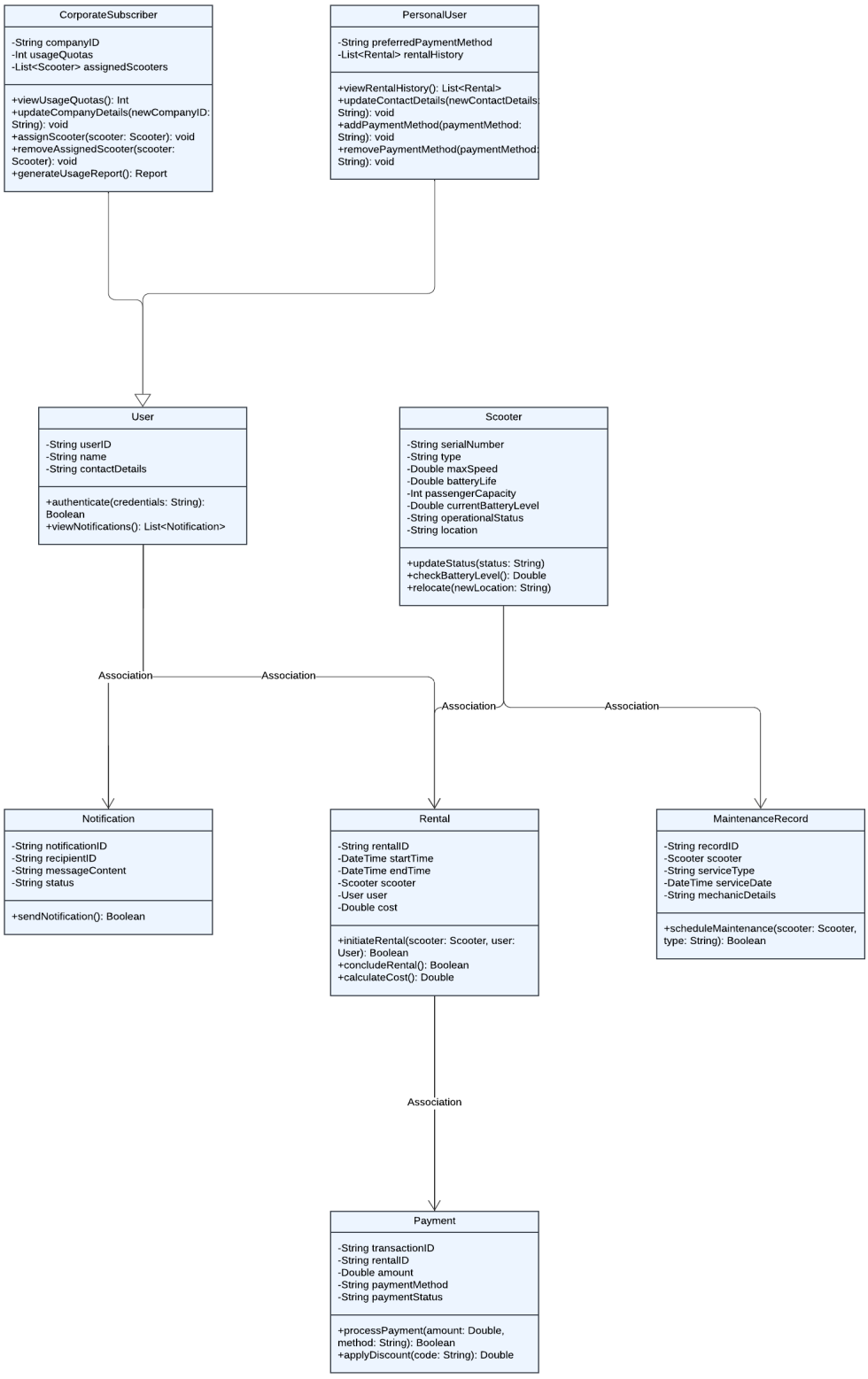
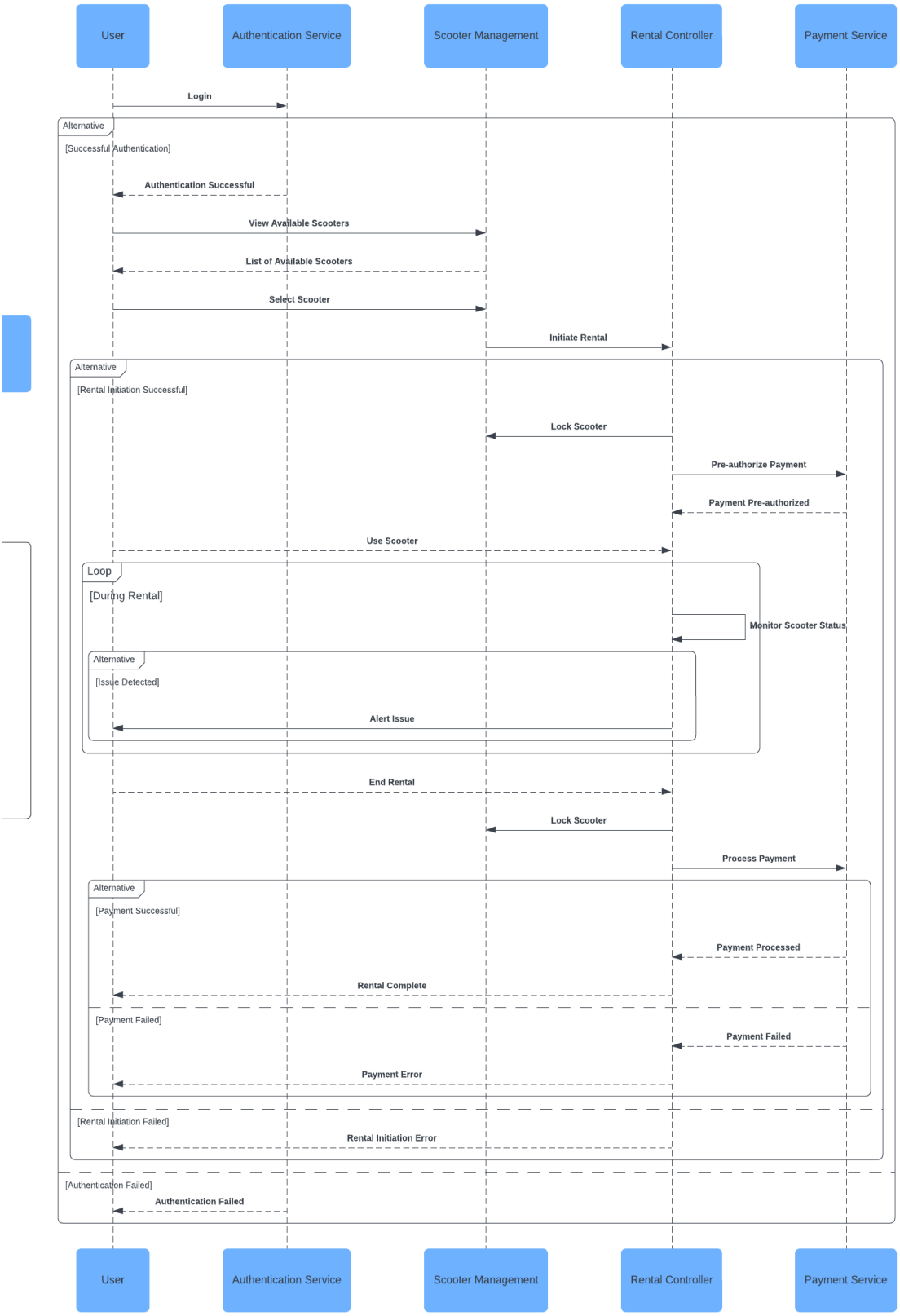
System Development Assignment

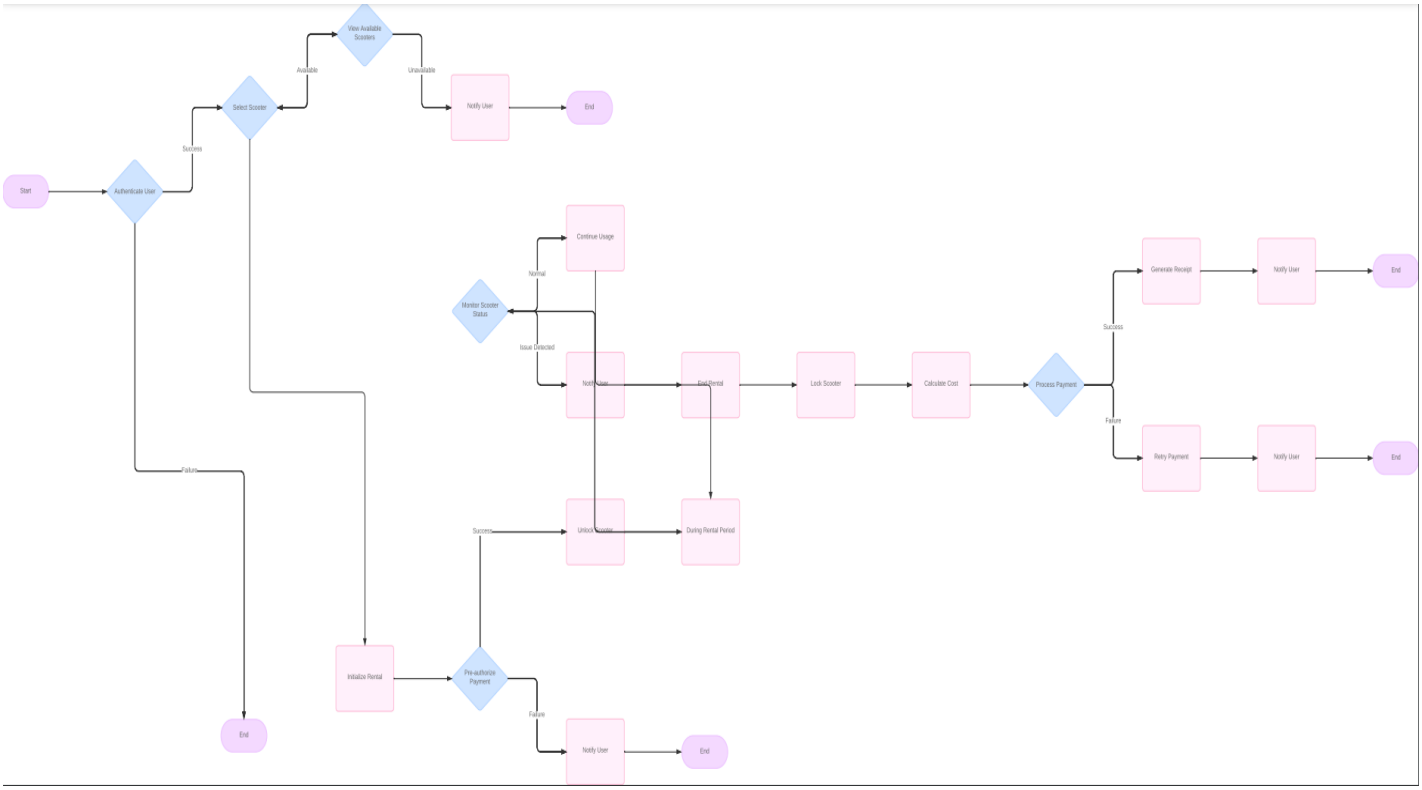
Class Diagram:


CorporateSubscriber
-String companyID
-Int usageQuotas
-List<Scooter> assignedScooters
+viewUsageQuotas(): Int
+updateCompanyDetails(newCompanyID: String): void
+assignScooter(scooter: Scooter): void
+removeAssignedScooter(scooter: Scooter): void
+generateUsageReport(): Report
PersonalUser
-String preferredPaymentMethod
-List<Rental> rentalHistory
+viewRentalHistory(): List<Rental>
+updateContactDetails(newContactDetails: String): void
+addPaymentMethod(paymentMethod: String): void
+removePaymentMethod(paymentMethod: String): void
User
-String userID
-String name
-String contactDetails
+authenticate(credentials: String): Boolean
+viewNotifications(): List<Notification>
Scooter
-String serialNumber
-String type
-Double maxSpeed
-Double batteryLife
-Int passengerCapacity
-Double currentBatteryLevel
-String operationalStatus
-String location
+updateStatus(status: String)
+checkBatteryLevel(): Double
+relocate(newLocation: String)
Association
Association
Association
Association
Notification
-String notificationID
-String recipientID
-String messageContent
-String status
+sendNotification(): Boolean
Rental
-String rentalID
-DateTime startTime
-DateTime endTime
-Scooter scooter
-User user
-Double cost
+initiateRental(scooter: Scooter, user: User): Boolean
+concludeRental(): Boolean
+calculateCost(): Double
MaintenanceRecord
-String recordID
-Scooter scooter
-String serviceType
-DateTime serviceDate
-String mechanicDetails
+scheduleMaintenance(scooter: Scooter, type: String): Boolean
Association
Payment
-String transactionID
-String rentalID
-Double amount
-String paymentMethod
-String paymentStatus
+processPayment(amount: Double, method: String): Boolean
+applyDiscount(code: String): Double

Sequence Diagram:


User
Authentication Service
Scooter Management
Rental Controller
Payment Service
Login
Alternative
[Successful Authentication]
Authentication Successful
View Available Scooters
List of Available Scooters
Select Scooter
Initiate Rental
Alternative
[Rental Initiation Successful]
Lock Scooter
Pre-authorize Payment
Payment Pre-authorized
Use Scooter
Loop
[During Rental]
Monitor Scooter Status
Alternative
[Issue Detected]
Alert Issue
End Rental
Lock Scooter
Process Payment
Alternative
[Payment Successful]
Payment Processed
Rental Complete
[Payment Failed]
Payment Failed
Payment Error
[Rental Initiation Failed]
Rental Initiation Error
[Authentication Failed]
Authentication Failed
User
Authentication Service
Scooter Management
Rental Controller
Payment Service

Activity Diagram:



Additional Notes

1. **Class Diagram**: I identified core entities like Scooter, User, Rental, Payment, Maintenance Record, and Notification to cover different aspects of the ESRS. I ensured to include attributes and methods relevant to their roles in the system.
2. **Sequence Diagram**: The sequence diagram captures the interactions between the user and the system components during a rental. It includes decision points and alternative paths for different outcomes, such as login failure and payment issues.
3. **Activity Diagram**: The activity diagram depicts the flow of activities and decisions from authentication to rental conclusion, including monitoring and handling exceptions like payment failures and scooter malfunctions.