



SOFTWARE SPECIFICATION

<<Groovy Cineplex>>

– Hanoi, January 2024 –

Record of Changes

Version	Date	A* M, D	In charge	Change Description
V1.0	10/01	A	Đào Duy Thái	Add hierarchy.
V1.0	10/01	A	Đào Duy Thái	Add use case specification 7-14
V1.0	10/01	A	Dương Thành Luân	Add use case diagram
V1.0	10/01	A	Phí Đức Thanh	Add use case specifications 22-27
V1.0	14/01	A	Lê Đại Nguyên	Add use case specifications 1-7
V1.0	14/01	A	Lê Thành An	Add use case specifications 15-17
V1.0	15/01	A	Lê Thành An	Add use case specifications 18-19
V1.0	15/01	A	Dương Thành Luân	Add business rules list
V1.0	16/01	A	Lê Thành An	Add use case specifications 20-21
V1.0	17/01	A	Đào Duy Thái	Add product context
V1.0	18/01	A	Đào Duy Thái	Add the diagrams for the assigned use cases

*A - Added M - Modified D - Deleted

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1. SOFTWARE REQUIREMENTS

1.1. Background

Groovy Cineplex, a leading movie theater chain, is launching a digital ticket booking website to enhance the movie-watching experience for its customers. This initiative aims to provide users with a convenient platform to browse movies, check showtimes, and book tickets online. The website will also feature movie-related news and administrative tools for efficient management. By leveraging technology and customer-centric design, Groovy Cineplex seeks to redefine the cinema experience and strengthen its connection with audiences.

1.2. Business Opportunities

- Digital Expansion: Develop a user-friendly ticket booking website to reach more customers online and stay competitive.
- Improved Customer Experience: Enhance convenience and flexibility for customers to book tickets and access movie information, boosting loyalty.
- Diversified Revenue: Explore additional revenue streams through advertising, partnerships, and promotions on the digital platform.
- Data-driven Insights: Utilize analytics to understand customer preferences and optimize offerings and marketing strategies.
- Brand Extension: Extend the brand's reach globally through digital channels, attracting audiences beyond physical locations.
- Partnerships: Collaborate with industry stakeholders for exclusive events and co-branded marketing initiatives.
- Innovation: Stand out by offering unique digital experiences like personalized recommendations or interactive content.
- Community Engagement: Foster an online community around cinema culture, enhancing brand affinity and leveraging user-generated content for marketing.

1.3. Business Objectives

- Increase online ticket sales.
- Enhance customer engagement.
- Expand market reach.
- Optimize operational efficiency.
- Maximize revenue generation.
- Improve customer satisfaction.
- Build brand loyalty.
- Stay ahead of competition.
- Promote innovation.
- Sustain growth trajectory.

1.4. Success Metrics

- Online Ticket Sales Growth.
- Website Traffic.
- Conversion Rate.
- Customer Retention Rate.
- Customer Satisfaction Scores.

- Market Penetration.
- Operational Efficiency.
- Revenue Growth.
- Brand Perception.
- Competitive Benchmarking.

1.5. Product Vision

The main objective for developing Groovy Cineplex Ticket Booking Website is to provide users with an online platform to browse movies, view showtimes, book tickets for movies playing and access news running at the Groovy Cineplex theatre. The website will also have administrative features to manage movies, showtimes, orders...

1.6. Major Features

1.6.1. User Authentication and Authorization:

- Customer and manager sign-in/sign-up functionality with appropriate authentication mechanisms.
- Account management for users and managers to update personal information and passwords.

1.6.2. Movie Exploration and Booking:

- Showcase of current and upcoming movies with detailed information.
- Ability for customers to select movies, view showtimes, and book tickets.
- Seating selection for chosen movie screenings.

1.6.3. Cinema Information and Management:

- Display of available cinemas and their details.
- Management of cinema facilities, including rooms, seats, and scheduling of movie shows.
- Tracking of ticket sales and revenue for individual cinemas and across multiple locations.

1.6.4. User Profile and Preferences:

- Personalized user profiles with options to view booking history, manage watchlists, and update preferences.
- Password reset functionality for account security.

1.6.5. Administrative Tools:

- Manager access to control cinema schedules, manage movie lineup, and monitor ticket sales and revenue.
- Authorization requests management for higher-level administrators.
- Head manager's oversight of multiple cinemas and management of movie bank and ticket pricing types.

1.6.6. Dashboard and Reporting:

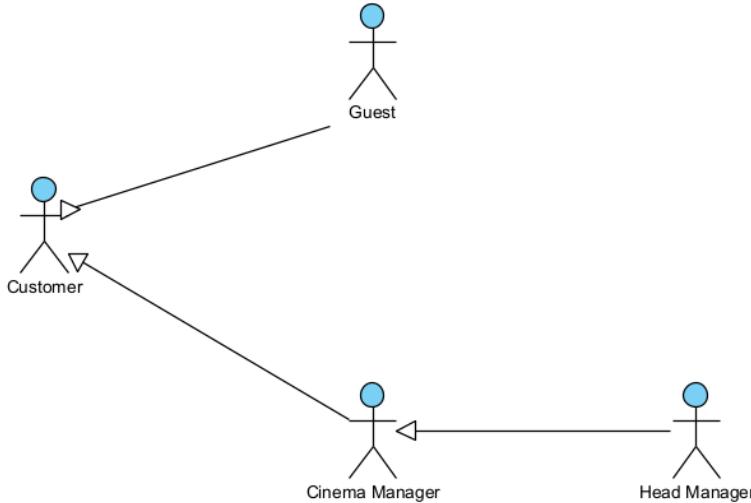
- Dashboard providing visual summaries and key metrics of cinema performance.

- Reporting tools for analyzing ticket sales, revenue, and other relevant data.

1.7. User Requirements

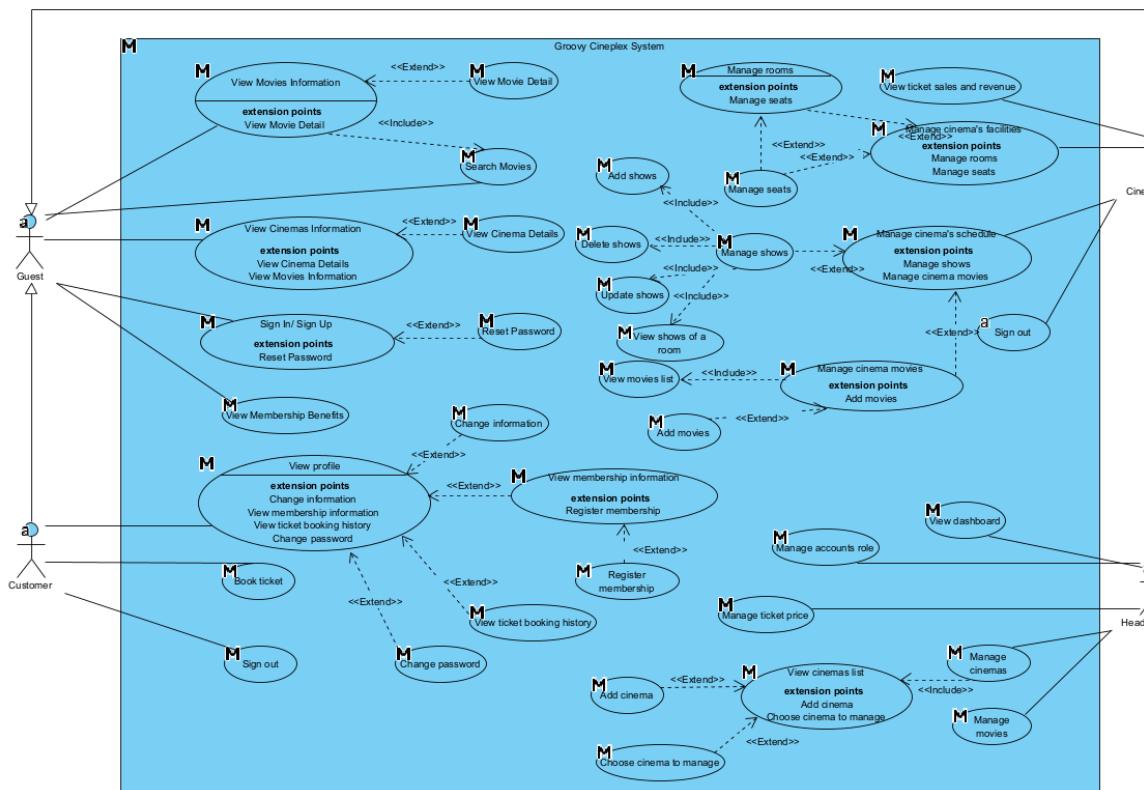
1.7.1. Actors List

The diagrams below provide a visual representation of the interactions between actors (users or external systems).



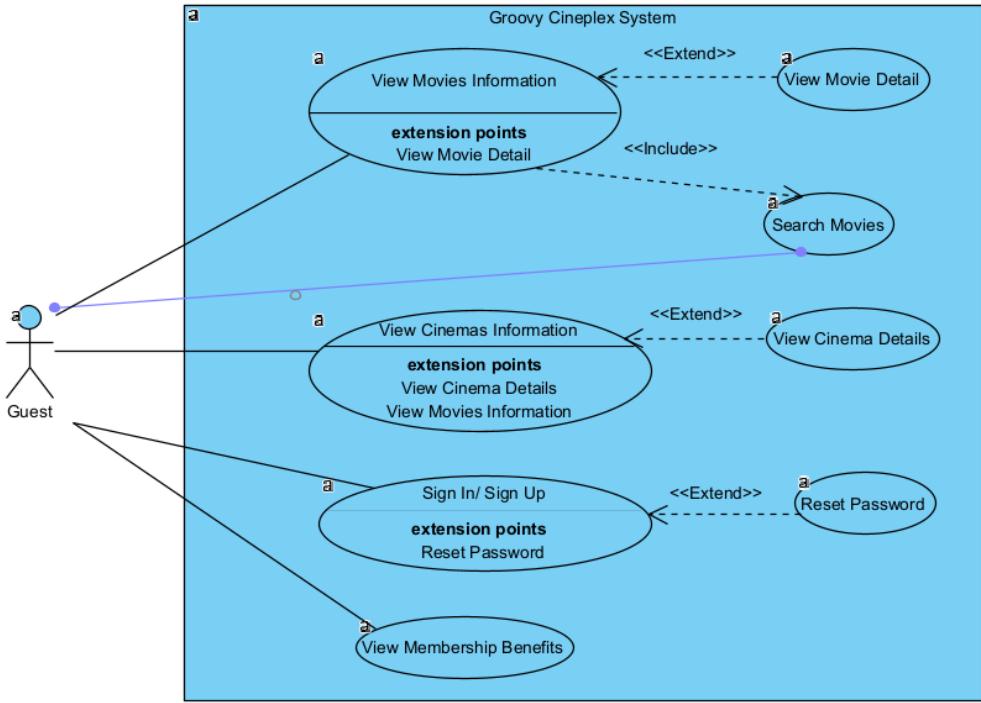
1.7.2. Use Cases

1.7.2.1. Overall use case

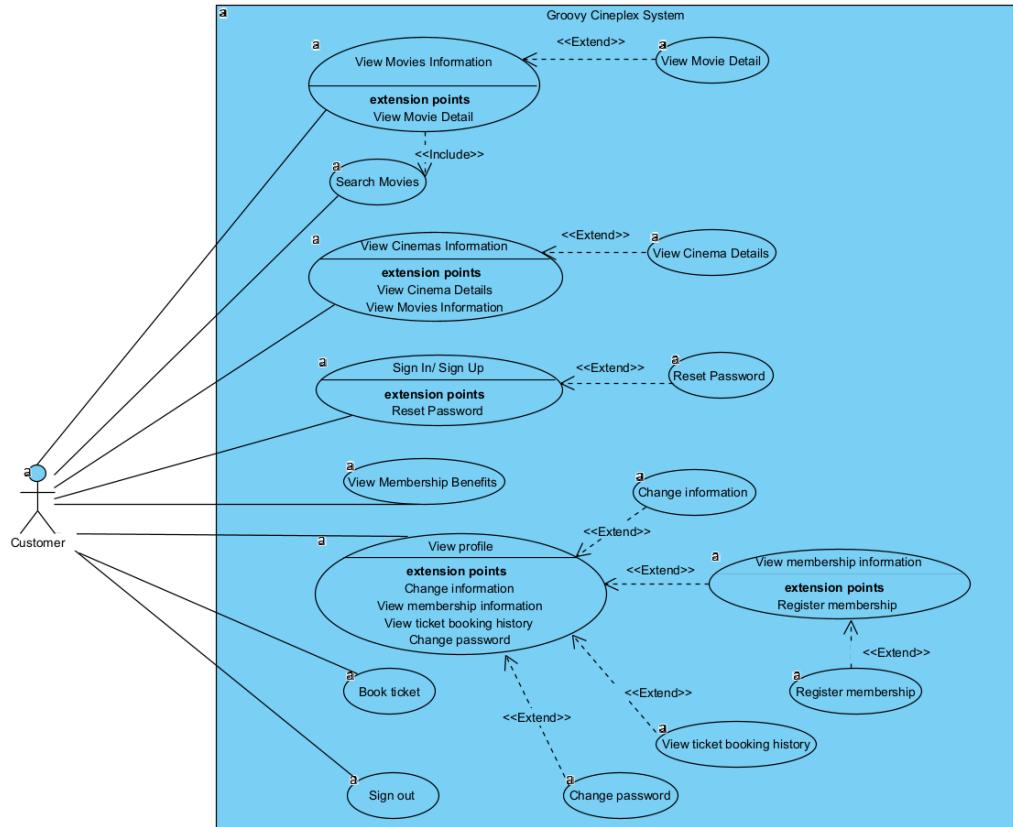


1.7.2.2. Decompose use case diagram

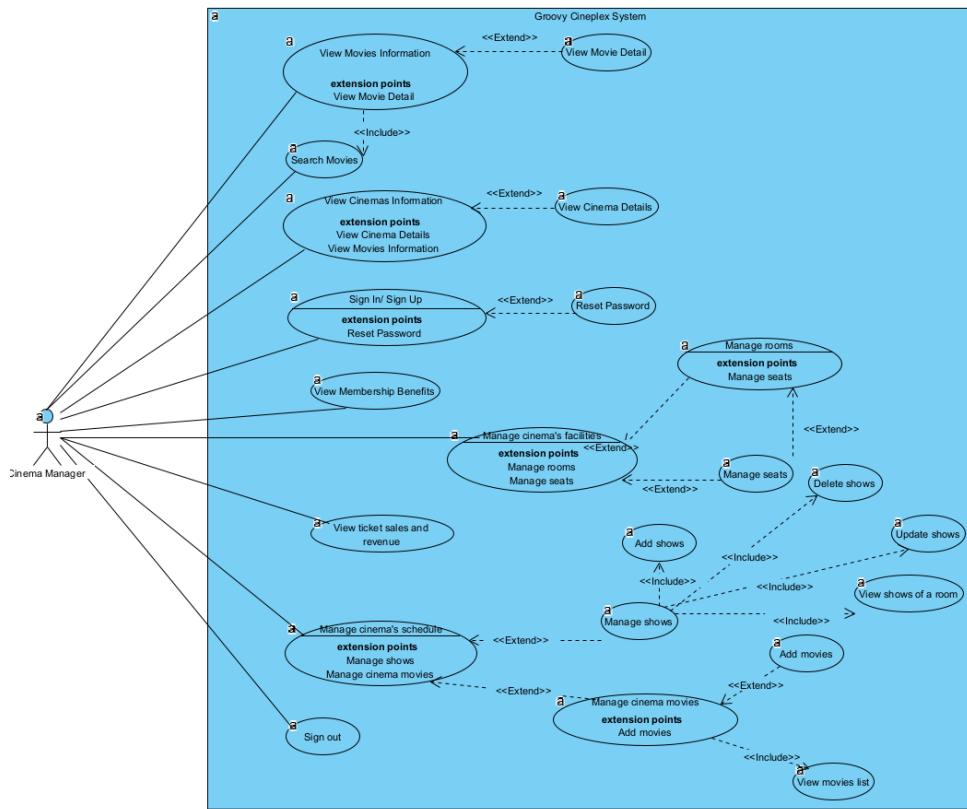
1.7.2.2.1. Use case diagram for Guest



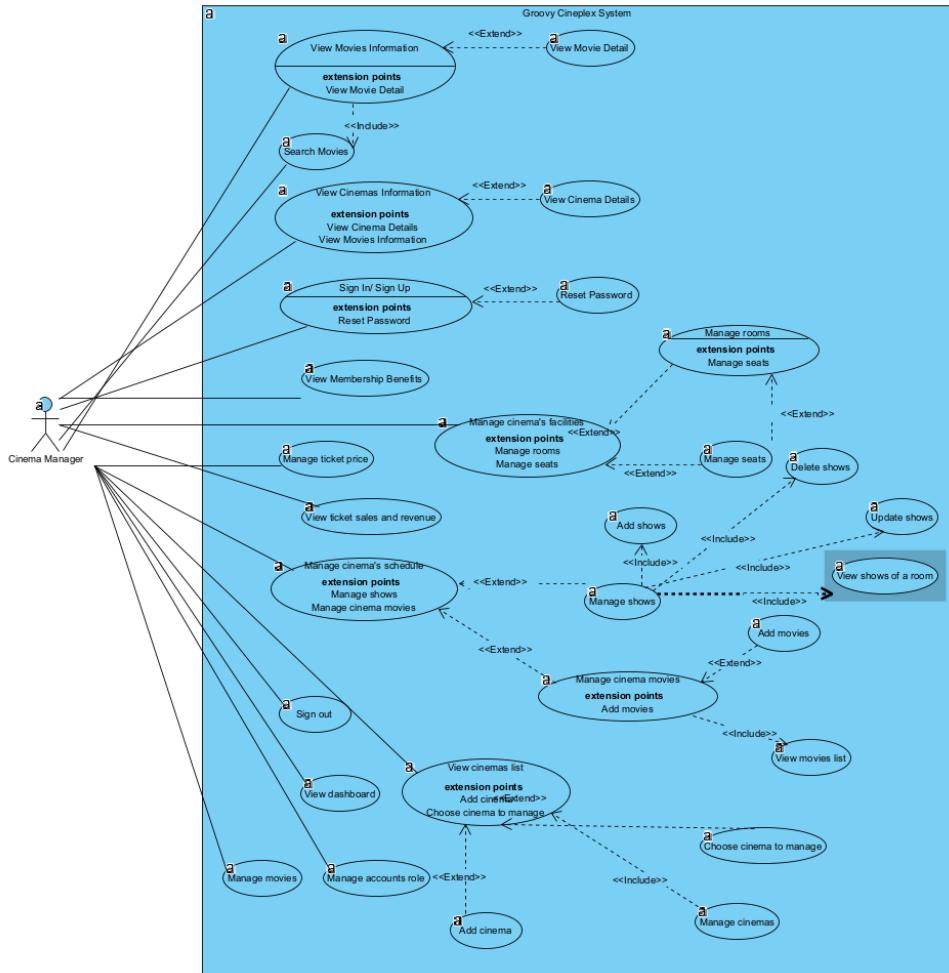
1.7.2.2.2. Use case diagram for Customer



1.7.2.2.3. Use case diagram for Cinema Manager



1.7.2.2.4. Use case diagram for Head Manager



1.8. Assumptions & Dependencies

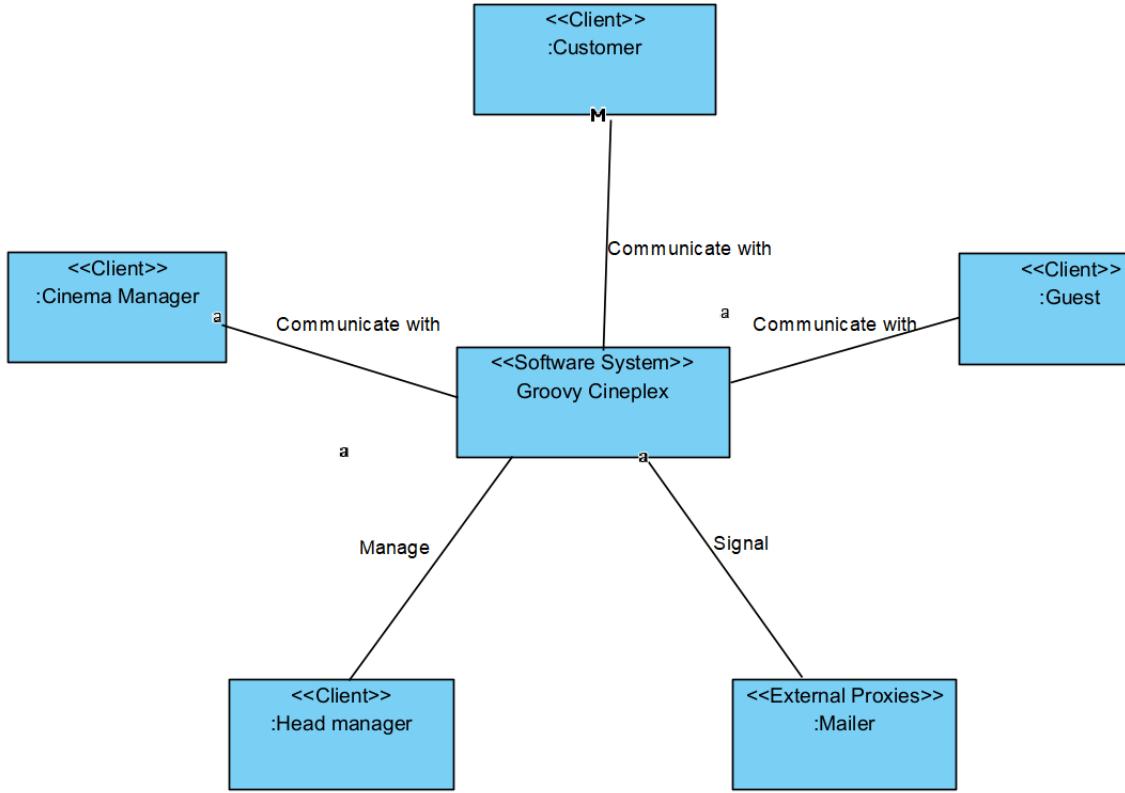
1.9. Limitations and Exclusions

1.10. Business Rules

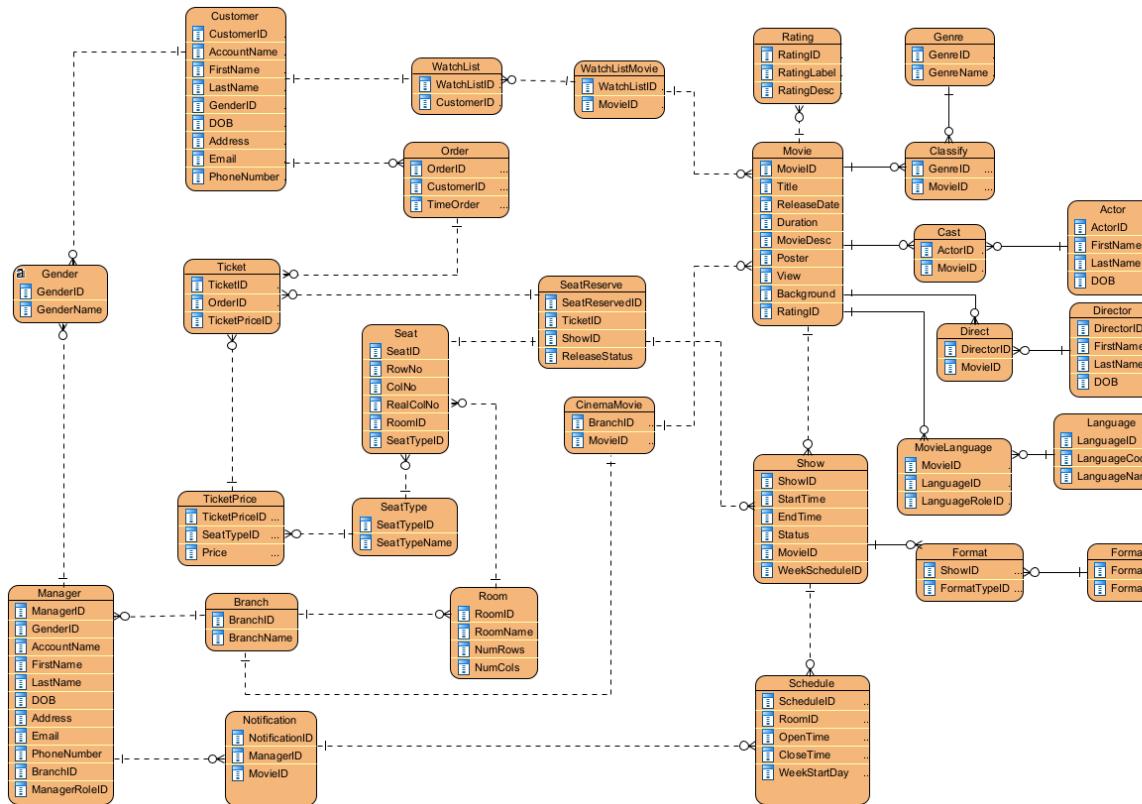
ID	Rule Name	Rule Definition
BR-01	User Registration	Users should be able to create an account and provide their basic information including name, email address, gender, date of birth (DOB), address, phone number, username, and password.
BR-02	Authentication and Authorization	Users should be required to log in with their credentials before accessing their account information or making a booking. Proper authorization mechanisms should be in place to restrict access to certain features based on user roles.
BR-03	Movie Listings	The website should display a comprehensive list of movies currently playing, along with their showtimes, theatres, and available seats.
BR-04	Seat Selection	Users should be able to select their desired seats for a particular showtime, and the system should prevent double bookings for the same seat.
BR-05	Booking Confirmation	After selecting seats, users should receive a confirmation page displaying the details of their booking, including movie title, showtime, theatre, and seat numbers. Users should also receive a confirmation email with the same details.
BR-06	Payment Processing	The website should support secure online payment options such as credit cards or digital wallets, to facilitate ticket purchases. Payment information should be handled securely and in compliance with relevant industry standards.
BR-07	Booking History	Users should have access to their booking history, allowing them to view past and upcoming bookings, print tickets, and request email receipts.
BR-08	Privacy and Data Protection	The website should adhere to privacy regulations and ensure the secure storage and handling of user data, including personal information and payment details.
BR-09	Customer Support	The website should offer customer support channels, such as email, live chat, or a dedicated helpline, to address user inquiries, issues, or complaints promptly.
BR-10	Analytics and Reporting	The system should track and analyse user behaviour, booking trends, and movie popularity to generate insights for business decisions and future improvements.

2. SOFTWARE ARCHITECTURE

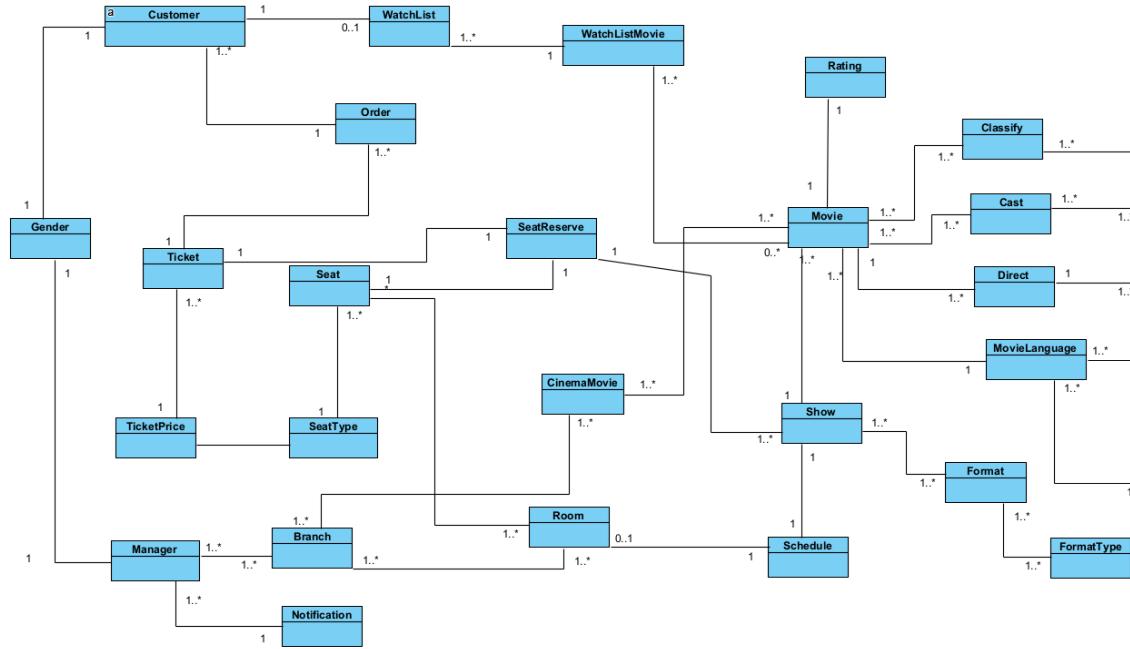
2.1. System Context



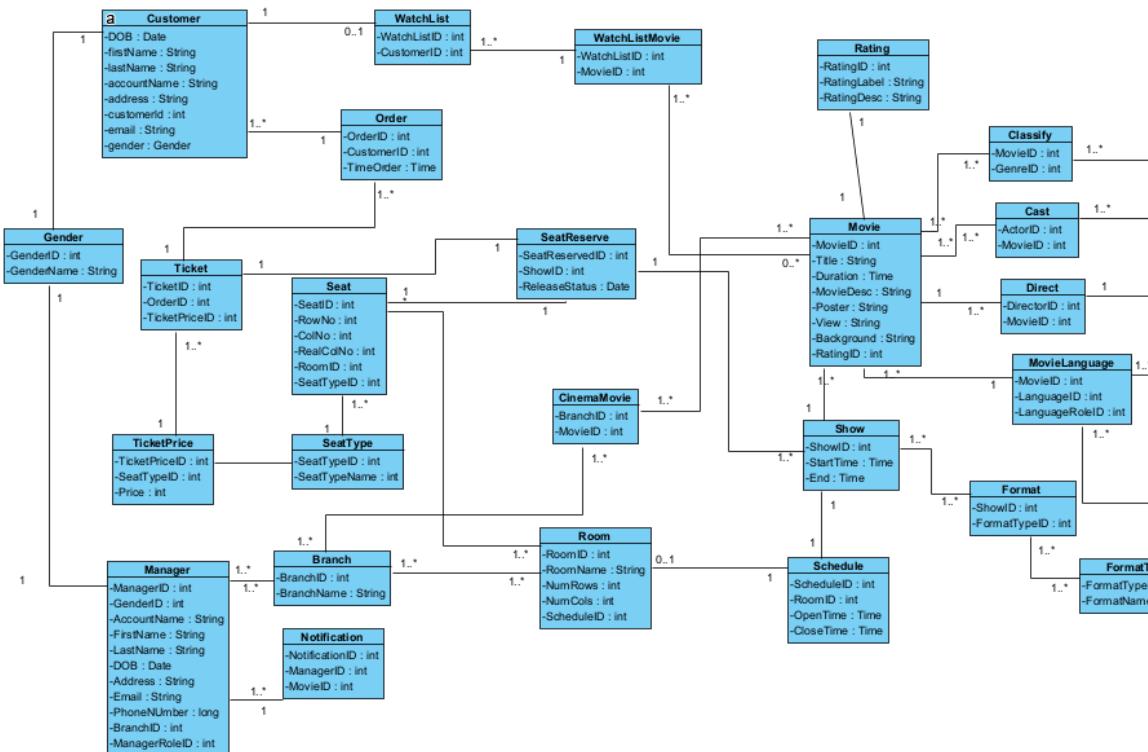
2.2. Database design



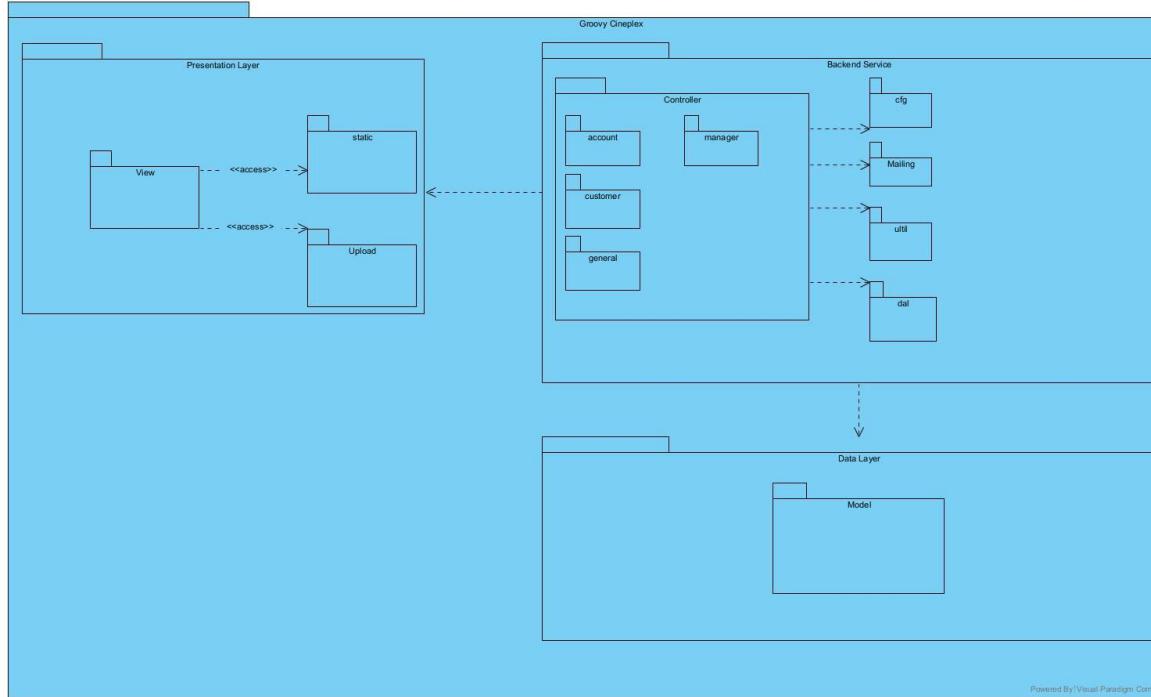
2.3. Class diagram



2.4. Detailed design class diagram



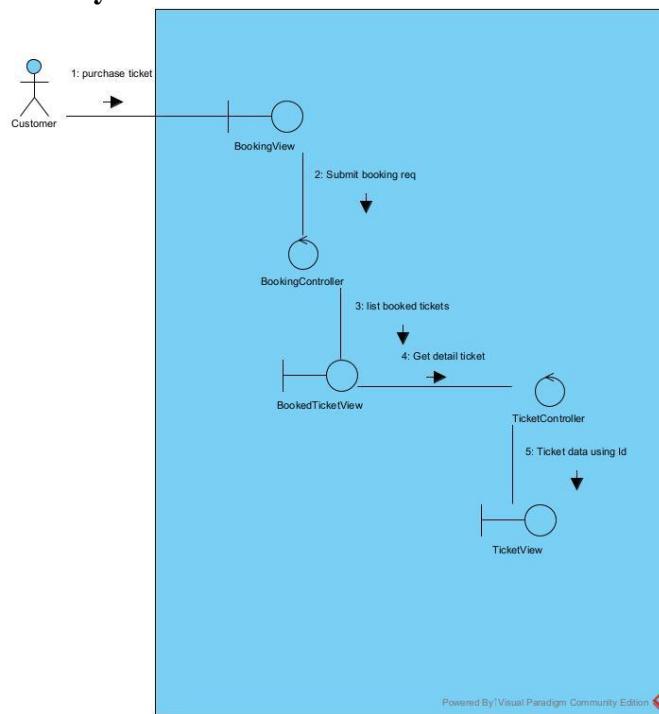
2.5. Package diagram



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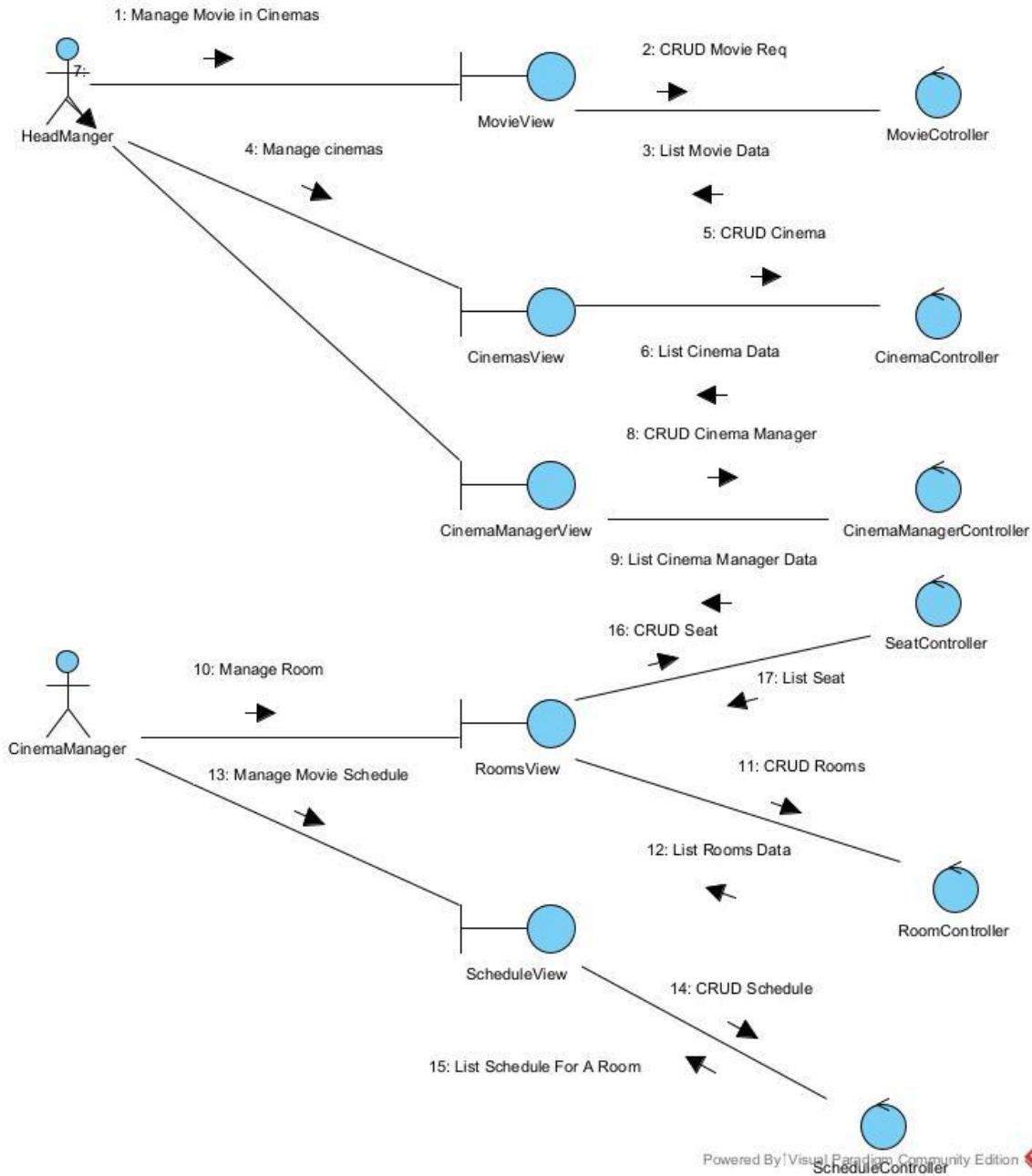
2.6. Consolidated communication diagram

2.6.1. Non-admin system:

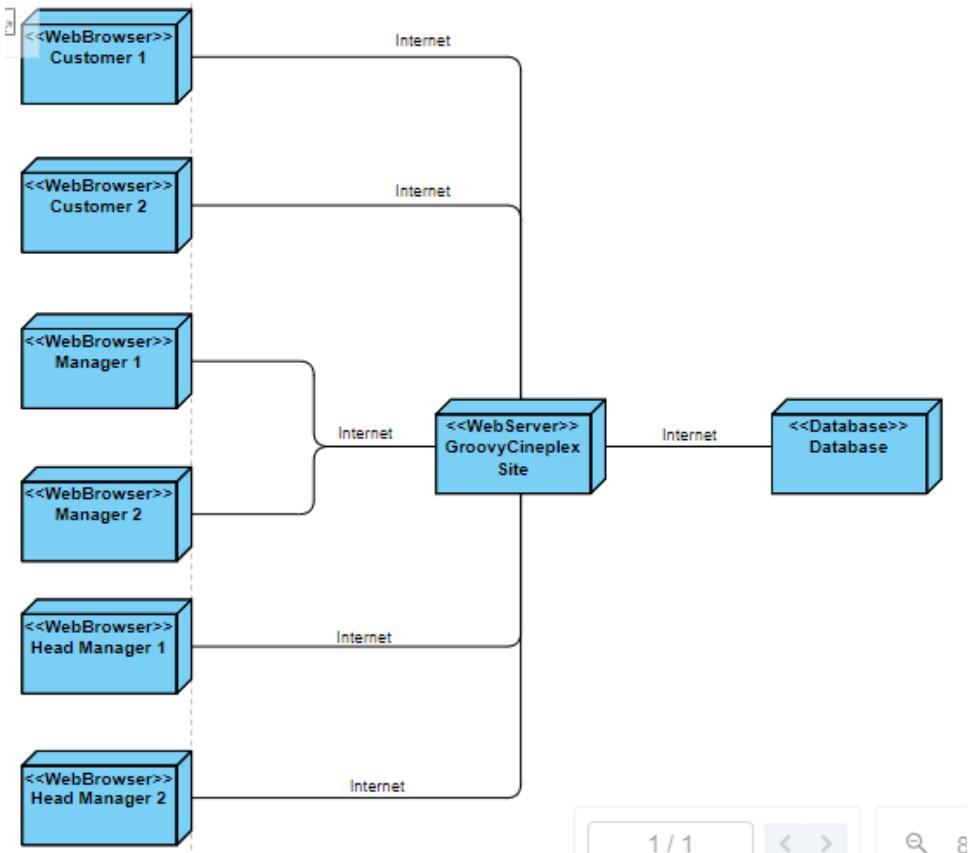


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2.6.2. Admin System

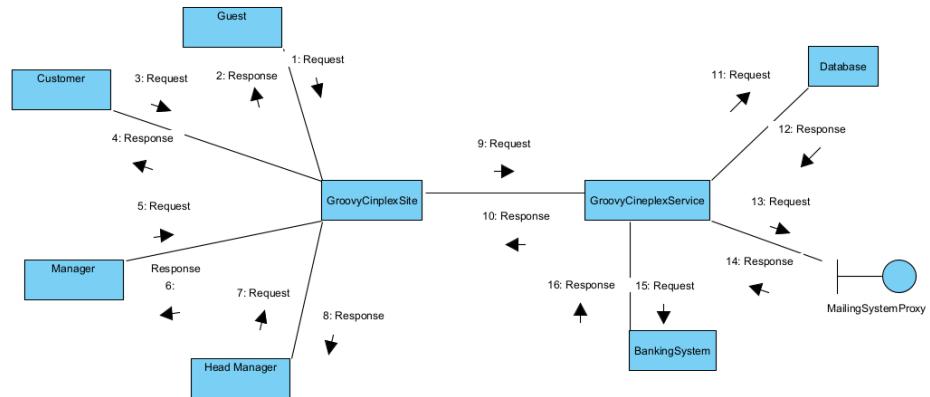


2.7. Deployment architecture

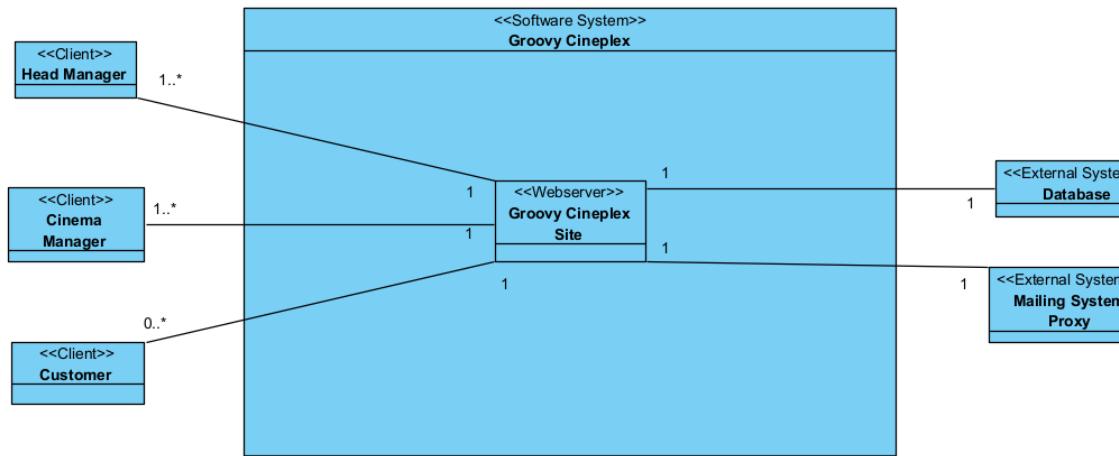


2.8. Information hiding class diagram

2.9. Subsystem architecture



2.10. Class diagram to depict the architectural system in a structural view



3. SOFTWARE DESIGN

3.1. Use case specification

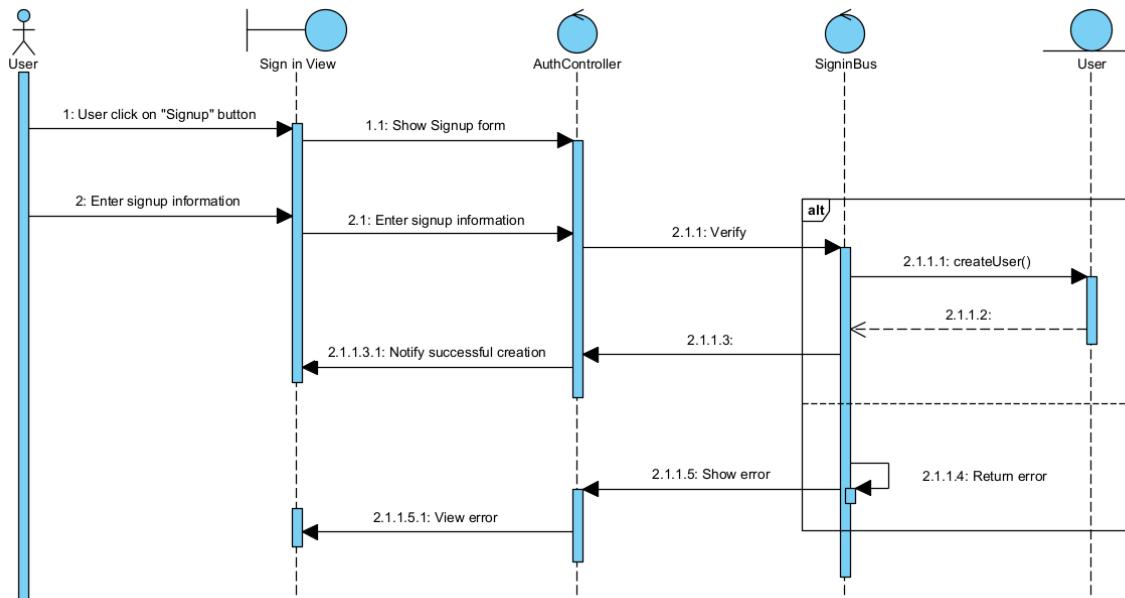
3.1.1. Sign up

3.1.1.1. Use case specification

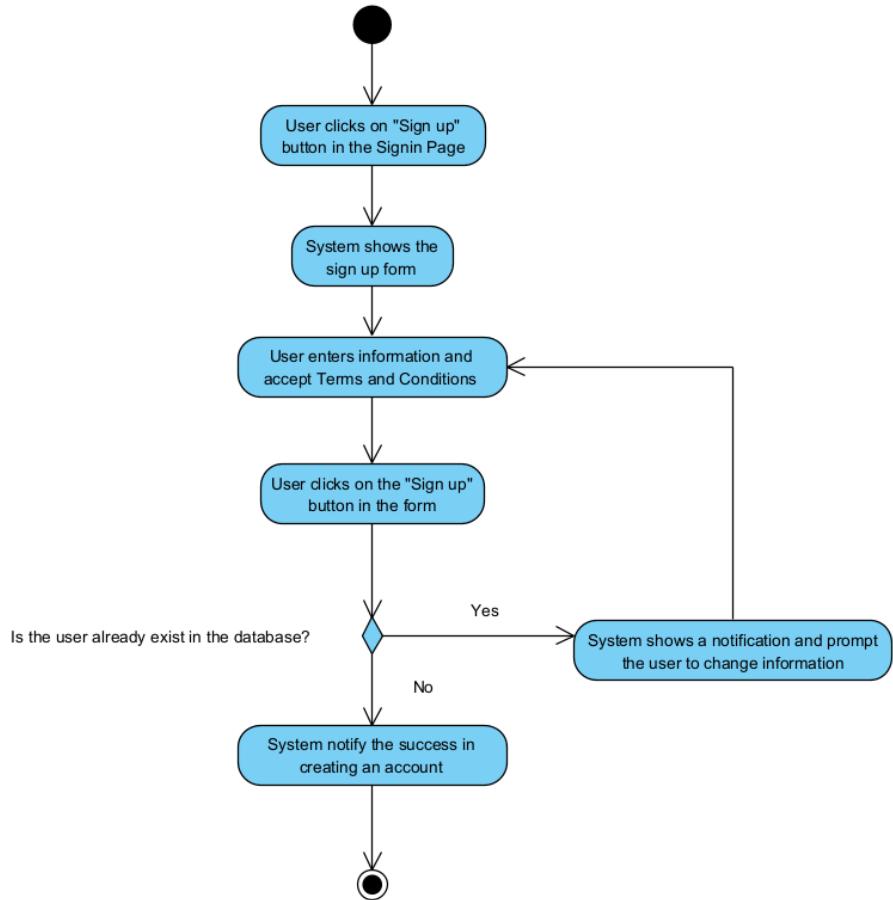
ID	UC-01		
Name	Sign up		
Created by	NguyenLD	Date created	15/01/2024
Priority	High	Frequency of use	High
Actor	Guest		
Description	Guests can enter their information to complete a signup form. This will create a new account, which allows them to access specific features.		
Trigger	Guest clicks “Sign up” in Sign in page		
Precondition	None		
Postcondition	User successfully signed up a new account to the system		
Normal flow	<ol style="list-style-type: none"> User inputs personal information (FR-01, FR-03) User agrees to the Terms and Conditions (FR-02) User clicks button Sign up System verifies user information and create a new account for user (FR-04) System redirects user to the Sign in screen 		

Alternative flow	None
Exception	<p>01-E1. Inputted username has already existed. Sign up page displays error message MSG-01</p> <p>01-E2. Lastname/ Firstname/ Username/ Password/ Email/ DOB/ Address/ Phone number is empty: Sign up page displays error message MSG-02</p> <p>01-E3. Inputted email has already existed. Sign up page displays error message MSG-03</p> <p>01-E4. Inputted phone numbers already existed. Sign up page displays error message MSG-04</p>
Business rules	BR-01
Assumption	None
Other information	None

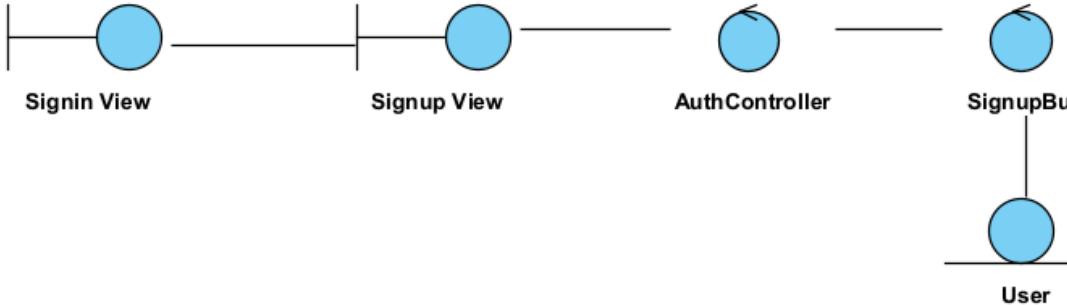
3.1.1.2. Interaction Diagram(s)



3.1.1.3. Activity Diagram(s)



3.1.1.4. View of Participating Classes



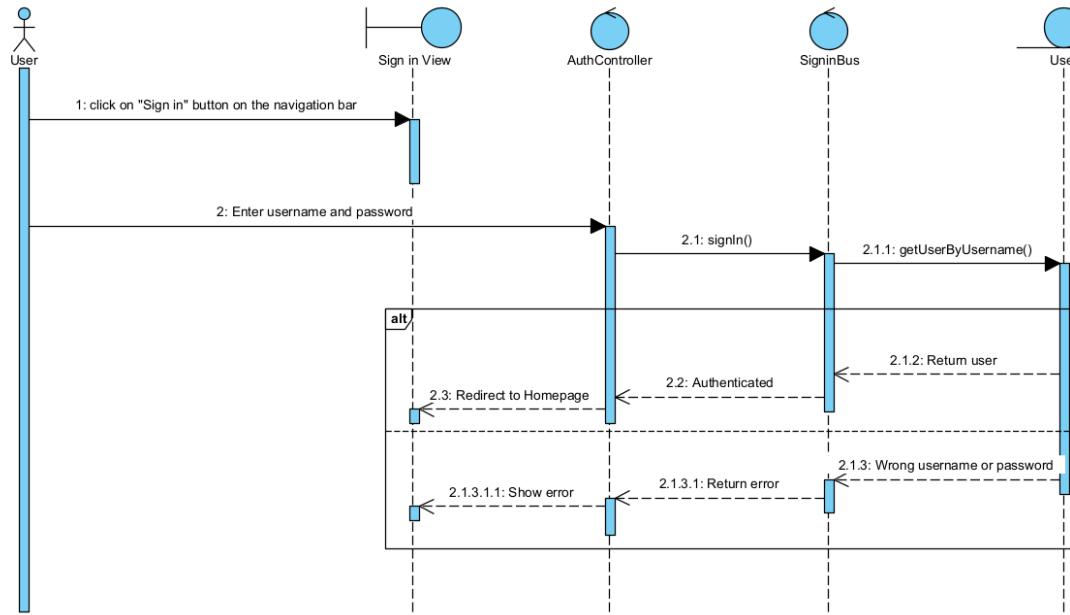
-Lastname: String
-Firstname: String
-Username: String
-Password: String
-Email: String
-DOB: Date
-Address: String
-Phone number: String

3.1.2. Sign in

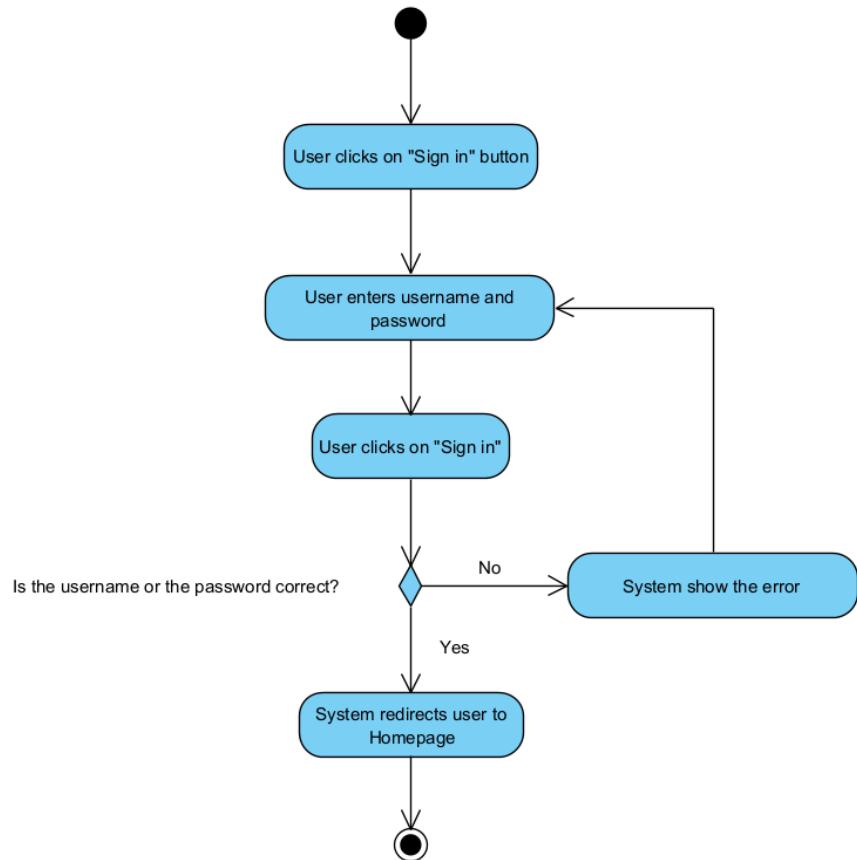
3.1.2.1 Use case specification

ID	UC-02		
Name	Sign in		
Created by	NguyenLD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Guest		
Description	Guest can sign into the system by username and password		
Trigger	Guest clicks on the 'Sign in' button in the homepage or is automatically redirected when clicking in booking ticket.		
Precondition	<ol style="list-style-type: none"> 1. User is not signed in 2. User has an existing account 		
Postcondition	User successfully signed into the system		
Normal flow	<ol style="list-style-type: none"> 1. User inputs username 2. User inputs password 3. User clicks button login 4. System verifies user information and allows access to user (FR-05) 		
Alternative flow	None		
Exception	<p>02-E1. Username/Password is incorrect: Sign up page displays error message MSG-03</p> <p>02-E2. Username/Password is empty: Sign up page displays error message MSG-02</p>		
Business rules	BR-01		
Assumption	None		
Other information	None		

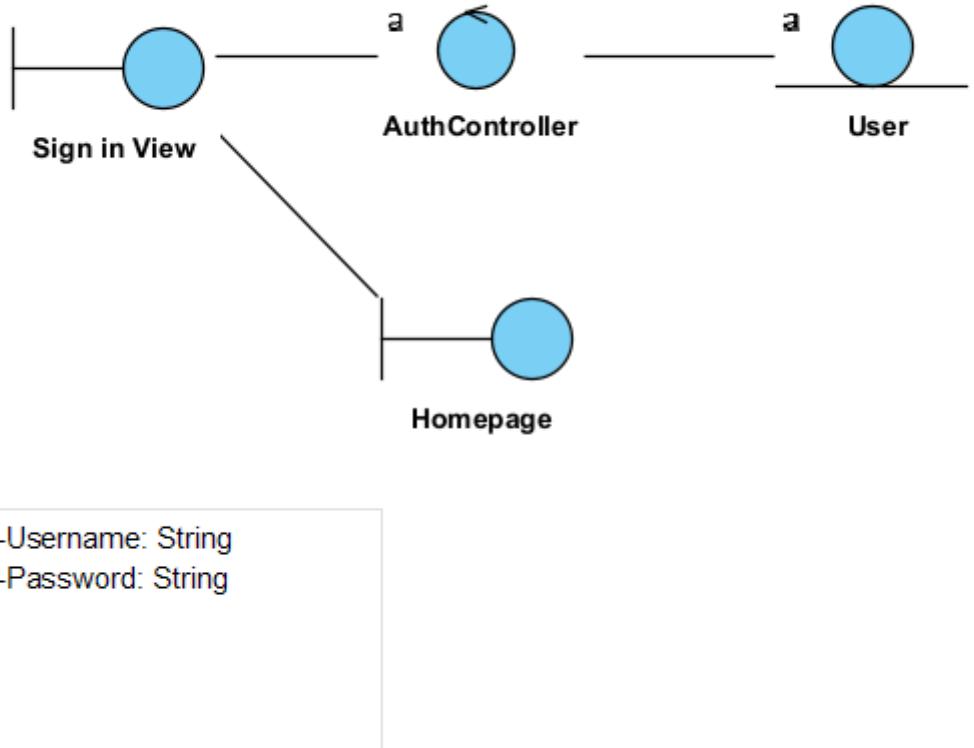
3.1.2.2. Interaction Diagram(s)



3.1.2.3. Activity Diagram(s)



3.1.2.4. View of Participating Classes

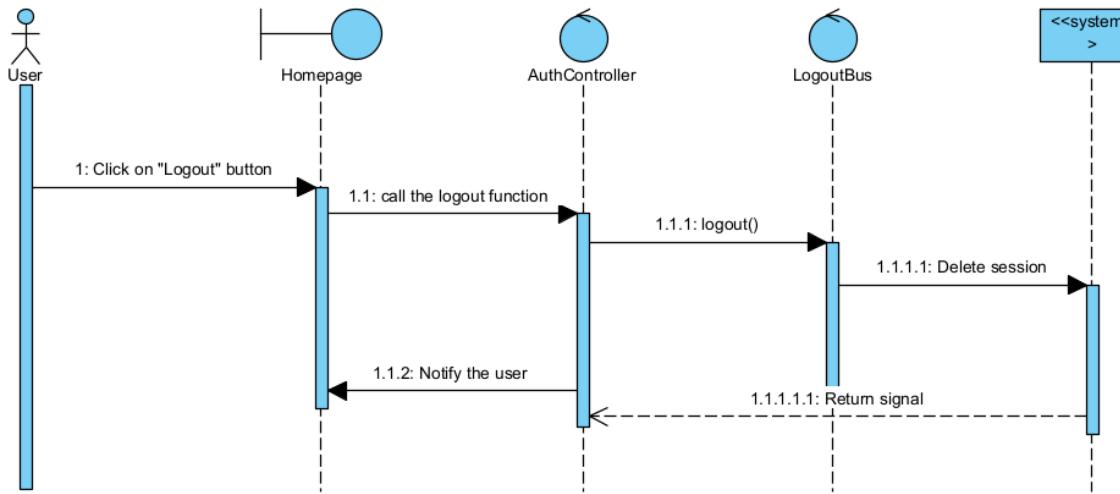


3.1.3. Sign out

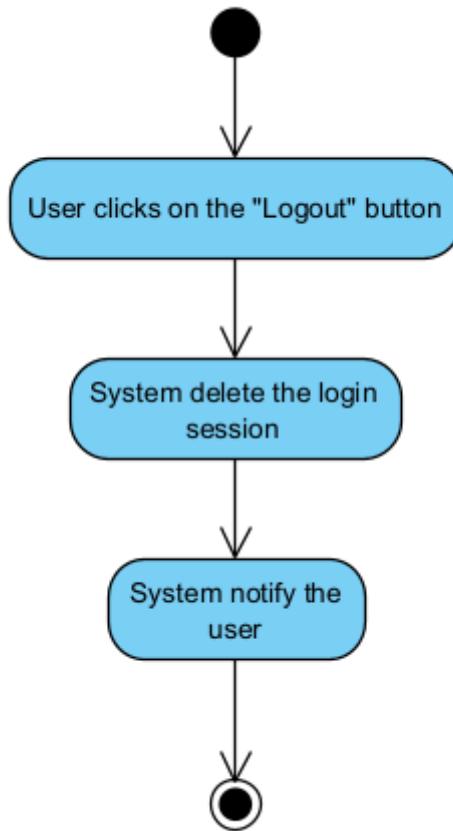
ID	UC-03		
Name	Sign out		
Created by	NguyenLD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Customer, Cinema Manager, Head Manager		
Description	The user can initiate the sign-out process to securely log off from the system, terminating their current session.		
Trigger	User clicks on “Sign out” button in menu bar		
Precondition	User is already logged in		
Postcondition	User successfully signs out the system		
Normal flow	<ol style="list-style-type: none"> 1. User clicks on “Sign out” button in menu bar 2. Sign out successfully 		

Alternative flow	None
Exceptions	None
Business rules	None
Assumption	None
Other information	None

3.1.3.2. Interaction Diagram(s)



3.1.3.3. Activity Diagram(s)



3.1.3.4. View of Participating Classes

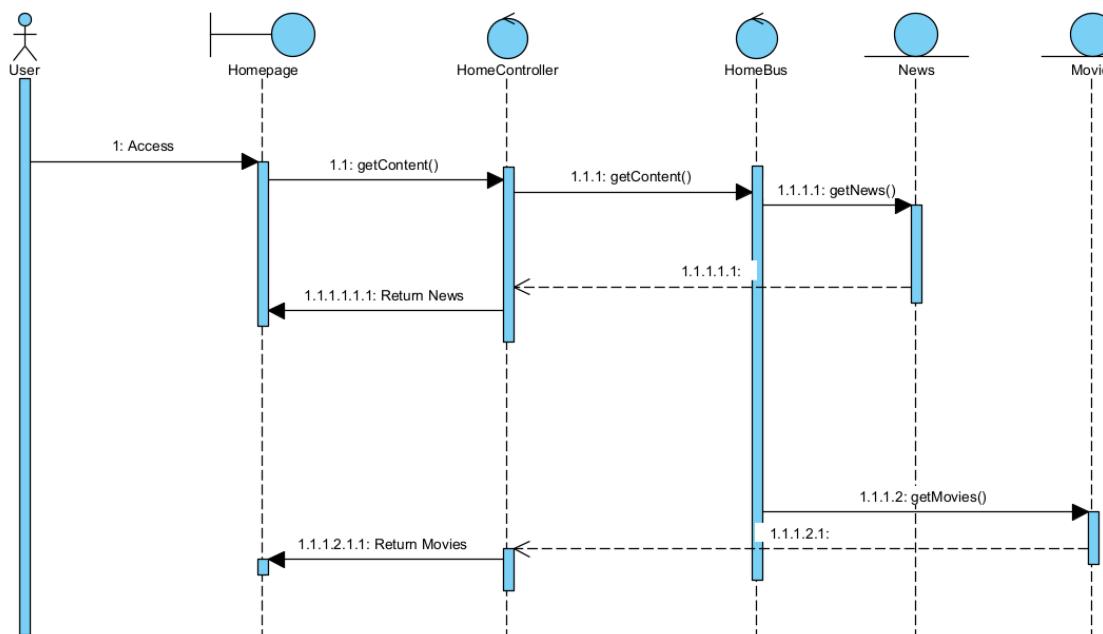


3.1.4. View homepage

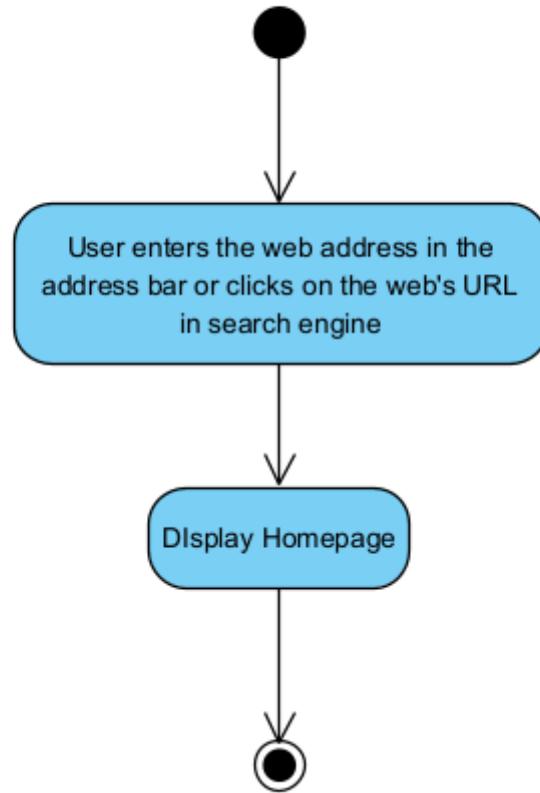
ID	UC-04		
Name	View homepage		
Created by	NguyenLD	Date created	14/01/2024
Priority	High	Frequency of use	High

Actor	Guest, Customer
Description	The user can view news displayed in slider, browse and select movie to view movie details, book tickets, and access static contact links in the footer
Trigger	User reaches the web by URL or click in the web link on browser
Precondition	None
Postcondition	User successfully reach the homepage screen
Normal flow	<ol style="list-style-type: none"> 1. User accesses the Homepage screen 2. System displays Homepage contents
Alternative flow	None
Exceptions	None
Business rules	None
Assumption	If the user is logged in as customer, the username is displayed on navigation bar
Other information	None

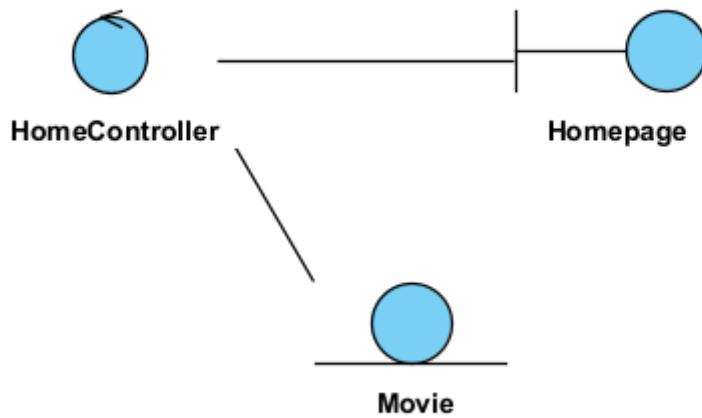
3.1.4.2. Interaction Diagram(s)



3.1.4.3. Activity Diagram(s)

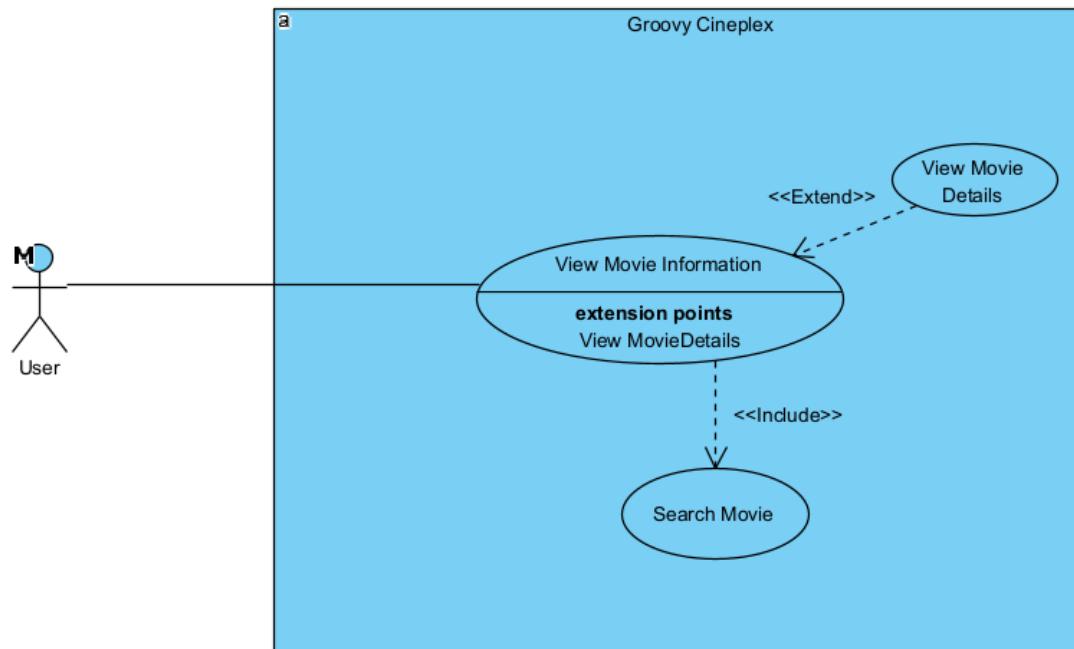


3.1.4.4. View of Participating Classes



3.1.5. Search movie

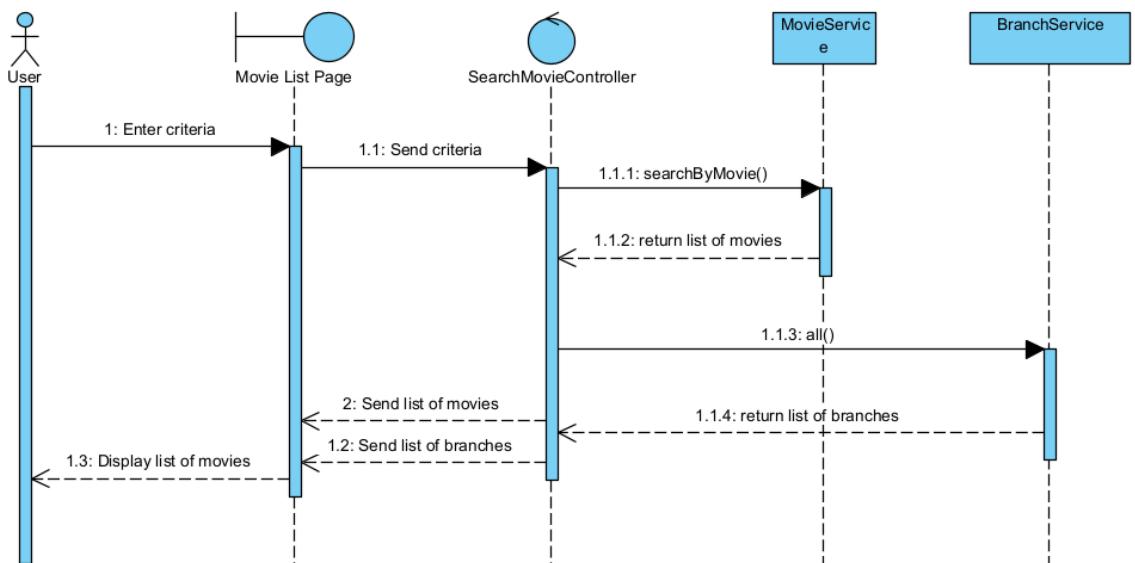
3.1.5.1. Use case specification



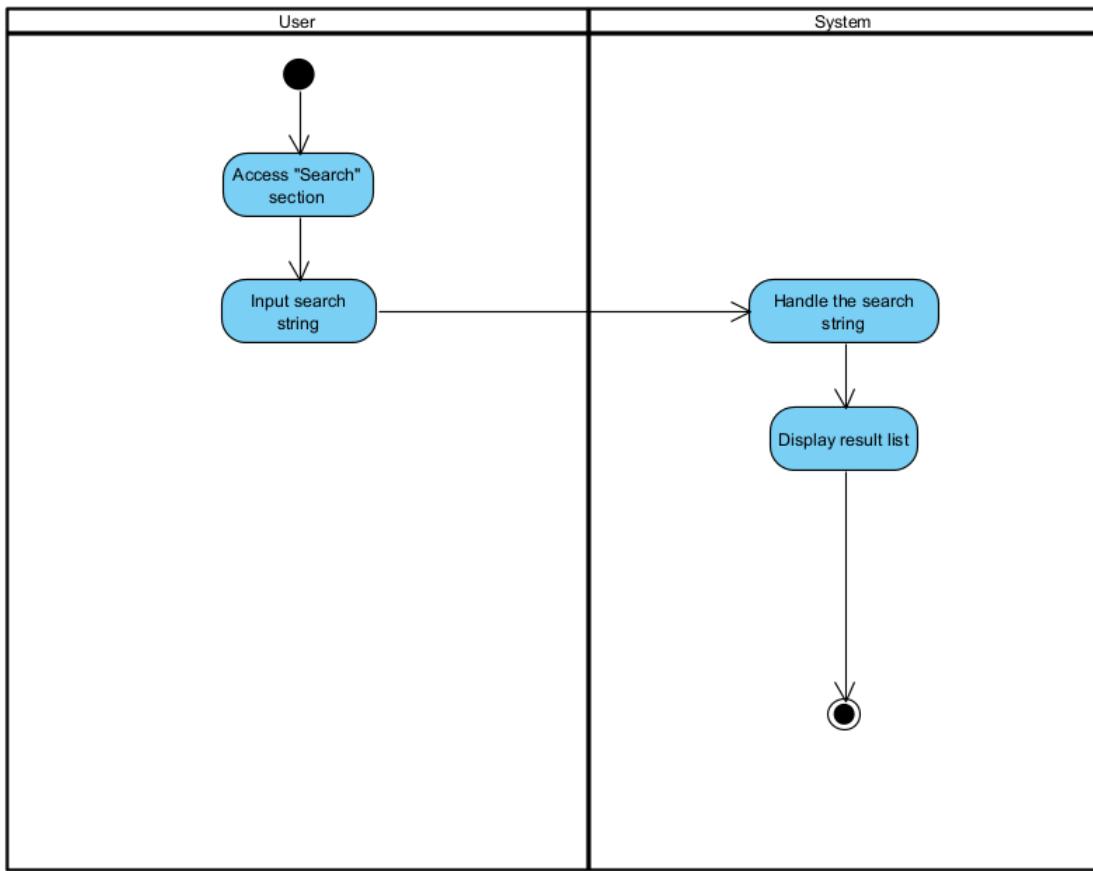
ID	UC-05		
Name	Search movie		
Created by	NguyenLD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Guest, Customer		
Description	The user can search for movies based on specific criteria or by filter.		
Trigger	The user clicks on “Search” section or click one of the filters		
Precondition	None		
Postcondition	System displays the movies corresponding to the search criteria filter.		
Normal flow	1. User clicks on “Search” section 2. User inputs search string 3. User presses enter 4. The system displays movies that correspond to the search criteria 5. System displays movies that fit the criteria		
Alternative flow	4.1.1 User filters by locations. 4.1.2 The system displays movies that correspond to the search criteria and are filtered by location filter. 4.2.1. User filters by times.		

	<p>4.2.2. The system displays movies that correspond to the search criteria and are filtered by time filter.</p> <p>4.3.1. User filters by locations and times.</p> <p>4.3.2. The system displays movies that correspond to the search criteria and are filtered by location filter, time filter.</p>
Exceptions	None
Business rules	None
Assumption	System displays nothing when there is no movie that fits the criteria.
Other information	None

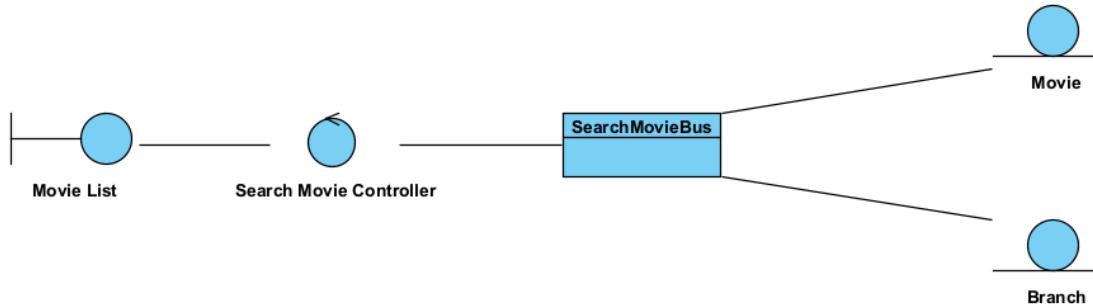
3.1.5.2. Interaction Diagram



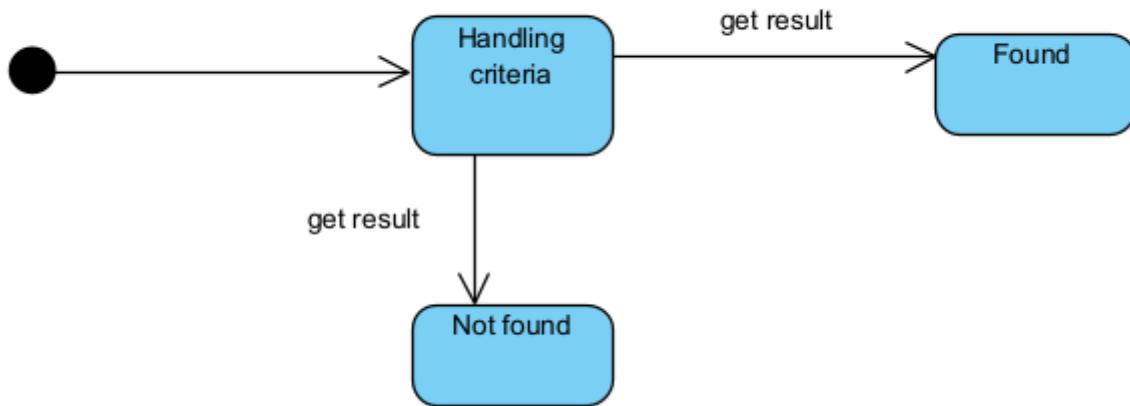
3.1.5.3. Activity Diagram



3.1.5.4. View of Participating Classes

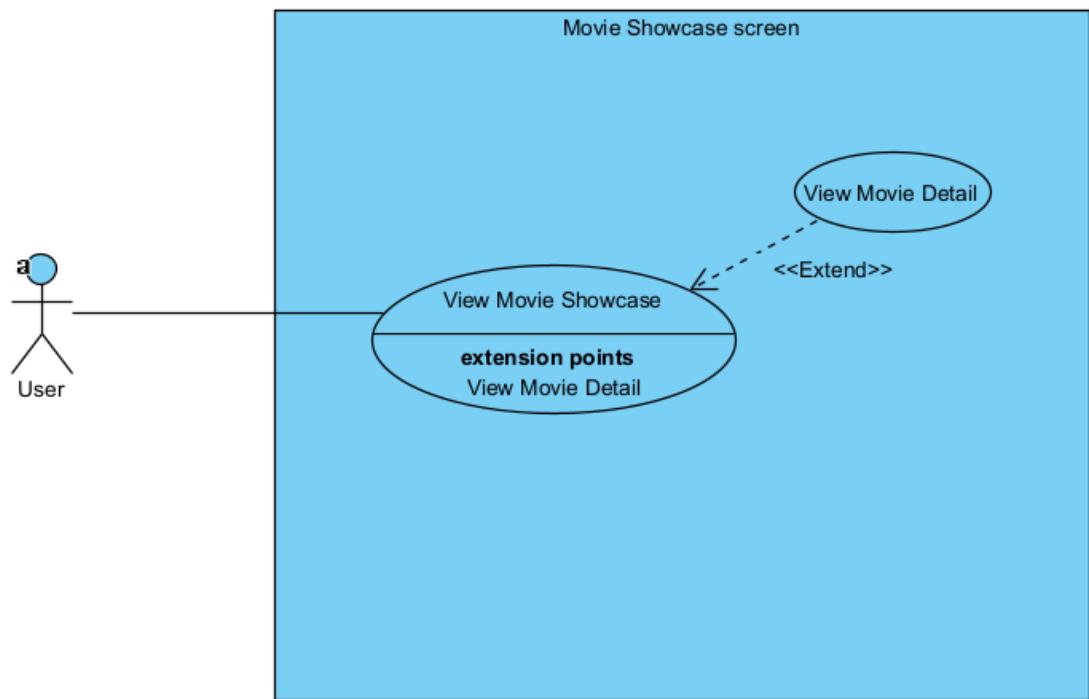


3.1.5.5. State chat Diagram



3.1.6. View movie showcase

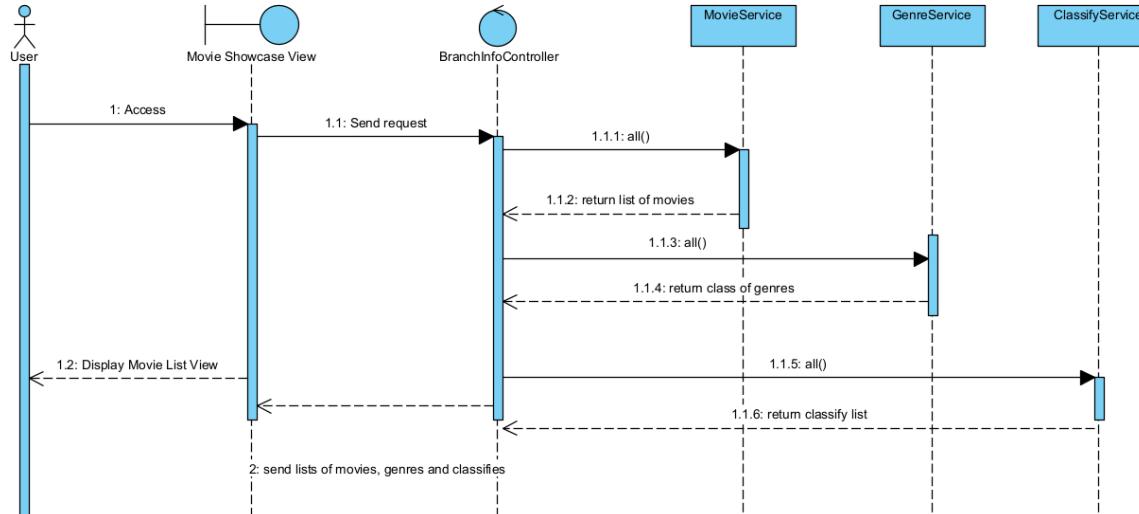
3.1.6.1. Use case specification



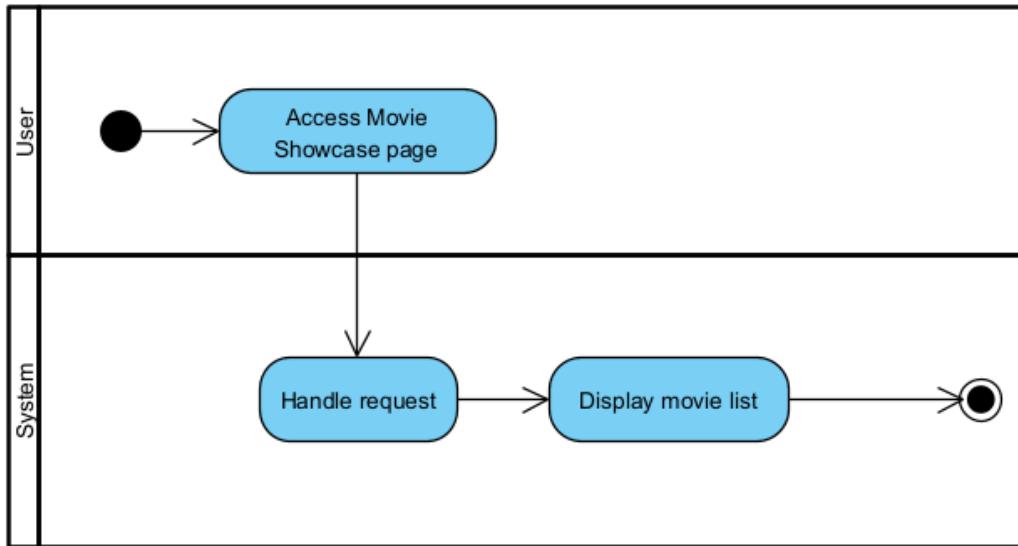
ID	UC-06		
Name	View movie showcase		
Created by	NguyenLD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Guest, Customer		

Description	Guests can explore the showcase of movies, browsing through collection of movies.
Trigger	The user clicks on ‘Schedule’ button on Navigation bar
Precondition	None
Postcondition	None
Normal flow	<ol style="list-style-type: none"> 1. User accesses the Movie Showcase screen. 2. System displays the movie list.
Alternative flow	<ol style="list-style-type: none"> 1. User selects “Now Showing”. <ol style="list-style-type: none"> 1.1. System displays the movies that is currently being shown. 2. User selects “Coming Soon”. <ol style="list-style-type: none"> 2.1. System displays the movies that will be shown in the future.
Exceptions	None
Business rules	None
Assumption	None
Other information	None

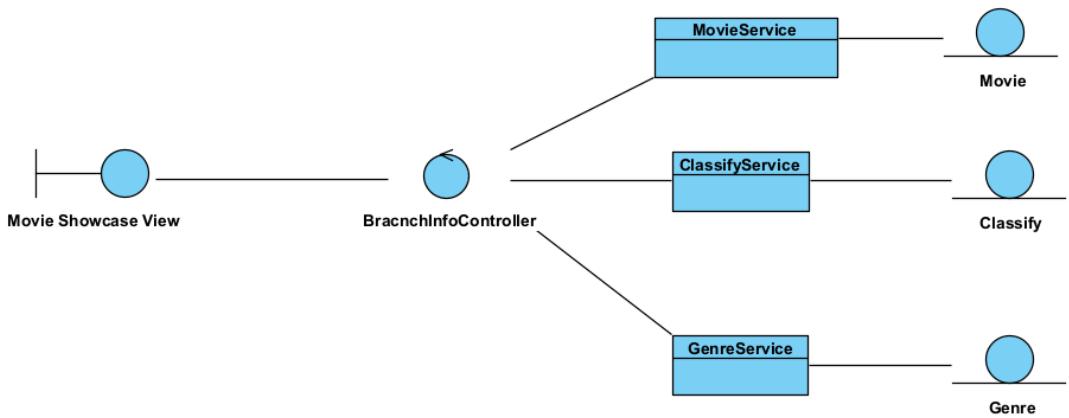
3.1.6.2. Interaction Diagram



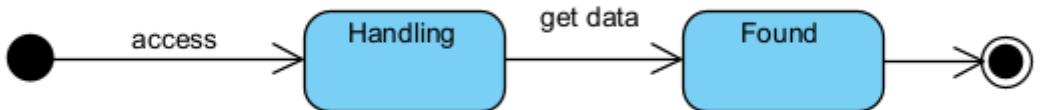
3.1.6.3. Activity Diagram



3.1.6.4. View of Participating Classes

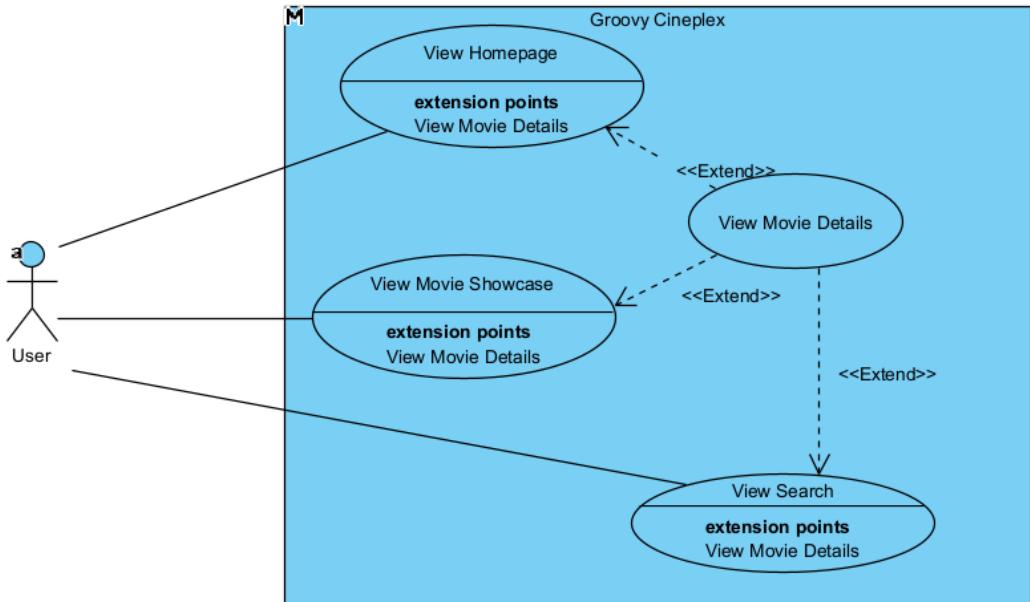


3.1.6.5. State chart diagram



3.1.7. View movie details

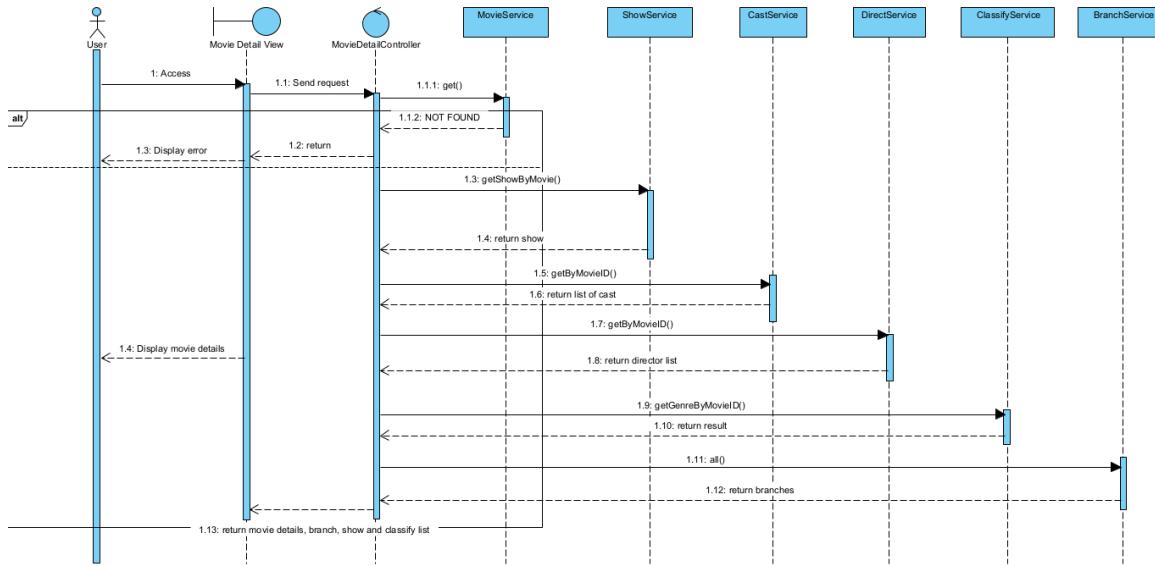
3.1.7.1. Use case specification



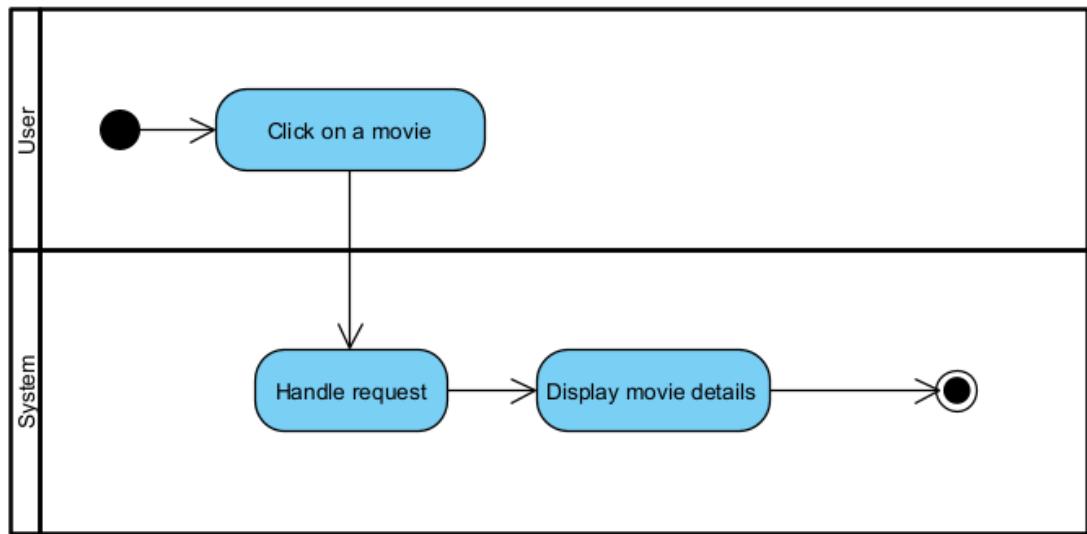
ID	UC-07		
Name	View movie details		
Created by	NguyenLD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Guest, Customer		
Description	Guests can select a specific movie from the movie showcase to be redirected to a detailed information page about that movie		
Trigger	User clicks on any movie's banner in Homepage or Movie Showcase screen or clicks on search results in Search screen		
Precondition	None		
Postcondition	System displays the details of the chosen movie successfully		
Normal flow	1. The user accesses the Movie Details screen 2. System displays details of the chosen movie		
Alternative flow	None		
Exceptions	1. The system displays error when the server cannot find details. 2. The system displays error when the server is down.		

Business rules	None
Assumption	None
Other information	None

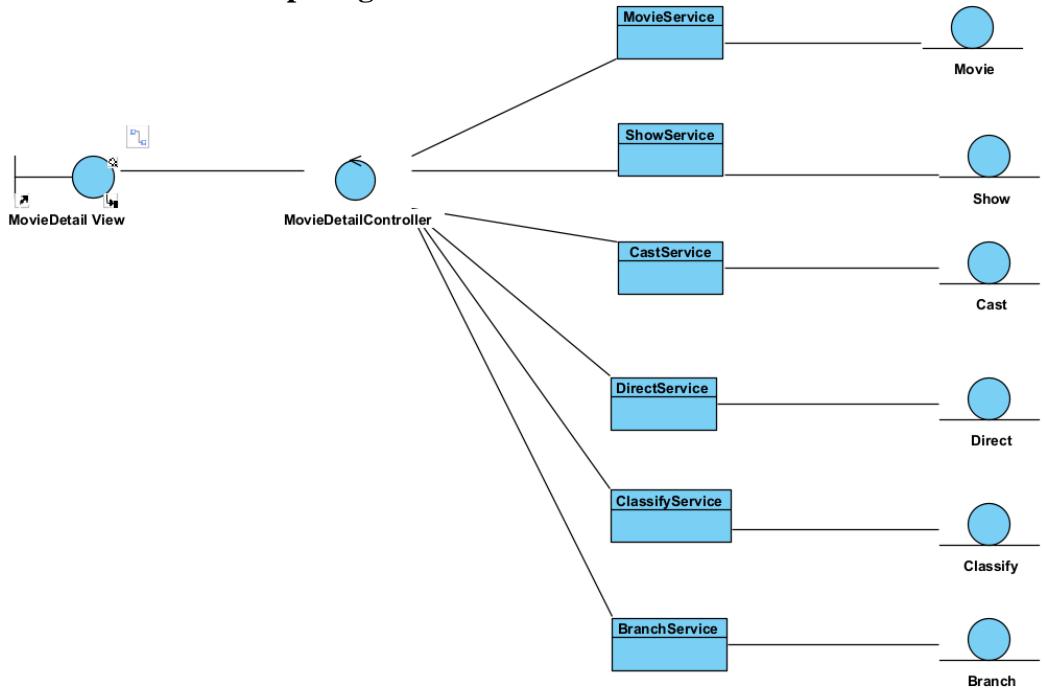
3.1.7.2. Interaction Diagram



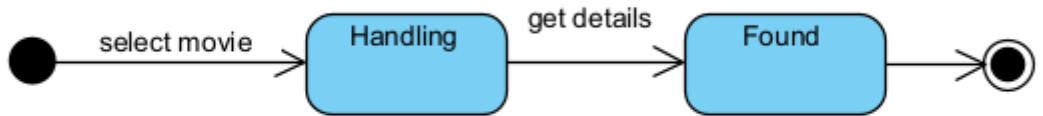
3.1.7.3. Activity Diagram



3.1.7.4. View of Participating Classes

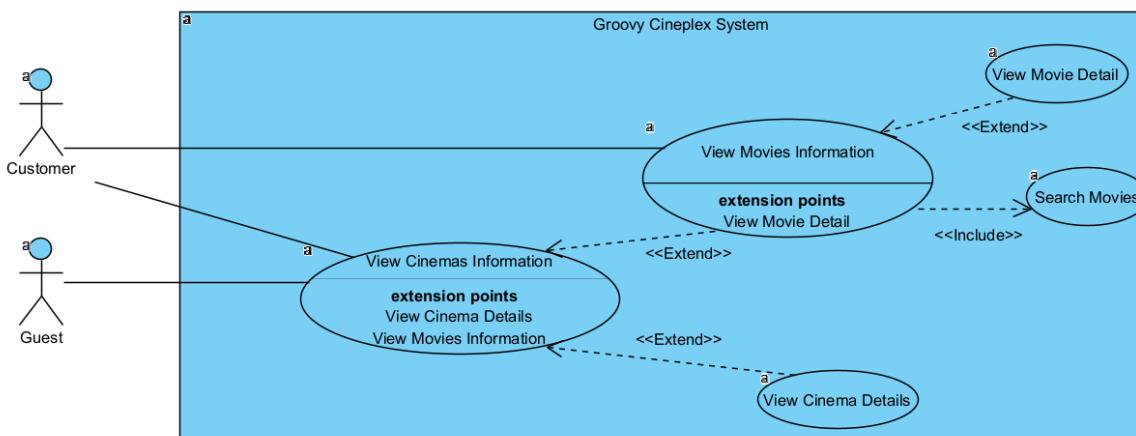


3.1.7.5. State chart Diagram



3.1.8. View cinema information

3.1.8.1. Use case specification

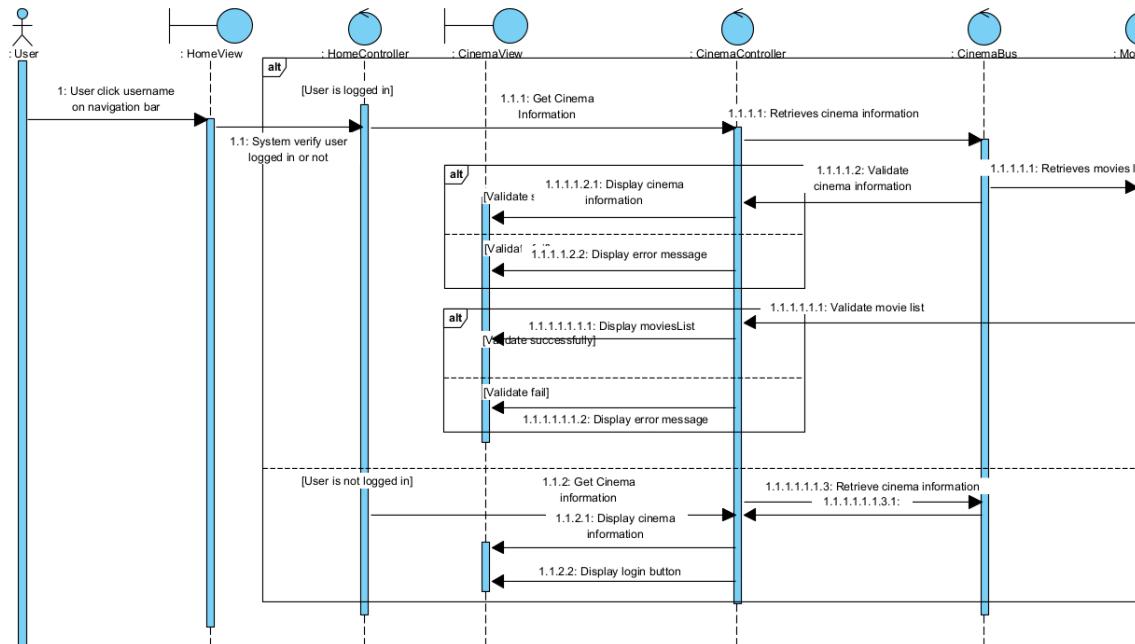


ID	UC-08
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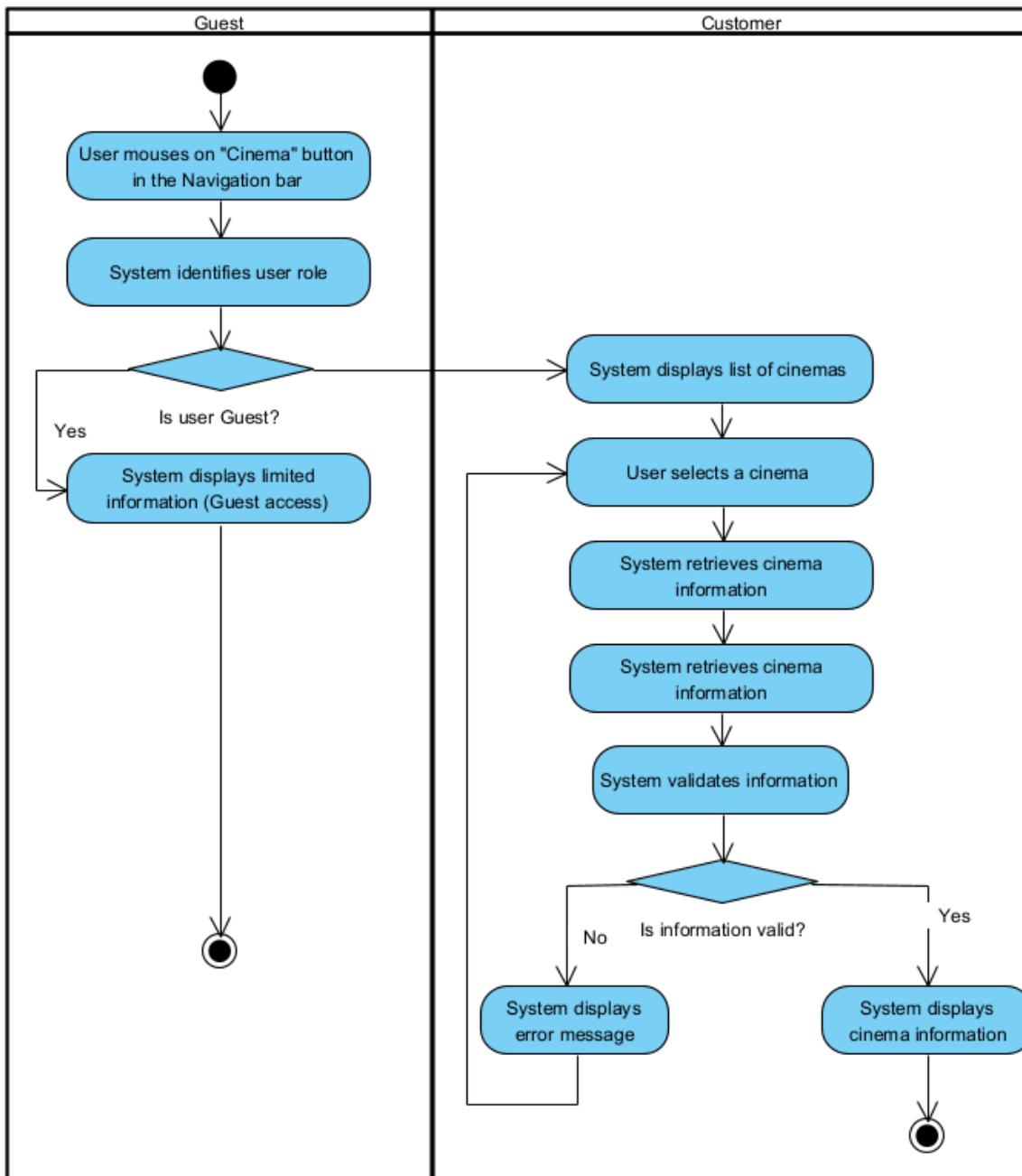
Name	View cinema information		
Created by	Đào Duy Thái	Date created	13/01/2024
Priority	High	Frequency of use	High
Actor	Guest, Customer		
Description	This use case describes the process by which users (guests customers) can explore the list of cinemas and view detailed information about a chosen cinema.		
Trigger	User mouses on “Cinema” button in the Navigation bar and selects one of the cinemas displayed		
Precondition	None		
Postcondition	Customer: System successfully displays the complete information for the chosen cinema. Guest: System successfully displays limited information for the chosen cinema.		
Normal flow	<ol style="list-style-type: none"> 1. User mouses over “cinema” button in the Navigation bar. 2. System identifies user role (Guest or Customer) 3. System displays list of cinemas. 4. User selects a cinema. 5. System retrieves cinema information including: <ul style="list-style-type: none"> - Title - Release Date (if applicable) - Duration (if applicable) - Movie Description (if applicable) - Poster Image - View trailers (optional, for customers only) - Background information (optional, for customers only) - Ratings (optional, for customers only) - Booking button 6. System validates information (optional) - This step can be used to ensure data integrity before displaying it, especially for critical information like titles or dates. 7. System displays cinema information: <ul style="list-style-type: none"> - Customers: See retrieved information from step 5. - Guests: See limited information including Title, Release Date (if applicable), and Poster Image. 		
Alternative flow	<p>Step 3: Guest User:</p> <ul style="list-style-type: none"> - If the user is a guest (not logged in), the system displays a limited set of information. 		

	<p>set of information for each cinema in the list (step 3).</p> <ul style="list-style-type: none"> - Full details (trailers, background info, ratings) are not accessible to guests. - System displays a link “login to explore more movies” and goes to step 02 <p>Step 7: Invalid Information:</p> <ul style="list-style-type: none"> - If the system encounters invalid or missing information during retrieval (step 5), an error message is displayed (step 7). - The user may be offered the option to retry selecting a cinema (back to step 4).
Exceptions	None
Business rules	None
Assumption	<p>The system has access to a database containing cinema information.</p> <p>The system can differentiate between logged-in customers and guest users.</p>
Other information	The specific layout and format for displaying cinema information may vary depending on the system design.

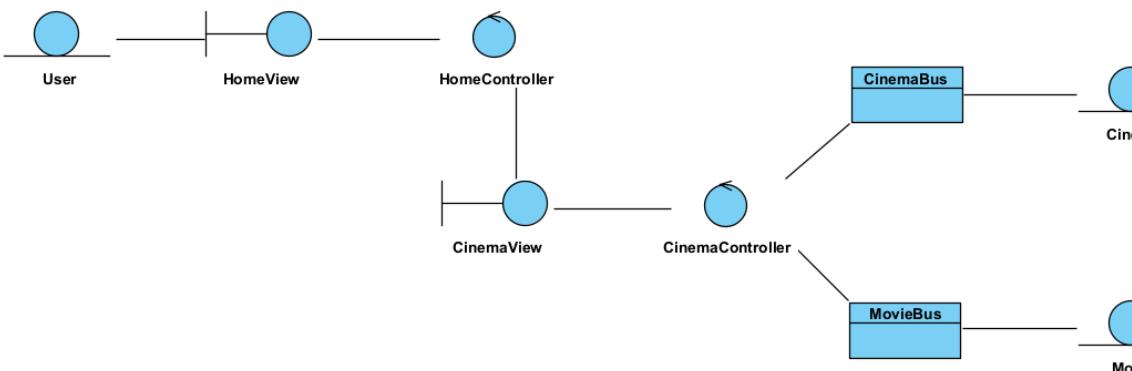
3.1.8.2. Interaction Diagram(s)



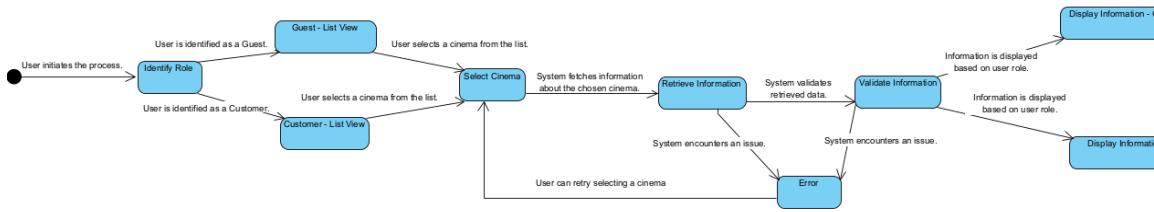
3.1.8.3. Activity Diagram(s)



3.1.8.4. View of Participating Classes

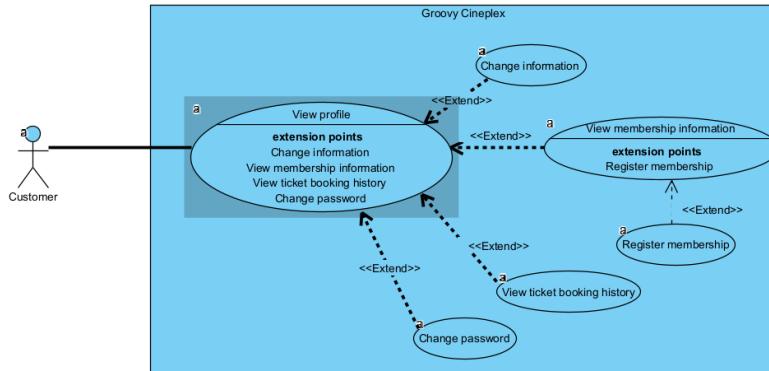


3.1.8.5. State chart diagram



3.1.9. View user profile

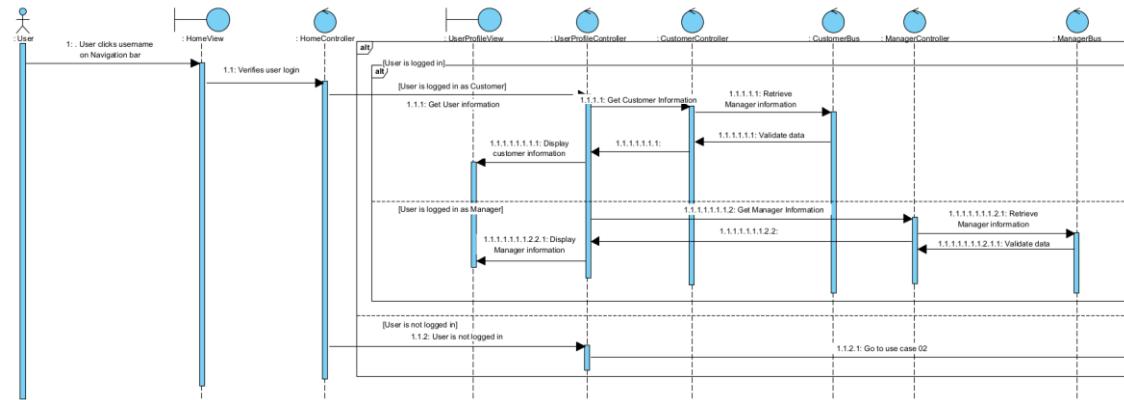
3.1.9.1. Use case specification



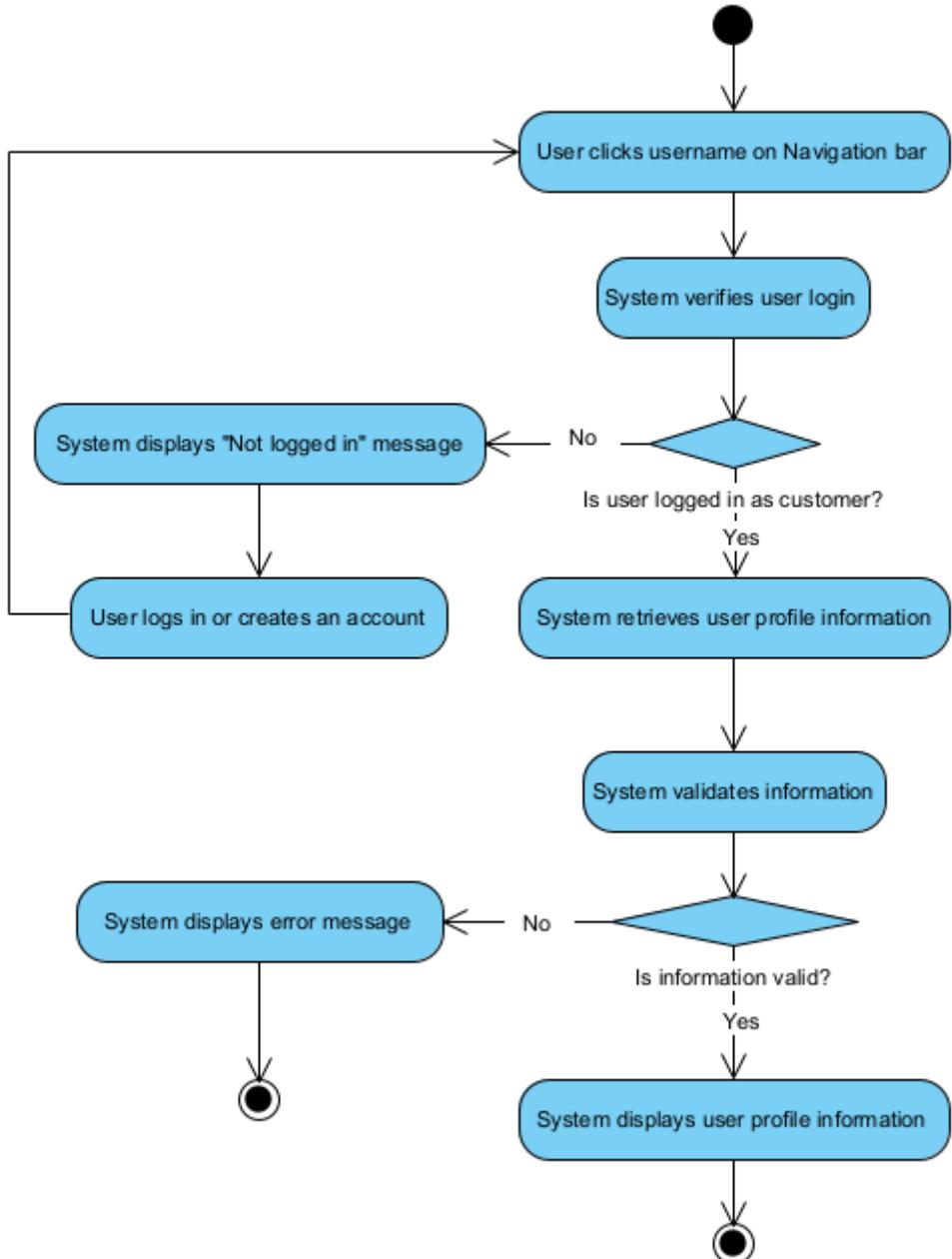
ID	UC-09		
Name	View user profile		
Created by	Dào Duy Thái	Date created	13/01/2024
Priority	High	Frequency of use	High
Actor	Customer		
Description	This use case describes the process by which a customer can access and view their profile information within the system.		
Trigger	The user clicks on his/her username on Navigation bar then click 'User profile'		
Precondition	User has signed in the system as customer (This ensures only logged in customers can view membership information).		
Postcondition	User successfully views his/her membership information (This clarifies the successful outcome).		
Normal flow	1. User clicks username on Navigation bar: The customer initiates the process by clicking on their username displayed in the navigation bar. 2. System verifies user login: The system checks if the user is currently logged in and has a valid customer account. 3. System retrieves user profile information: Upon successful login verification, the system retrieves the following profile information associated with the user's account:		

	<ul style="list-style-type: none"> - Account Name - First Name - Last Name - Gender - Date of Birth - Address - Email Address - Phone Number <p>4. System displays user profile information: The retrieved user profile information is then presented to the customer in a clear and user-friendly format. This may involve displaying each data point with its corresponding label or utilizing a profile overview page.</p>
Alternative flow	<p>Step 3: User Not Logged In:</p> <ul style="list-style-type: none"> - If the user clicks on their username but is not currently logged in, the system, the system displays a message indicating that they are not logged in. - The system may then offer options for the user to either log in to their existing account or create a new user account. This might involve directing the user to the Login Use Case (UC-02). <p>Step 4: Invalid User Information:</p> <ul style="list-style-type: none"> - In the case of unexpected system errors or data corruption, retrieved user information might be incomplete or invalid. - The system should display an error message informing the user that there was a problem retrieving their profile information. - Depending on the severity of the issue, the system might offer options to contact customer support or retry retrieving information.
Exceptions	None
Business rules	BR-02
Assumption	<ul style="list-style-type: none"> - The user has a valid customer account within the system. - The system has the capability to securely store and retrieve user profile information.
Other information	None

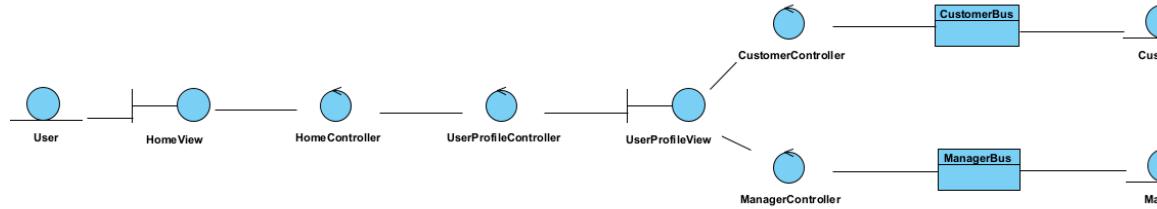
3.1.9.2. Interaction Diagram(s)



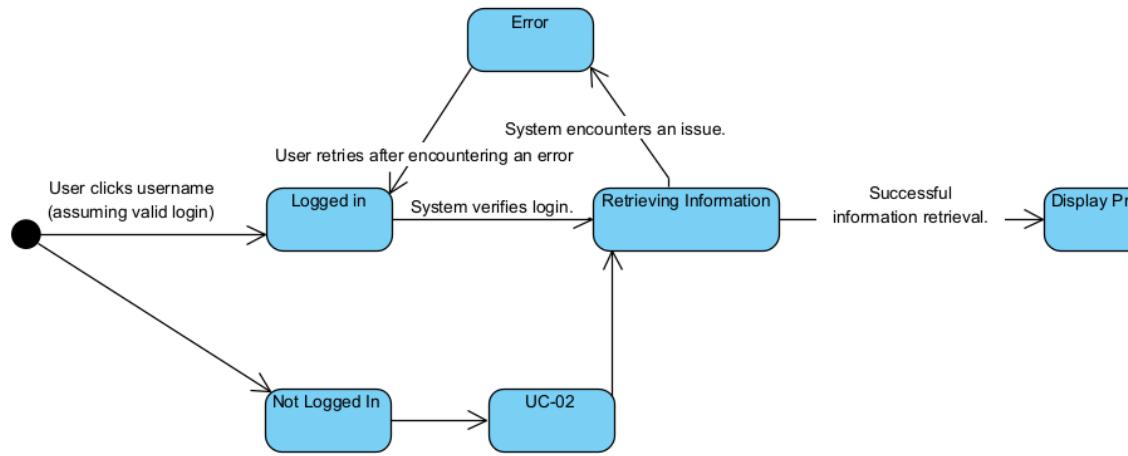
3.1.9.3. Activity Diagram(s)



3.1.9.4. View of Participating Classes



3.1.9.5. State chart diagram



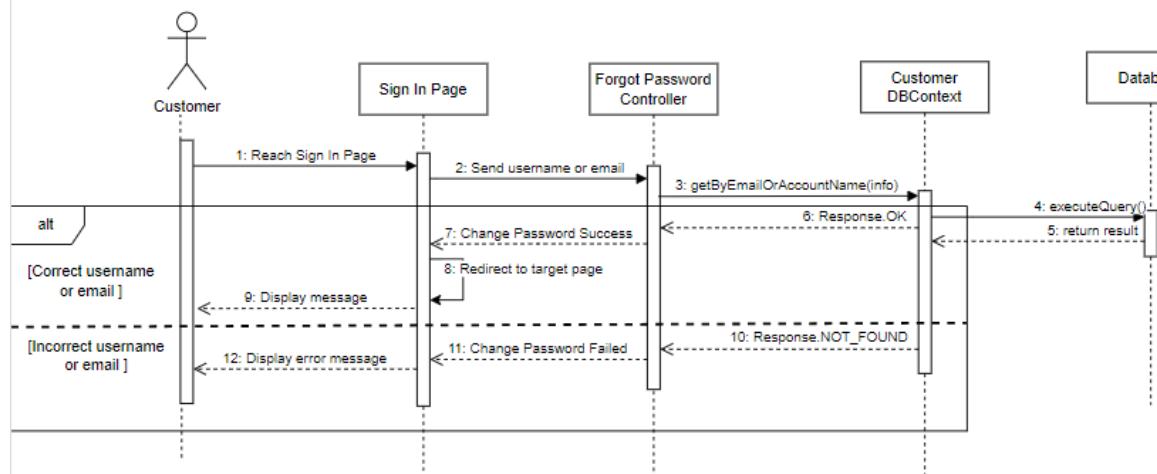
3.1.10. Change password

3.1.10.1. Use case specification

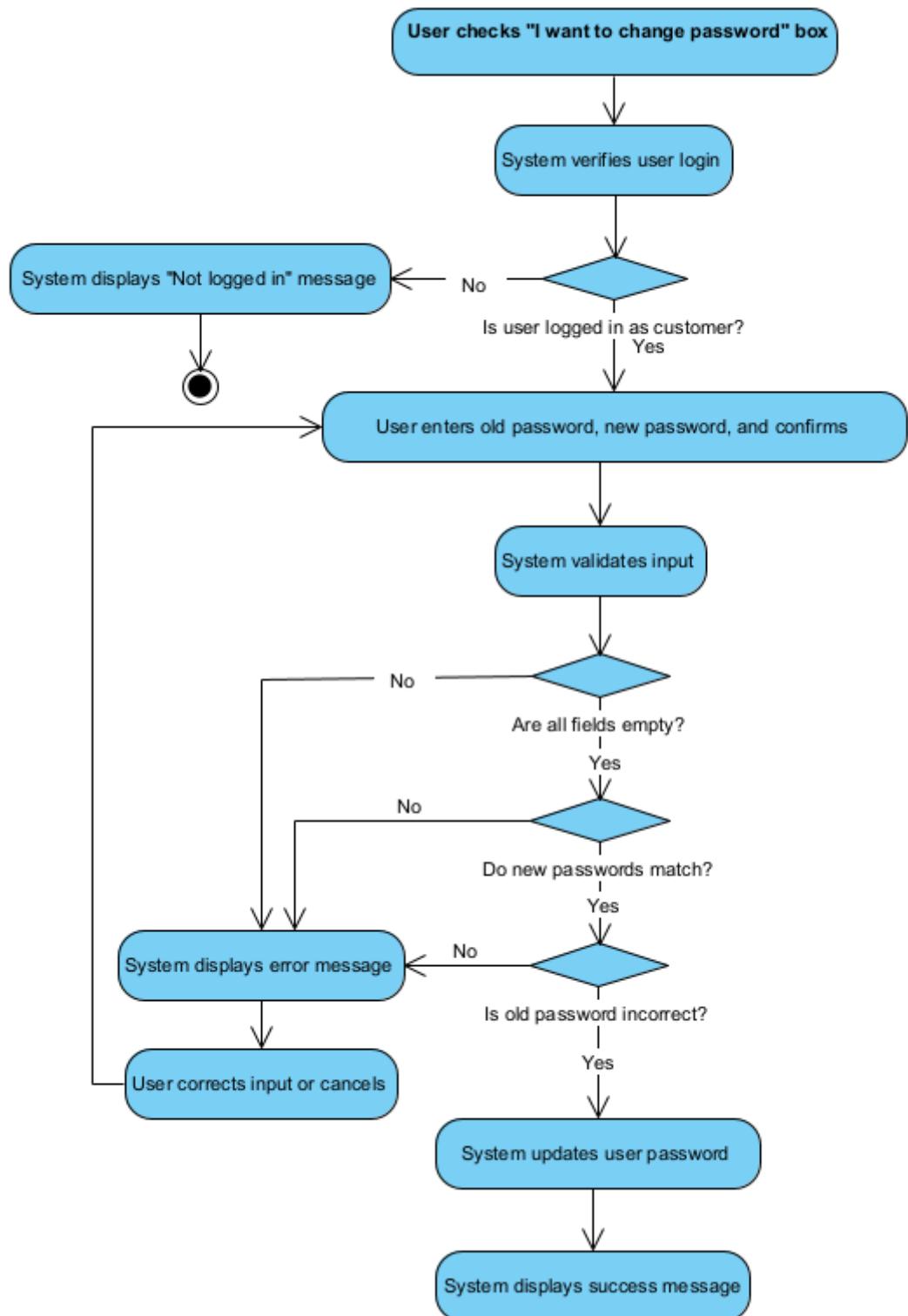
ID	UC-10		
Name	Change password		
Created by	Đào Duy Thái	Date created	13/01/2024
Priority	Medium	Frequency of use	Low
Actor	Customer		
Description	The user can change his/her password by inputting his current password as well as new password.		
Trigger	The user checks the box “I want to change password” in User profile screen		
Precondition	User have signed in as customer		
Postcondition	User changes the password for his/ her account successfully		
Normal flow	1. User checks the box “I want to change password” 2. User inputs old password, new password and confirm		

	3. User clicks button “Update” 4. System verifies information 5. System change password for user 1. System displays “Change password successfully” message
Alternative flow	None
Exception	<p>10-E1. Incorrect Old Password: If the provided old password does not match the user's current password, the system displays error message MSG-06</p> <p>10-E2. Empty Old Password, New Password, Confirm New Password: If the old password, new password, or confirm new password fields are left empty, the system displays error message MSG-02</p> <p>10-E3. New Password and Confirm New Password Mismatch: If the new password and the confirm new password do not match, the system will display an error message MSG-07</p>
Business rules	BR-02
Assumption	None
Other information	None

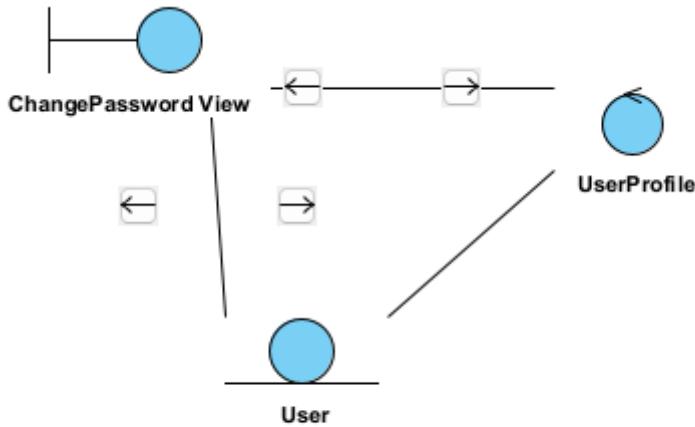
3.1.10.2. Interaction Diagram(s)



3.1.10.3. Activity Diagram(s)



3.1.10.4. View of Participating Classes



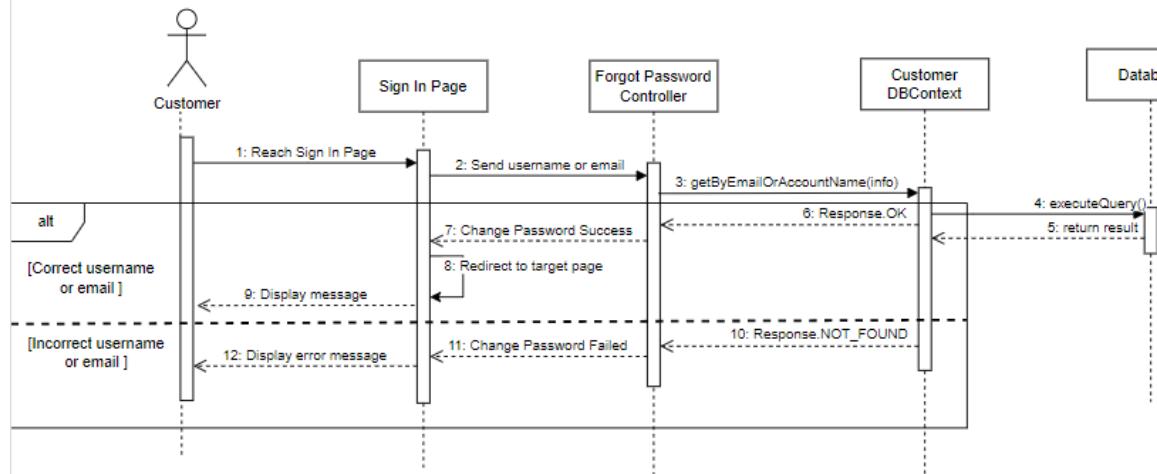
3.1.11. Reset password

3.1.11.1. Use case specification

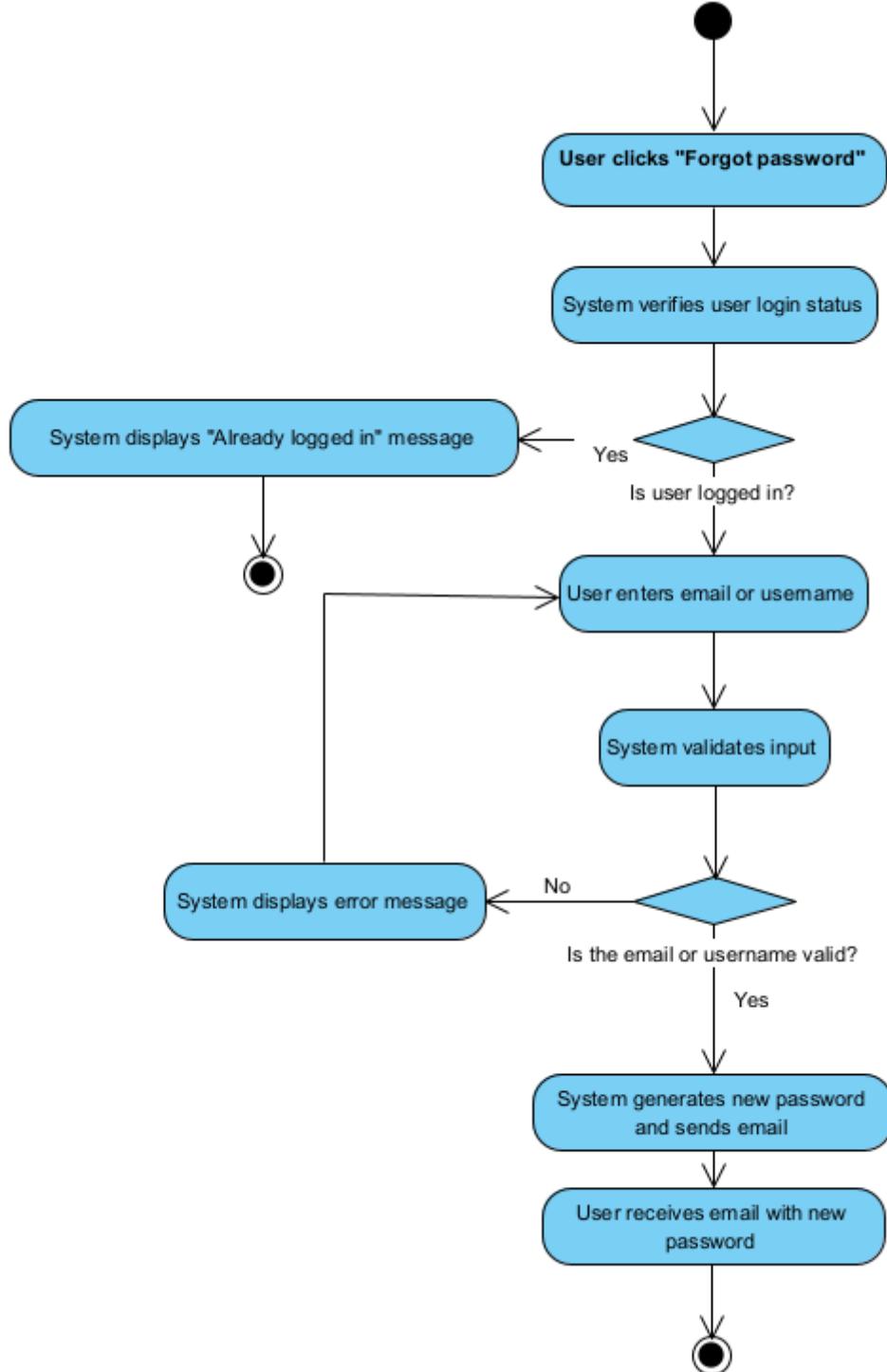
ID	UC-11		
Name	Reset password		
Created by	Đào Duy Thái	Date created	13/01/2024
Priority	Medium	Frequency of use	Low
Actor	Customer		
Description	The user can reset the account password and get a new password by entering account email or username.		
Trigger	Guest clicks “Forgot password” in the Sign In screen		
Precondition	User has not signed in the system		
Postcondition	User successfully reset password for their account		
Normal flow	1. User accesses the “Forgot password” screen 2. User enter email or username to get new password 3. System gets the account corresponding with the user name and password 4. System sends an password email in user email 5. User opens email and receive new password		
Alternative flow	None		
Exception	11-E1: Invalid Email or Username:		

	<p>If the provided email or username does not correspond to an existing account in the system, the system will display an error message MSG-08.</p> <p>11-E2: Email Not Received: If the password reset email is not received by the user, the system should provide an option for the user to request the email again or provide alternative instructions to reset the password.</p> <p>11-E3: Password Reset Token Expiration: If the user attempts to use the password reset link after the expiration period, the system should display an error message MSG-09 that the password reset link has expired and prompt the user to request a new password reset.</p>
Business rules	None
Assumption	None
Other information	None

3.1.11.2. Interaction Diagram(s)



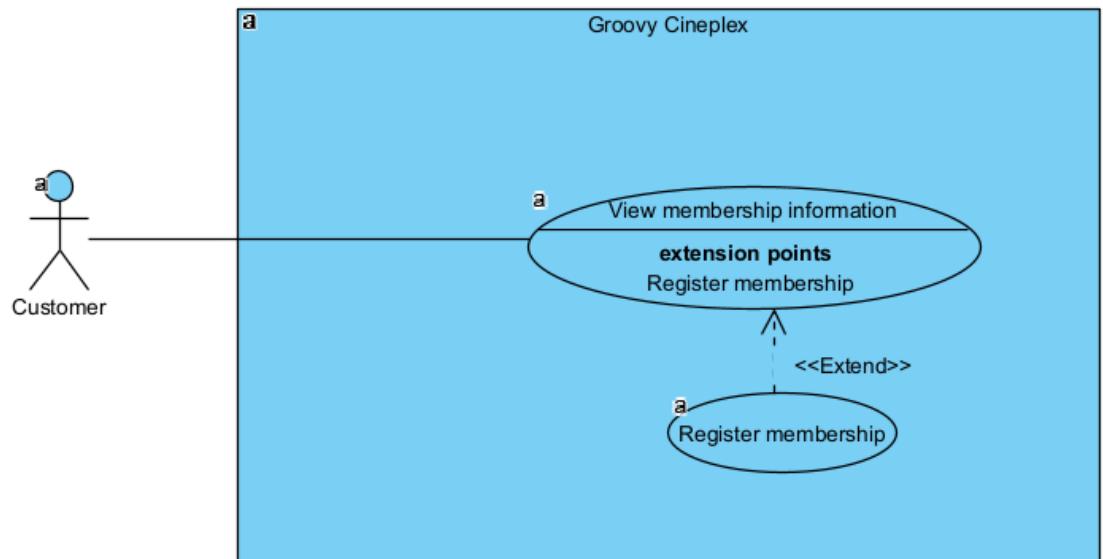
3.1.11.3. Activity Diagram(s)



3.1.11.4. View of Participating Classes

3.1.12. View membership information

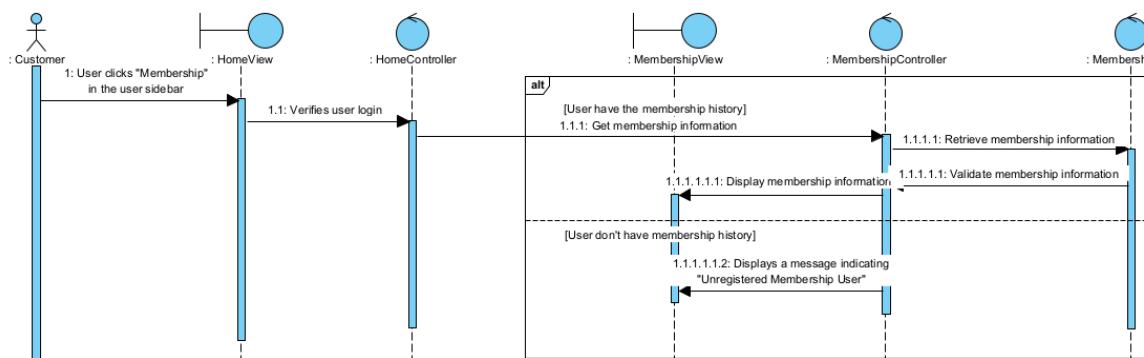
3.1.12.1. Use case specification



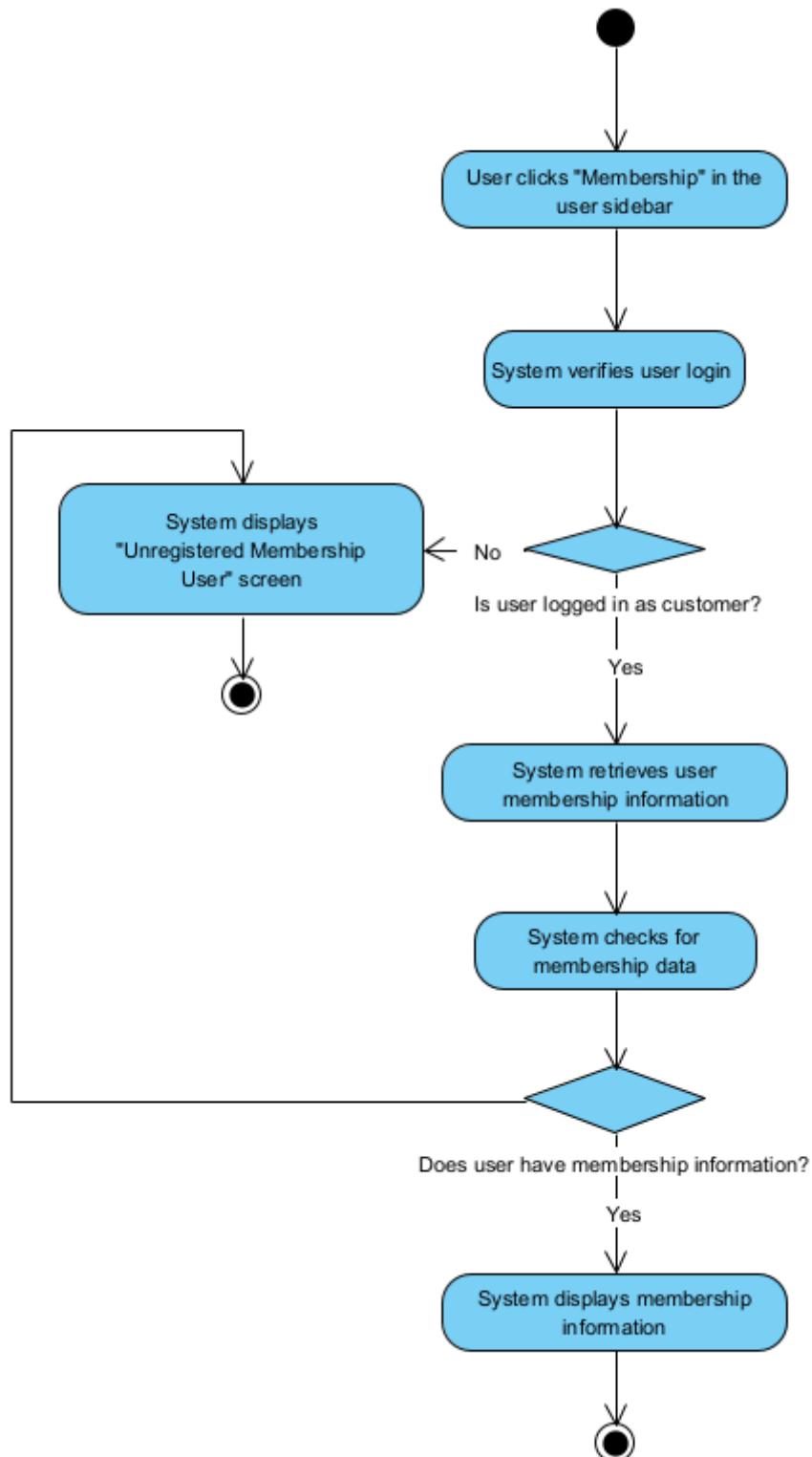
ID	UC-12		
Name	View membership information		
Created by	Đào Duy Thái	Date created	13/01/2024
Priority	Medium	Frequency of use	Low
Actor	Customer		
Description	This use case describes the process by which a customer can view their membership information within the system.		
Trigger	Guest clicks "Membership" in the user side bar		
Precondition	<ul style="list-style-type: none"> - User is logged in to the system. - User has a customer account (implicit in being logged in as a customer). 		
Postcondition	<ul style="list-style-type: none"> - If the user has membership information: The system displays retrieved membership information successfully. - If the user does not have membership information: The system displays a message indicating no registered membership. 		
Normal flow	<ol style="list-style-type: none"> 1. User clicks "Membership" in the user sidebar. 2. System verifies user login: The system confirms that the user is logged in and has a valid customer account. 3. System retrieves user membership information: The system attempts to retrieve any membership data associated with the user. 		

	<p>account.</p> <p>4. System checks for membership data: The system verifies whether any membership information was retrieved in step 3:</p> <ul style="list-style-type: none"> - If membership information exists, proceed to step 5. - If no membership information is found, proceed to the Alternative Flow (step 4a). <p>5. System displays membership information: The system presents the retrieved membership information to the user in a clear and user-friendly format. This information might include details such as membership tier, benefits, points balance, etc. (details can be adjusted based on your system).</p>
Alternative flow	<p>Step 4: if the user not logged in as customer:</p> <p>If no membership information is found associated with the user account (step 4), the system displays a message indicating "Unregistered Membership User" (Exception 12-E1).</p>
Exception	<p>12-E1: User Hasn't Registered Membership: This exception is triggered when a user attempts to view membership information but has no membership associated with their account. The system displays an "Unregistered Membership User" message.</p>
Business rules	None
Assumption	<ul style="list-style-type: none"> - The system has a mechanism to store and retrieve user membership information. - The system can differentiate between logged-in users and their account types (customer vs. guest).
Other information	None

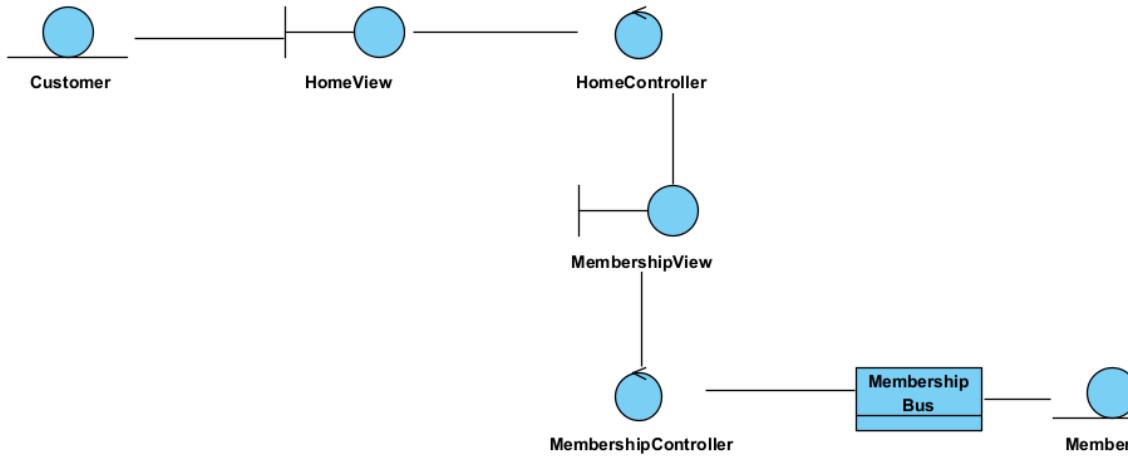
3.1.12.2. Interaction Diagram(s)



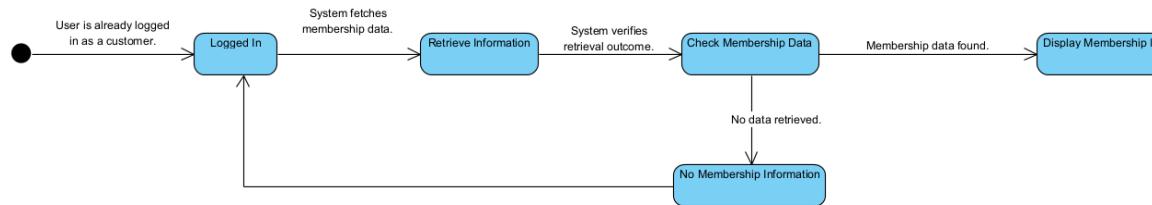
3.1.12.3. Activity Diagram(s)



3.1.12.4. View of Participating Classes

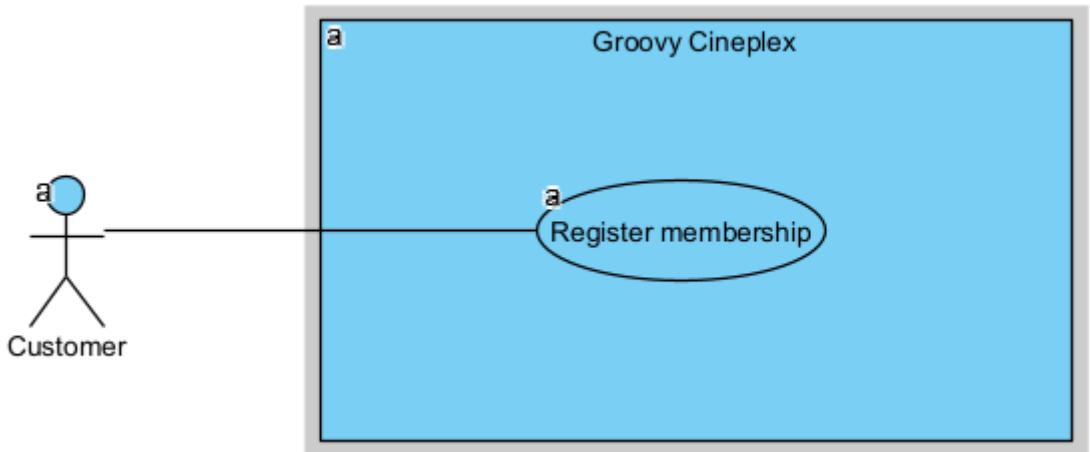


3.1.12.5. State chart diagram



3.1.13. Register membership

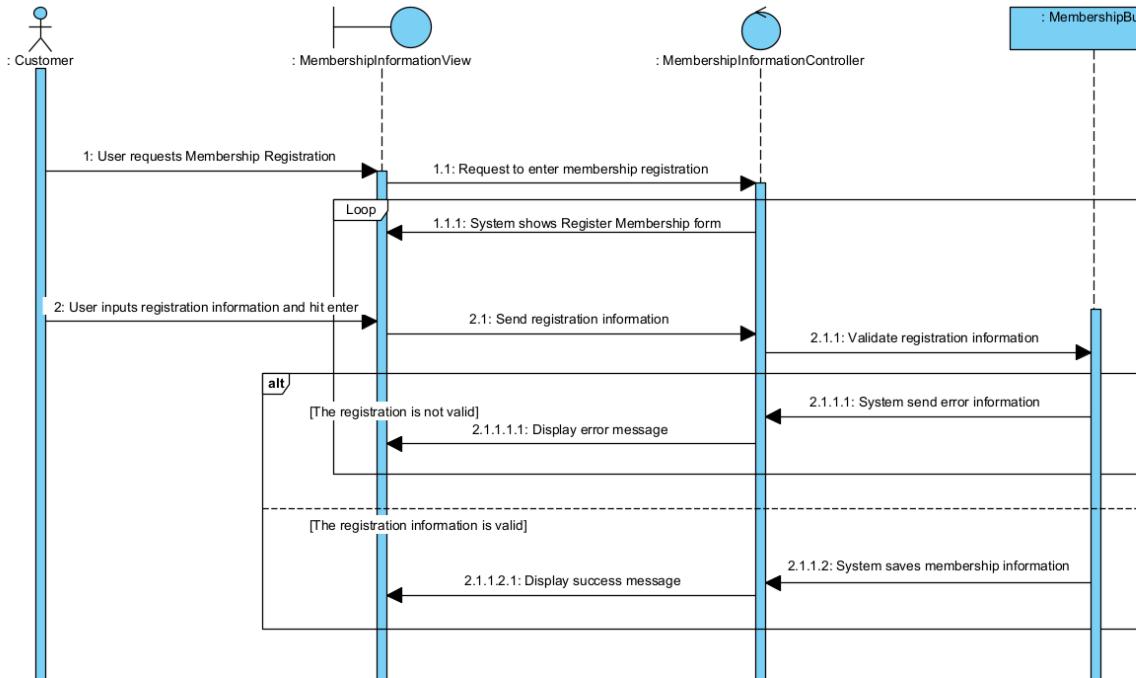
3.1.13.1. Use case specification



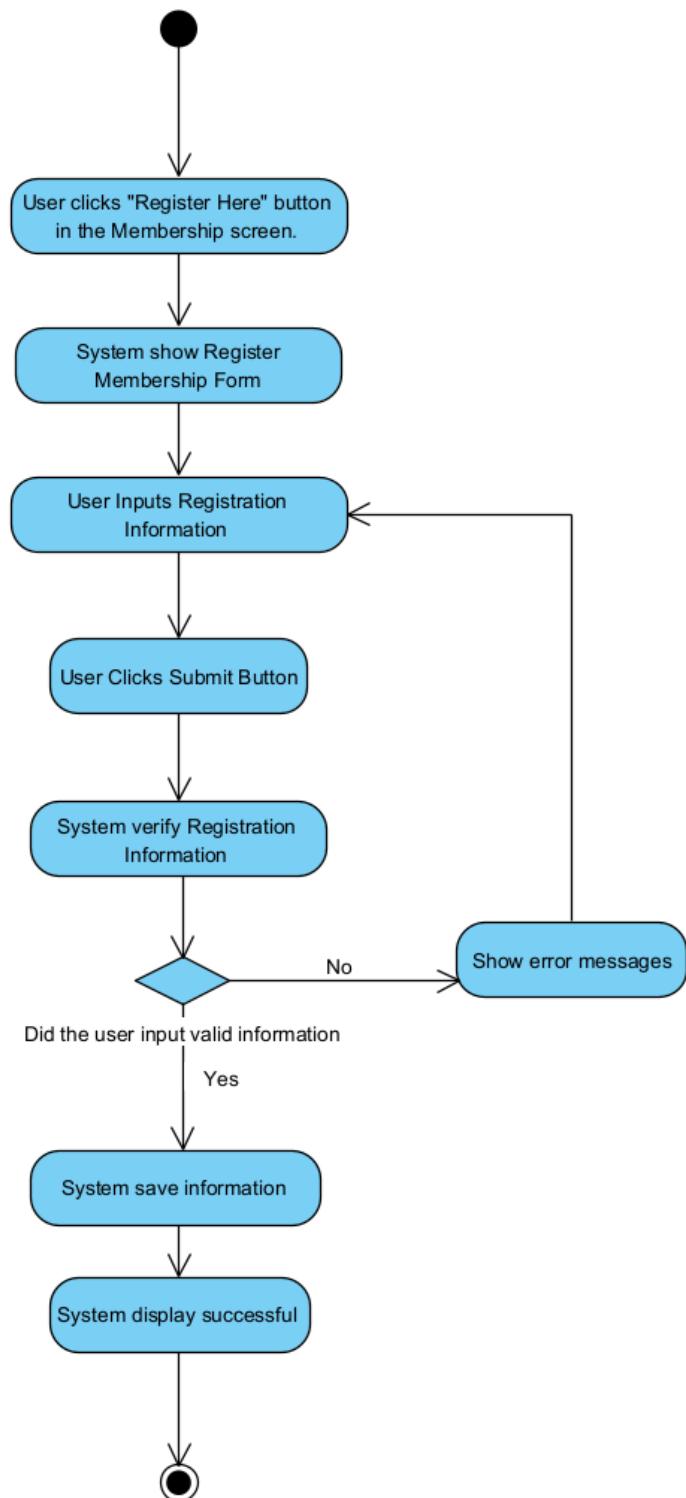
ID	UC-13		
Name	Register membership		
Created by	Đào Duy Thái	Date created	13/01/2024
Priority	Medium	Frequency of use	Low
Actor	Customer		
Description	This use case describes the process by which a customer can register for a membership program within the system using a membership code. A membership offers exclusive benefits and rewards.		
Trigger	Customer clicks the "Register Here" button in the Membership screen (assuming the user is not already a member).		
Precondition	User is logged in to the system as a customer.		
Postcondition	<ul style="list-style-type: none"> - If registration is successful: The system displays a confirmation message indicating successful membership registration. - If registration fails due to errors: The system displays an appropriate error message depending on the encountered exception. 		
Normal flow	<ol style="list-style-type: none"> 1. User requests Membership Registration: Customer clicks "Register Here" button. 2. System shows Register Membership form: The system presents a form for the user to enter their membership information. This form should include: <ul style="list-style-type: none"> - Membership Code field - Any other required information for registration (optional, based on your system) 3. User inputs registration information: The customer enters their membership code and any other necessary details in the provided form. 4. User clicks submit button: The customer initiates the registration process by clicking the "Submit" button. 5. System verifies registration information: The system performs the following checks: <ul style="list-style-type: none"> - E5.1: Invalid Card Number Format: The system validates the entered membership code format against the expected format (e.g., alphanumeric characters, length). If the format is invalid, proceeds to the Alternative Flow (exception E5.1). 		

	<p>- E5.2: Duplicate Membership Registration: The system checks if the entered membership code is already associated with another user's account. If a duplicate is found, proceed to the Alternative Flow (exception E5.2).</p> <p>- E5.3: Empty Card Number: The system verifies that the membership code field is not left blank. If empty, proceed to Alternative Flow (exception E5.3).</p> <p>- Additional validation steps can be added here based on your specific business rules (refer to BR-01 and BR-02).</p> <p>6. If correct, system saves membership information: If all validation steps pass, the system stores the customer's membership information and links it to their user account.</p> <p>7. System displays registration result: The system displays a message indicating successful membership registration. This message may also include details about the customer's new membership tier and benefits (optional).</p>
Alternative flow	<ul style="list-style-type: none"> - Invalid Card Number Format: If the format of the entered membership code is invalid, the system displays error message MSG-10 explaining the issue and prompting the user to correct the format. - Duplicate Membership Registration: If the entered membership code is already registered by another user, the system displays error message MSG-11 informing the user that the code is already in use. - Empty Card Number: If the membership code field is left empty, the system displays error message MSG-02 reminding the user to enter their membership code.
Exception	<ul style="list-style-type: none"> - Invalid Card Number Format (described in Alternative Flow) - Duplicate Membership Registration (described in Alternative Flow) - Empty Card Number (described in Alternative Flow)
Business rules	BR-01, BR-02
Assumption	<ul style="list-style-type: none"> - The system has a mechanism to validate and store membership information. - The system can associate membership information with user accounts.
Other information	The membership code is provided in a physical membership card which can be purchased offline or through support channels.

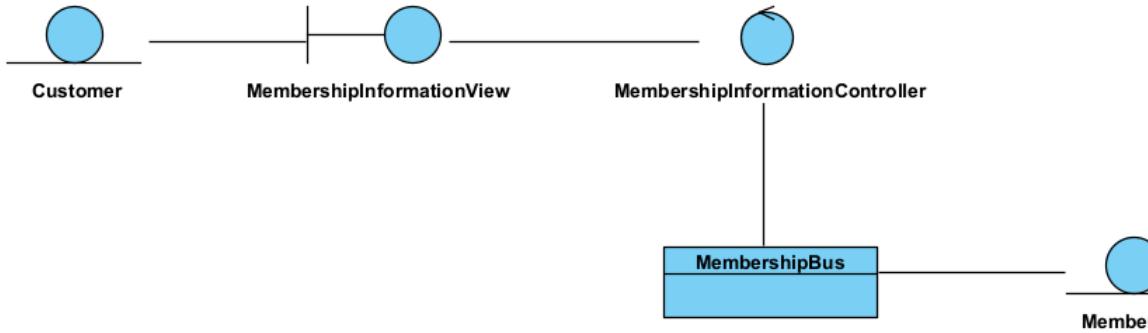
3.1.13.2. Interaction Diagram(s)



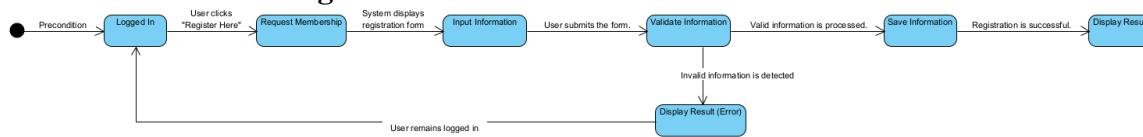
3.1.13.3. Activity Diagram(s)



3.1.13.4. View of Participating Classes



3.1.13.5. State chart diagram



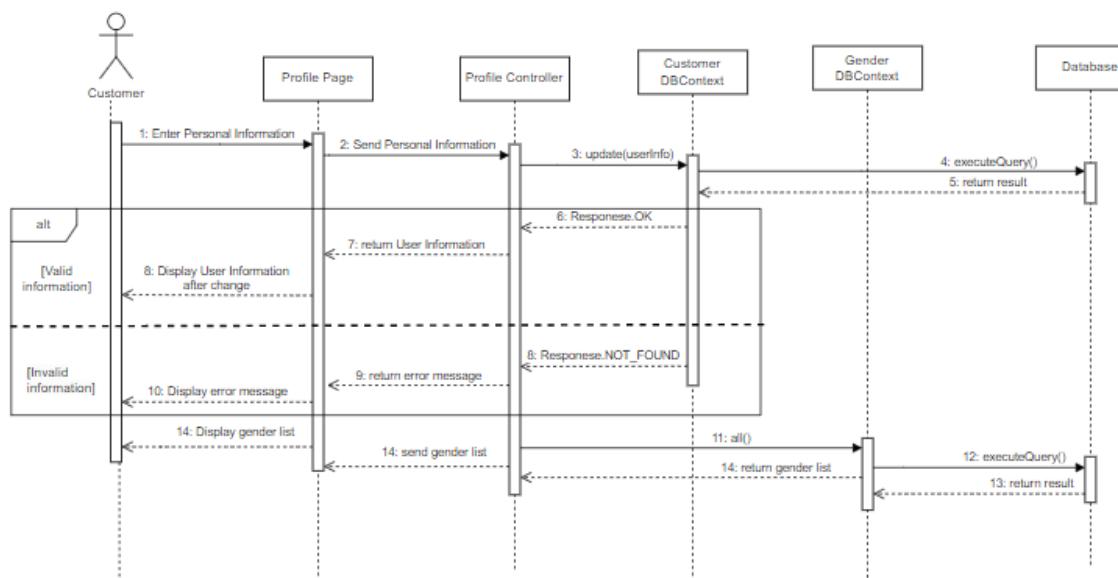
3.1.14. Change user information

3.1.14.1. Use case specification

ID	UC-14		
Name	Change user information		
Created by	Đào Duy Thái	Date created	13/01/2024
Priority	TBD	Frequency of use	TBD
Actor	Customer		
Description	The user can update and modify their personal information, such as name, contact details.		
Trigger	The user clicks on his/her username on Navigation bar then clicks 'User profile'		
Precondition	User is already logged in by a customer account.		
Postcondition	User changes the information successfully		
Normal flow	<ol style="list-style-type: none"> User accesses User Profile screen System displays user information fields User edits information field that his/her need User clicks "Update" button System validates inputted information System saves the changes System display result message 		
Alternative flow	None		

Exceptions	<p>14-E1. Lastname/Firstname/ Username/ Password/ Email/ Address/ Phone number is empty: Change user information page displays error message M01</p> <p>14-E2. Inputted email has already existed. Change user information page displays error message M03</p> <p>14-E3. Inputted phone numbers already existed. Change user information page displays error message M04</p>
Business rules	BR-01, BR-02
Assumption	None
Other information	None

3.1.14.2. Interaction Diagram(s)

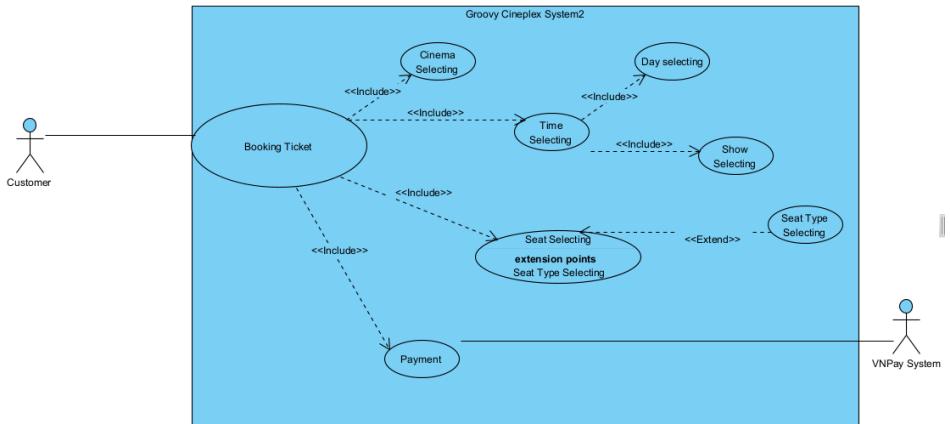


3.1.14.3. Activity Diagram(s)

3.1.14.4. View of Participating Classes

3.1.14.5. VOPC Diagram(s)

3.1.15. Book ticket

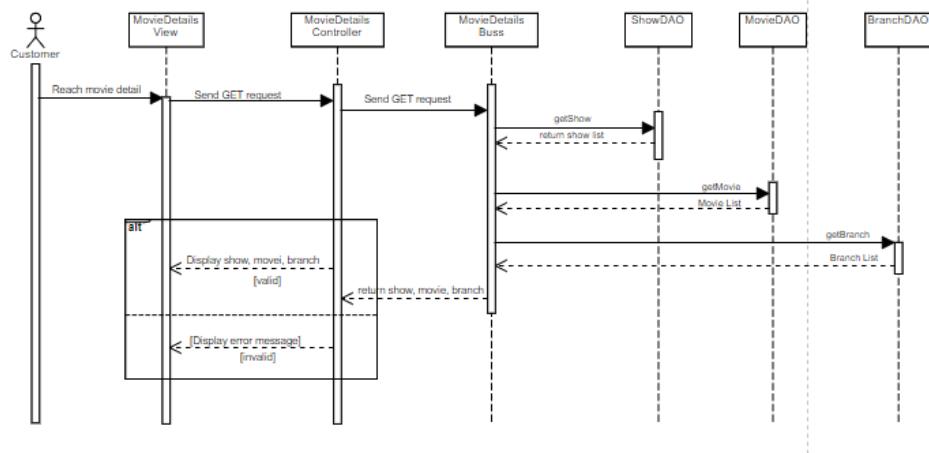


a. Use case specification

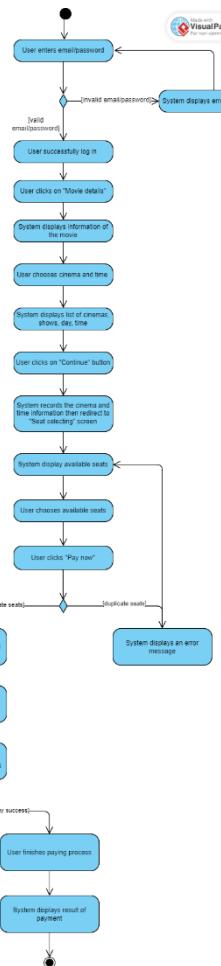
ID	UC-15		
Name	Book ticket		
Created by	Lê Thành An	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Customer		
Description	The user can select a movie and book tickets for a desired showtime room and cinema.		
Trigger	User clicks on Cinema drop-down list in Movie Details screen, phase 1 of the use case		
Precondition	User is already logged in by a customer account.		
Postcondition	User book ticket for the chosen movie successfully		
Normal flow	1. User accesses “Movie Details” screen 2. System displays the information of the movie 3. Phase 1: Cinema and time selecting 3.1. User clicks on Cinema drop-down list 3.2. System displays list of cinemas that are showing the movie 3.2. User chooses a cinema to watch 3.3. System displays the corresponding shows of that cinema 3.4. User chooses a day to watch 3.5. User chooses the show type to watch 3.6. User chooses a show time to watch 3.7. User clicks “Continue” button 3.8. System records the cinema and time information then redirect to the next screen 4. Phase 2: Seat selecting 4.1. User clicks on available seat(s) that he/she want to book 4.2. User clicks on “Paynow” 4.3. System records the seats information then displays the payment screen		

	<p>payment pop-up</p> <p>5. Phase 3: Final Payment</p> <p>5.1. User clicks on “Pay” button</p> <p>5.2. System redirects to VNPay system to take paying process</p> <p>5.3. User finishes paying process</p> <p>5.4. System redirects to Order Result screen</p> <p>5.5. System displays result of payment</p>
Alternative flow	None
Exceptions	<p>15-E1: Seat Selection Conflict: If another user books the same seat(s) before the current user completes the booking process, the system should display an error message MSG-12</p> <p>15-E2: Payment Timeout: If the user takes longer than 5 minutes to complete the payment process, resulting in a timeout, the system will display “Order failed” screen</p>
Business rules	BR-02
Assumption	None
Other information	None

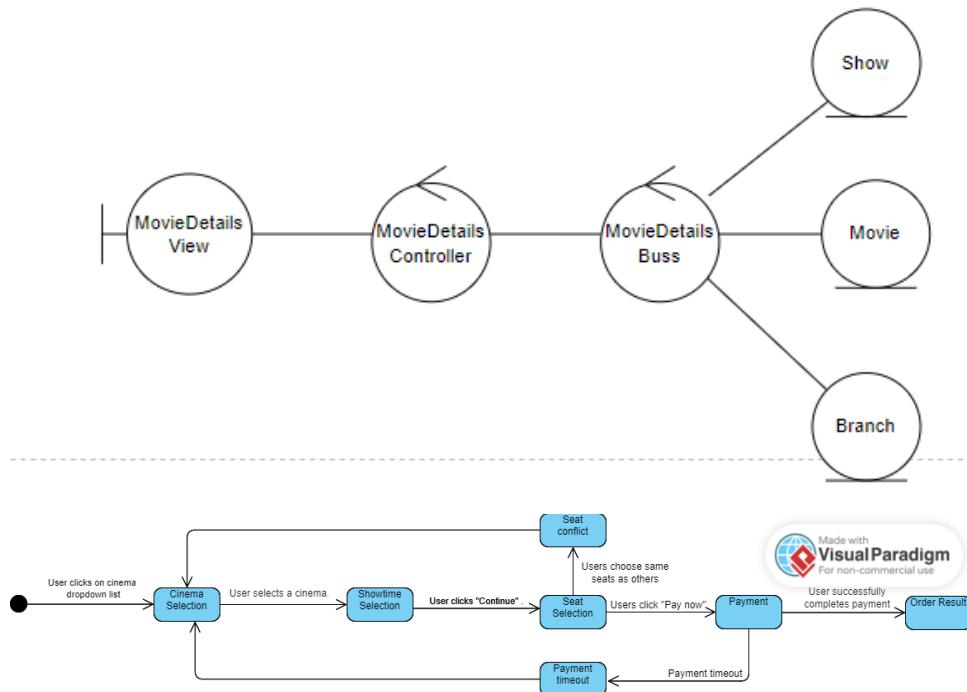
b. Interaction diagram



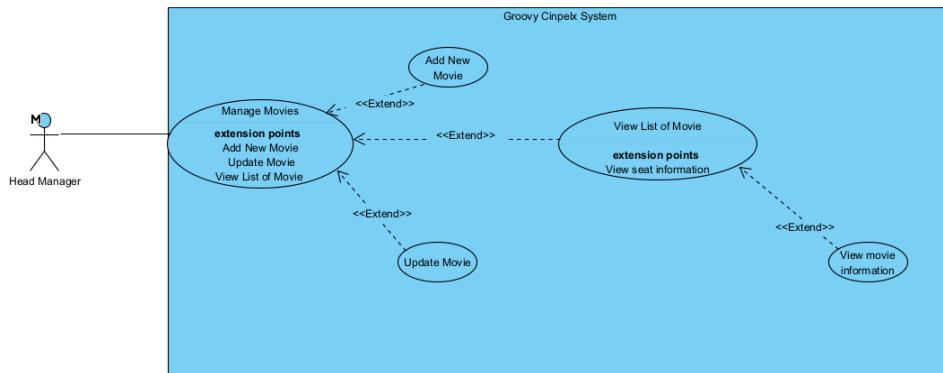
c. Activity diagram



d. View of participating classes

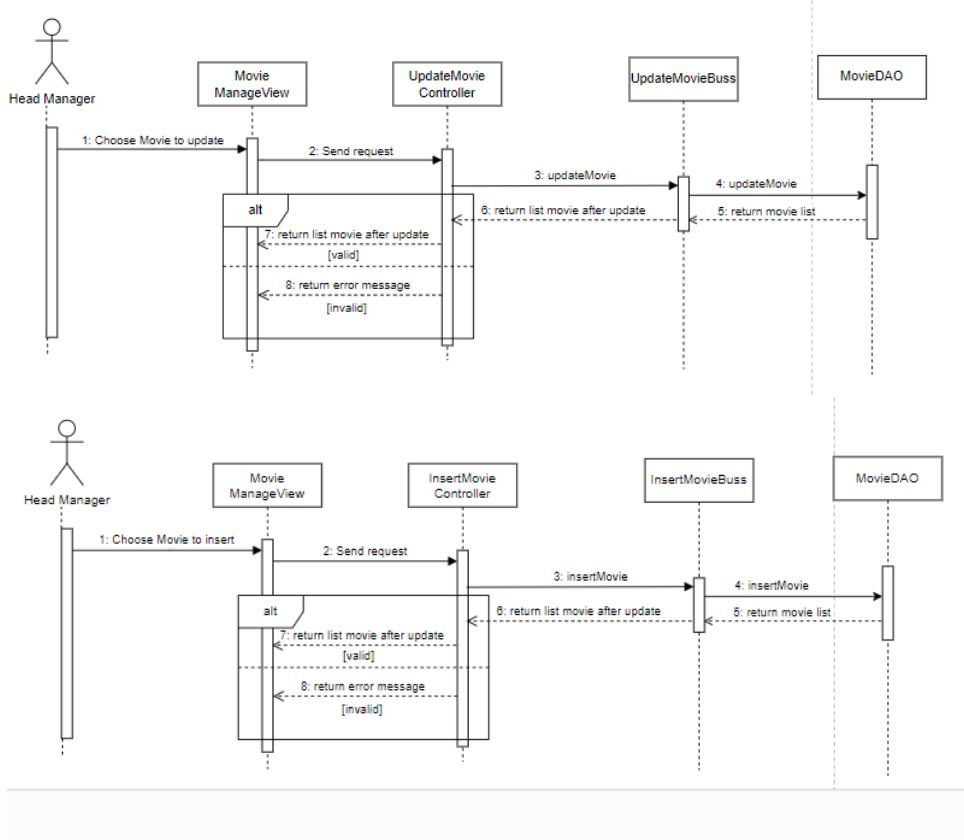


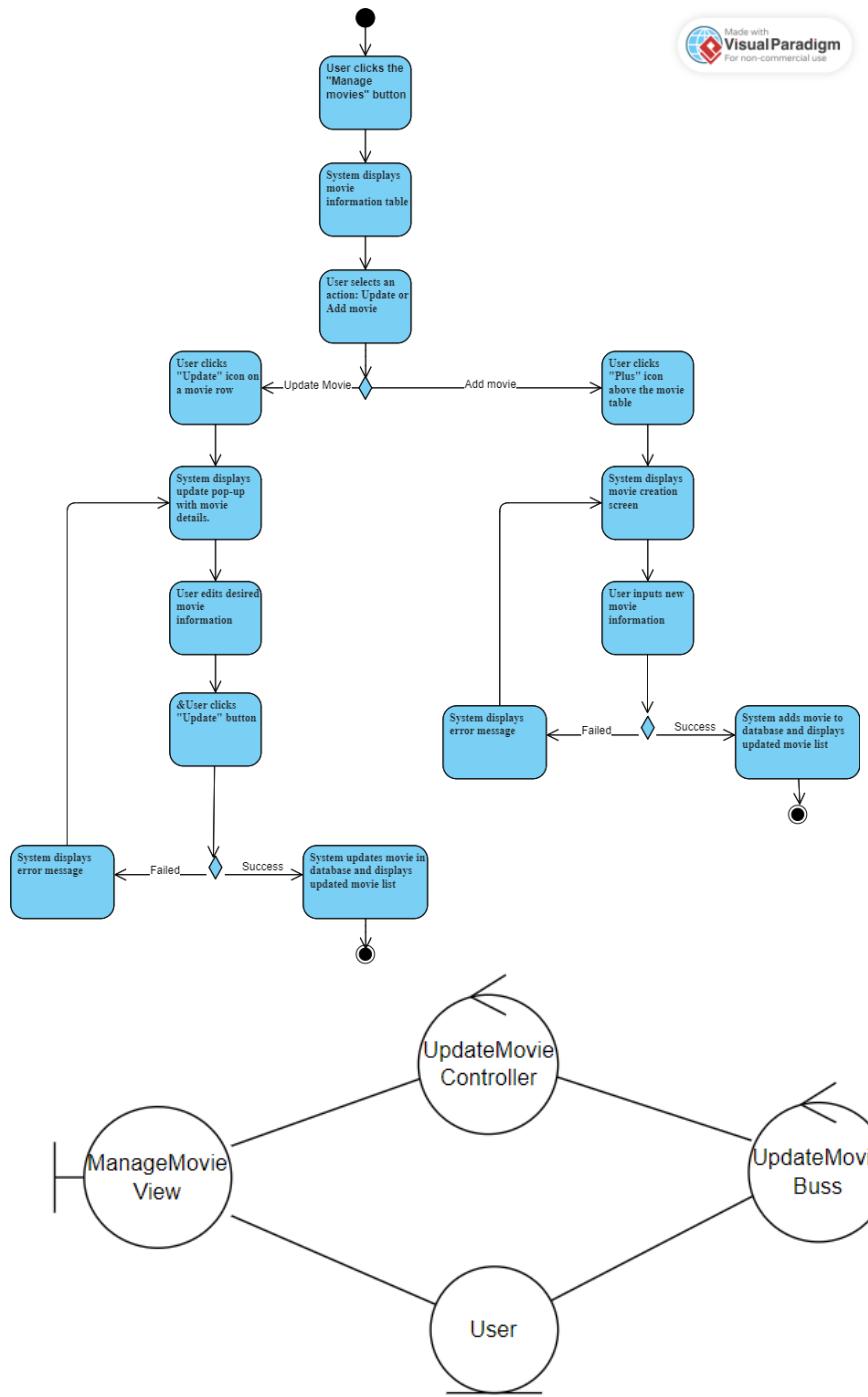
3.1.18. Manage Movies

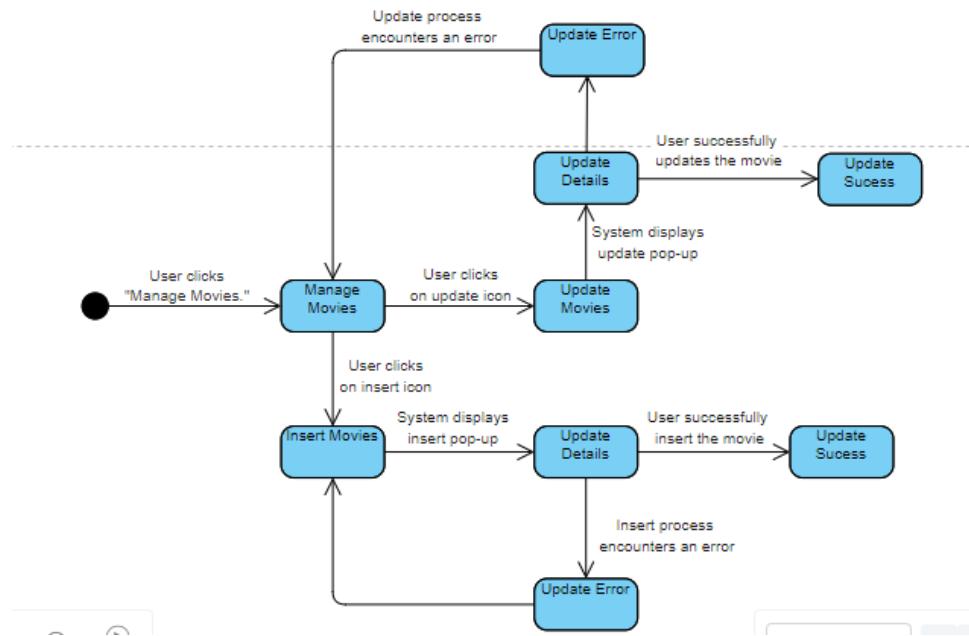
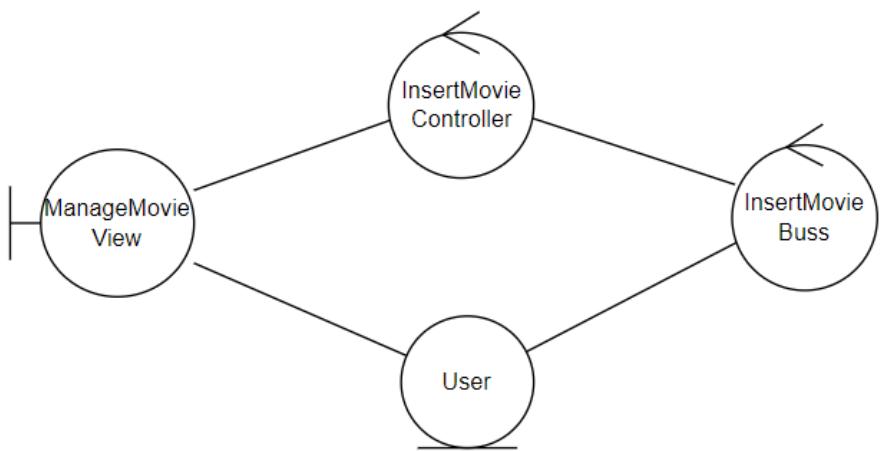


ID	UC-18		
Name	Manage movies		
Created by	Lê Thành An	Date created	15/01/202
Priority	High	Frequency of use	High
Actor	Head manager		
Description	The manager can manage movies on the, including adding new movies, updating movie details, and handling movie-related operations.		
Trigger	User clicks on “Manage movies” button in head manager’s sidebar.		
Precondition	User is already logged in by a head manager account.		
Postcondition	None		
Normal flow	<ol style="list-style-type: none"> 1. User clicks on “Manage movies” button in admin’s sidebar. 2. System displays the information of movies by table, which contains their ID, Title, Release Date, Duration, Rate, Post Views. <p>In this screen, the system also allows the user to update certain movies and add new movie.</p> <p>3.1. Update movie</p> <ol style="list-style-type: none"> 3.1.1. User clicks on Update icon of that movie row 3.1.2. System displays update pop-up. 3.1.3. User changes the information he/she need 3.1.4. User clicks on Update button 3.1.4. System update new information for the movie and display movies table <p>3.2. Add new movie</p> <ol style="list-style-type: none"> 3.2.1. User clicks on the Plus icon above the movies table 		

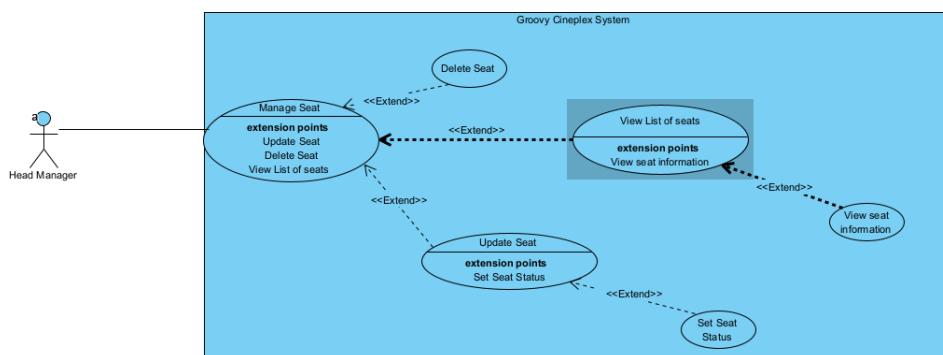
	<p>3.2.2. System displays add screen.</p> <p>3.2.3. User inputs movie's information</p> <p>3.2.4. User clicks on Add button</p> <p>3.3.5. System add new movie and displays movies table</p>
Alternative flow	None
Exceptions	<p>Update Movies</p> <p>18-E1: Error Updating Movie Details: If the user fails to update movie details, such as encountering database errors or violating constraints, the system displays an error message MSG-14 and the changes are not saved.</p> <p>Add new Movie</p> <p>18-E2: Invalid Movie Information: If the user fails to provide valid and complete movie details during the addition process, the system displays an error message MSG-14 and the movie is not added to the database.</p>
Business rules	BR-03
Assumption	None
Other information	None







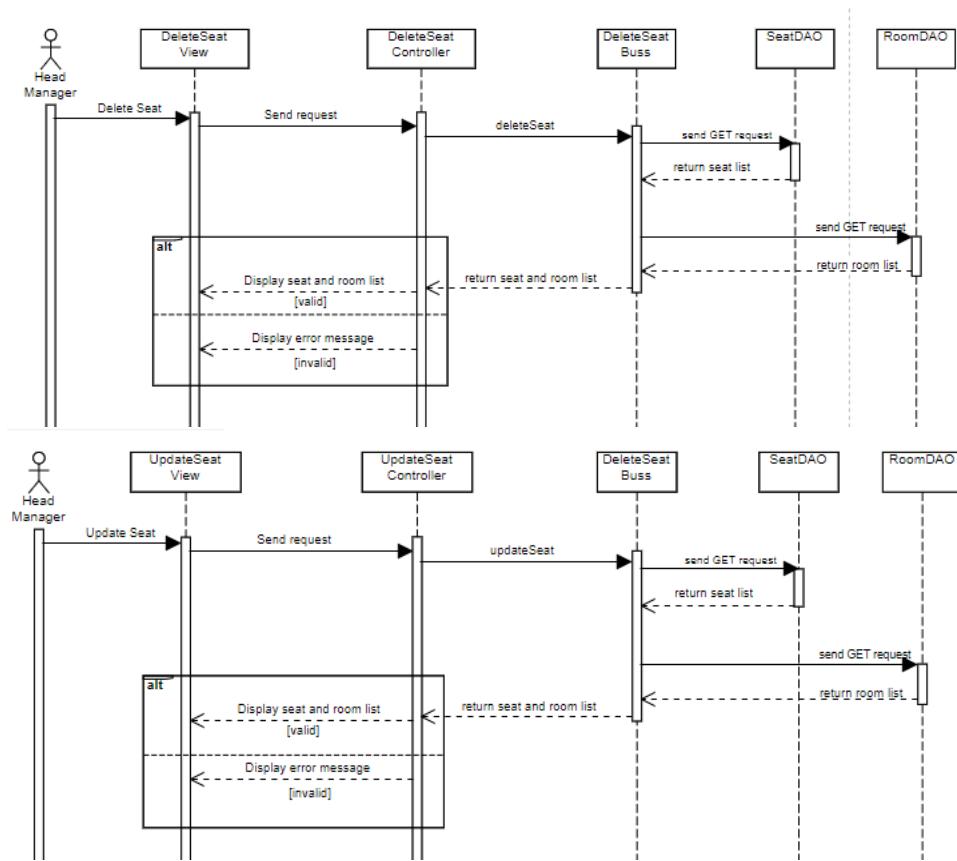
3.1.21. Manage Cinema's facility – Seats

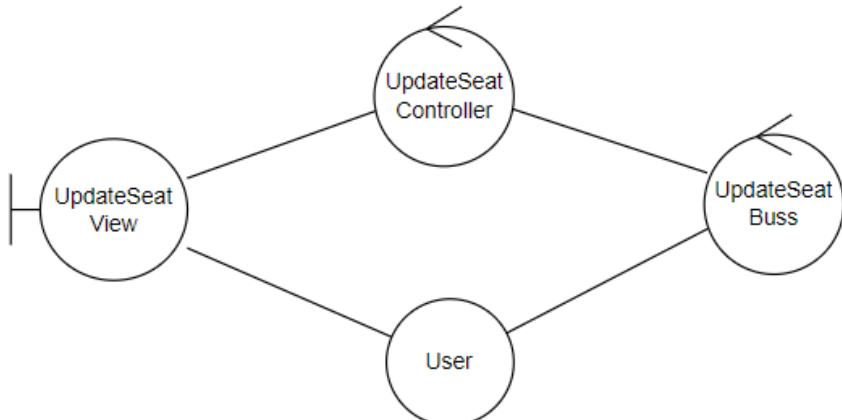
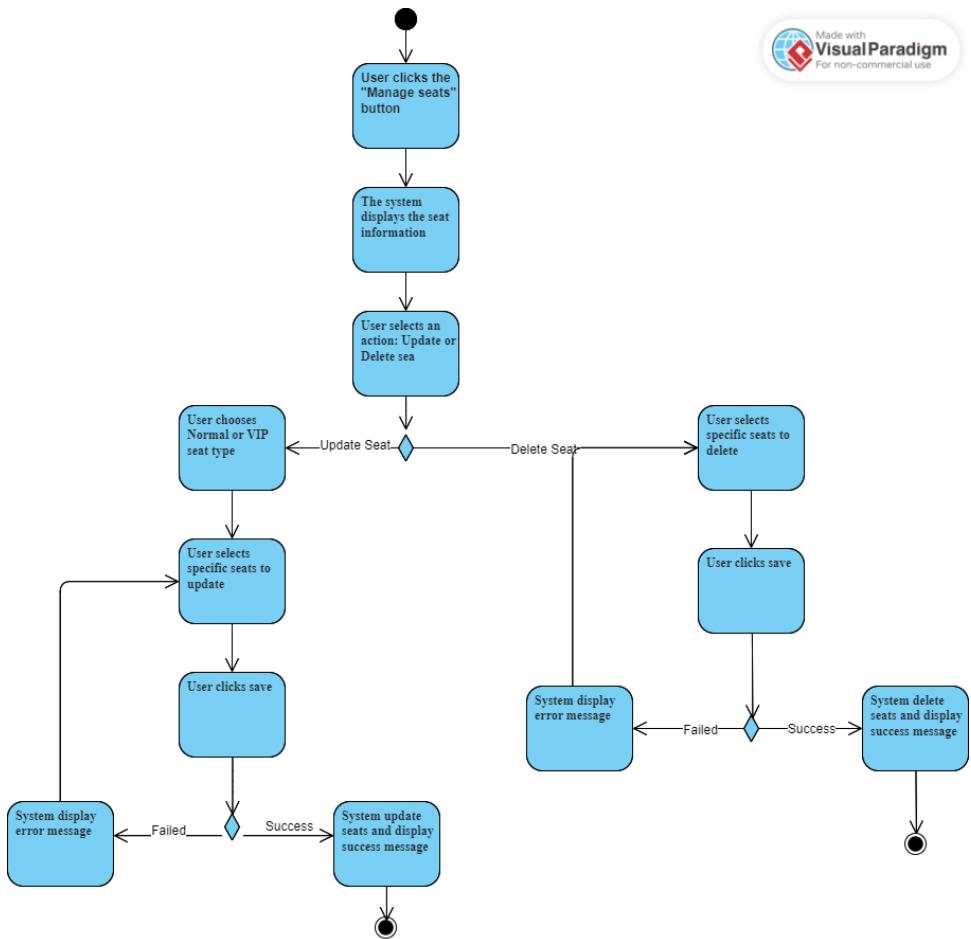


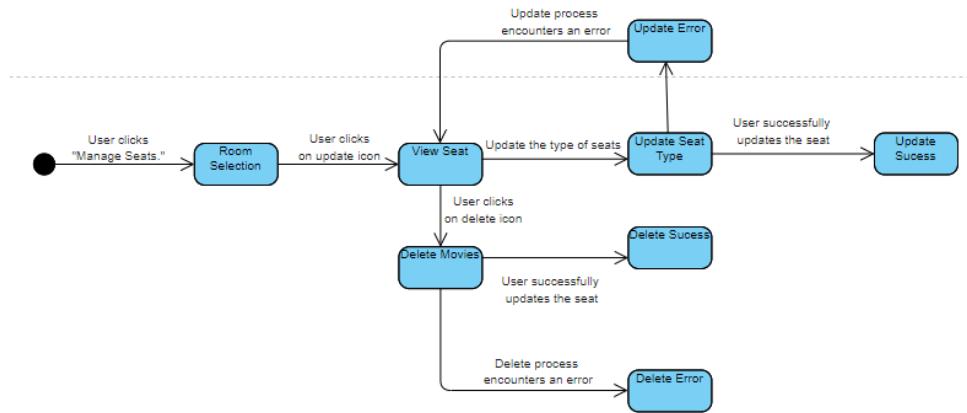
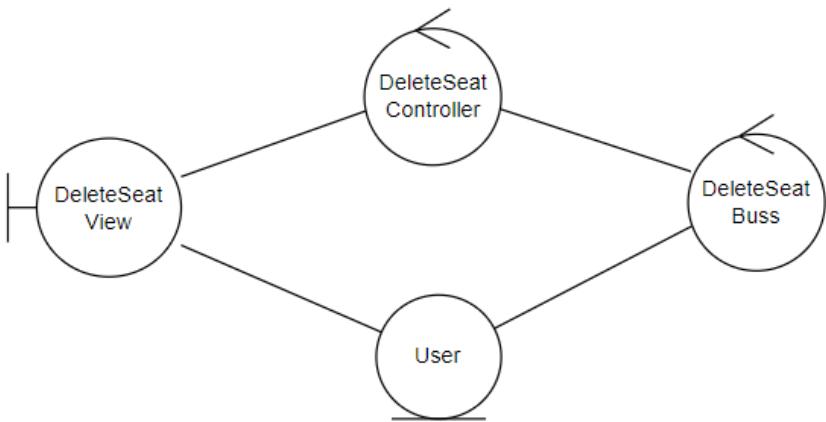
ID	UC-21
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Name	Manage cinema's facility - Seats		
Created by	Lê Thành An	Date created	16/01/2024
Priority	High	Frequency of use	High
Actor	Head manager, Cinema manager		
Description	The admin can manage seats in a selected room, including adding new seats, updating seat details, handling seat-related operations		
Trigger	User clicks on “Manage seats” button on any rooms in Manage rooms screen		
Precondition	User is already logged in by a manager account.		
Postcondition	None		
Normal flow	<ol style="list-style-type: none"> 1. User clicks on “Manage seats” button on any rooms in Manage rooms screen 2. System displays the information of seats by map <p>3.1. Delete seat</p> <ol style="list-style-type: none"> 3.1.1. User clicks on Delete seat box 3.1.2. System enables the delete action 3.1.3. User clicks on Row number, Col number or individual seats to delete the seat 3.1.4. User clicks save button 3.1.5. System receives the seat information and save <p>3.2. Update certain seat</p> <ol style="list-style-type: none"> 3.2.1. User clicks on Normal seats or VIP seat box 3.2.2. System enables the user to update the seats 3.2.3. User clicks on Row number, Col number or individual seats to update the seat type 3.2.4. User clicks save button 3.2.5. System receives the seat information and save 		
Alternative flow	None		
Exceptions	<p>Update Seat, Delete Seat</p> <p>If the room has shows that are or on-showing, the seats of the room can not be updated or deleted. If user click save button, the system displays message MSG-14 or MSG-16</p>		
Business rules	BR-03, BR-04		

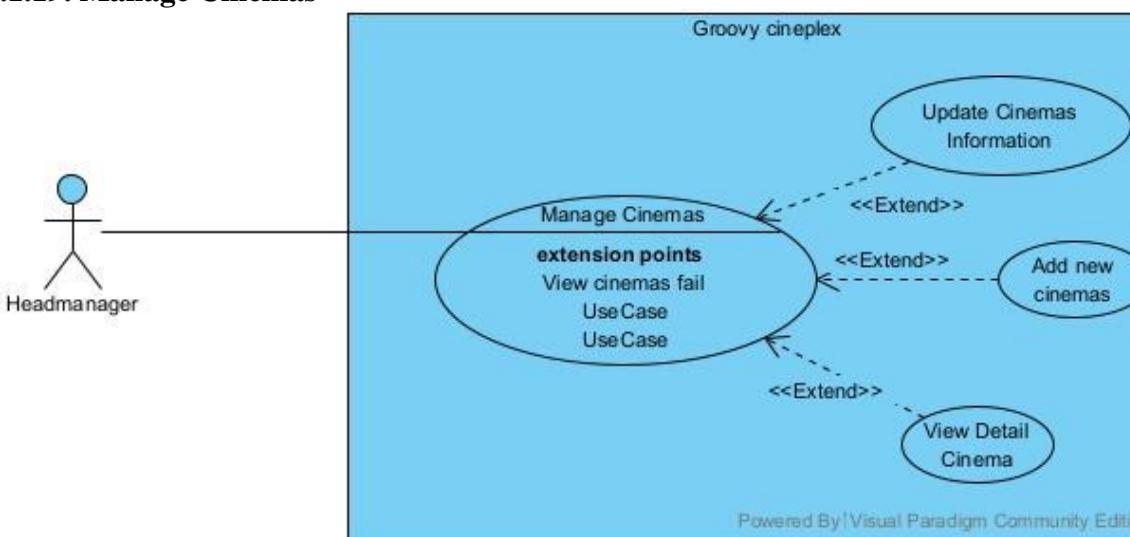
Assumption	None
Other information	None





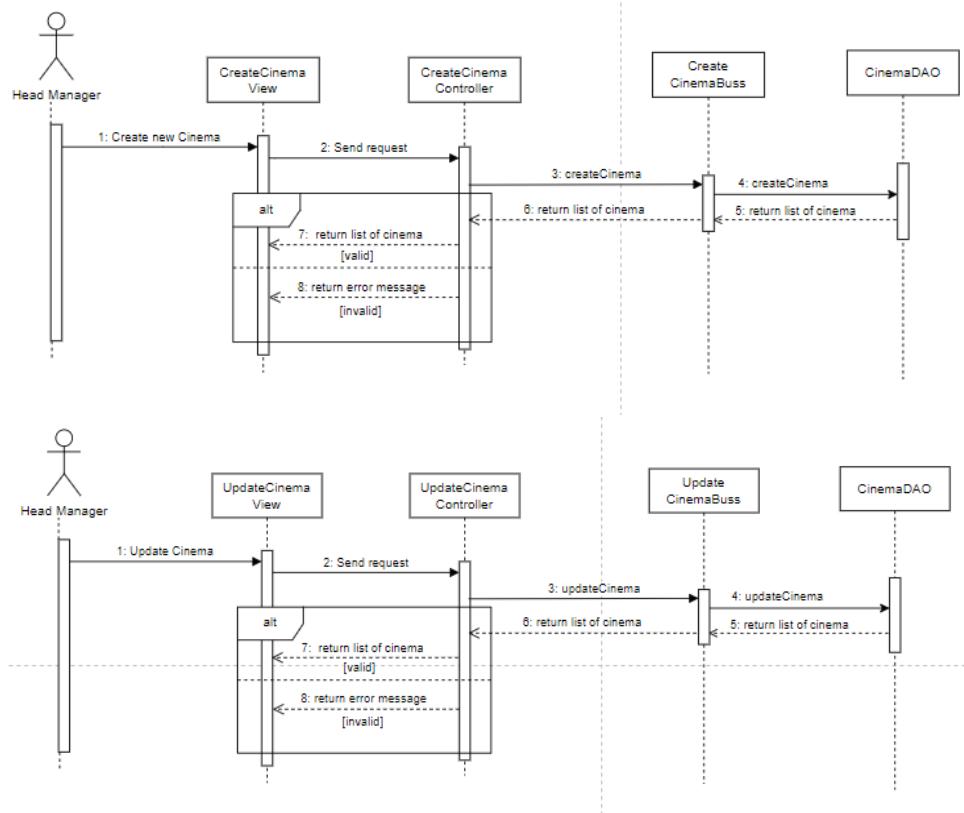


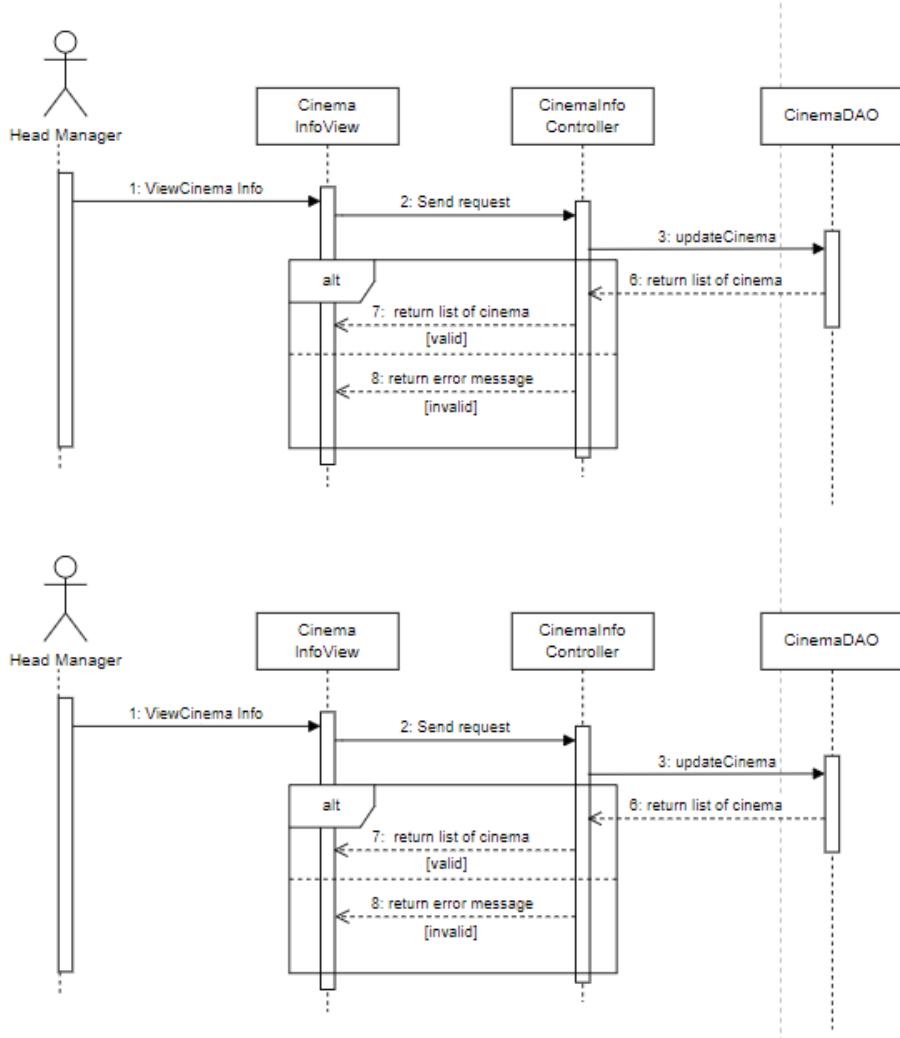
3.1.19. Manage Cinemas



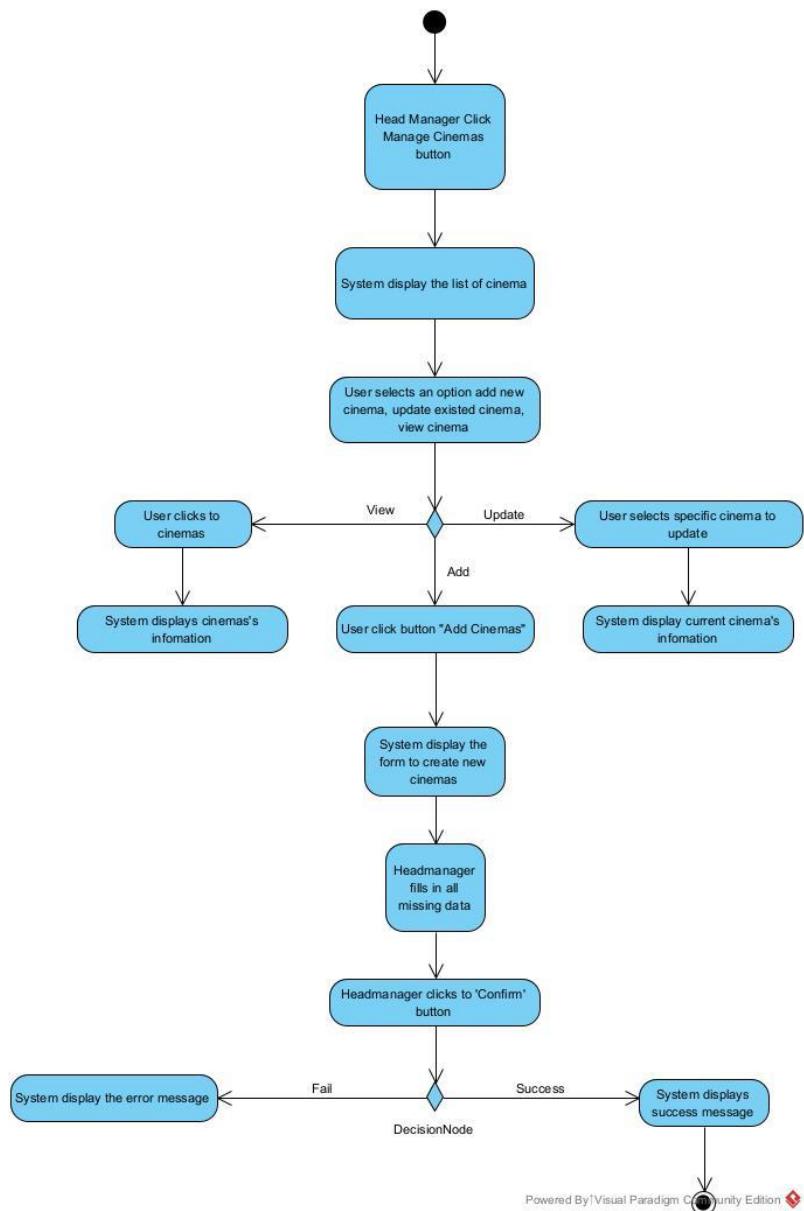
ID	UC-19		
Name	Manage cinemas		
Created by	Dương Thành Luân	Date created	15/01/2024
Priority	High	Frequency of use	High
Actor	Head manager		
Description	The head manager can manage cinemas, including adding new cinemas, updating cinema details, and handling cinema-related operations.		
Trigger	User clicks on “Manage cinemas” button in head manager’s sidebar.		
Precondition	User is already logged in by a head manager account.		
Postcondition	None		
Normal flow	<p>1. User clicks on “Manage cinemas” button in admin’s sidebar.</p> <p>2. System displays the list of cinemas</p> <p>In this screen, the system also allows the user to view details, update certain cinema, add new cinema</p> <p>3.1. View cinema details</p> <p>3.1.1. User clicks on icon on “View details” text of any cinema</p> <p>3.1.2. System displays a pop-up screen which shows cinema details information and allows the user to change the information directly.</p> <p>3.2. Update cinema</p> <p>3.2.1. User clicks on icon on “View details” text of any cinema</p> <p>3.2.2. System displays a pop-up screen which shows cinema details information and allows the user to change the information directly.</p> <p>3.2.3. User changes the information he/she need</p> <p>3.2.4. User clicks on Update button</p> <p>3.2.4. System update new information for the cinema and displays cinemas table</p> <p>3.3. Add new cinema</p> <p>3.3.1. User clicks on the Plus icon above the movies table</p> <p>3.3.2. System displays add pop-up.</p> <p>3.3.3. User inputs cinema’s information</p> <p>3.3.5. User clicks on Add button</p> <p>3.3.6. System adds new cinemas and displays cinemas list</p> <p>3.4. Redirect to rooms manage</p> <p>3.4.1. User clicks on ‘Manage rooms’ on any cinema</p> <p>3.4.1. System displays manage rooms screen of that cinema</p>		

Alternative flow	None
Exceptions	<p>Update Cinemas</p> <p>19-E1: Error Updating Cinema Details: If the user fails to update cinema details, such as encountering database errors or violating constraints, the system displays an error message MSG-14 and the changes are not saved.</p> <p>Add new Cinemas</p> <p>19-E2: Invalid cinema Information: If the user fails to provide valid and complete cinema details during the addition process, the system displays an error message MSG-15 and the cinema is not added to the database.</p>
Business rules	BR-03, BR-04
Assumption	None
Other information	None

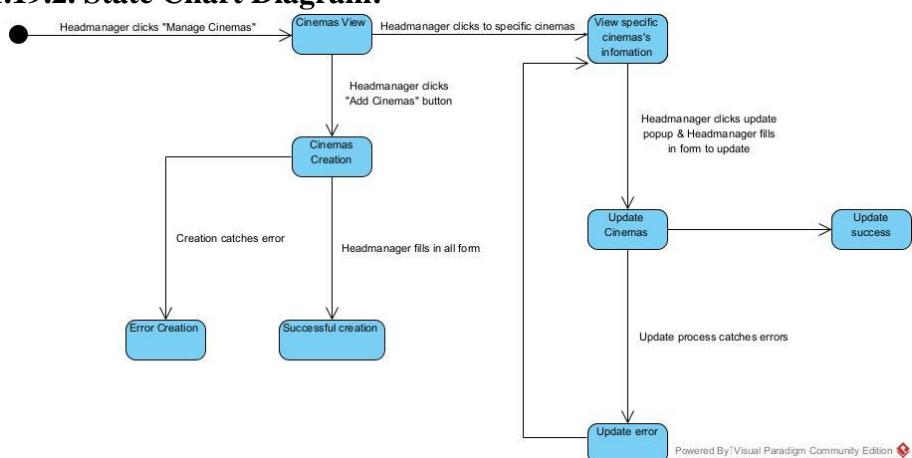




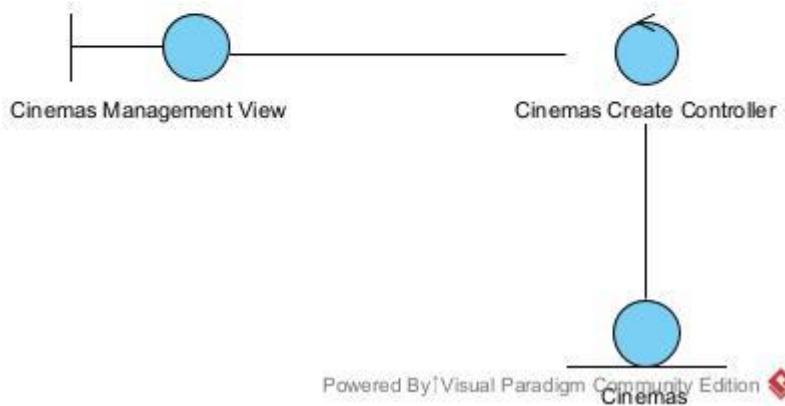
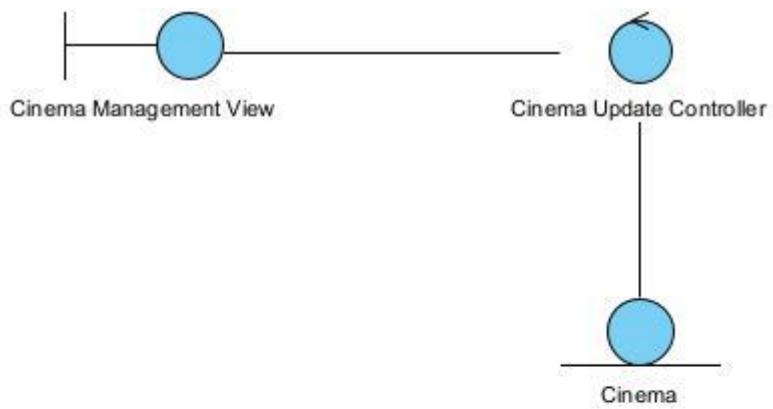
3.1.19.1. Activity Diagram



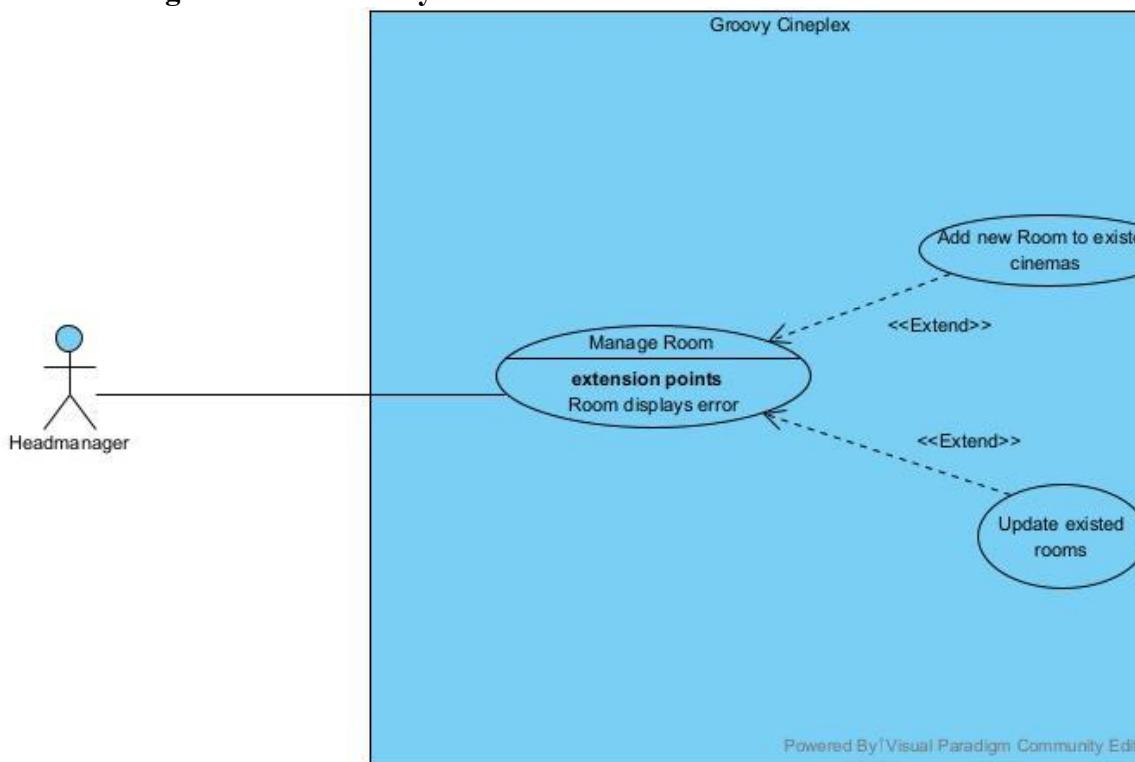
3.1.19.2. State Chart Diagram:



3.1.19.3. VOPC Diagram:



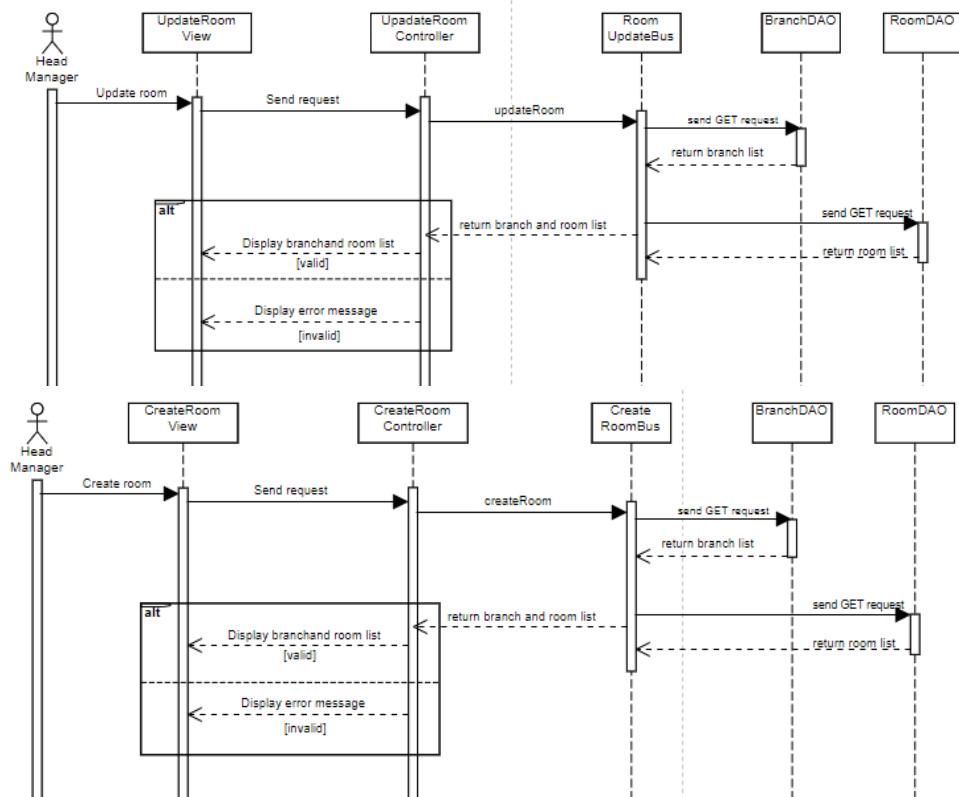
3.1.20. Manage Cinema's facility – Rooms



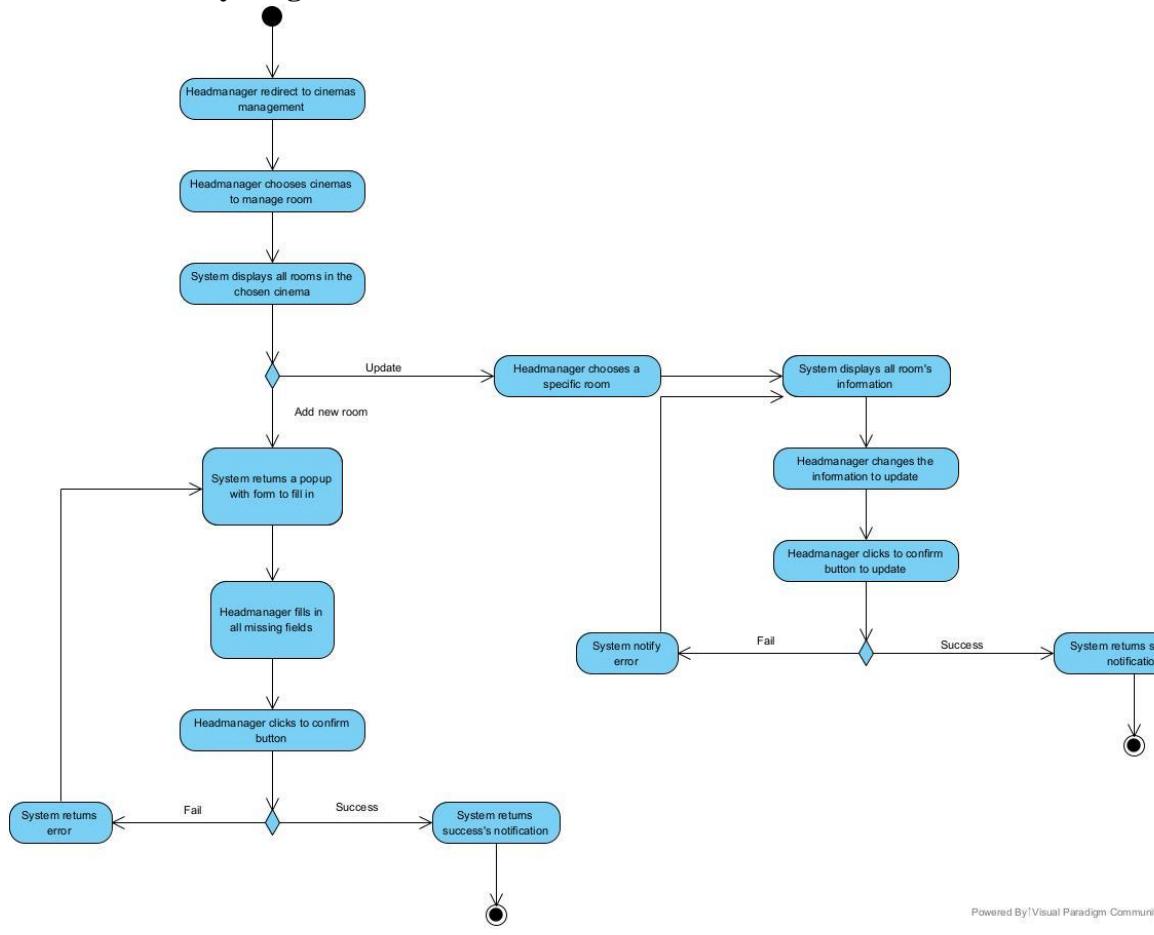
ID	UC-20		
Name	Manage cinema's facility - Rooms		
Created by	Dương Thành Luân	Date created	16/01/2024
Priority	High	Frequency of use	High
Actor	Cinema manager, Head manager		
Description	The head manager can manage rooms in a selected cinema meanwhile cinema manager can manage rooms in his/ her cinema including adding new rooms, updating room details, configuring room settings (seats, description) handling room-related operations.		
Trigger	User clicks on “Manage rooms” button in cinema manager’s sidebar or “Manage rooms section in manage cinema screen		
Precondition	User is already logged in by a manager account.		
Postcondition	None		
Normal flow	<p>1. User clicks on “Manage rooms” button in cinema manager’s sidebar</p> <p>2. System displays the room lists, each of the room contains Room Name, Number of seats, Number of Columns, Number of Rows</p> <p>In this screen, the system also allows the user to update a certain room, add new room.</p> <p>3.1. Update certain room</p> <p>3.1.1. User clicks on Update icon on “Update” column of any row of room table</p> <p>3.1.2. System displays update pop-up.</p> <p>3.1.3. User changes the information he/she needs</p> <p>3.1.4. User clicks on Update button</p> <p>3.1.5. System updates new information for the room and displays rooms table</p> <p>3.2. Add new room</p> <p>3.2.1. User clicks on the Plus icon above the rooms table</p> <p>3.2.2. System displays add pop-up.</p> <p>3.2.3. User inputs room’s information</p> <p>3.2.4. User clicks on Add button</p> <p>3.2.5. System adds new rooms and displays rooms table</p>		
Alternative flow	None		
Exceptions	Update Room		

	<p>19-E1: Error Updating Room Details: If the user fails to update room details, such as encountering database errors or violating constraints, the system displays an error message MSG-14 and the changes are not saved.</p> <p>Add new Room</p> <p>19-E2: Invalid cinema Information: If the user fails to provide valid and complete room details during the addition process, the system displays an error message MSG-14 and the cinema is not added to the database.</p>
Business rules	BR-03, BR-04
Assumption	None
Other information	None

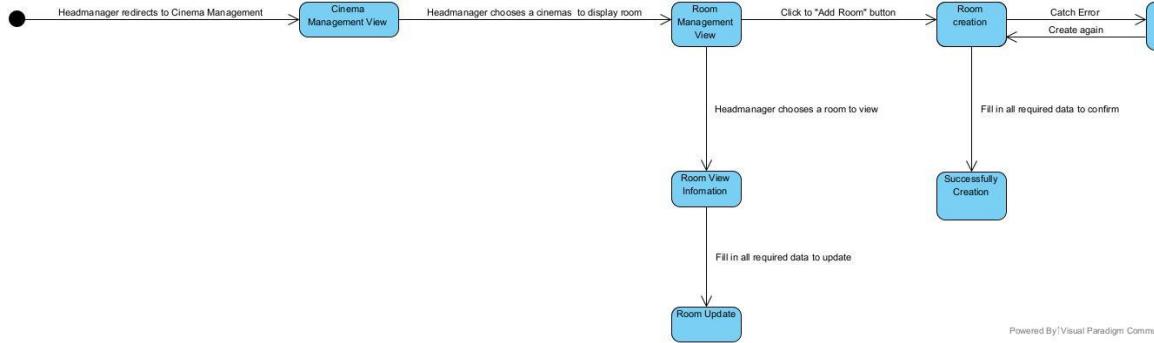
3.1.20.1. Interaction Diagram:



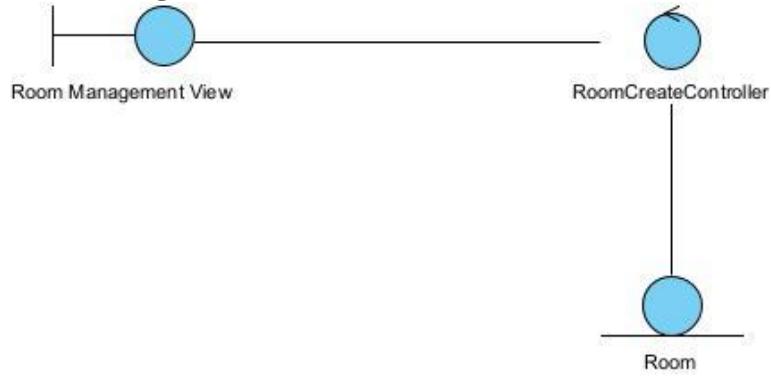
3.1.20.2. Activity diagram:



3.1.20.3. State chart diagram:



3.1.20.4. VOPC Diagram:



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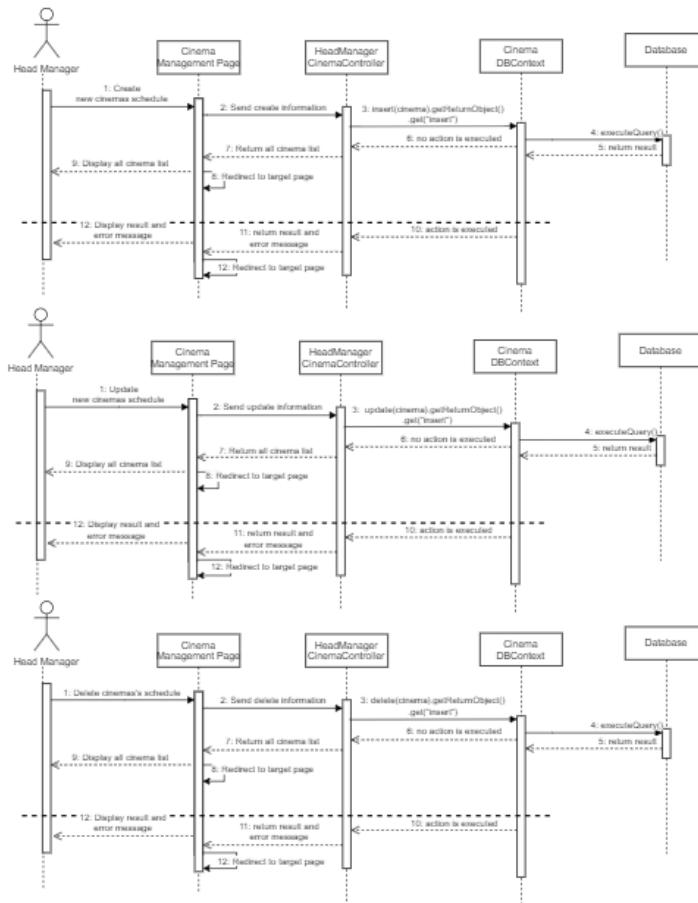
3.1.22 Manage cinema's schedule – Shows

3.1.22.1 Use Case Specification

ID	UC-22		
Name	Manage cinema's schedule - Shows		
Created by	ThanhPD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Cinema Manager, Head Manager		
Description	The manager can manage shows, including adding new show, updating show details, handling show-related operations		
Trigger	User clicks on “Manage shows” button in admin’s sidebar		
Precondition	User is already logged in by an admin account.		
Postcondition	None		
Normal flow	1. User clicks on “Manage shows” button in admin’s sidebar 2. System displays the information of shows by table, which contains ID, Movie, Time start, Time end, Room Name		

	<p>In this screen, the system also allows the user to update or delete certain show and add a new show.</p> <ul style="list-style-type: none"> 3.1. Delete certain show <ul style="list-style-type: none"> 3.1.1. User drags a certain show to the Delete section 3.1.2. System deletes the show 3.1.3. System reloads and displays show table 3.2. Update certain show <ul style="list-style-type: none"> 3.2.1. User drags a certain movie onto the show he/she wants to update 3.2.2. System changes the movie of that show by the chosen movie 3.3. Add new show <ul style="list-style-type: none"> 3.3.1. User clicks on a time slot on the schedule to create a new show, clicks multiple times to expand the show time. 3.3.2. System displays the created show on the screen. 3.3.3. User drags a certain movie onto the show 3.3.4. System changes the movie of that show by the chosen movie 3.3.5. User clicks on Create Show button 3.3.5. System adds new show into the database and displays a successfully message
Alternative flow	None
Exceptions	<p>Update Show, Delete Show</p> <p>If the shows are on-showing, the shows cannot be updated or deleted.</p> <p>If user click save button, the system displays message MSG-14</p> <p>MSG-16</p>
Business rules	BR-03, BR-04
Assumption	None
Other information	None

3.1.22.2 Interaction Diagram(s)



3.1.22.3 Activity Diagram(s)

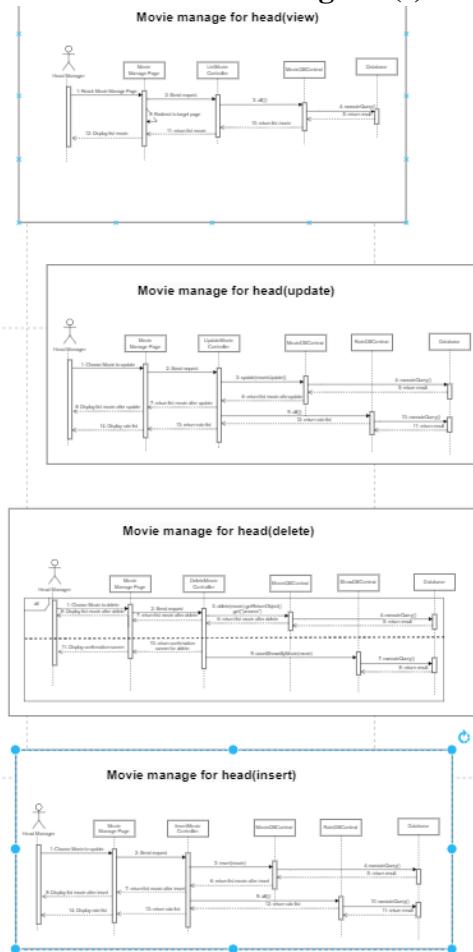
3.1.22.4 View of Participating Classes

3.1.23 Manage cinema's movie

ID	UC-23		
Name	Manage cinema's movie		
Created by	ThanhPD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Cinema Manager		
Description	The manager can manage movies of a cinema, add movies for his cinema to control the number of shows.		
Trigger			
Precondition	User is already logged in by a cinema manager account.		
Postcondition	None		

Normal flow	
Alternative flow	None
Exceptions	None
Business rules	BR-03, BR-04
Assumption	None
Other information	None

3.1.23.2 Interaction Diagram(s)

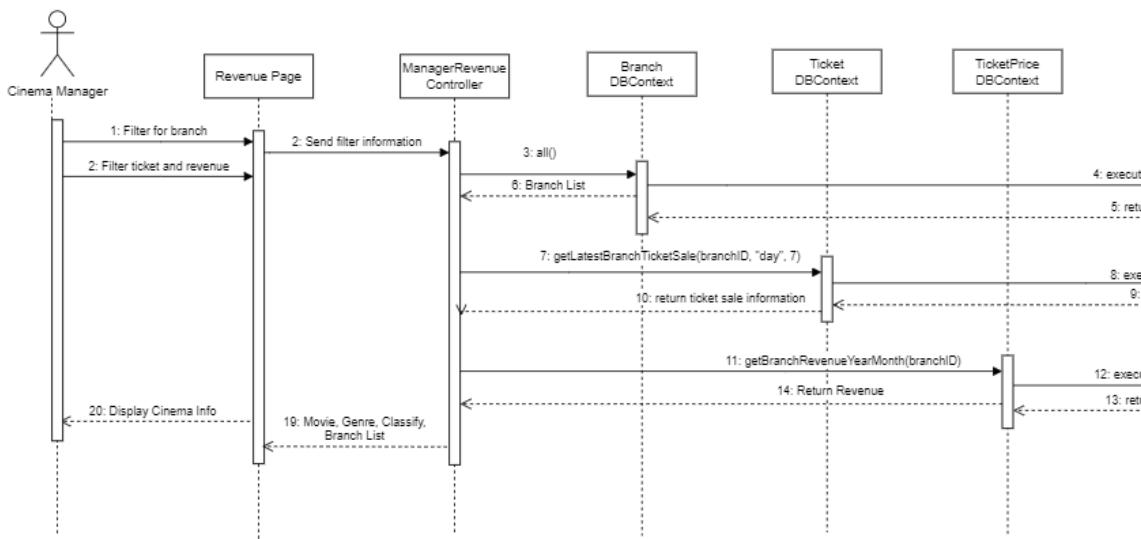


3.1.24 Manage ticket sales and revenue

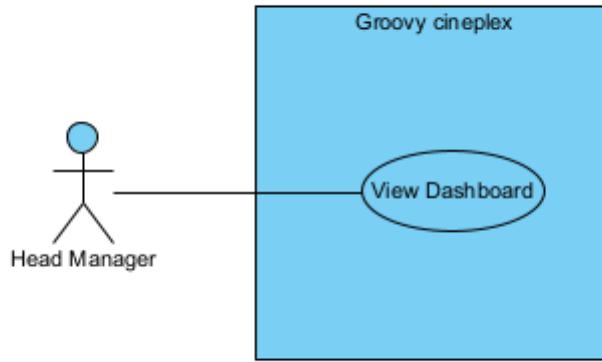
ID	UC-24		
Name	Manage ticket sales and revenue		
Created by	ThanhPD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Cinema manager, Head manager		

Description	The manager can view the total ticket sales, revenue catalogued different cinemas, customers' types, or movies.
Trigger	
Precondition	User is already logged in by a manager account.
Postcondition	None
Normal flow	
Alternative flow	None
Exceptions	None
Business rules	BR-03, BR-04
Assumption	None
Other information	None

3.1.24.2 Interaction Diagram(s)

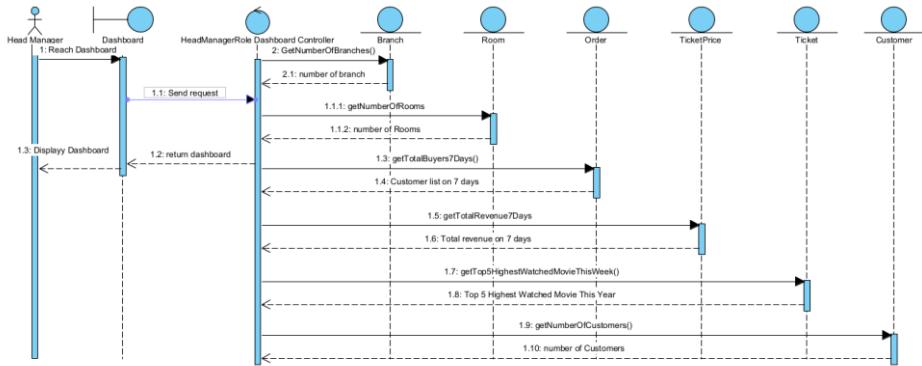


3.1.25 View dashboard

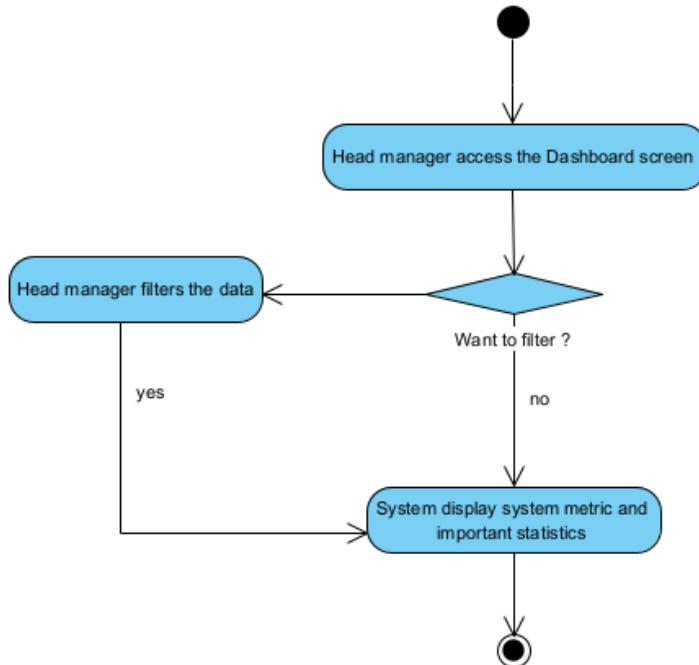


ID	UC-25		
Name	View dashboard		
Created by	ThanhPD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Head manager		
Description	The manager can views key metrics of website performance, Groovy Cineplex System statistics.		
Trigger	The user clicks on Dashboard on the Manager Navbar or be redirected after login as head manager		
Precondition	User is already logged in by a head manager account.		
Postcondition	None		
Normal flow	1. User accesses the Dashboard screen 2. System displays system metrics and important statistics		
Alternative flow	1. User filters the data 2. System		
Exceptions	None		
Business rules	BR-04		
Assumption	None		
Other information	None		

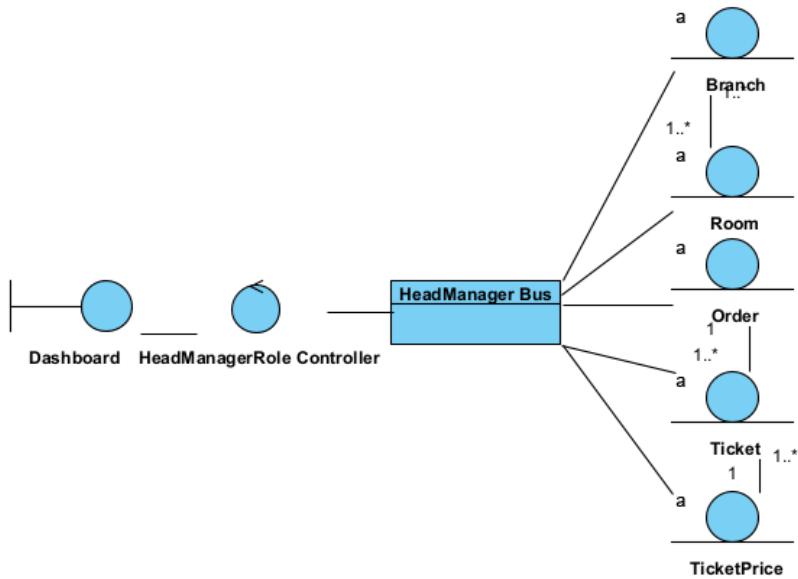
3.1.25.2 Interaction Diagram(s)



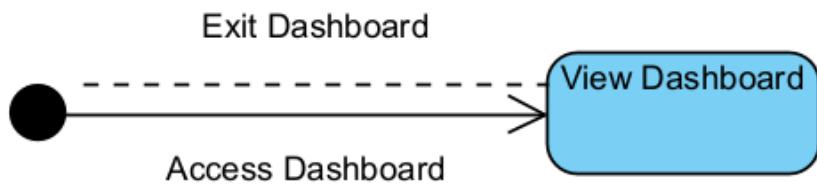
3.1.25.3 Activity Diagram



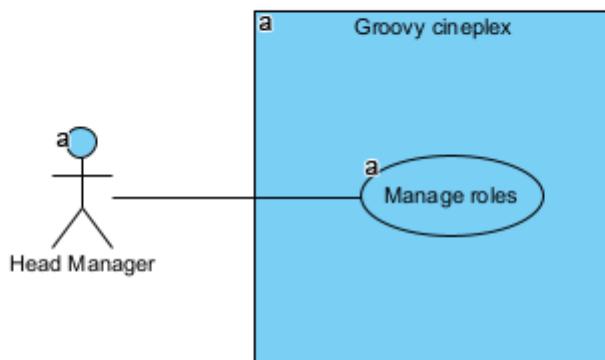
3.1.25.4 View of participating classes



3.1.25.5 State chart diagram



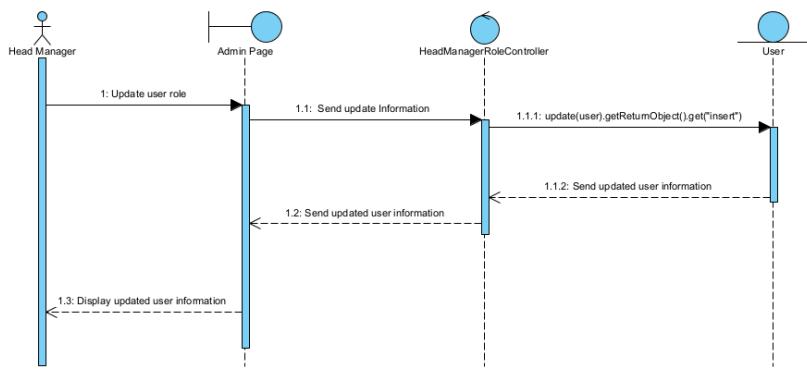
3.1.26 Manage account roles



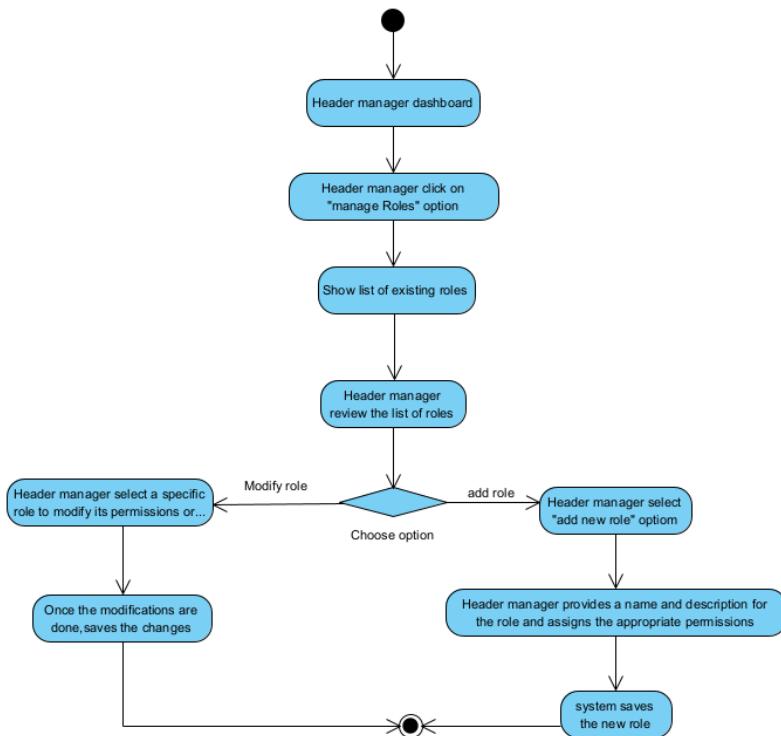
ID	UC-29
----	-------

Name	Manage account roles		
Created by	ThanhPD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Head Manager		
Description	"Header Manager" is an account or system used to manage account information. Ability to review and modify roles in the system.		
Trigger	Header Manager click into "Role" of account and select option Header Manager need change role for account		
Precondition	User is already logged in by a head manager account.		
Postcondition	None		
Normal flow	<ul style="list-style-type: none"> € User Accesses the "Header Manager" account/system. € The system displays a dashboard with various management options. € Selects the " Manage Roles " option from the dashboard. € The system presents a list of existing roles in the system along with their descriptions and associated permissions. € Reviews the list of roles to understand their current configurations and functionalities. € If necessary, selects a specific role to modify its permissions or other attributes. € The system allows to adjust the permissions or make necessary changes to the selected role. € Once the modifications are done, saves the changes. € has the option to add a new role if required. € If adding a new role, provides a name and description for the role and assigns the appropriate permissions. € Confirm the creation of the new role, and the system saves the changes. 		
Alternative flow	None		
Exceptions	None		
Business rules	BR-0x		
Assumption	None		
Other information	None		

3.1.26.2 Interaction Diagram(s)



3.1.26.3 Activity Diagram

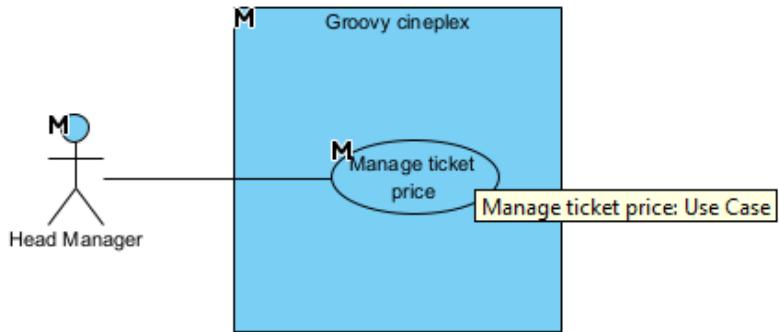


3.1.26.4 View of participating classes



3.1.26.5 State chart diagram

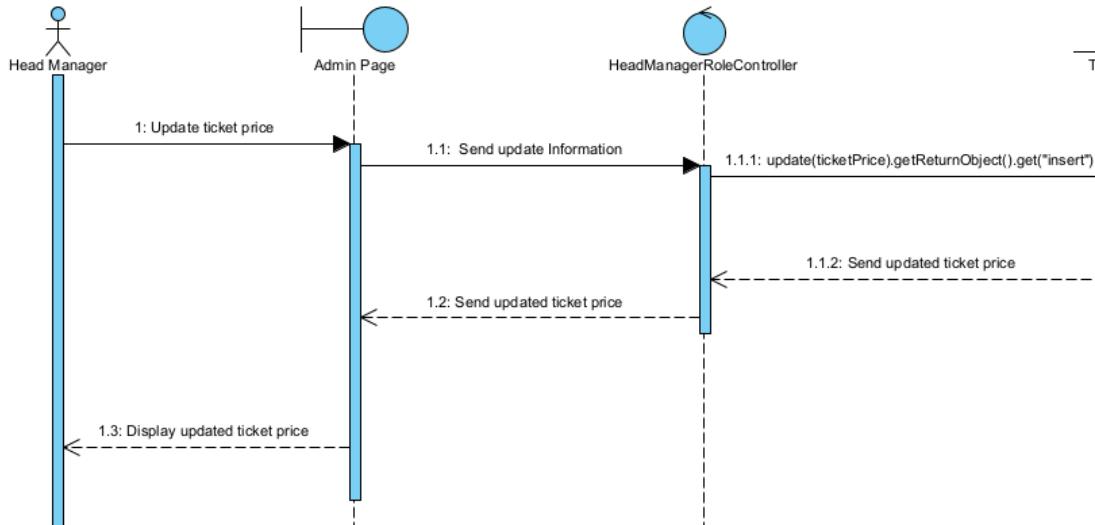
3.1.27 Manage ticket price types



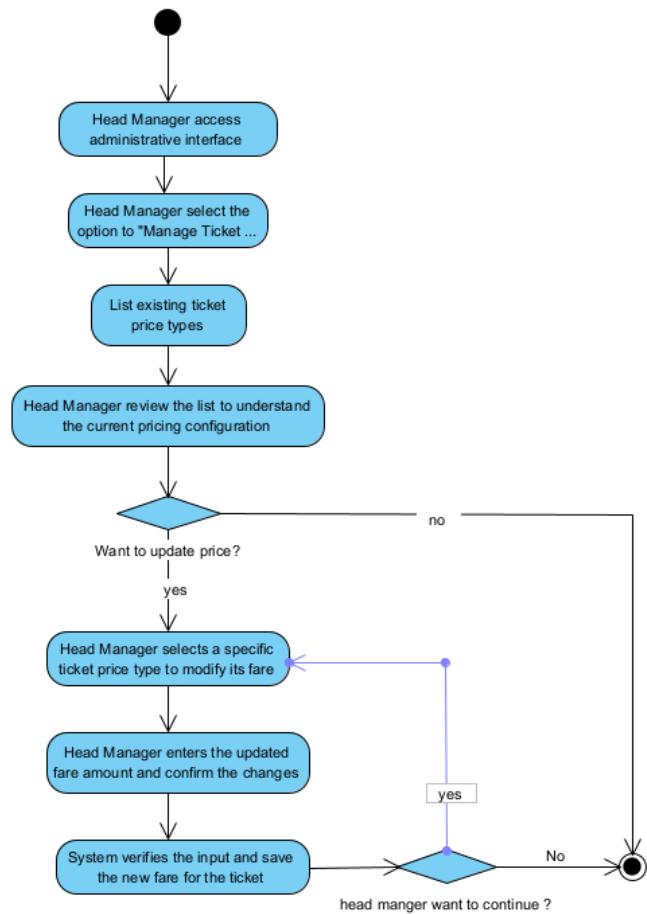
ID	UC-27		
Name	Manage ticket price types		
Created by	ThanhPD	Date created	14/01/2024
Priority	High	Frequency of use	High
Actor	Head manager		
Description	The head manager can modify prices of seat		
Trigger			
Precondition	User is already logged in by a head manager account.		
Postcondition	None		
Normal flow	1. The Head Manager accesses the system's administrative interface. 2. From the dashboard or management menu, the Head Manager selects the option to "Manage Ticket Price Types." 3. The system displays a list of existing ticket price types, including their current fares. 4. The Head Manager reviews the list to understand the current pricing configuration. 5. If necessary, the Head Manager selects a specific ticket price type to modify its fare. 6. The system allows the Head Manager to enter a new fare value for the selected ticket price type.		

	<p>7. The Head Manager enters the updated fare amount and confirms the changes.</p> <p>8. The system verifies the input and saves the new fare for the selected ticket price type.</p> <p>9. If applicable, the Head Manager repeats the process to modify fares for other ticket price types.</p> <p>10. The Head Manager logs out from the administrative interface when all necessary changes are completed.</p>
Alternative flow	None
Exceptions	None
Business rules	FR-10, FR-11, FR-12, FR-13
Assumption	None
Other information	None

3.1.27.2 Interaction Diagram(s)



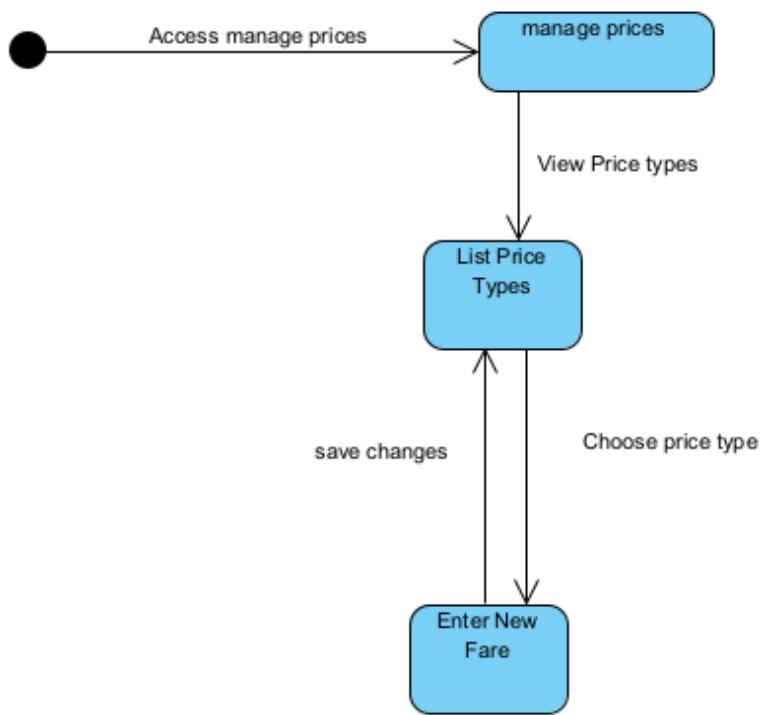
3.1.27.3 Activity Diagram



3.1.27.4 View of participating classes



3.1.27.5 State chart diagram



4. NON-FUNCTIONAL REQUIREMENTS

- 4.1. External Interfaces
- 4.2. Quality Attributes
 - 4.2.1. Usability
 - 4.2.2. Reliability
 - 4.2.3. Performance