3a2. The system prompts the Passenger to correct the invalid details.
  - 3a3. The Passenger corrects the input and resubmits the booking request.
- **6a. System Experiences Payment Error**:
  - 6a1. The system fails to process the payment.
  - 6a2. The system displays an error message explaining the payment issue.
  - 6a3. The Passenger may choose to retry the payment or cancel the booking.

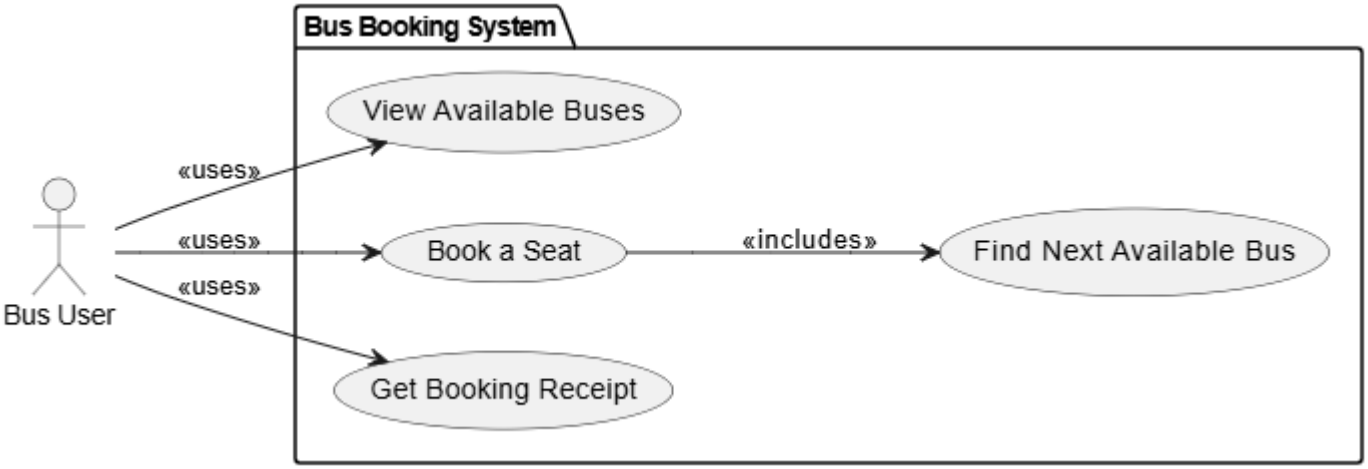
NOMAN SHAKIR
FA22-BSE-115

- **7a. No Seats Available**:
  - 7a1. The system finds no available seats on the selected bus.
  - 7a2. The system informs the Passenger of the lack of available seats.
  - 7a3. The system suggests alternative buses or dates or allows the Passenger to modify their search.

8. Special Requirements:

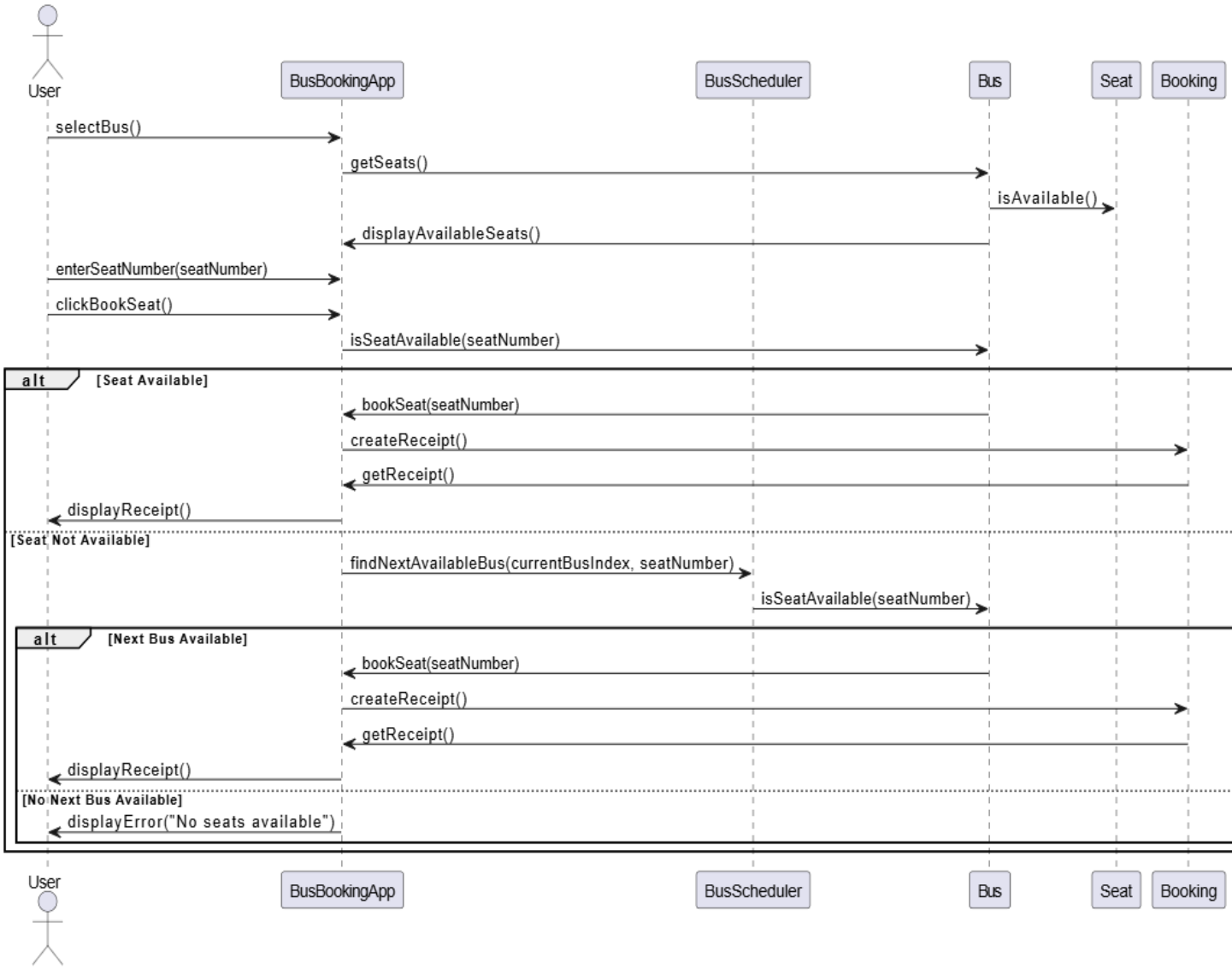
- **Performance**: The system should process seat bookings within 2 seconds under normal load conditions.
- **Usability**:
  - The booking interface should be intuitive and user-friendly.
  - Support for seat selection using a visual representation of the bus seating arrangement.
- **Scalability**: The system must handle a large number of concurrent seats booking requests without performance degradation.
- **Accessibility**: The system should comply with accessibility standards to support users with disabilities.

Book Seat Use Case For Implementation of Code



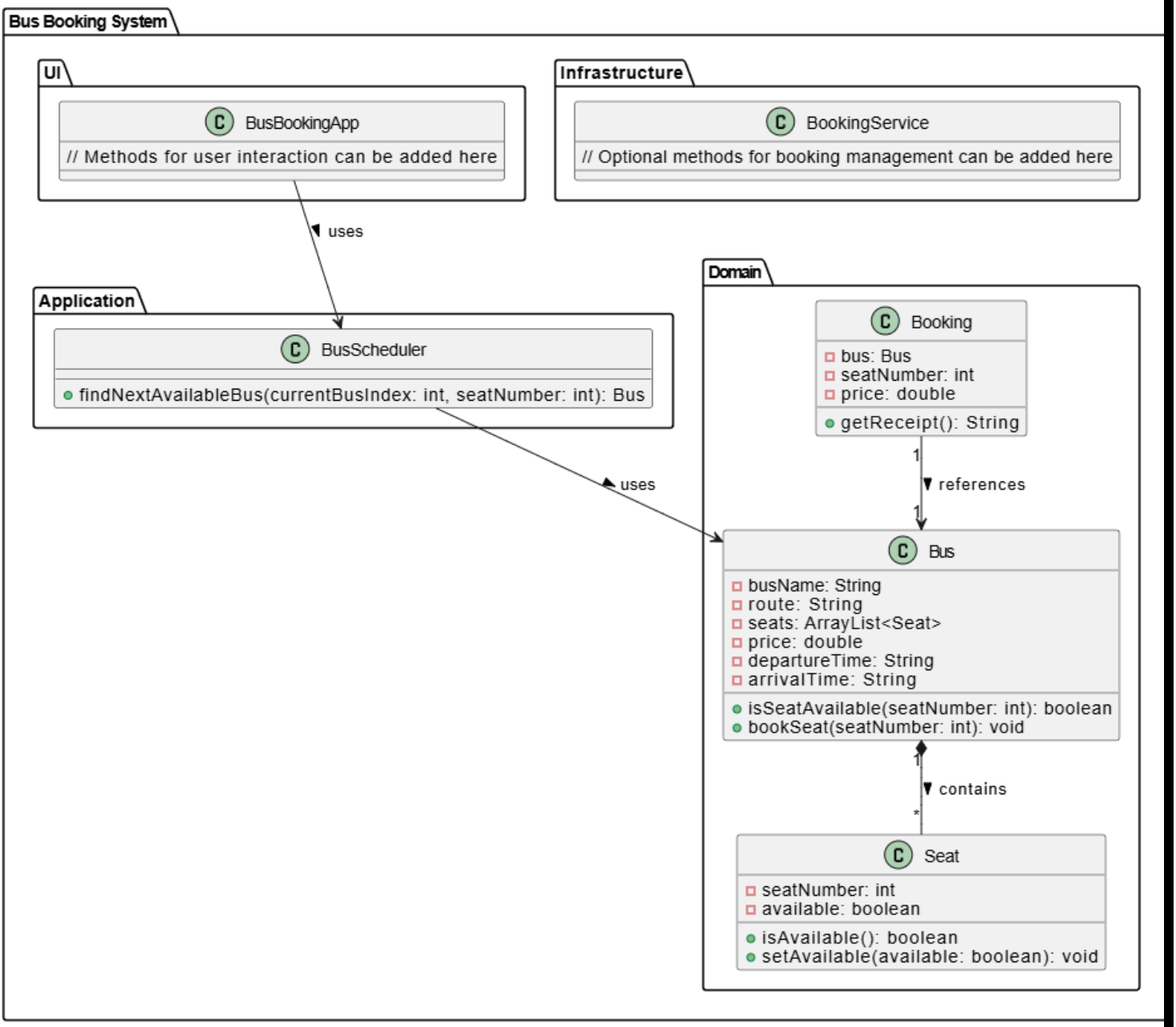
NOMAN SHAKIR
FA22-BSE-115

Sequence diagram



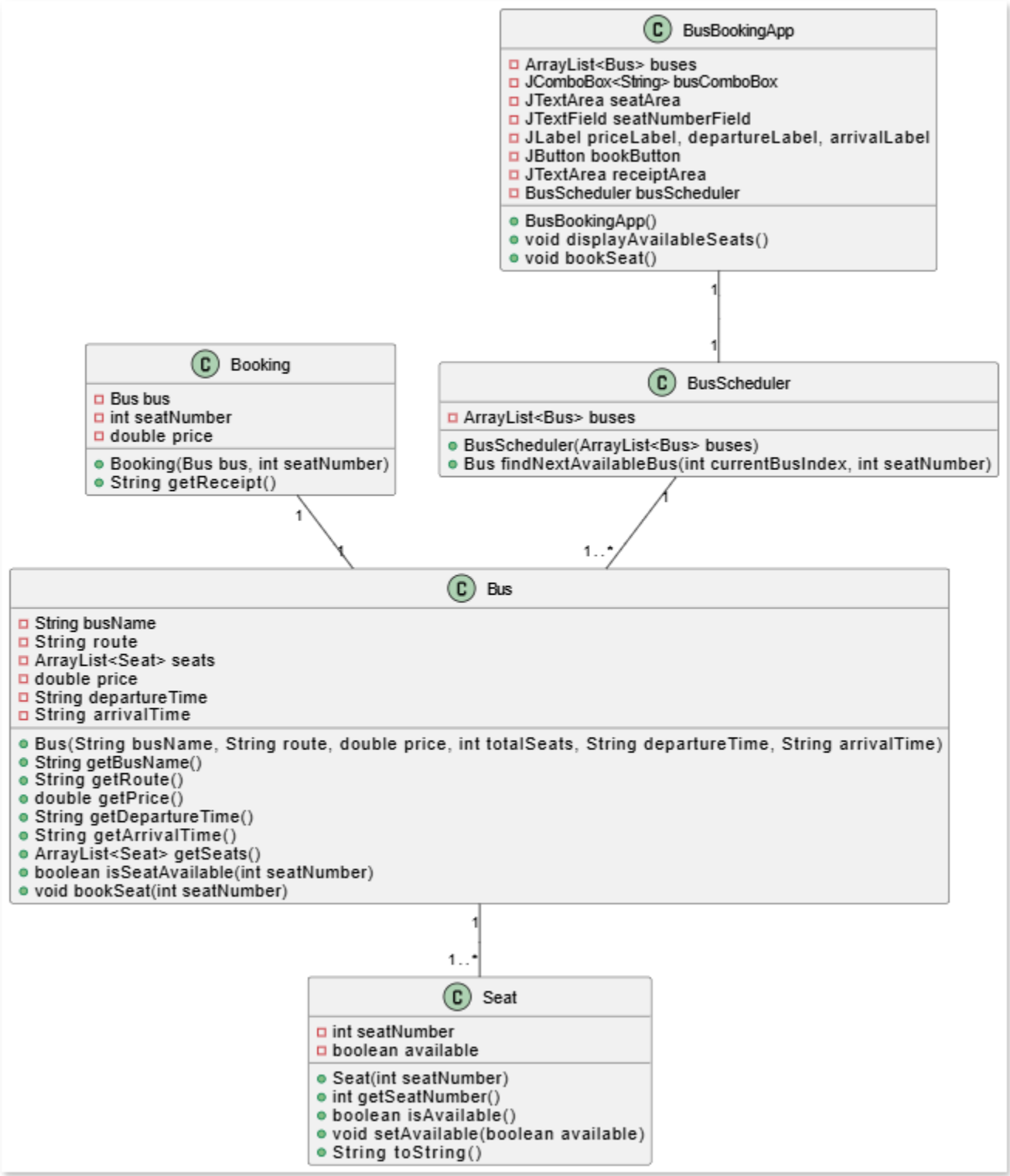
NOMAN SHAKIR
FA22-BSE-115

Composite Structure Diagram:



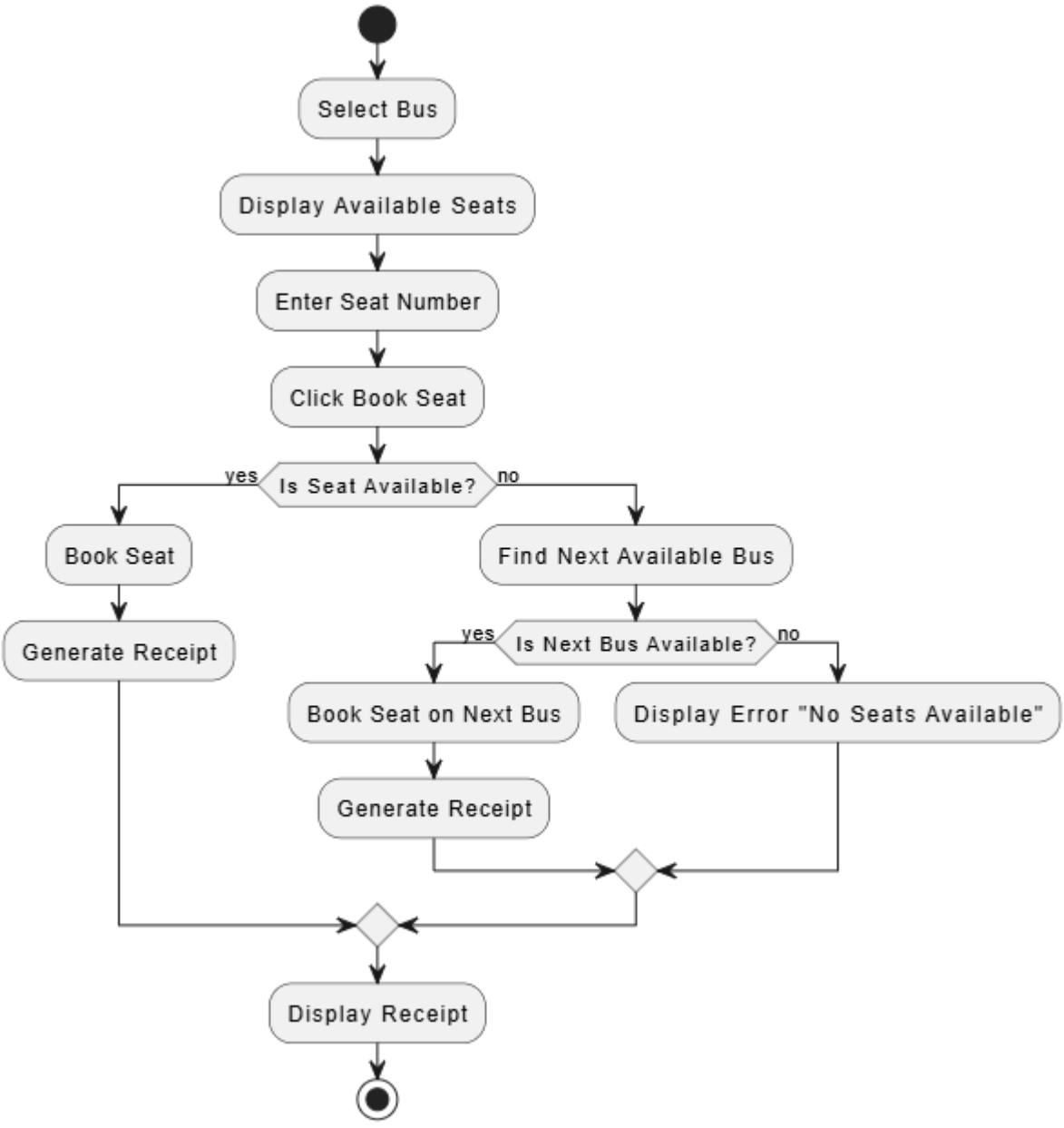
NOMAN SHAKIR
FA22-BSE-115

Class Diagram:



NOMAN SHAKIR
FA22-BSE-115

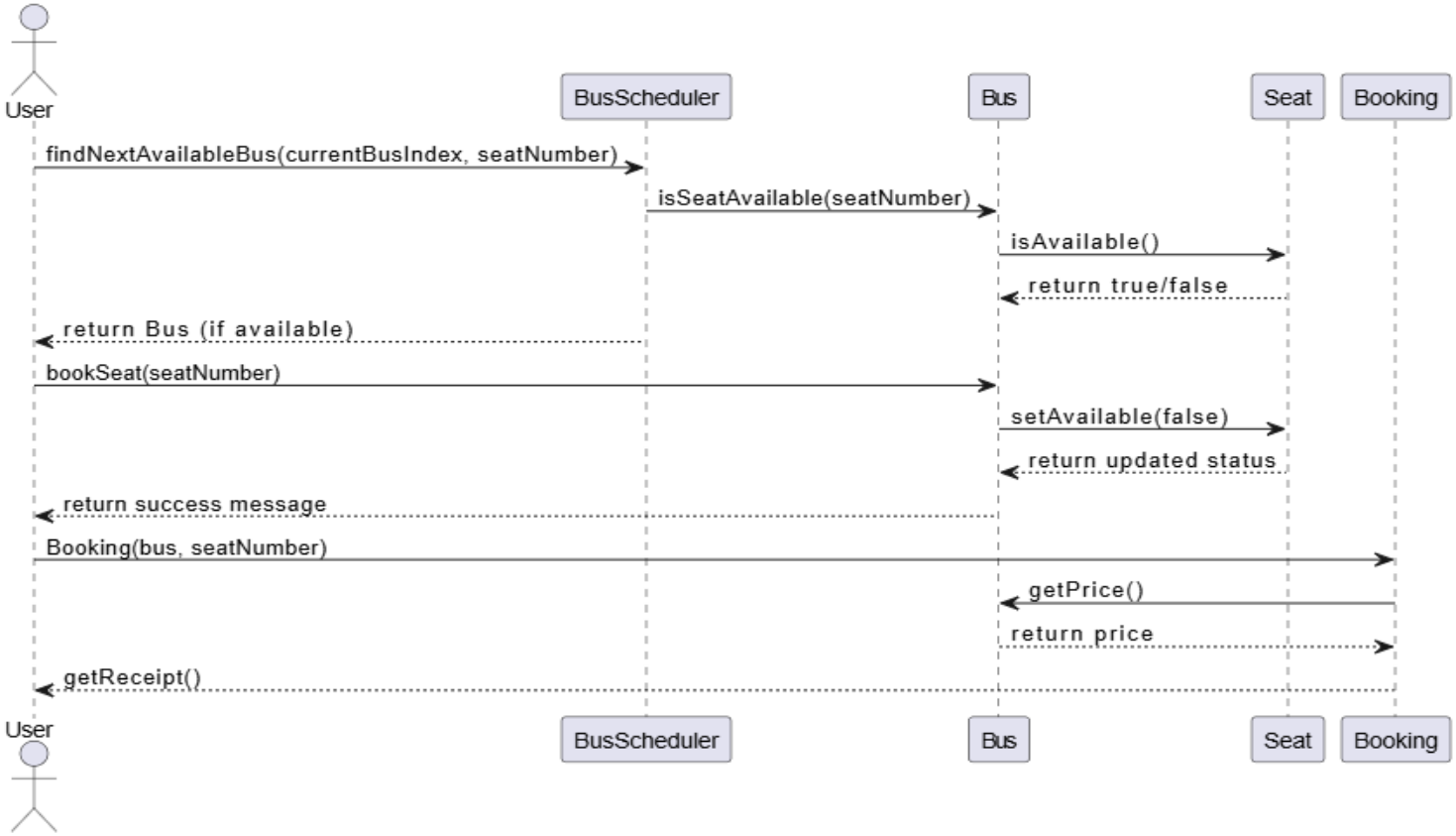
Activity Diagram:



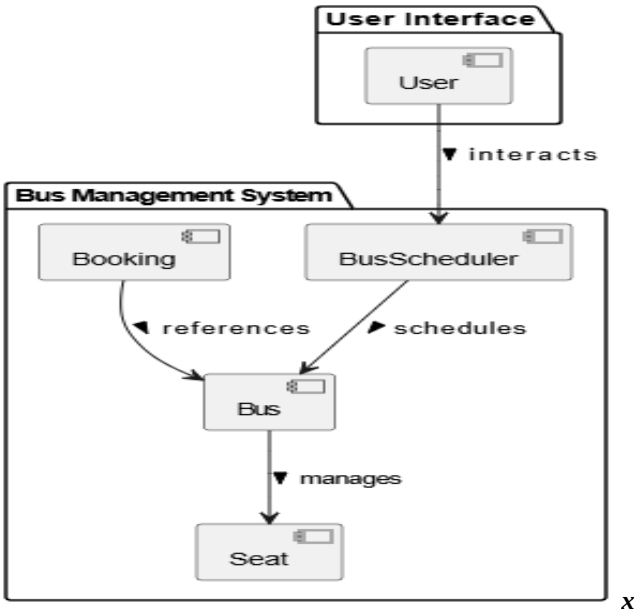
NOMAN SHAKIR
FA22-BSE-115

Communication Diagram:

communication diagram based on your Bus, Seat, Bus Scheduler, and Booking classes, including the principles of high cohesion and information expert.



Package Diagram:



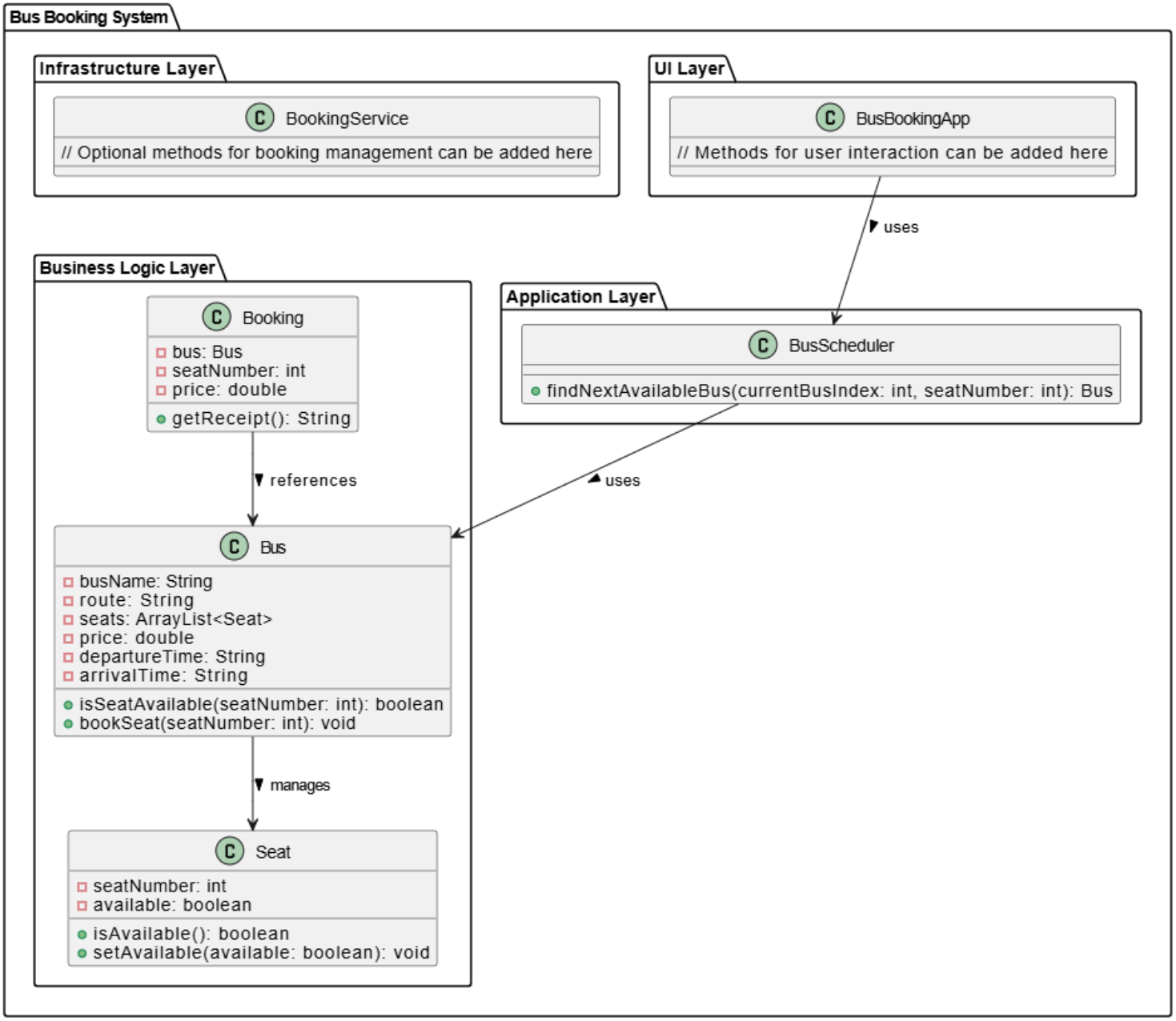
x

File Structure

```
src
├── application
│   └── BusScheduler.java
├── domain
│   ├── Bus.java
│   ├── Seat.java
│   └── Booking.java
├── infrastructure
│   └── BookingService.java  (optional)
└── ui
    └── BusBookingApp.java
```


NOMAN SHAKIR
FA22-BSE-115

Layer Architecture Diagram:



NOMAN SHAKIR
FA22-BSE-115