

SOFTWARE REQUIREMENTS SPECIFICATION

1.0 Introduction

This section provides an overview of the entire requirement document. This document describes all data, functional and behavioral requirements for software.

1.1 Goals and objectives

Virtual catalog for a physical library for library patrons to browse the library, view their account status, and place holds. It also allows for admins to check media in or out and add or remove media from the catalog.

1.2 Statement of scope

Inputs: File media/account catalog, check in, check out, add/remove media, place on hold, login(user accounts), search input, account management, fee management

Processing functionality: Takes catalogue from file, displays catalogue to UI, displays search results to UI, checks books in and out, login functionality, search functionality, create/delete account

User Authentication:

- Patrons: [barcode# or username, password: pin]
- Admin: [username, password]

Outputs: Catalog UI, Search results UI, Account UI

1.3 Software context

The software assists the library's goals of improving accessibility, enhancing user experience and increasing operational efficiency by serving as an extension of the library's standard functions. It extends these functions by digitizing them and making them available 24/7.

1.4 Major constraints

Scalability is a major constraint, as we do not have the technical capacity to extend databases to accommodate a relatively larger number of users. This would include how many people can use the system simultaneously, how many user accounts can exist, how much media can be in the system, etc.

The number of different types of media that the library stores. A physical library can't store all kinds of media.

2.0 Usage scenario

This section provides a usage scenario for the software. It organized information collected during requirements elicitation into use-cases.

2.1 User profiles

Administrator: The administrator is a library employee and has the highest clearance in the library. Monitors the flow of media inventory, updates media inventory, and manages patron accounts. The administrator is also responsible for checking books out and checking them back in.

Patron: Patrons are allowed to have media checked out and tied to their account. They can request media, and make inquiries about media availability. They can also browse the catalog.

2.2 User stories

1. As a patron

I want to **Login** to my account on the library catalog website using my library card number and pin.

Acceptance criteria

- Website must validate card number and pin number
- Upon successful login, user is redirected to dashboard
- If incorrect card # or corresponding pin number is entered, system shows an error to the user.

2. As a patron

I want to **search the library** catalog by title, author, publisher, and/or ISBN, while filtering by genre and/or media type so that I can find specific materials of interest.

Acceptance criteria

- Website must access the library catalog and query library catalog database.
- Website must display the results that match the criteria entered.
- If there are no results for the search criteria, website must display a message stating such
- Results must show essential details (title, author, media type, availability)

3. As a patron

I want to **request new media** for the library catalog so that I can suggest new books or materials the library could acquire.

Acceptance criteria

- User must be logged in to make a media request
- User must be told what information to enter to send a request
- Upon submission, system must confirm that the request was successfully sent.

4. As a patron

I want to **put media that is currently checked out on hold.**

Acceptance criteria

- User must be logged in to place a hold
- User must have a piece of media that is not currently available selected from the catalog
- The held item must appear in the user's "On Hold" list in their account.

5. As a patron

I want to **check which media items I have due to return**

Acceptance criteria

- User must be logged in
- Media items checked out are displayed with due dates and fines if applicable
- Users must be able to sort or filter by due date or media type.

6. As a librarian

I want to **Login to the administrator account**

Acceptance criteria

- Website must validate username and password
- If authentication fails, system must display an "Invalid credentials" message.
- Upon successful login, librarian must be redirected to the admin dashboard.

7. As a librarian

I want to **Check books out for a patron**

Acceptance criteria

- Administrator account must be logged in
- Librarian must provide barcode number and patron card number for the media item and the patron checking it out.
- System must update the media item's status to "Checked out" and tie the item to the patron's account

- System must automatically record the checkout date and calculate the due date based on loan policy.

8. As a librarian

I want to **Check books in**

Acceptance criteria

- Administrator account must be logged in
- Librarian must provide barcode number for the media item being checked in.
- System must update the item's status to "Checked in" and remove tie to the patron's account
- If checked in past due date, fee must be recorded to patron's account

9. As a librarian

I want to approve/deny **Media Requests** made by patrons

Acceptance criteria

- Administrator account must be logged in
- System must display a list of all pending media requests
- Librarian must be able to select each request and choose to approve or deny it.
- When a request is approved
 - Add the approved media to the catalog
 - Notify the requesting patron that their request is approved
- When a request is denied
 - Notify the patron that their request has been denied.

10. As a librarian

I want to **Record payment from outstanding fees**

Acceptance Criteria

- Administrator account must be logged in
- Librarian must provide card number for library patron
- System must subtract payment amount from patron's fee balance

11. As a librarian

I want to **create a new patron account**

Acceptance criteria

- Administrator account must be logged in
- Librarian must provide patron card number, name, address, email(optional), and phone number(optional).

- If phone number provided, last 4 digits of phone number are used for account pin
- If no phone number provided, librarian must provide separate pin number

12. As a librarian

I want to **delete a patron account**

Acceptance criteria

- Administrator account must be logged in
- Librarian must select patron account
- System must prompt for confirmation before permanently deleting patron account
- Once confirmed, system must remove the account from database

13. As a librarian

I want to **add an item to media catalog**

Acceptance criteria

Acceptance criteria

- Administrator account must be logged in
- Librarian must select whether item is a new piece of media or a new copy of an existing piece of media in the catalog
 - If a copy, librarian must provide only barcode number of new item
 - If new piece of media, librarian must provide barcode number of new item, title, author(optional), ISBN(optional), Cover pic(optional), genre(optional), media type(optional), publisher(optional)

14. As a librarian

I want to **delete an item from the media catalog**

Acceptance criteria

- Administrator account must be logged in
- Librarian must be able to search for and select the item to be deleted.
- System must prompt for confirmation before permanently deleting item
- Once confirmed, system must remove the item from catalog and remove it from database
- If item is checked out, add a lost item fee to the user account

15. As a librarian

I want to **Update information on patron account**

Acceptance criteria

- Administrator account must be logged in

- Patron card number must be provided by librarian
- Librarian must provide new name(optional), new address(optional), new email(optional), new phone number(optional), and new pin number(optional)
- System must update information on patron account

2.3 Special usage considerations

Inputting initial catalog, creating admin account, concurrent usage, user privacy, website frontend design

Possible use of bar code scanner when requesting media item barcode numbers and patron card numbers

3.0 Data Model and Description

This section describes information domain for the software

3.1 Data Description

Data objects that will be managed/manipulated by the software are described in this section.

3.1.1 Data objects

Library Media Catalog

- Contains all of the media items for the media contained in the library

Library Media Item

- Contains information about the item
 - All barcode numbers of individual copies - with associated User IDs for all checked out copies
 - Title
 - ISBN
 - Cover Picture
 - Author Name
 - Genre
 - Media Type
 - Publisher
 - Holds on item

Library Account

- Contains account information
 - Administrator y/n
 - Username(if admin)/Account number
 - Password(if admin)/Pin number

- Name
- Address
- email
- phone number
- items on hold
- items checked out
- fees due
- media requests pending

Library Account Catalog

- Contains all of the account objects

3.1.2 Relationships

| Class MediaItem | |
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| <p><u>Responsibilities</u></p> <p>1.1 Stores media item information</p> <p><u>Attributes:</u></p> <ul style="list-style-type: none"> - barcode: int - hold: boolean - holdAccount: string - loan: boolean - loanAccount: string - info: MediaData - dueDate: string - data: Media Data<struct> | <p><u>Collaborators:</u></p> <p>MediaCatalog Checkout Service Checkin Service</p> |

| Class MediaCatalog | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| <p><u>Responsibilities:</u></p> <p>1.1 Stores all media items 1.2 Search media items</p> <p><u>Attributes:</u></p> <ul style="list-style-type: none"> + inputTitle: string + inputISBN : int + author: string + genre: string + mediaType: string | <p><u>Collaborators:</u></p> <p>MediaItem Menu</p> |

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| Class MediaCatalog | |
| + availableOnly: Boolean | |

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| Class Menu | |
| <u>Responsibilities:</u> 1.1 Operate Search UI 1.2 Create Search <u>Attributes:</u> currentUser: Account | <u>Collaborators:</u> Media Catalog |

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| Class Checkout Service | |
| <u>Responsibilities:</u> 1.1 Operate UI for checking out media 1.2 functionality for checking out media <u>Attributes:</u> | <u>Collaborators:</u> Medialtem Librarian Patron |

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| Class Checkin Service | |
| <u>Responsibilities:</u> 1.1 Operate UI for checking out media 1.2 functionality for checking out media <u>Attributes:</u> | <u>Collaborators:</u> Medialtem Librarian Patron |

| Class Librarian | |
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| <p><u>Responsibilities:</u></p> <p>1.1 Check out item 2.1 Check in item 3.1 Create Patron Account 3.2 Delete Patron Account 3.3 Update Patron Info 3.4 Record Payment 4.1 Approve/Deny Media Request 4.2 Add Media Item</p> <p><u>Attributes:</u></p> | <p><u>Collaborators:</u></p> <p>CheckoutService CheckinService AccountCatalog MediaRequestService Account</p> |

| Class Patron | |
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| <p><u>Responsibilities:</u></p> <p>1.1 Stores patron account information 1.2 Place Hold 2.1 Create Media Request 3.1 View Checked out items</p> <p><u>Attributes:</u></p> <ul style="list-style-type: none"> - checkedOutItems: List<medialtem> - holds: List<Medialtem> - fees: List<fee> <struct> | <p><u>Collaborators:</u></p> <p>Patron Details MediaRequestService CheckoutService CheckinService Account</p> |

| Class Notification | |
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| <p><u>Responsibilities:</u></p> <p>1.1 Stores notification information</p> <p><u>Attributes:</u></p> <ul style="list-style-type: none"> + recipient: Patron + message: string | <p><u>Collaborators:</u></p> <p>Patron</p> |

Class Patron Details

Responsibilities:

1.1 Stores patron information

Collaborators:

Patron
Session

Attributes:

- currentUser: Account

Class Session

Responsibilities:

1.1 Stores session information

Collaborators:

Patron Details
Account

Attributes:

- currentUser: Account

Class Account

Responsibilities:

1.1 Stores account information

1.2 Login

1.3 Logout

Collaborators:

Session
Librarian
Patron

Attributes:

- username: string
- password: string
- contactInfo: AcclInfo
- isActive: bool
- AcclInfo <struct>

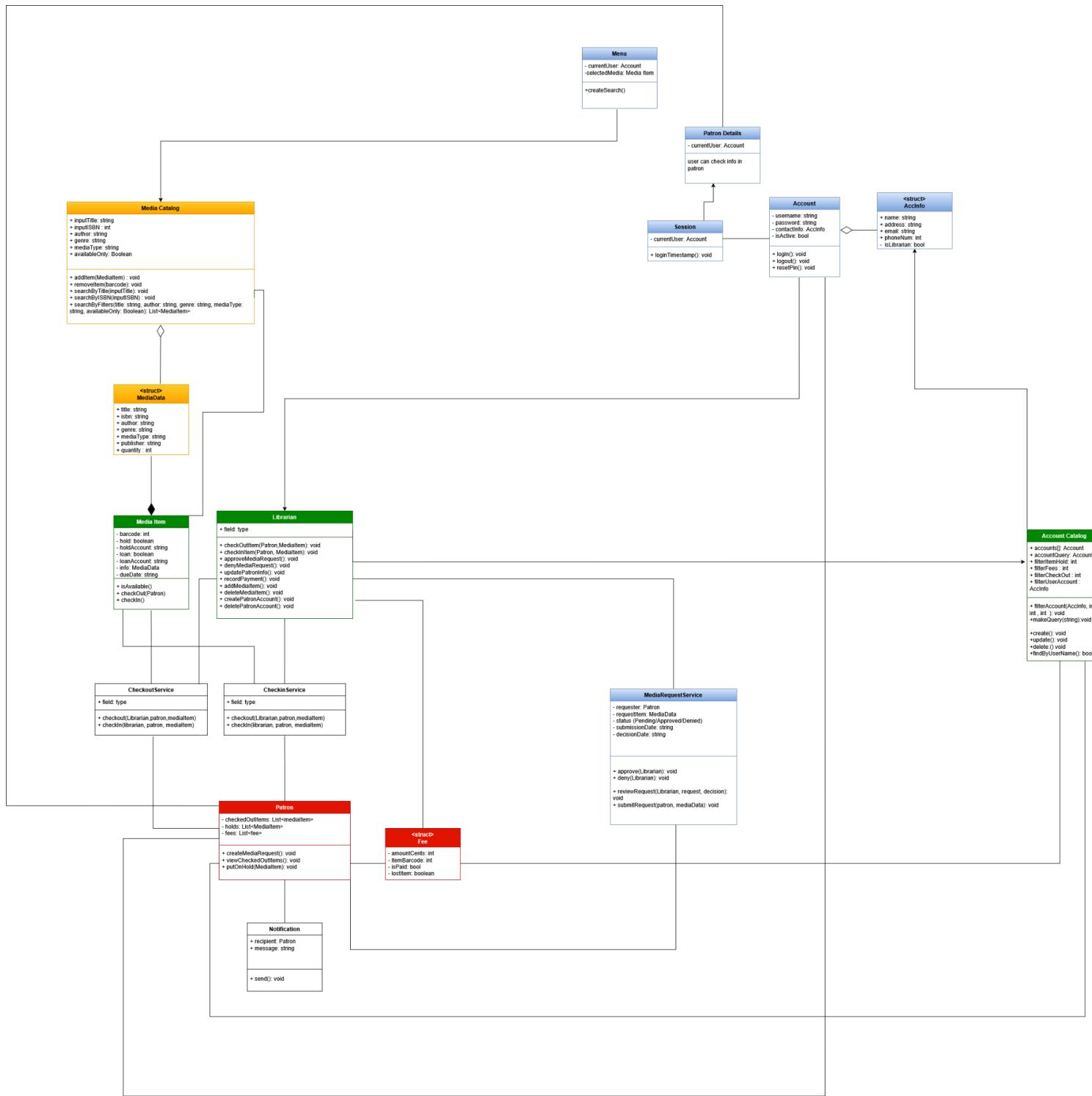
| Class AccountCatalog | |
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| <p><u>Responsibilities:</u></p> <p>1.1 Store Accounts 2.1 Create Account 2.2 Remove Account 2.3 Update Account 2.4 Find User Account</p> <p><u>Attributes:</u></p> <ul style="list-style-type: none"> + accounts[]: Account + accountQuery: Account + filterItemHold: int + filterFees : int + filterCheckOut : int + filterUserAccount : AcInfo | <p><u>Collaborators:</u></p> <p>Patron Librarian</p> |

| Class Media Request Service | |
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| <p><u>Responsibilities:</u></p> <p>1.1 Approve/Deny Media Requests</p> <p><u>Attributes:</u></p> <ul style="list-style-type: none"> - requester: Patron - requestItem: MediaData - status (Pending/Approved/Denied) - submissionDate: string - decisionDate: string | <p><u>Collaborators:</u></p> <p>Librarian Patron</p> |

3.1.3 Complete data model

3.1.4 Data dictionary

UML Class Diagram:



4.0 Functional Model and Description

Description of major software functions along with UML Use Case, sequence, and communication diagrams.

4.1 Description for Function n

4.1.1 Use case name

4.1.2 Actors

4.1.3 Preconditions

4.1.4 Triggers

4.1.5 Scenario Description

4.1.6 Post Conditions

4.1.6 Exceptions

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| Use case name: | Login |
| Scenario Description: | Patron logs into system by entering his/her library card number and pin |
| Actors: | Patron/Librarian |
| Preconditions: | Patron or Librarian has a library card and is registered in the system |
| Postconditions: | Patron or Librarian is logged into his/her account; session is created and user is redirected to the main catalog homepage. |
| Triggers: | User selects the sign in button and wants to sign in |
| Event Flow: | <ol style="list-style-type: none">1. Enter Library Card number and pin2. System checks if account is approved3. System create session for the user4. System displays the library catalog homepage |
| Exceptions: | <ol style="list-style-type: none">3. When provided login information is not approved<ol style="list-style-type: none">a. System displays an error message: "Invalid card number or PIN. Please try again." |

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| Use case name: | Logout |
| Scenario Description: | Patron aims to log out of their account on the website |
| Actors: | Patron |
| Preconditions: | Patron is logged in to an account |
| Postconditions: | Patron is successfully logged out |
| Triggers: | Patron clicks the Logout button |
| Event Flow: | <ol style="list-style-type: none"> 1. System displays Library menu. |
| Exceptions: | |

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| Use case name: | Search Library |
| Scenario Description: | Patron searches the catalog by media attributes, with options to filter by media type, genre, or other attributes |
| Actors: | Patron |
| Preconditions: | Patron has selected the search bar |
| Postconditions: | Patron has successfully searched for media |
| Triggers: | Patron wishes to search catalog |
| Event Flow: | <ol style="list-style-type: none"> 1. Patron types the title or keyword to search 2. Patron can filter by media type, genre, author, or publisher 3. System filters through the media catalog 4. System displays the results of the search to the patron |
| Exceptions: | 3a. System does not display any results for the patron input. <ul style="list-style-type: none"> - 3a1: System displays " Media Item not found. Please try different keywords or filters" |

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| Use case name: | Create Media Request |
| Scenario Description: | Patron aims to request a new media item for the library |
| Actors: | Patron |
| Preconditions: | Patron is logged in to an account |
| Postconditions: | Patron has sent a media request |
| Triggers: | Patron wishes for new media in the library catalog |
| Event Flow: | <ol style="list-style-type: none"> 1. System prompts patron for information about the media request <ol style="list-style-type: none"> a. Title(required), Author, Genre, Media Type, ISBN, Publisher (optional fields) 2. Patron enters information in as many fields as they wish 3. Patron clicks button to send request 4. System verifies a title has been entered 5. System sends request with the information entered |
| Exceptions: | 5a. When a title has not been provided for the media requested <ul style="list-style-type: none"> - 5a1. System displays error and prompts patron to fill out the required "Title" field. |

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| Use case name: | Search Account |
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| Scenario Description: | <ol style="list-style-type: none"> 1. Admin can look up anyone who is registered. 2. The admin is able to select listed Patron. 3. The admin can filter to list desired Patron accounts. |
| Actors: | Librarian |
| Preconditions: | Librarian logged in on an administrative account. Registered and assigned as part of an administrative account. |
| Postconditions: | All the patron accounts are listed |
| Triggers: | Librarian wishes to search for a patron account |
| Event Flow: | <ol style="list-style-type: none"> 1. Librarian type the username 2. System display list of account username. |
| Exceptions: | 1a. Patron not found in system - 1a1: The system displays "No matching account found." |

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| Use case name: | Check in |
| Scenario Description: | Librarian aims to check in media item for patron. |
| Actors: | Librarian |
| Preconditions: | Librarian logged in on an administrative account. Registered and assigned as part of an administrative account. |
| Postconditions: | The media item is removed from Patron account checkout items |
| Triggers: | Patron returns a media item to library |
| Event Flow: | <ol style="list-style-type: none"> 1. Librarian types the barcode number of the media 2. Librarian press button to check in media item 3. System updates the check in status of the media item 4. System updates Patron account, removing the media item from patron's checked out items. |
| Exceptions: | |

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| Use case name: | Check out |
| Scenario Description: | Librarian aims to check out media item for patron. |
| Actors: | Librarian |
| Preconditions: | Librarian logged in on an administrative account. Registered and assigned as part of an administrative account. |
| Postconditions: | Media item is now checked out to the specific patron, recorded in both patron account and media status. |
| Triggers: | Patron wishes to check out a book |
| Event Flow: | <ol style="list-style-type: none"> 1. Librarian types barcode of media item 2. Librarian presses button to check out media item 3. System asks admin to provide patron card number 4. Librarian enters patron card number 5. System checks if patron has reached the maximum allowable checkout items 6. System checks if patron account has any overdue media items. 7. If all checks pass, System updates the patron account, adding media item to checked out media items. <ol style="list-style-type: none"> a. System records the date media item has been checked out. 8. System updates media item check out status. 9. Librarian prints out receipts with media info and checkout date. |
| Exceptions: | 4a. Patron's account has overdue media items <ul style="list-style-type: none"> - 4a1: System displays message " Patron can not checkout any media items" - 4a2: System terminates checkout request 4b. Patron has reached the maximum allowed checked-out items <ul style="list-style-type: none"> - 4b1: System displays message: "Patron has reached the checkout limit." - 4b2: System terminates the checkout request |

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| Use case name: | Delete Media |
| Scenario Description: | Completely remove a media item from library system |
| Actors: | Librarian |
| Preconditions: | Logged in as admin. |
| Postconditions: | Media item has been deleted from media catalog |
| Triggers: | Librarian wishes to remove an item from catalog - Item lost, or otherwise no longer at library |
| Event Flow: | <ol style="list-style-type: none"> 1. Librarian searches for media in the catalog 2. Librarian then selects media for deletion 3. System prompts for confirmation for deleting the item 4. Librarian confirms deletion 5. System deletes media <ol style="list-style-type: none"> a. If item is checked out, add lost item fee to patron account |
| Exceptions: | |

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| Use case name: | Check which items that are due to return |
| Scenario Description: | The Patron aims to see which items they have that need to be returned. |
| Actors: | Patron |
| Preconditions: | Patron is logged into their account |
| Postconditions: | Patron successfully checked items they have due |
| Triggers: | Patron wishes to check what items they checked out |
| Event Flow: | <ol style="list-style-type: none"> 1. Patron has logged into their account 2. Patron selects option to view checked out media items 3. System displays the items the Patron has checked out with due dates / fines 3a. Patron sorts media items by due date or media type |
| Exceptions: | |

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| Use case name: | Put items on hold |
| Scenario Description: | Patron wants to request a media item that is currently out or unavailable and put the item on hold. |
| Actors: | Patron |
| Preconditions: | Patron is logged in |
| Postconditions: | The media item is associated with a new hold on the patron's account, waiting for availability. |
| Triggers: | Patron wishes to put an item on hold. |
| Event Flow: | <ol style="list-style-type: none"> 1. Patron select the media item on menu 2. Patron clicks button to put media on hold. 3. System checks if item is available 4. Media is unavailable: System creates hold for media item for the patron 5. System notifies Patron: "hold placed. You will be notified when the item is checked out to you." |
| Exceptions: | <p>3a. Patron tries to put hold on an available media item.</p> <ul style="list-style-type: none"> - 3a1: System displays to patron to check out the item instead and does not create a hold. |

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| Use case name: | Approve/Deny media requests |
| Scenario Description: | Librarian views the requests made by patrons to add media to catalog or deny their request. |
| Actors: | Librarian |
| Preconditions: | Librarian account has logged in |
| Postconditions: | Patron has successfully approved or denied a request |
| Triggers: | Librarian wishes to manage requests for new media |
| Event Flow: | <ol style="list-style-type: none"> 1. System displays list of all pending patron media requests 2. Librarian selects a request to approve or deny <ol style="list-style-type: none"> 3.1 Librarian approves request <ol style="list-style-type: none"> a. System adds the approved media to the catalog b. System notifies the patron that their request is approved 3.2 Librarian denies request <ol style="list-style-type: none"> a. System notifies the patron that their request has been denied |
| Exceptions: | |

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| Use case name: | Record payment from outstanding fees |
| Scenario Description: | Patron has paid their fees and it is cleared on their account |
| Actors: | Admin, Patron |
| Preconditions: | Admin account logged in |
| Postconditions: | Patron fees have been paid |
| Triggers: | <p>Patron has fees due</p> <ul style="list-style-type: none"> - patron wishes to pay off fees - patron makes payment in person at library |
| Event Flow: | <ol style="list-style-type: none"> 1. Admin searches patron account 2. System displays the fees held by the patron 3. Admin displays the fee to the patron 4. Patron uses payment method of choice 5. System process the patron payment 6. System subtracts fees from the patron balance |
| Exceptions: | 5a. Patron payment declines and has to try again |

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| Use case name: | Create new patron account |
| Scenario Description: | Admin creates a new account for a patron |
| Actors: | Admin |
| Preconditions: | Admin account logged in |
| Postconditions: | A new patron account has been successfully created |
| Triggers: | <p>Patron without an account wishes to create an account</p> <ul style="list-style-type: none"> - patron meets whatever requirements library has to have a library card |
| Event Flow: | <ol style="list-style-type: none"> 1. Librarian starts the create account process 2. System prompts user to provide Patron information (Name, Address, Email [optional], Phone Number [optional]) 3. After information has been provided, system generates patron library card number. 4a. If phone number provided, last 4 digits of phone number are used for account pin 4b. If no phone number provided, Patron must provide a separate 4 digit pin for the account. 5. System successfully creates new account for patron |
| Exceptions: | |

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| Use case name: | Delete patron account |
| Scenario Description: | Librarian searches for a patron and deletes the account. The account is removed from the database. |
| Actors: | librarian |
| Preconditions: | Librarian is Logged In |
| Postconditions: | The patron account is removed; the patron will not be able to log in using deleted credentials. |
| Triggers: | Patron wishes to create account Patron no longer meets requirements to have an account/a library card |
| Event Flow: | <ol style="list-style-type: none"> 1. Librarian search for patron 2. Librarian clicks on the patron account. 3. Librarian click “delete”. 4. System prompts the admin to confirm the deletion. 5. Admin click “Confirm”. |
| Exceptions: | Deleting the librarian account. |

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| Use case name: | Add Media to catalog |
| Scenario Description: | <p>1. Librarian scans the barcode of a media, enters details if it's new media, and the media gets added to the catalog.</p> |
| Actors: | Librarian |
| Preconditions: | Librarian is logged In |
| Postconditions: | Media is added to the catalog. |
| Triggers: | New media is obtained by the library to be put in the catalog |
| Event Flow: | <p>1. Librarian enters the barcode of a media</p> <p>2. System checks if the media exists in the catalog by ISBN or other unique identifier</p> <p>3. If yes:</p> <ul style="list-style-type: none"> a. System prompts librarian to confirm adding additional copy or updating existing entry b. then the admin enters the barcode <p>4. If not:</p> <ul style="list-style-type: none"> a. Librarian enters media information (title, cover, ISBN, author, media type, genre, and publisher) b. The system adds the media item to the catalog. |
| Exceptions: | <p>4a. Adding an already existing media in the catalog.</p> <ul style="list-style-type: none"> - 4a1: System displays warning: "Media already exists. Would you like to add another copy or update existing details?" |

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| Use case name: | Update Patron Information |
| Scenario Description: | Librarian aims to update patron account information |
| Actors: | Admin |
| Preconditions: | Librarian logged in on an administrative account. Registered and assigned as part of an administrative account. |
| Postconditions: | Patrons account information is updated. |
| Triggers: | Patron wishes to change information on account - Contact Info has changed, wants new PIN, etc |
| Event Flow: | <ol style="list-style-type: none"> 1. Librarian types in patron card number 2. Librarian presses button to update patron account 3. System displays patron account information 4. Librarian inputs new optional : <ol style="list-style-type: none"> a. Name b. Address c. Email d. phone number e. Pin number 5. Librarian presses confirm button. 6. System updates all changed attributes under patron account. |
| Exceptions: | |

4.2 Software Interface Description

The software interface(s) to the outside world is(are) described.

4.2.1 External machine interfaces

Connection to barcode scanner for scanning media and library cards.

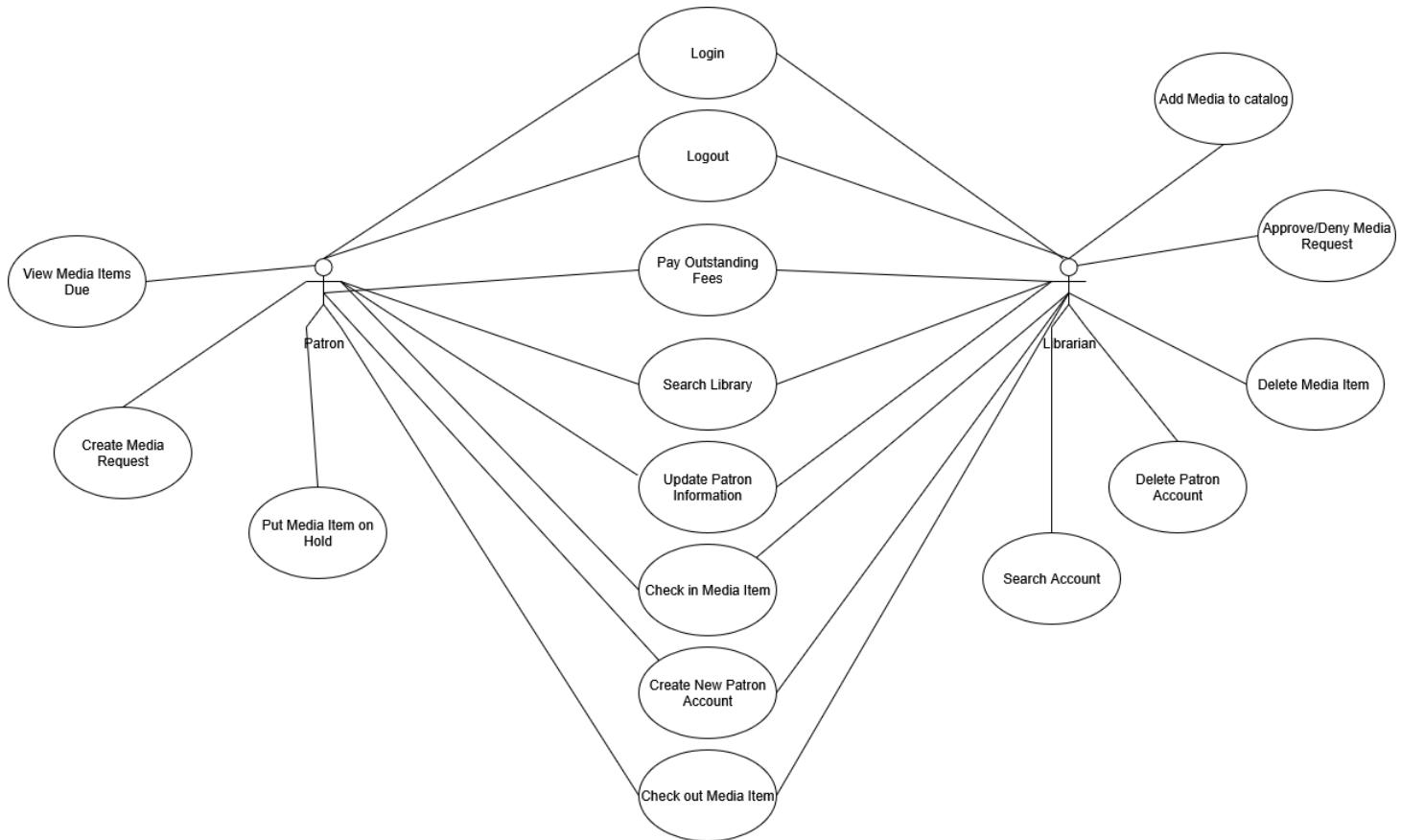
4.2.2 External system interfaces

Not Applicable

4.2.3 Human interface

Keyboard and mouse controls. Readable UI to display information.

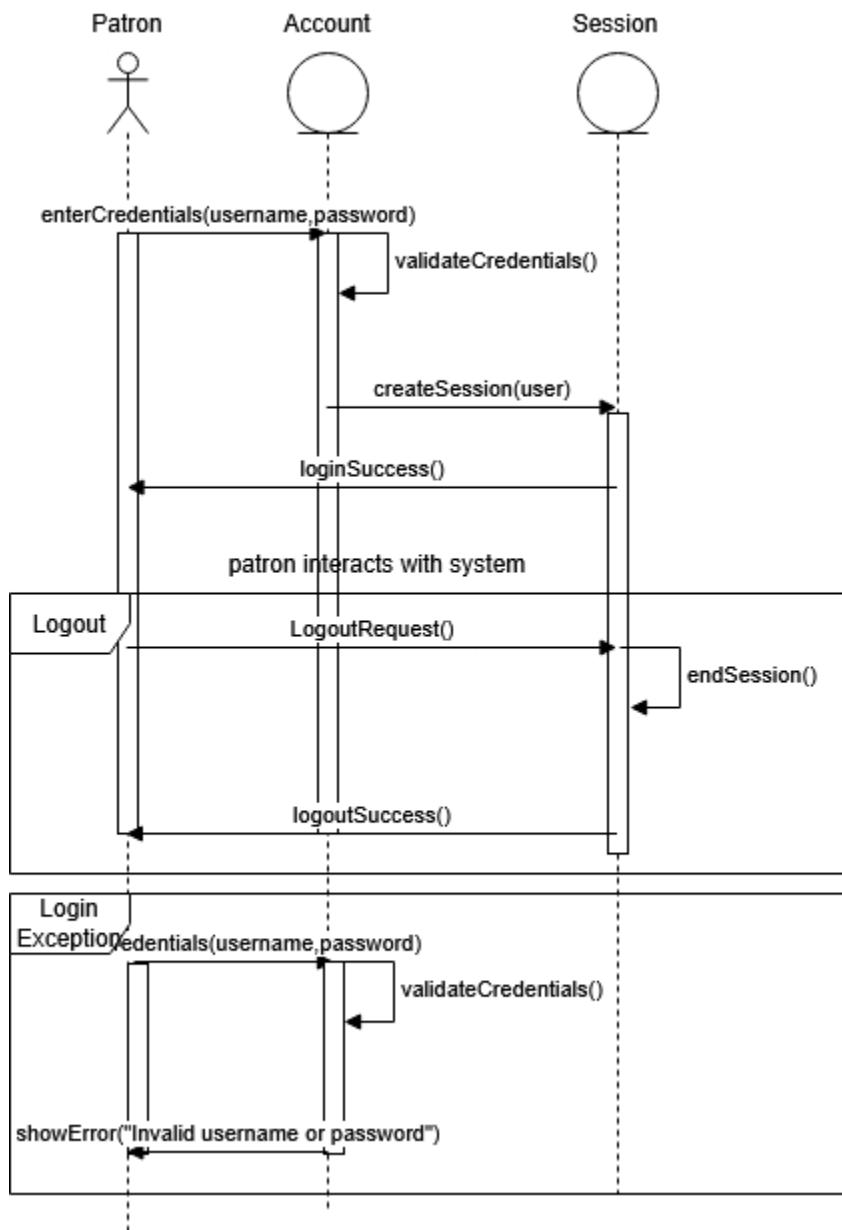
4.3 Use Case Diagrams



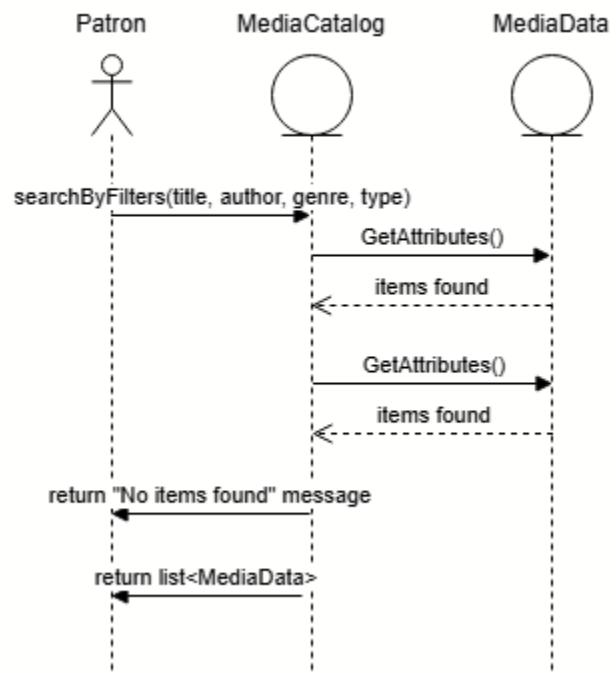
4.4 Sequence Diagrams

Used to model the class interactions needed for the use cases.

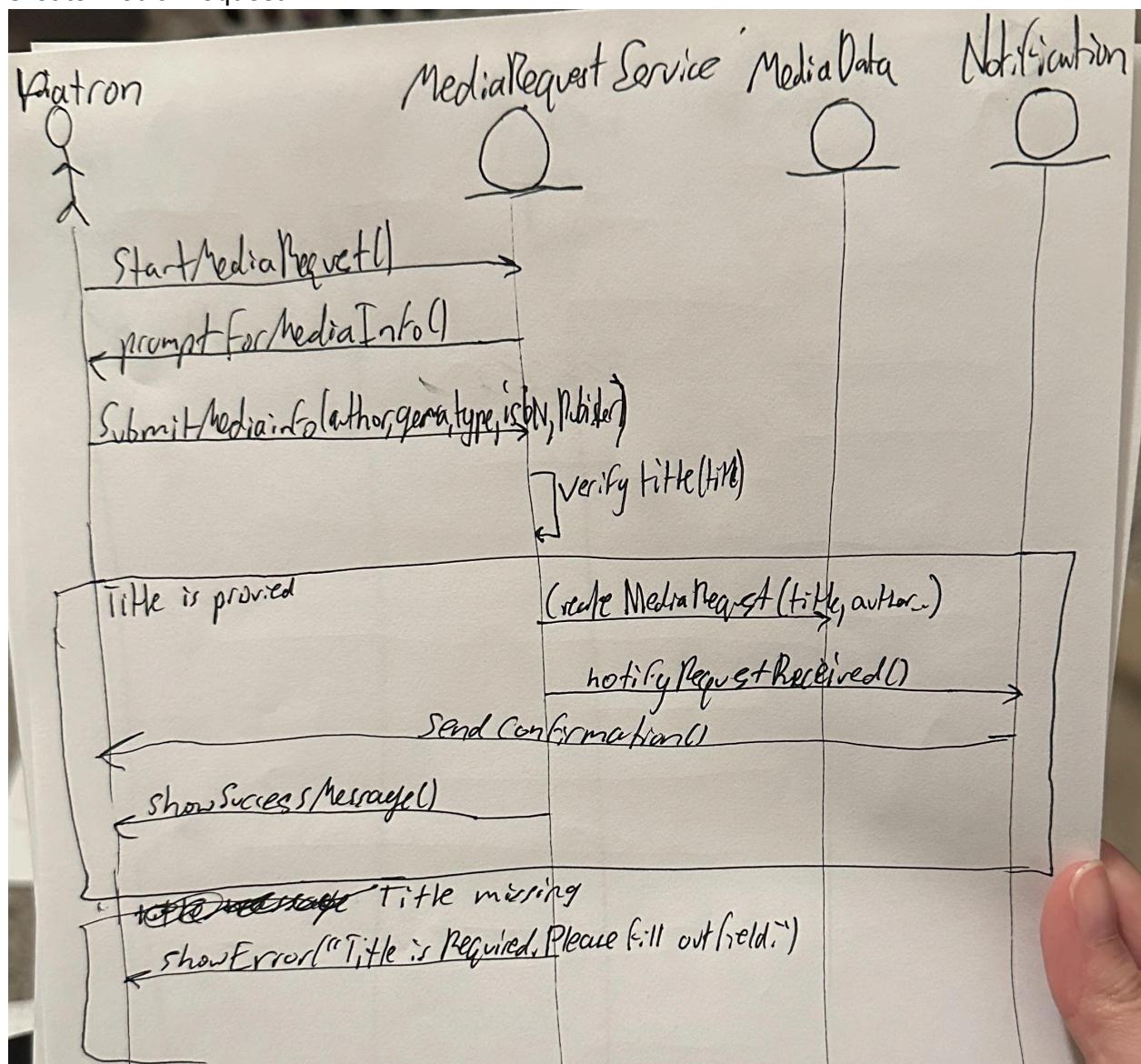
Login/Logout



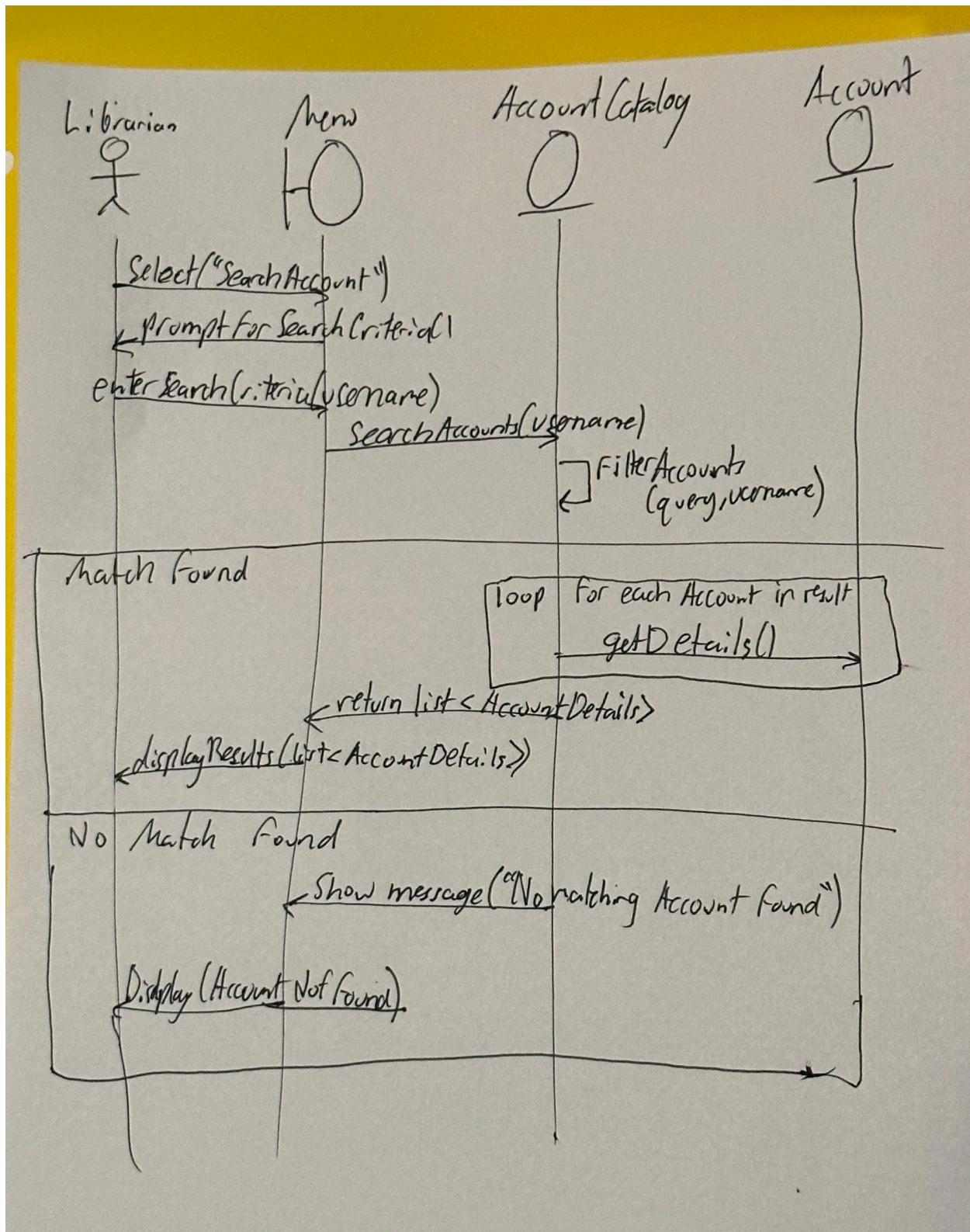
Search Library



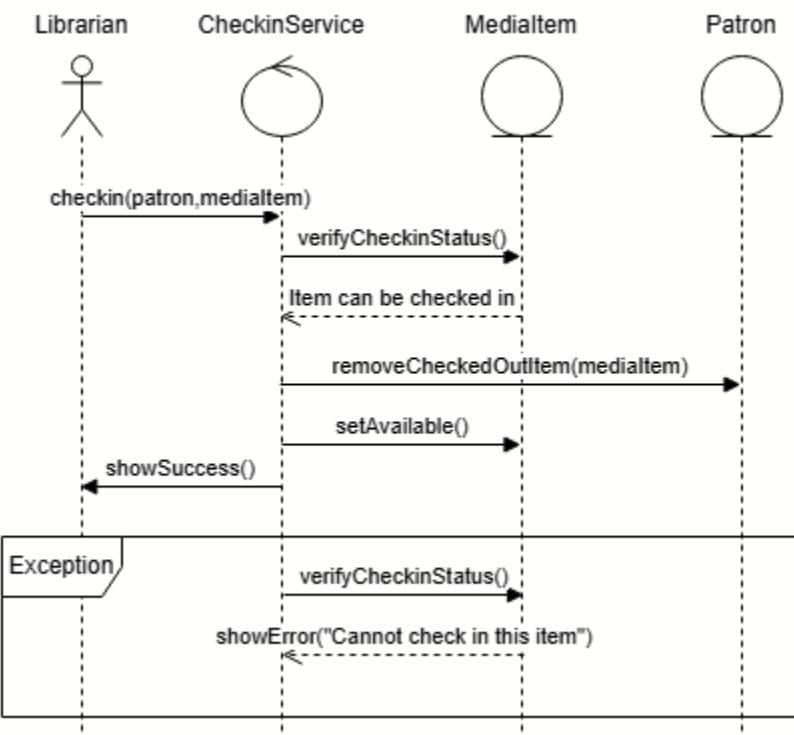
Create Media Request



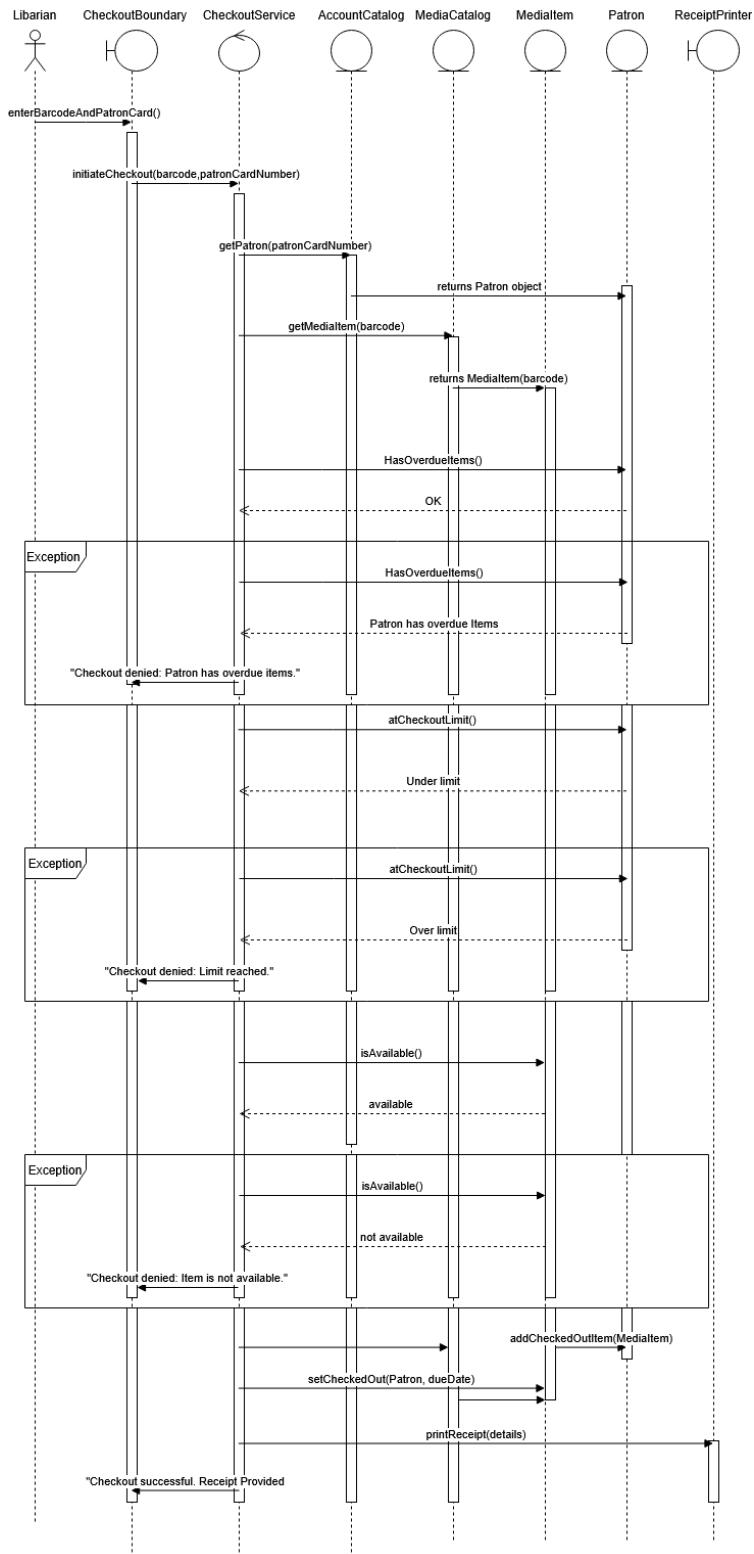
Search Account



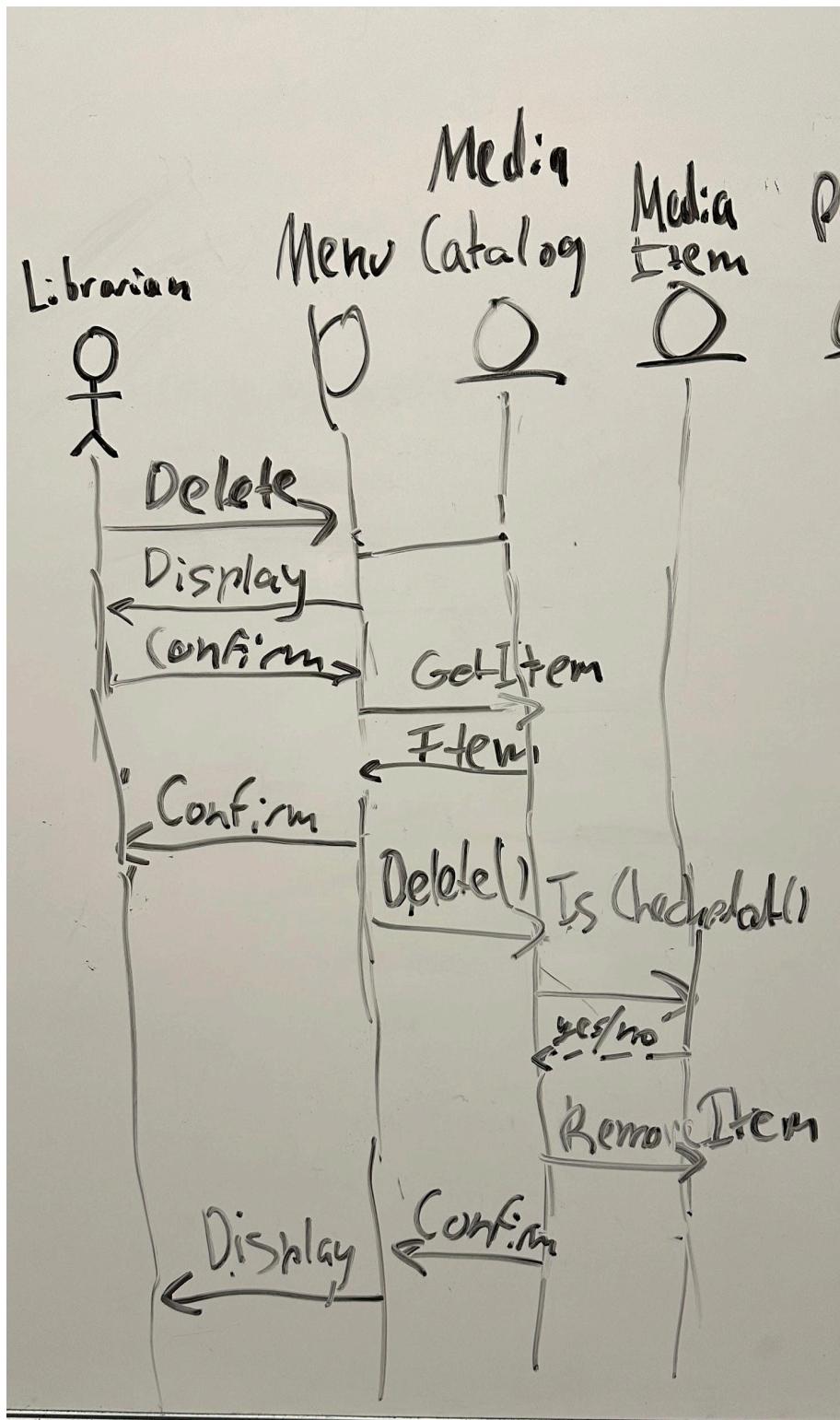
Check in

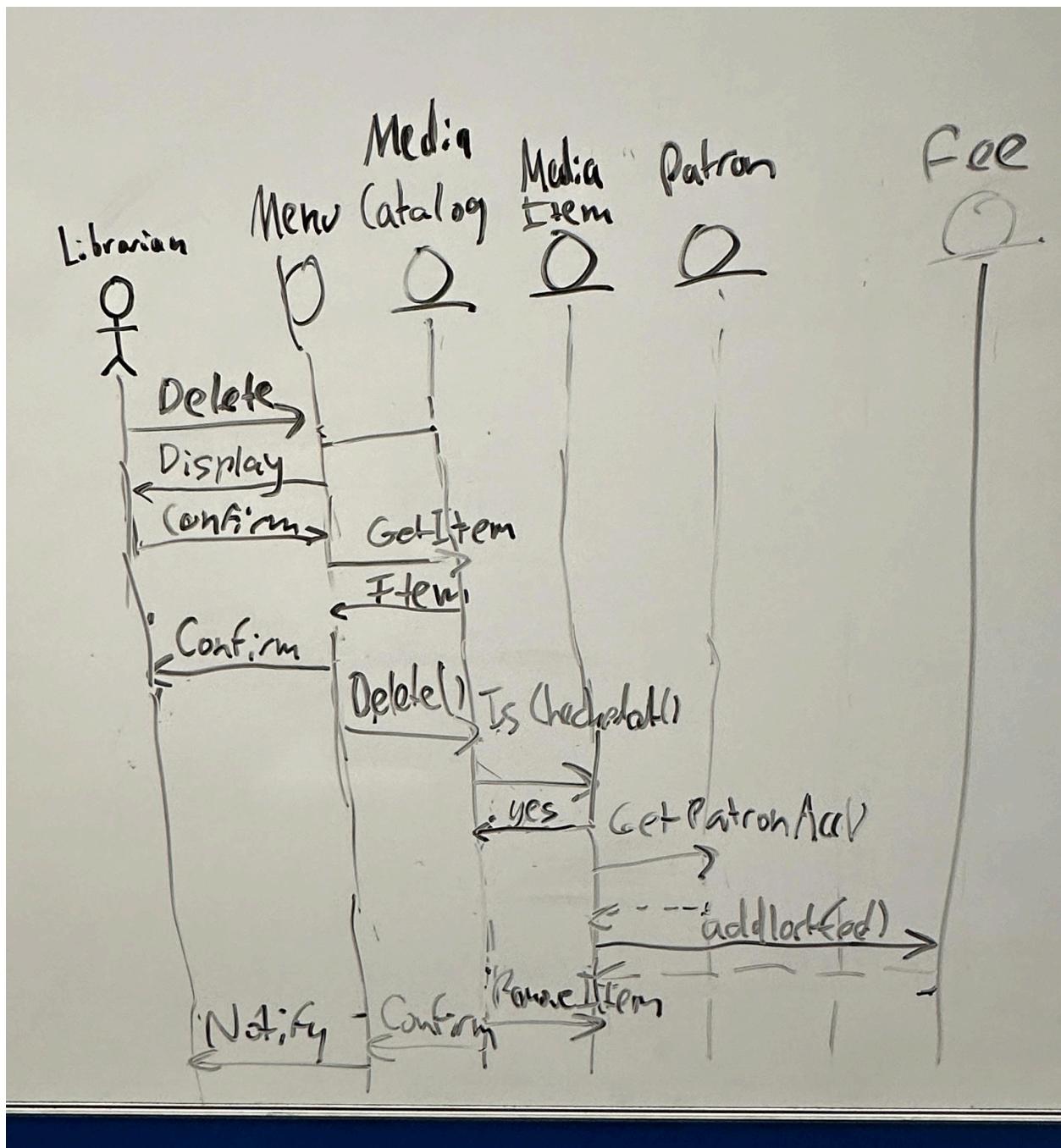


Check out

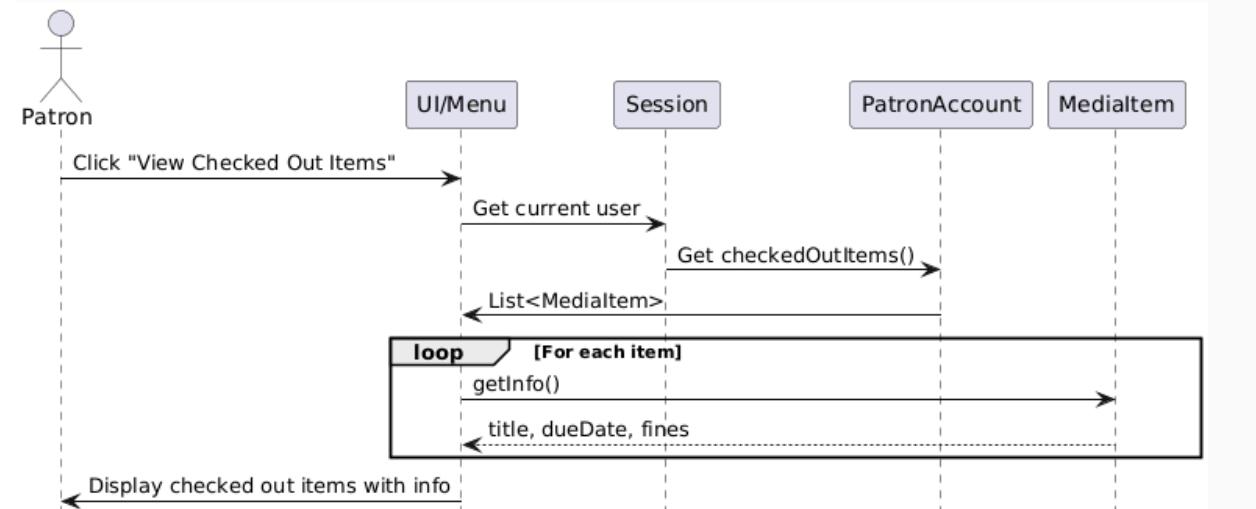


Delete Media

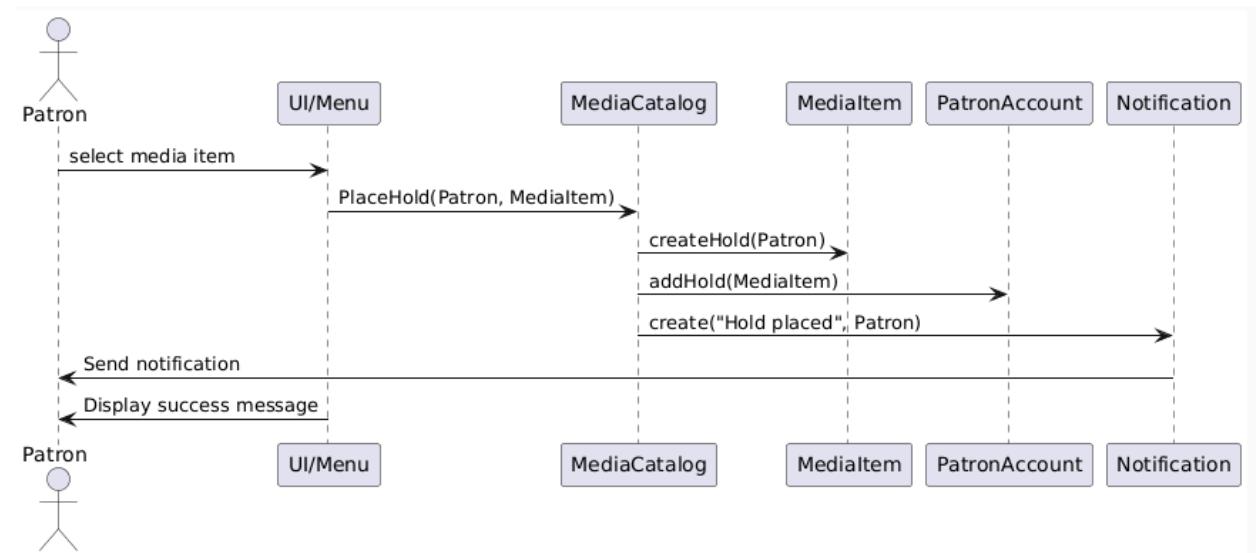




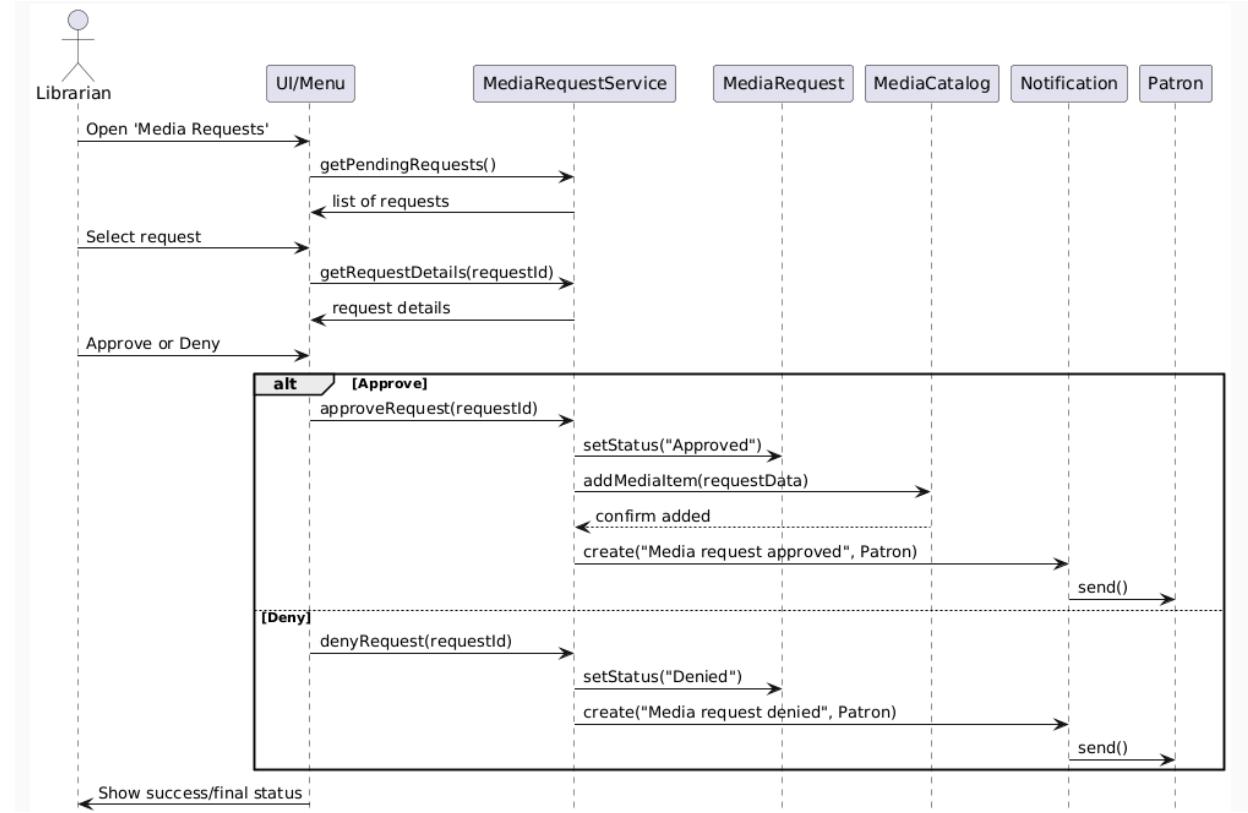
Check which items that are due to return



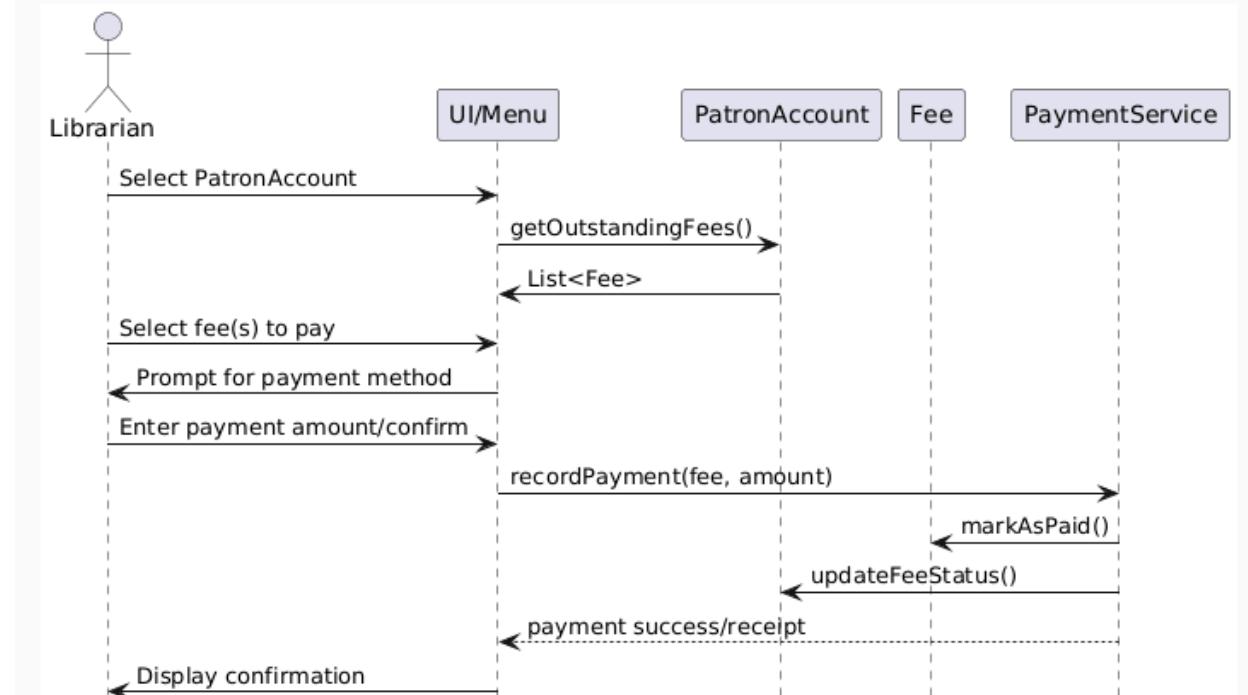
Put items on hold



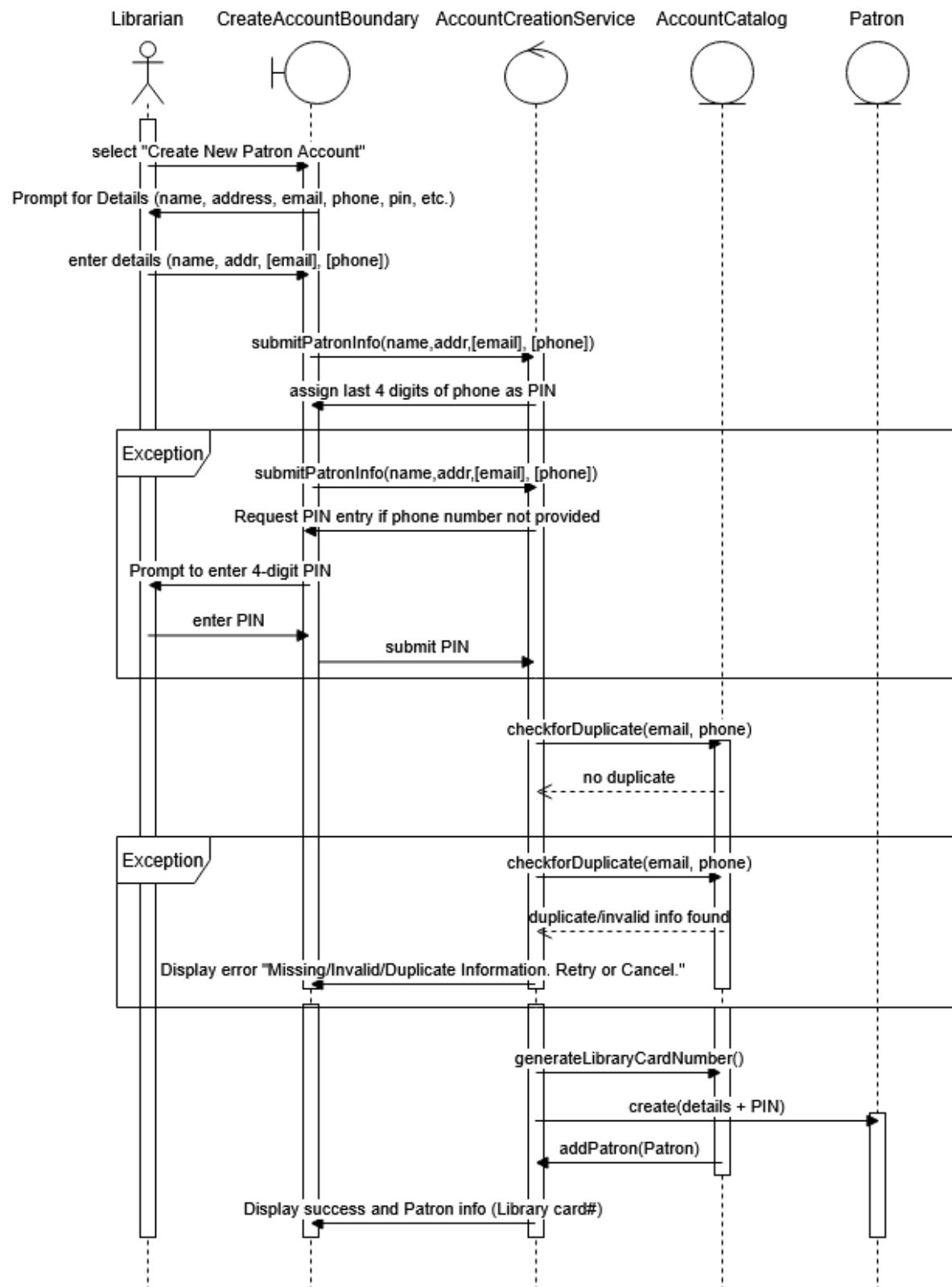
Approve/Deny media requests



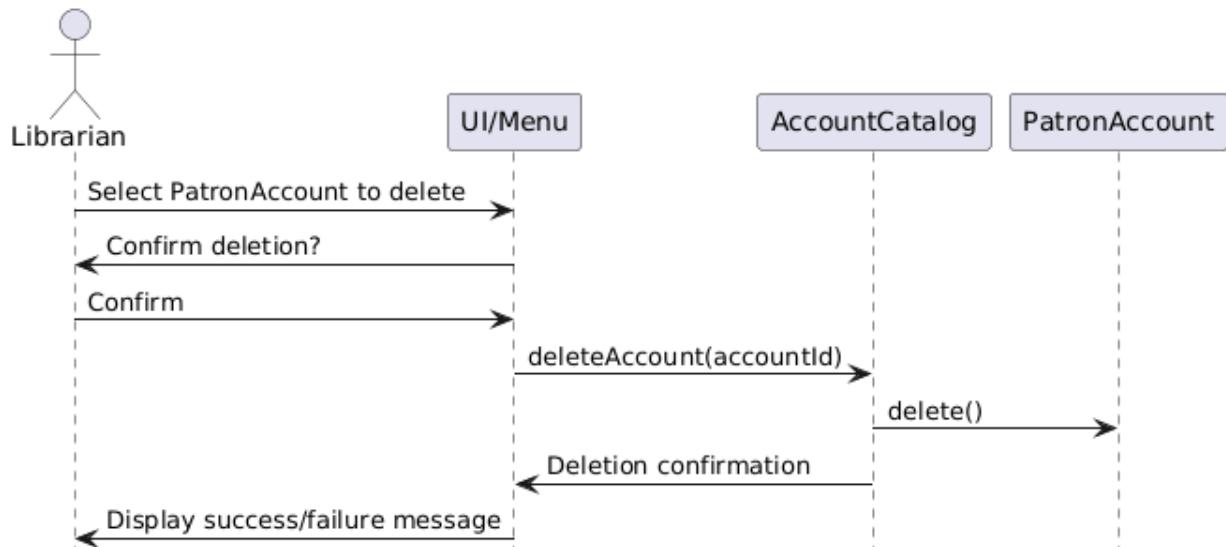
Record payment from outstanding fees



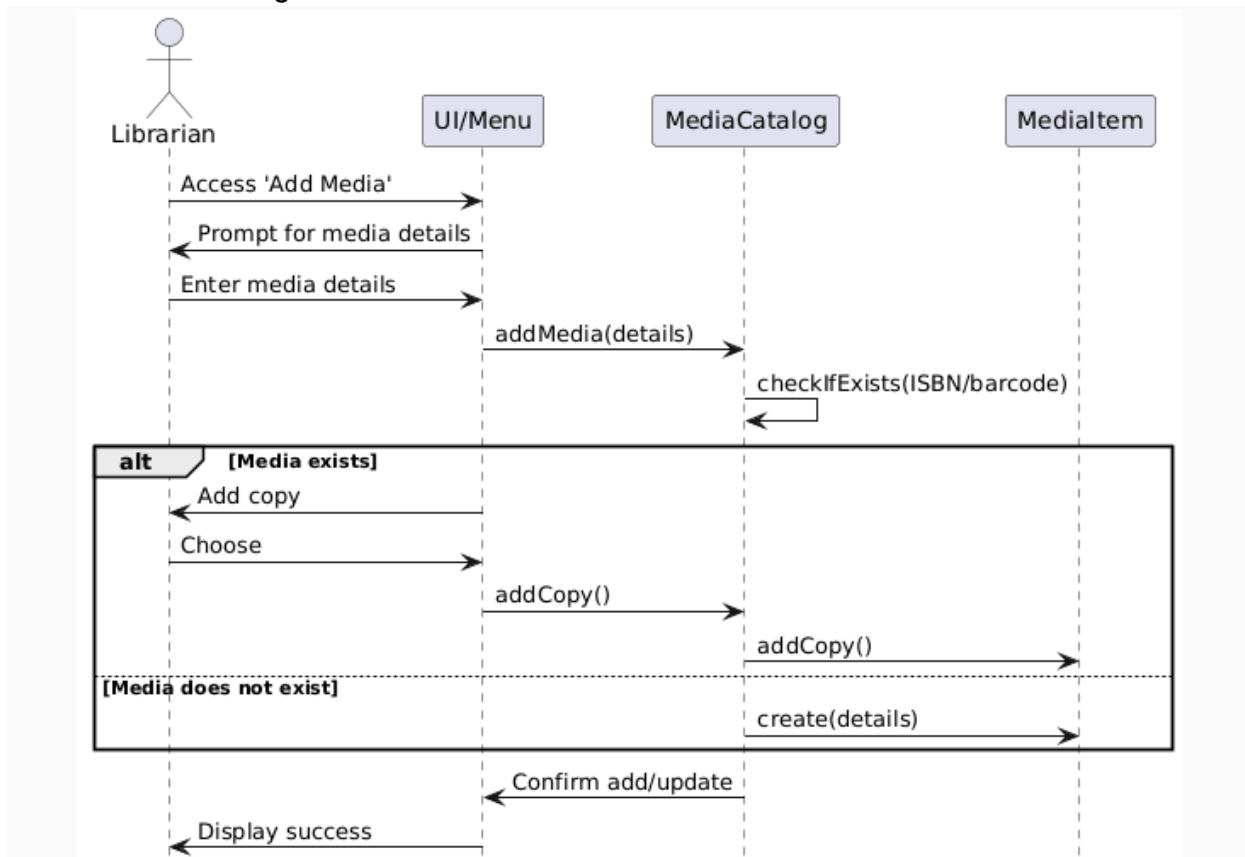
Create new patron account



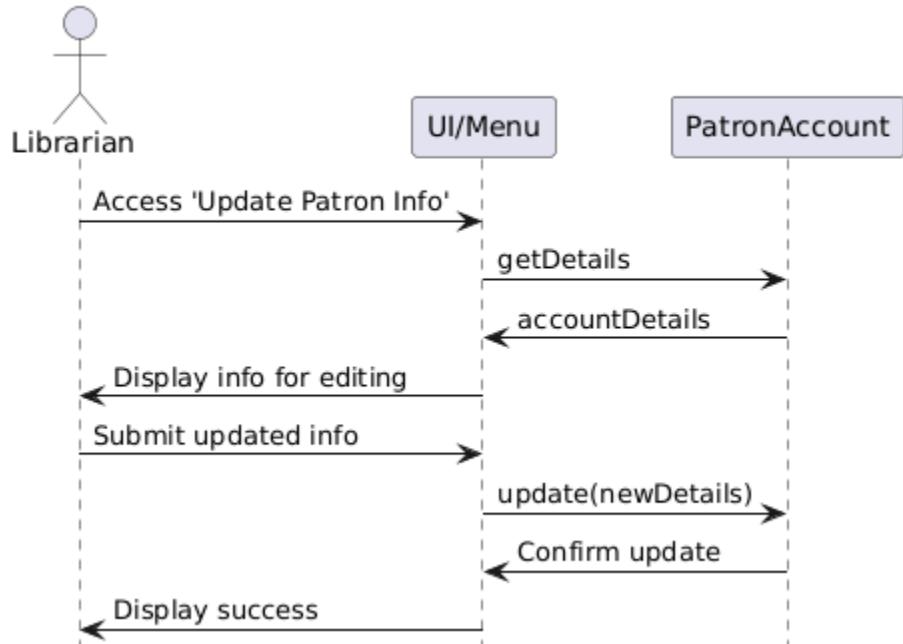
Delete patron account



Add Media to catalog



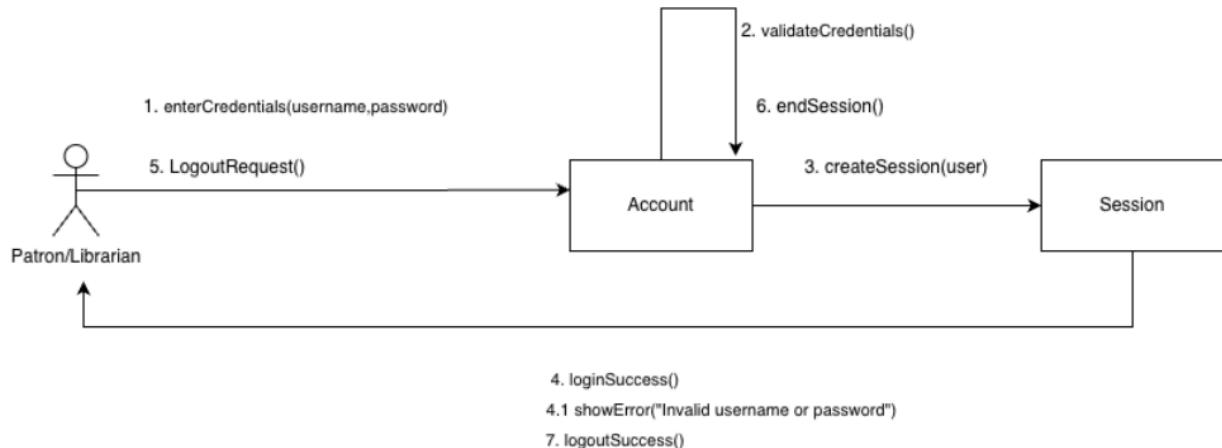
Update Patron Information



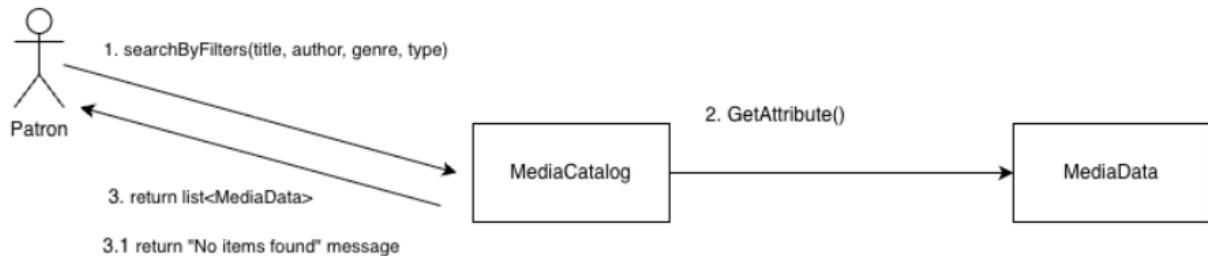
4.5 Communication Diagrams

Used to model the message passing structure of the system functions.

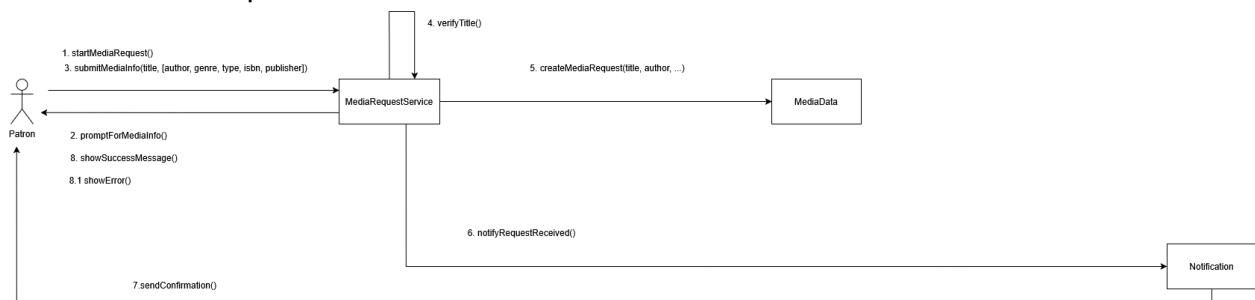
Login/Logout



Search Library



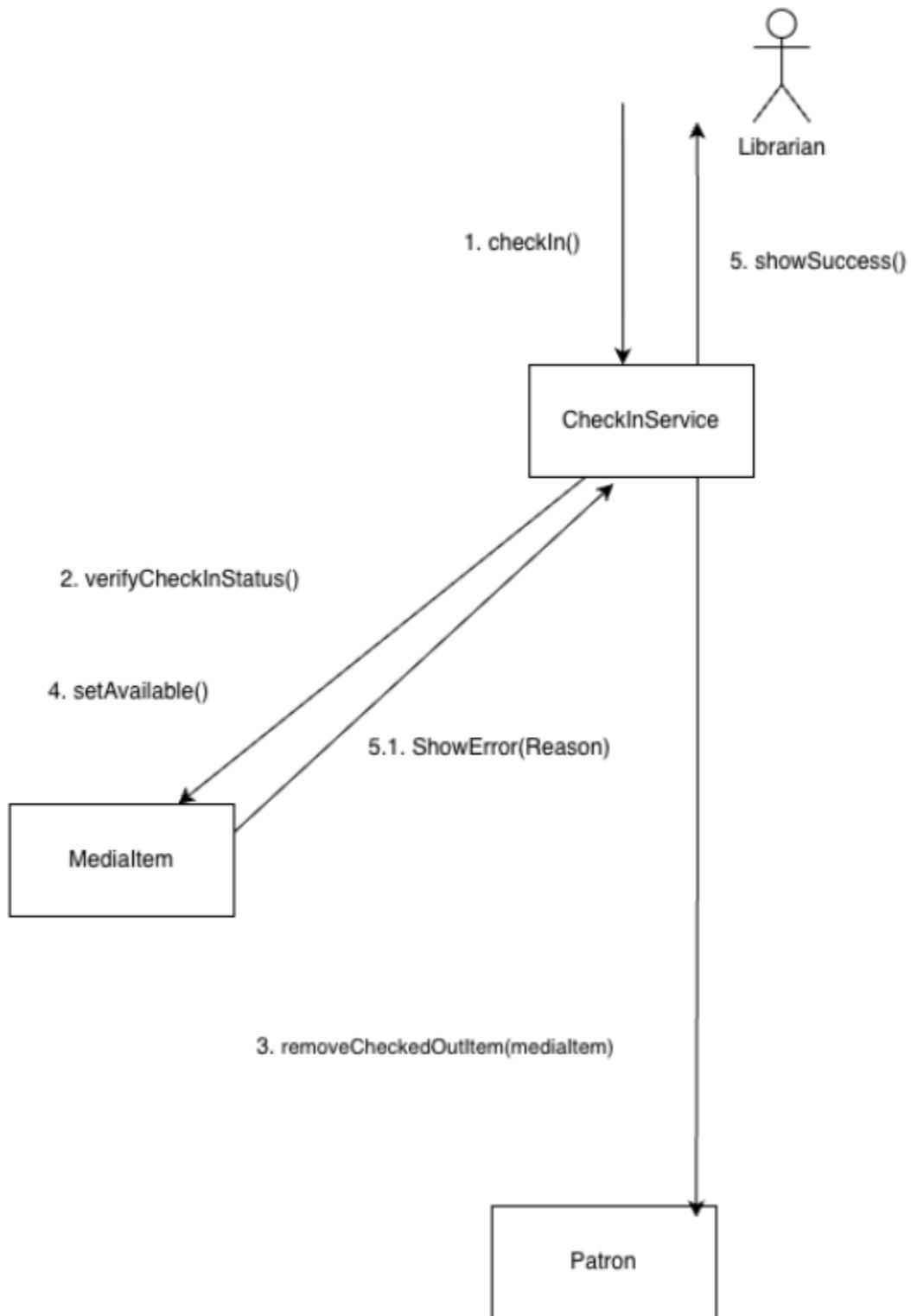
Create Media Request



Search Account



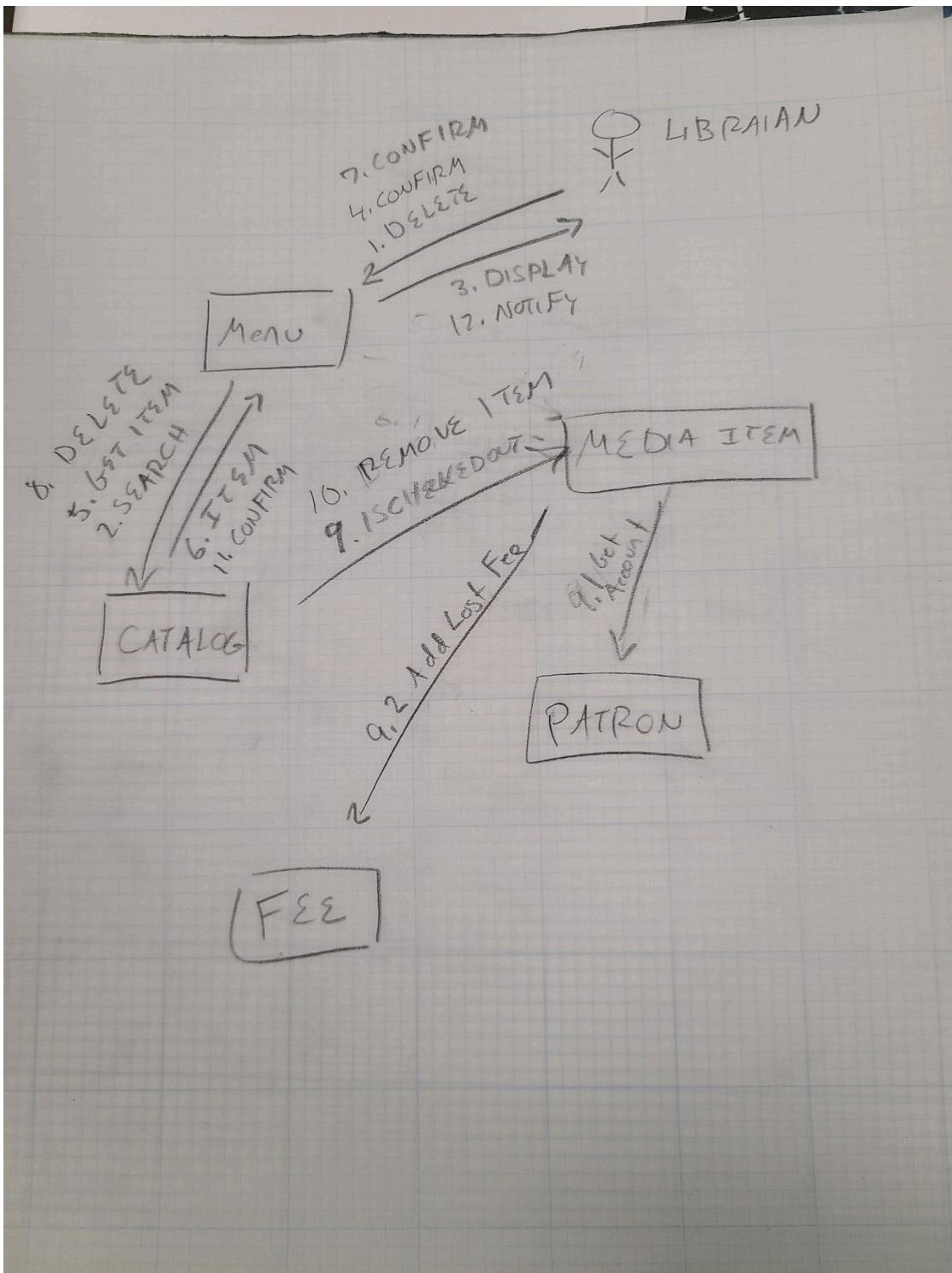
Check in



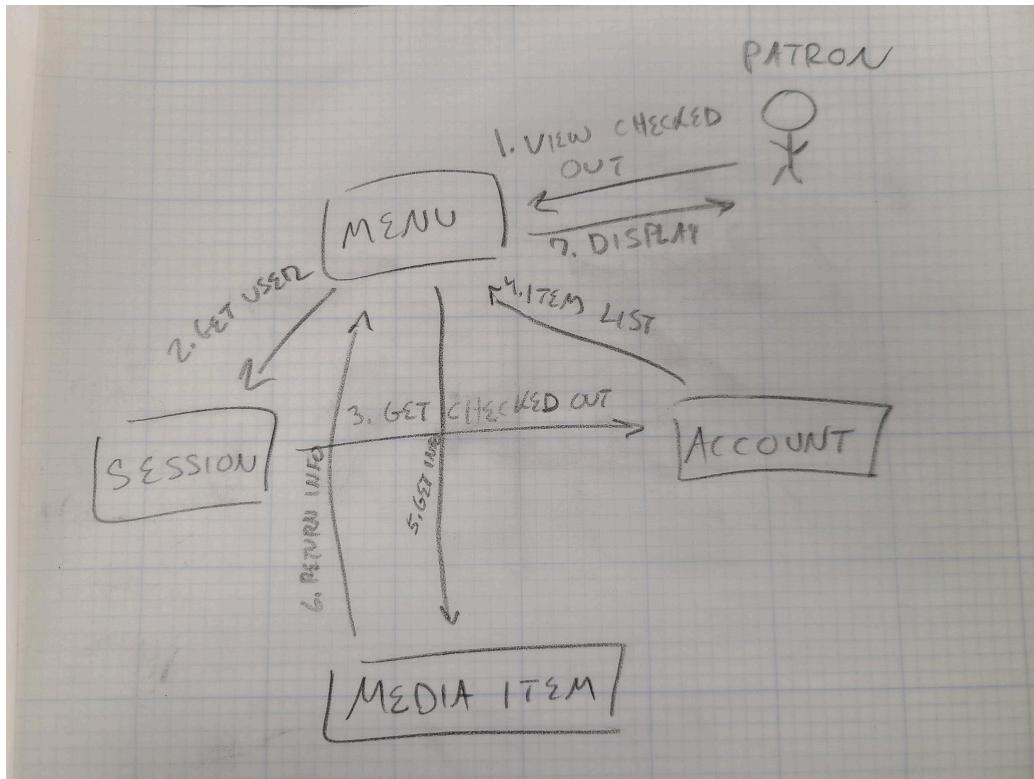
Check out



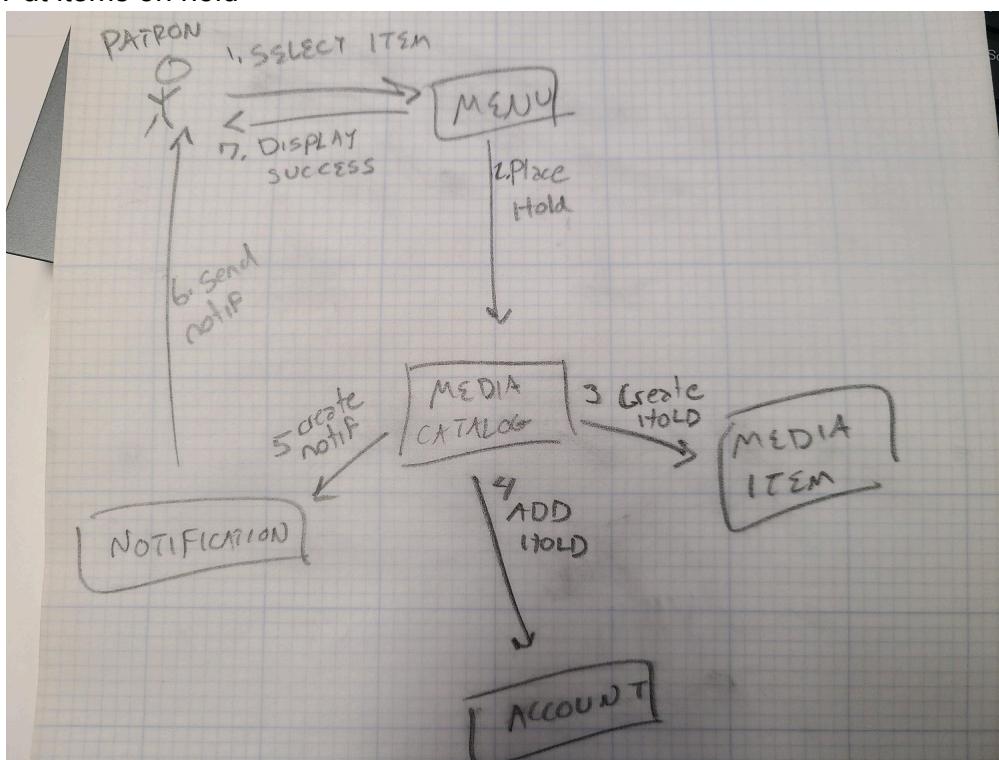
Delete Media



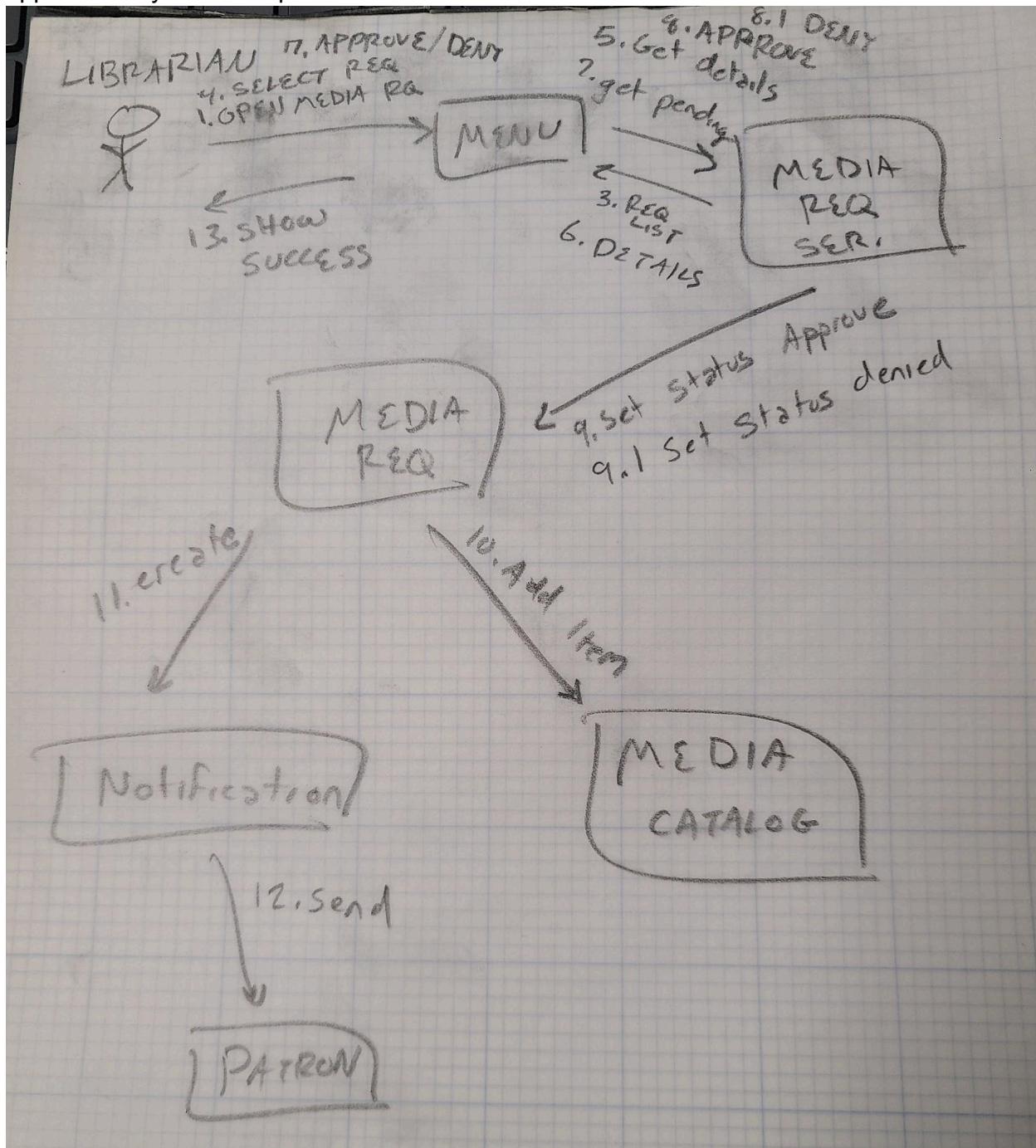
Check which items that are due to return



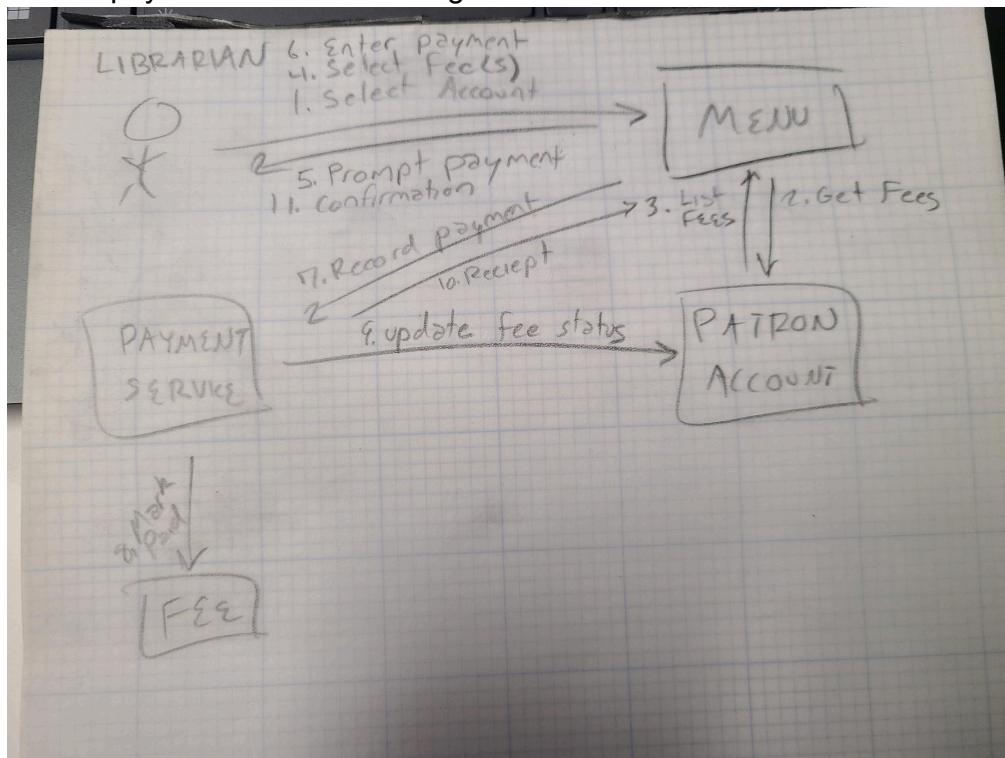
Put items on hold



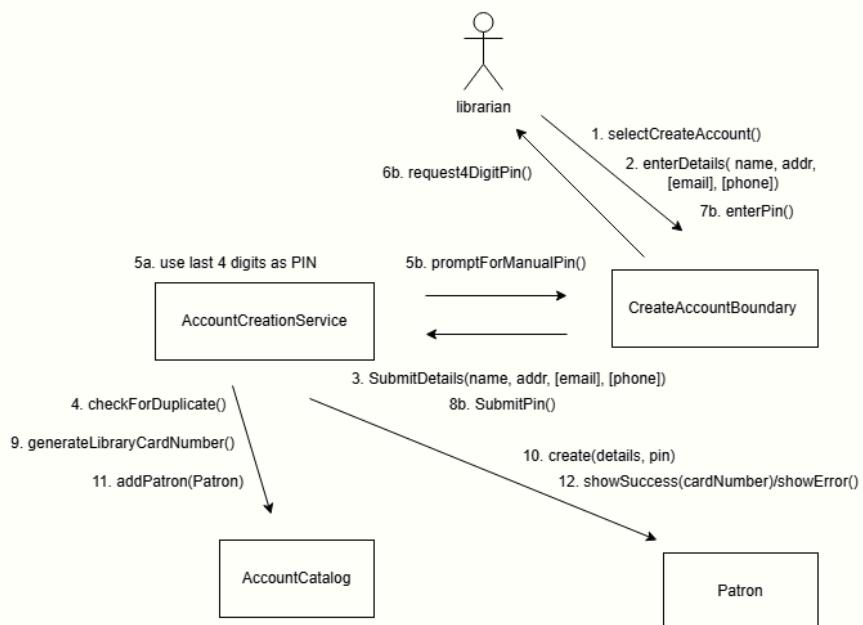
Approve/Deny media requests



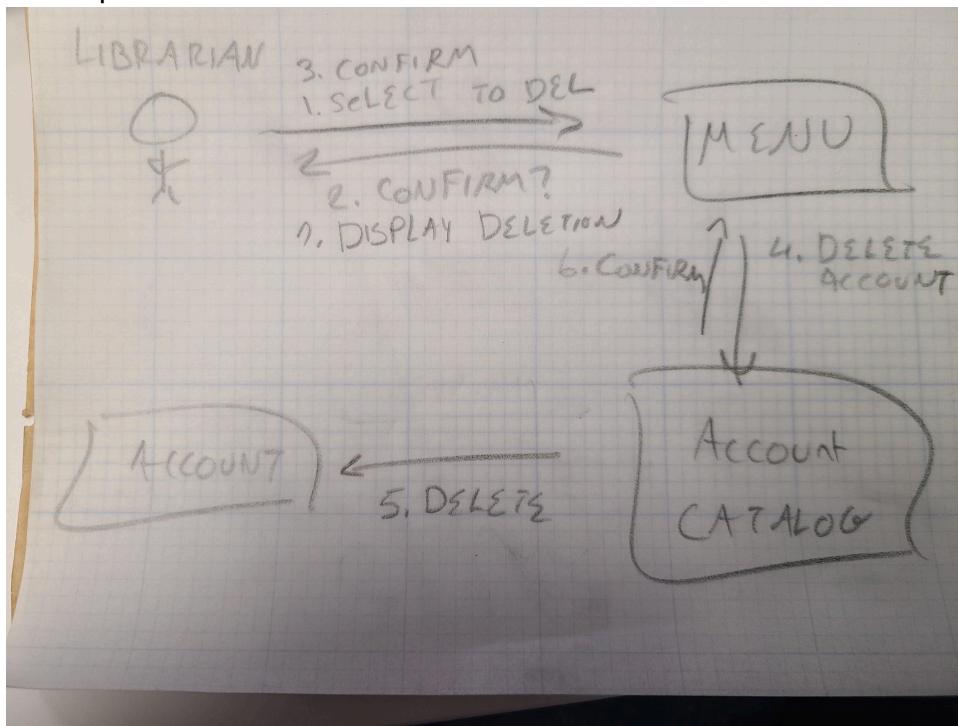
Record payment from outstanding fees



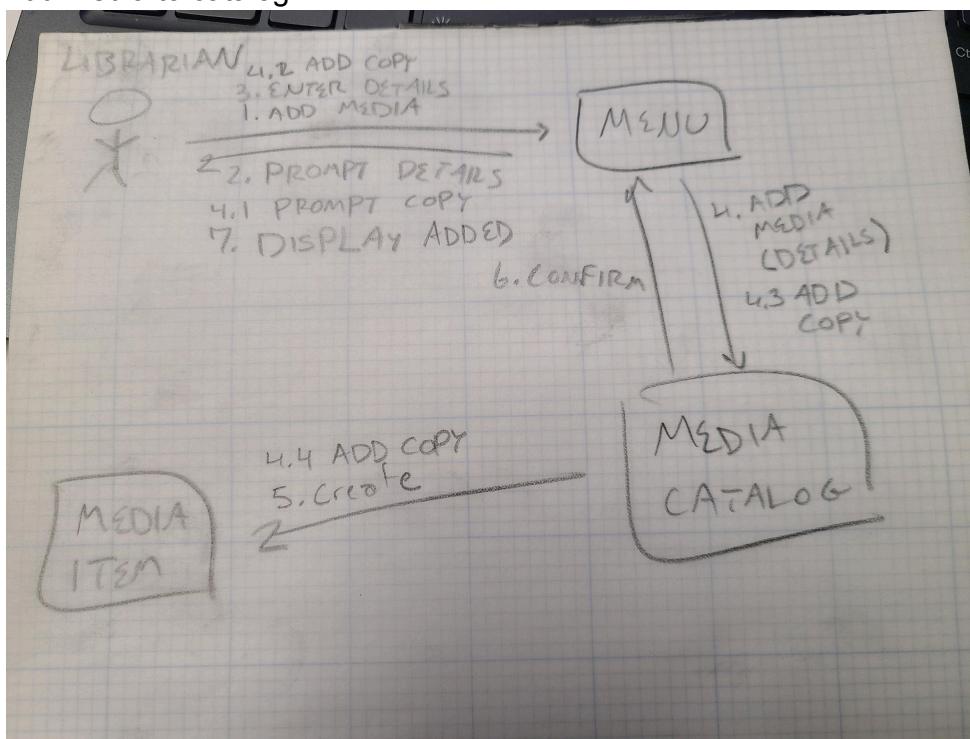
Create new patron account



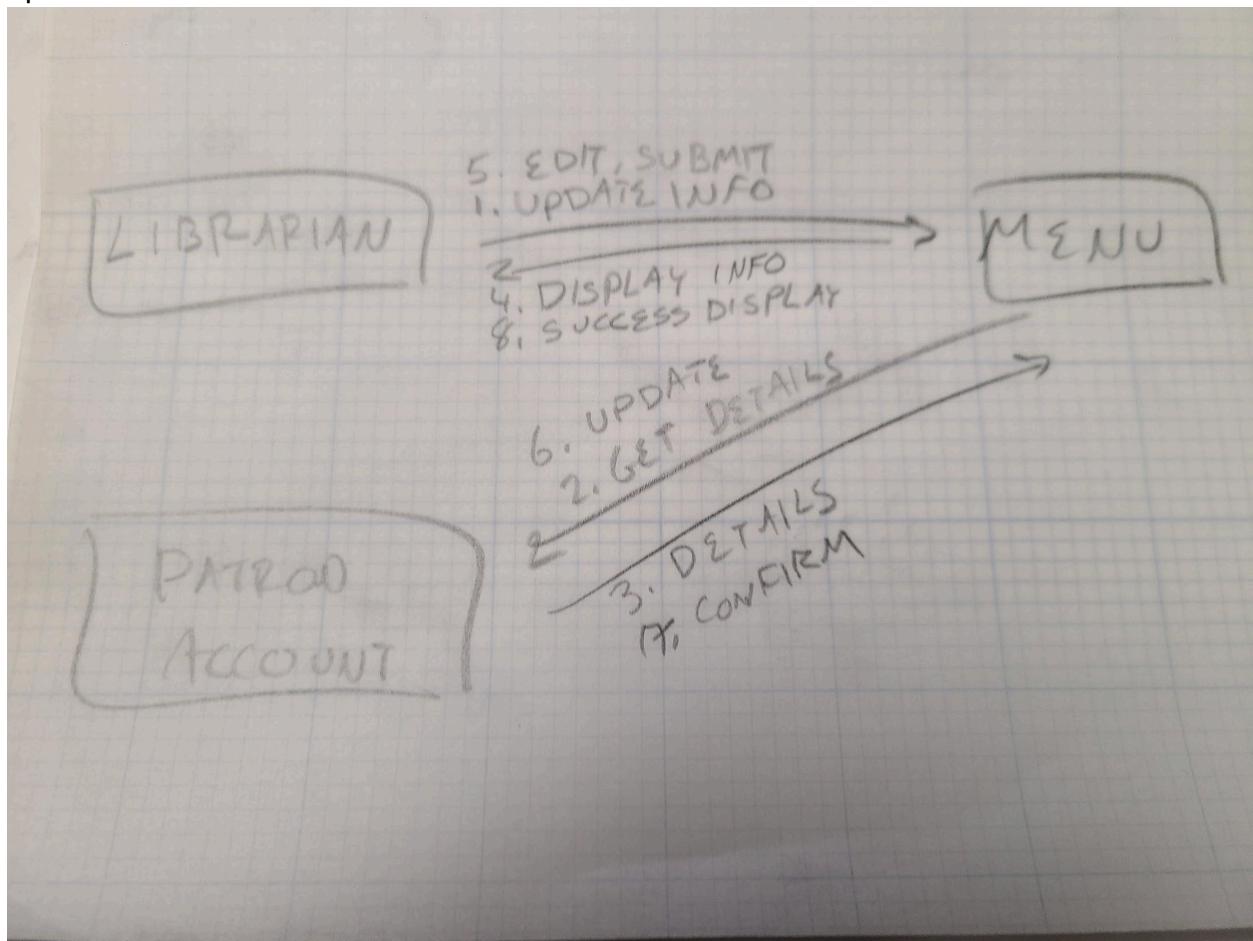
Delete patron account



Add Media to catalog



Update Patron Information



5.0 Behavioral Model and Description

A description of the behavior of the software is presented.

5.1 Description for software behavior

A detailed description of major events and states is presented in this section.

5.1.1 Events

A listing of events (control, items) that will cause behavioral change within the system is presented.

- Logging in/out
- Check in/out item
- Add/remove item
- Create/manage/delete request
- Create/Manage/delete account

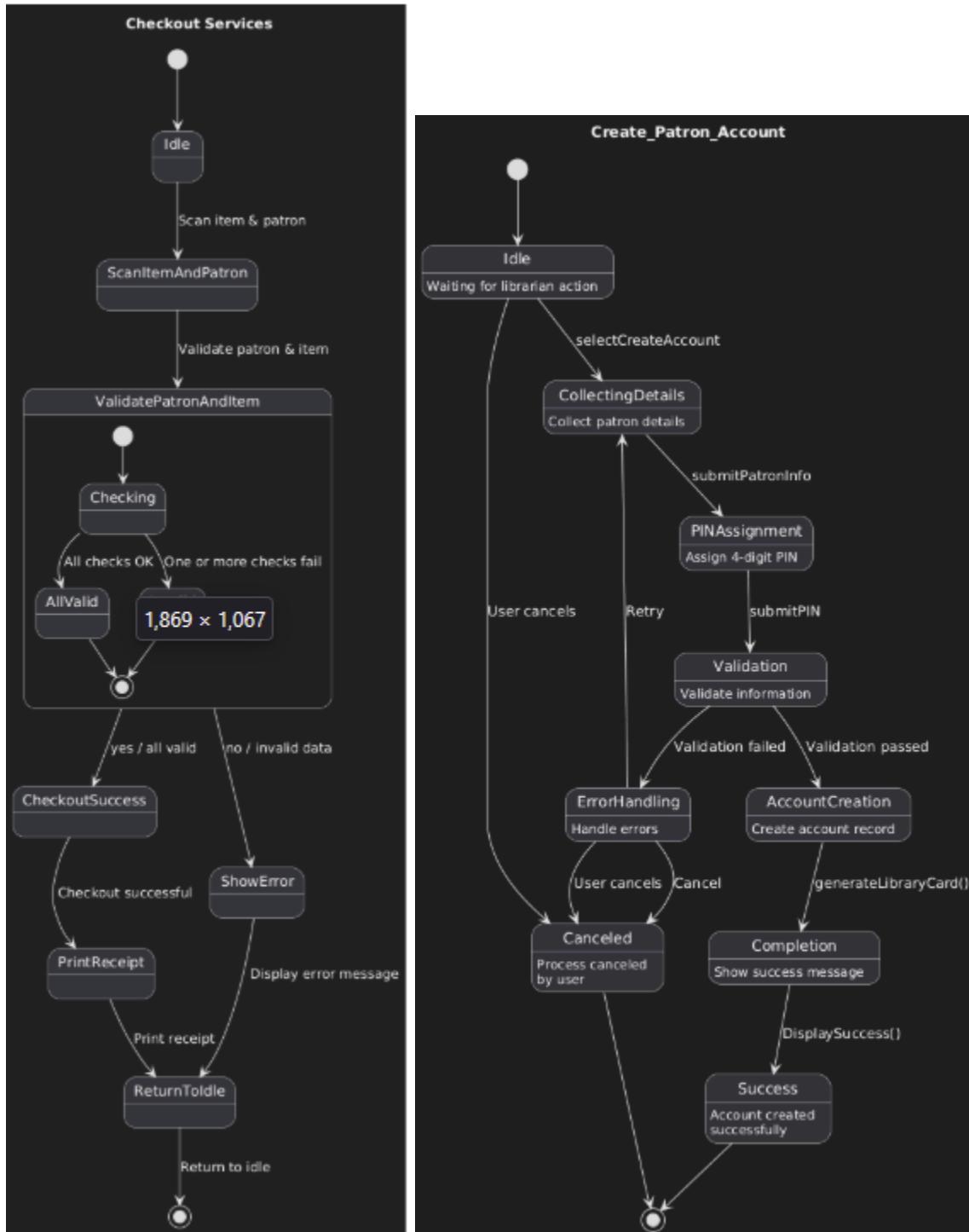
5.1.2 States

A listing of states (modes of behavior) that will result as a consequence of events is presented.

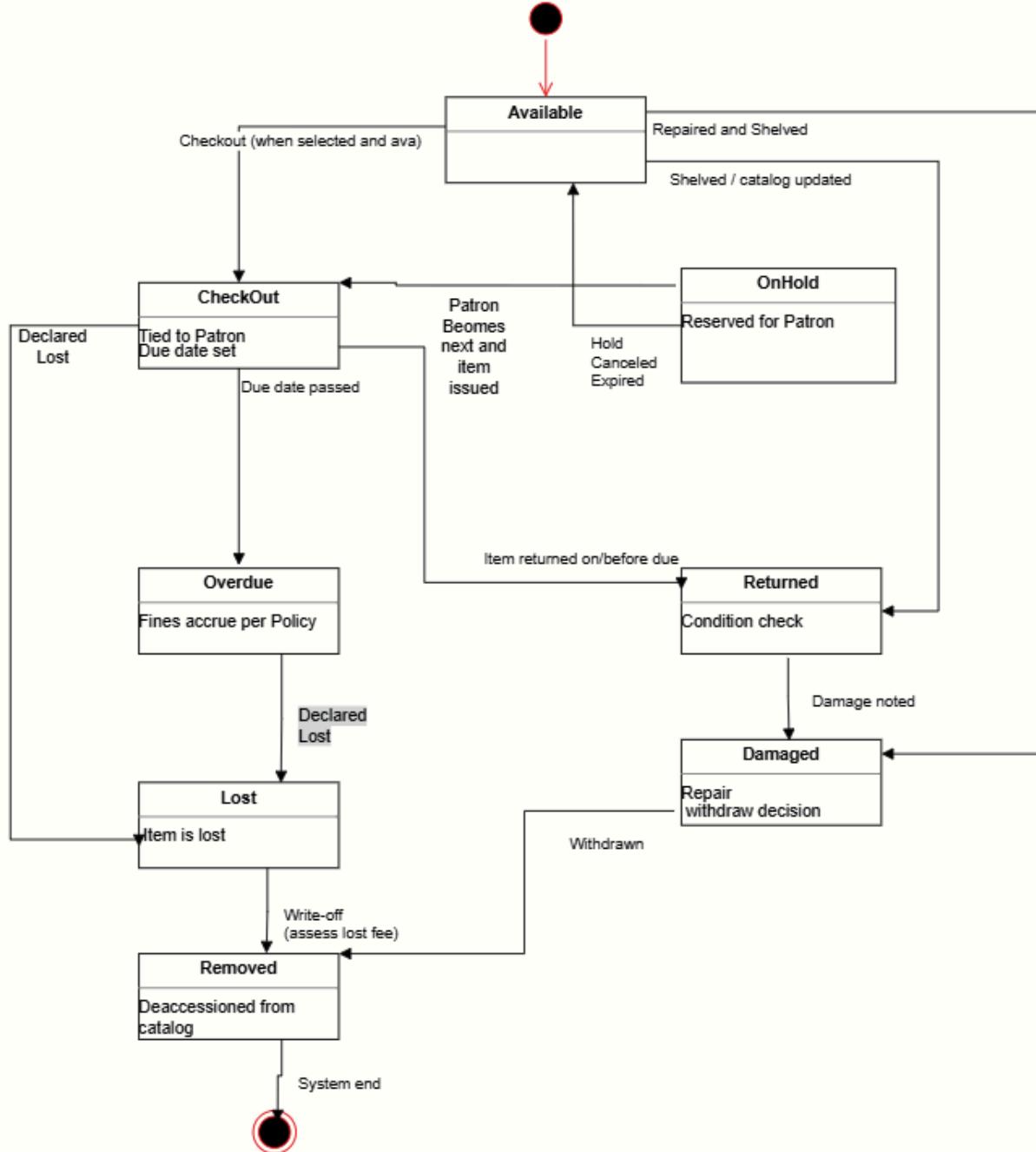
- System Idle
- Collecting Details
- Validate
- Success
- Print Receipt
- Error Handling
- Item Available
- Item On Hold
- Item Checked Out
- Media Request Pending Review
- Item removed
- Logged In
- Logged Out

5.2 State Transition Diagrams

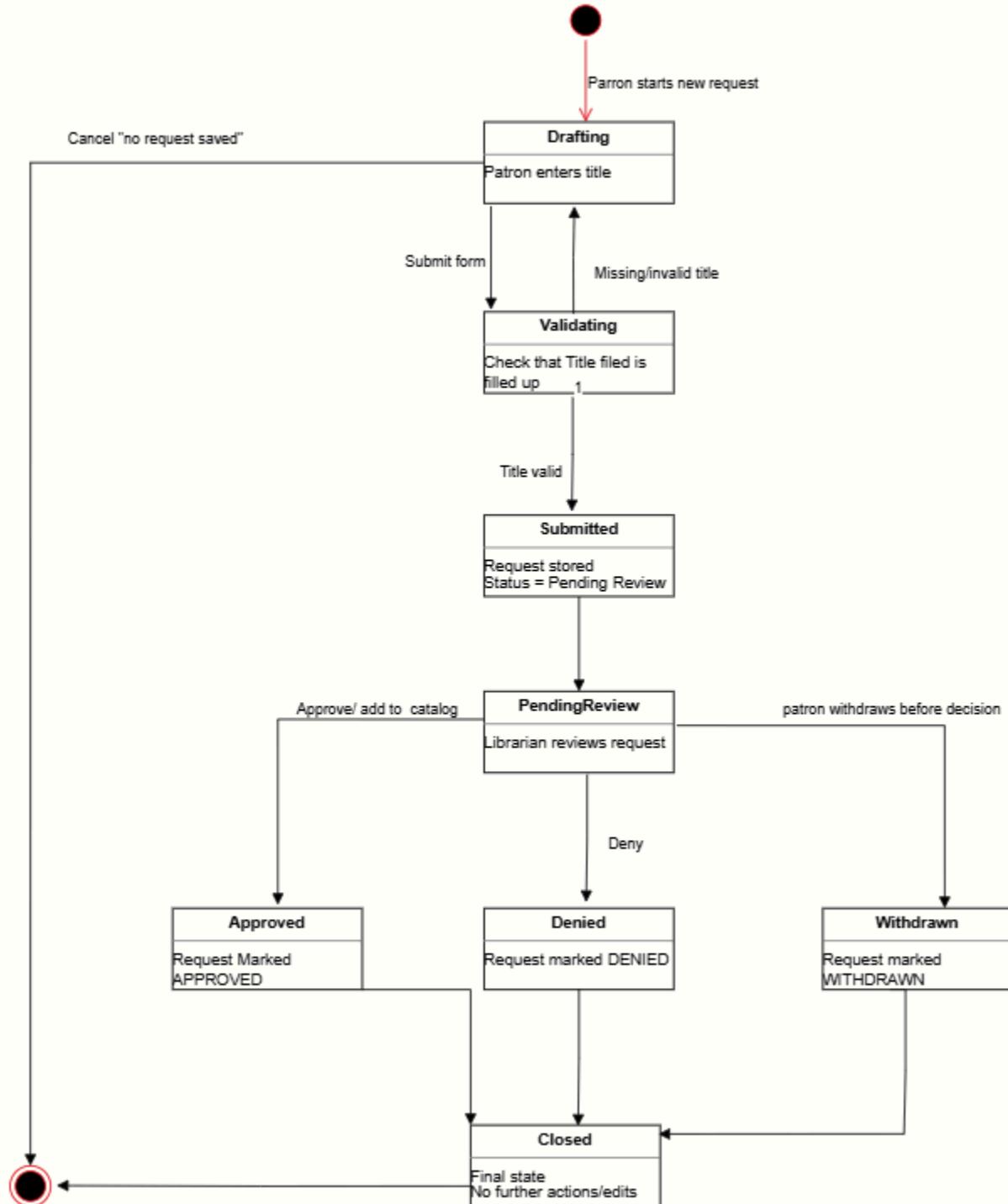
Depict the manner in which the software reacts to external events.



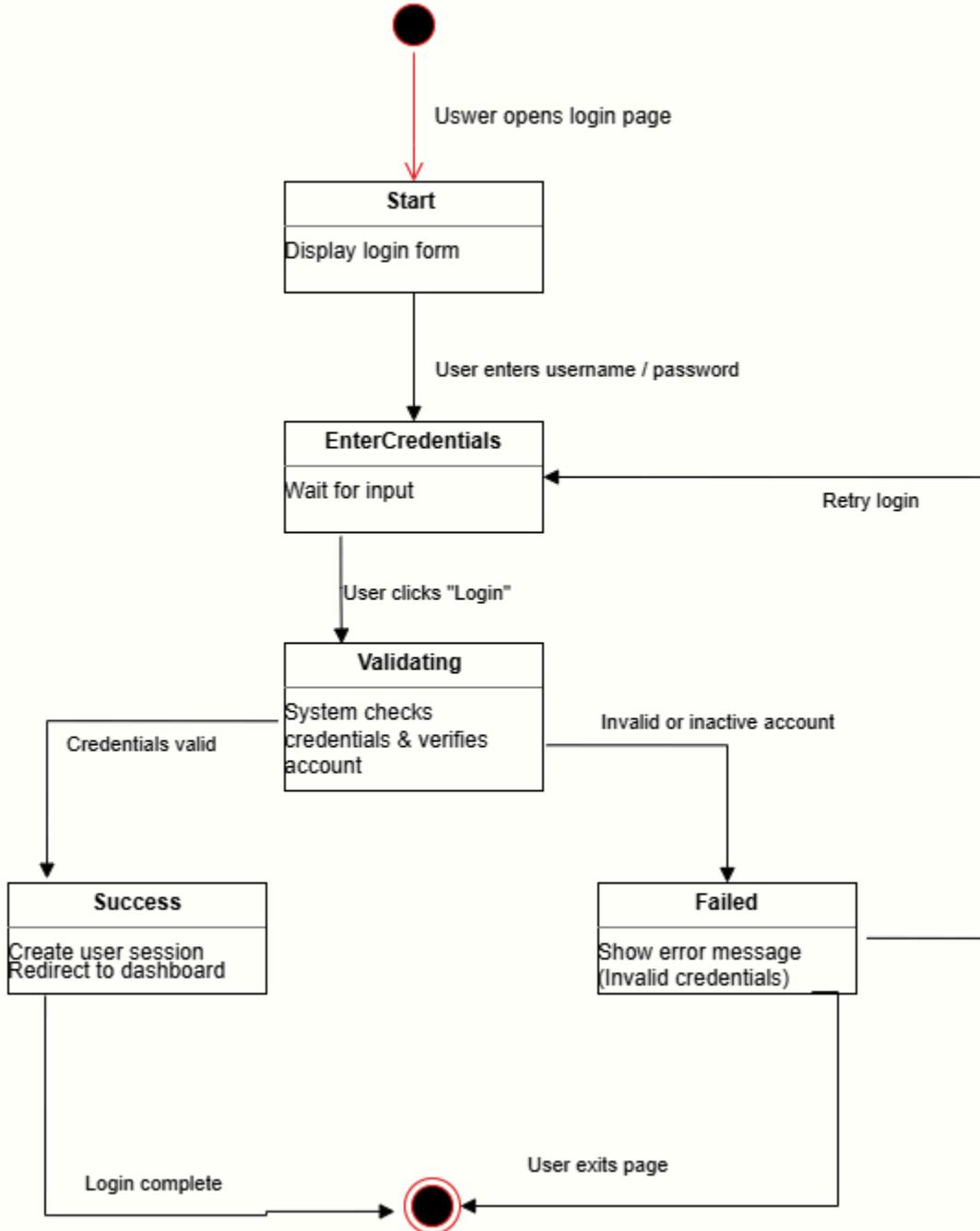
Media Item



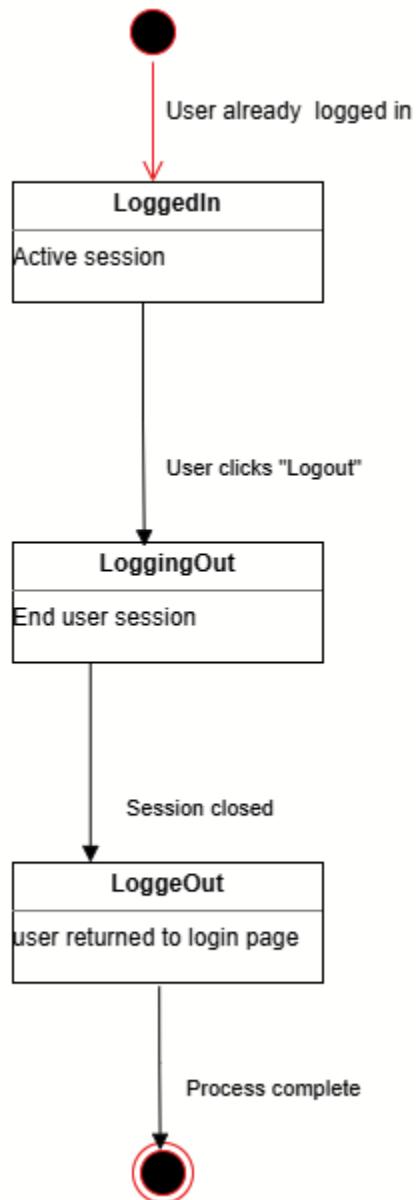
Media Request



Login



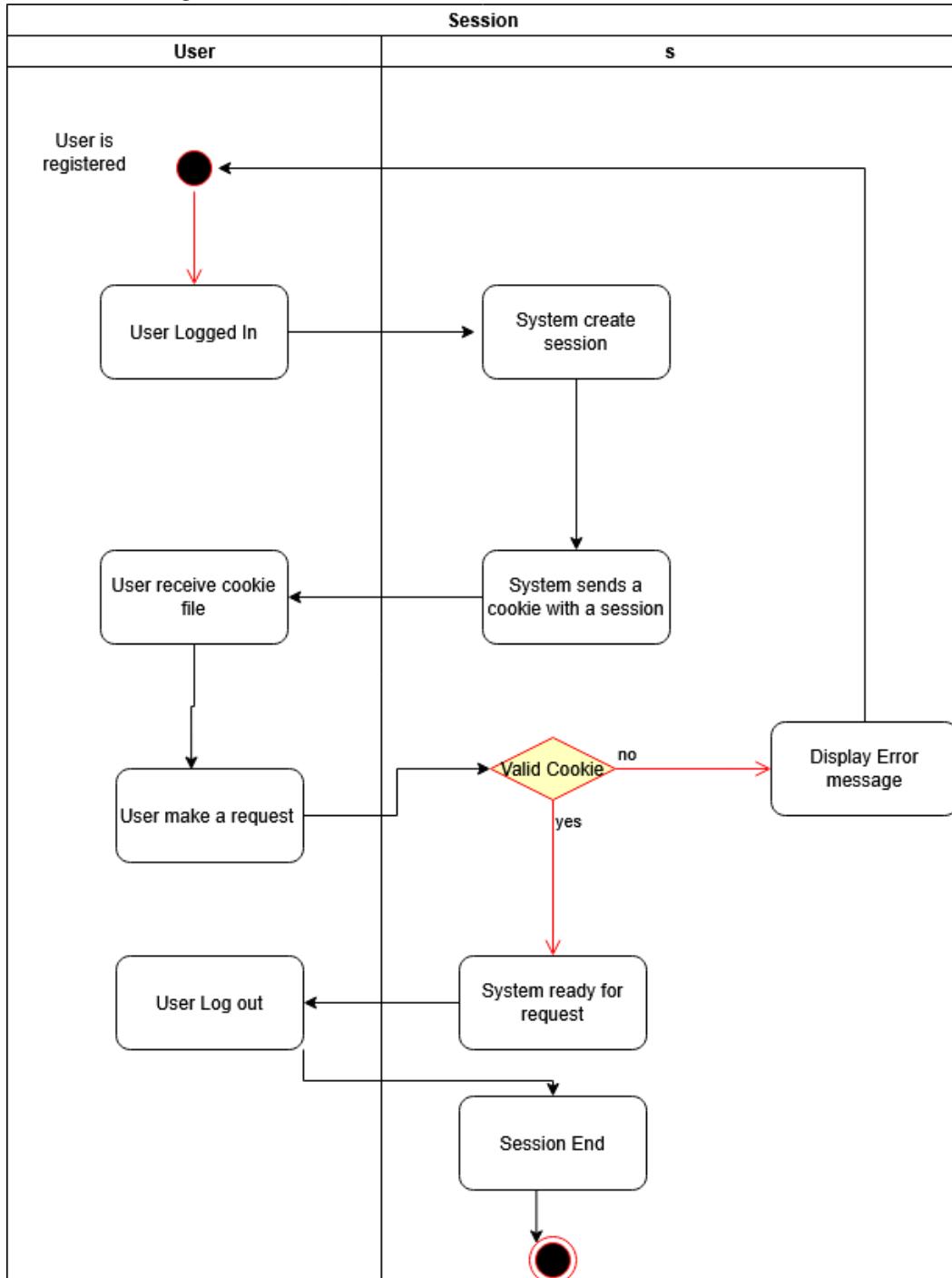
LogOut



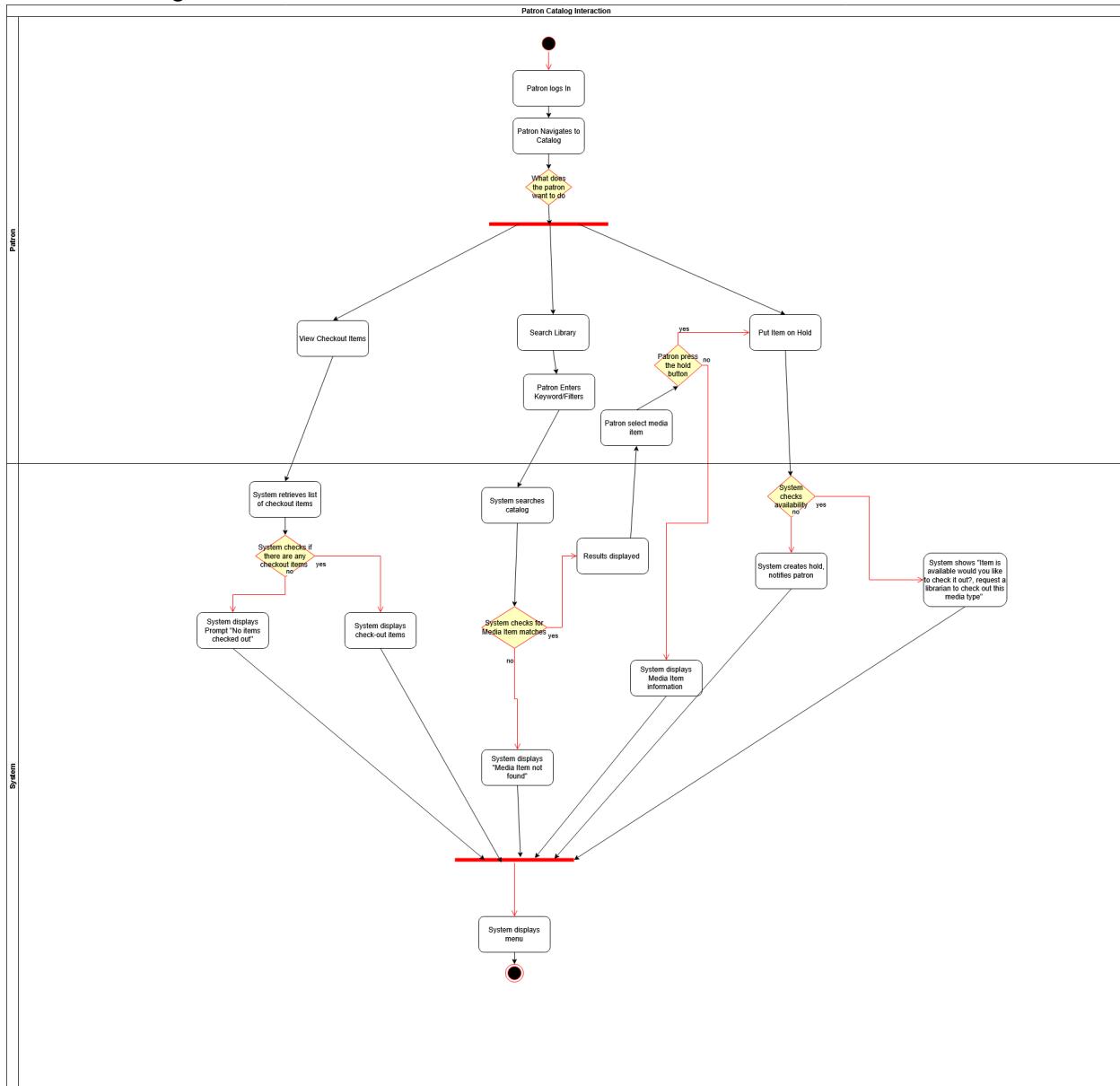
5.3 Activity Diagram

Depict the manner in which the software reacts to internal events.

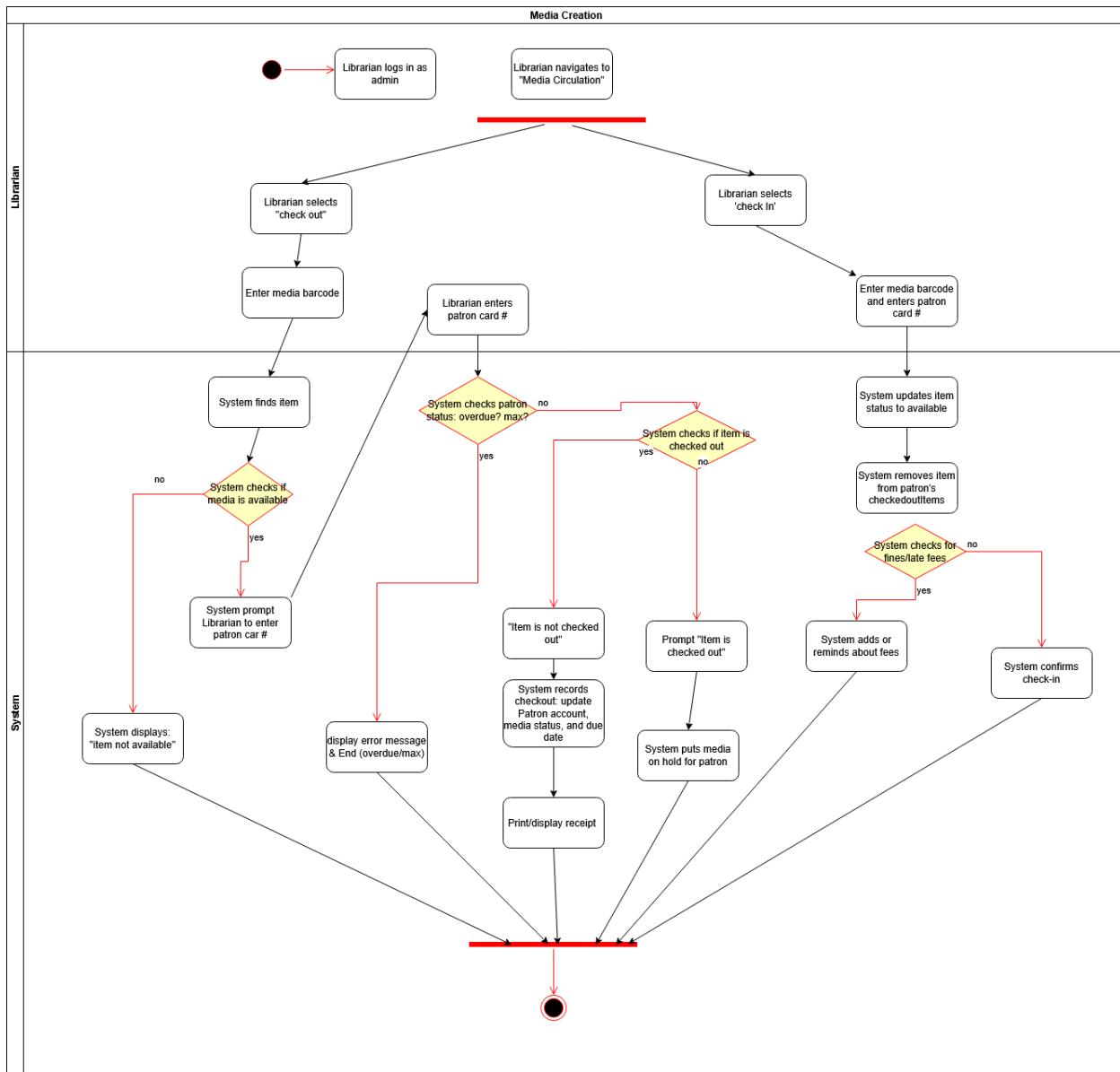
Session Management



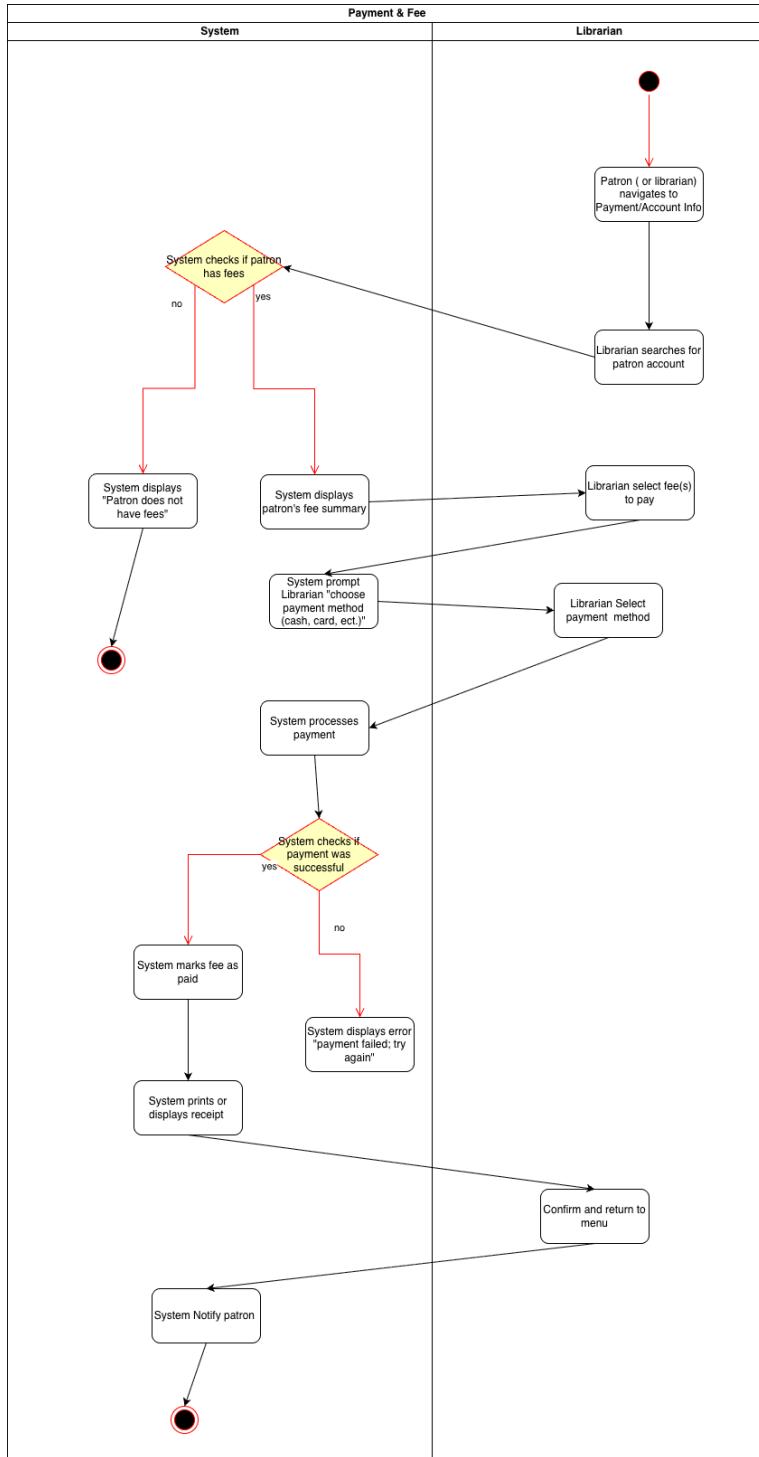
Patron Catalog Interactions

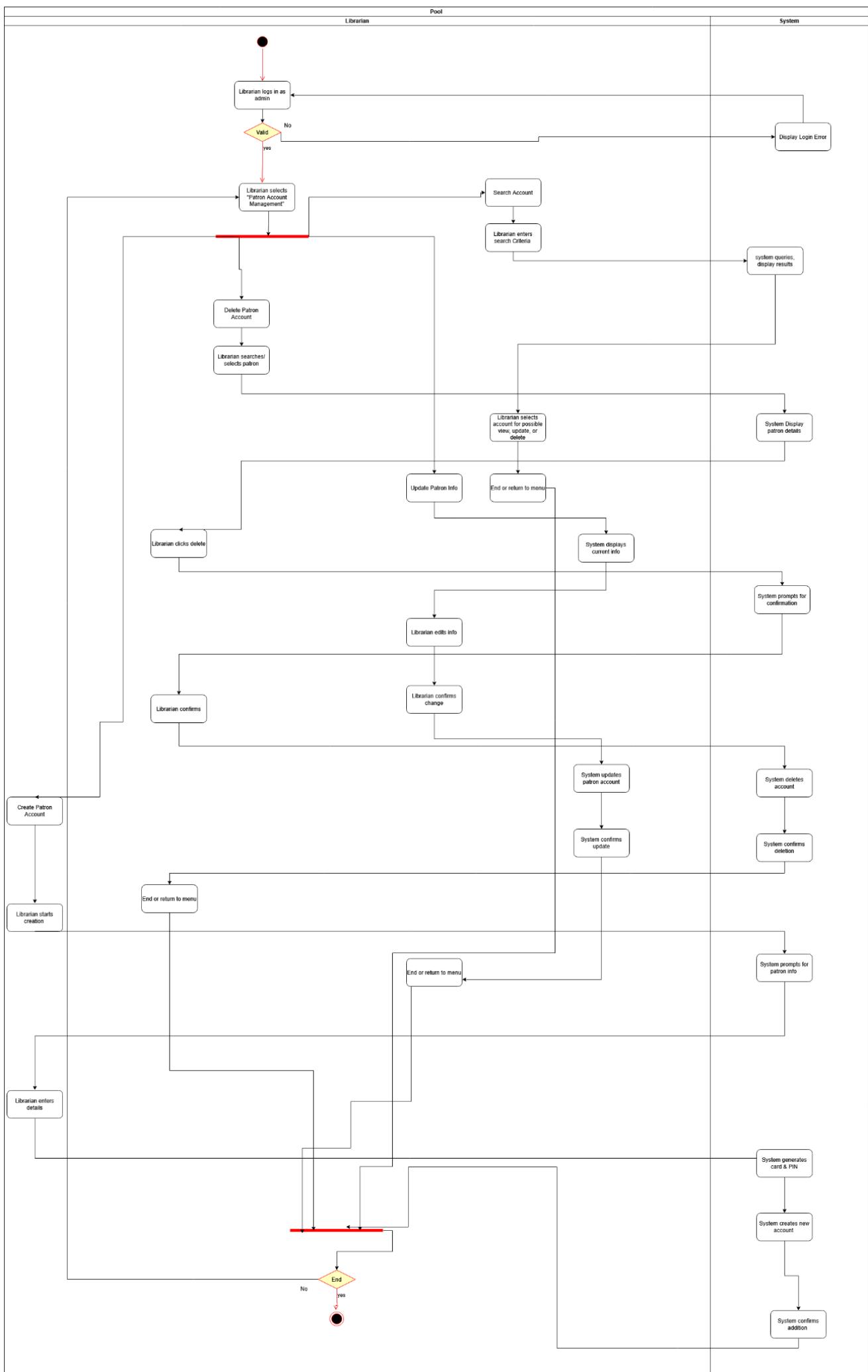


Media Curation

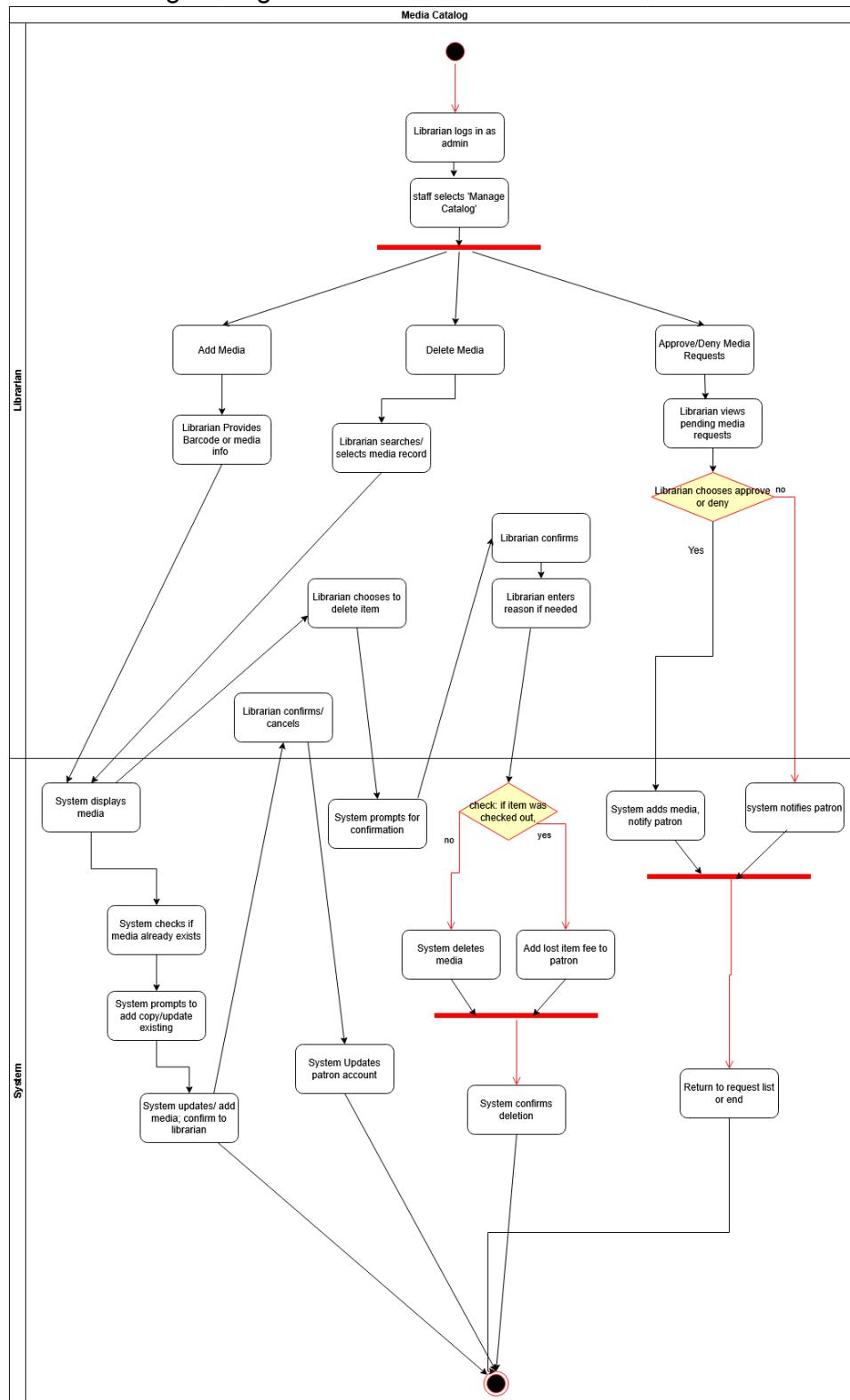


Record payment from outstanding fees





Media Catalog Management



6.0 Restrictions, Limitations, and Constraints

Method of fee payment, method of simulating barcode scanner, and method of simulating scale are all constraints on the design and implementation.

6.1 Technical Constraints

1. Hardware Dependency:

The system depends on library computers equipped with barcode scanners for check-in and check-out operations. Limited hardware availability may restrict simultaneous workstation use.

2. Database Scalability:

The current database configuration is optimized for small to medium library environments and cannot accommodate large-scale, multi-branch integrations without migration to a distributed or cloud-based database.

3. Network Connectivity:

System performance depends on stable local network connectivity. Interruptions or slow connections can delay catalog access or transaction processing.

4. Browser and Device Compatibility:

The user interface is optimized for desktop browsers. Mobile responsiveness is limited and will require redesign in future iterations.

6.2 Operational Constraints

1. Barcode Simulation and Hardware Integration:

The use of simulated barcode scanners during testing may not fully replicate real scanning hardware behavior, potentially affecting reliability and input accuracy.

2. Fee Payment Method Limitation:

Fee payments are currently processed manually at the library desk. Online or automated payment processing is not yet supported.

3. Library Operating Hours:

Administrative operations such as check-in, check-out, and account updates are only available during staffed library hours, even though catalog browsing may be available 24/7.

6.3 Design and Implementation Limitations

1. Scalability:

The system is designed for a limited number of users and concurrent sessions. Handling a large number of patrons or media records may reduce system performance.

2. Security and Data Privacy:

User passwords and PINs are stored in an encrypted format, but no multi-factor authentication or end-to-end encryption is implemented in the current version.

3. Maintenance and Upgrades:

All maintenance and software updates must be performed manually by administrators with local server access. Automatic update deployment is not supported.

6.4 Environmental Constraints

1. Development Environment:

The system is designed and tested in a controlled environment using standard desktop hardware and web technologies. Deployment on other environments may require configuration adjustments.

2. Resource Availability:

Limited technical staff and funding may delay implementation of new features or bug fixes.

8.0 Appendices

Presents information that supplements the Requirements Specification

8.1 System traceability matrix

A matrix that traces stated software requirements back to the system specification.

| Business Requirement ID/Use Case | Business Requirement Description | Functional Requirement ID/Use Case | Functional Requirement Description | Priority |
|----------------------------------|------------------------------------------------------|------------------------------------|----------------------------------------------------------|----------|
| BR-1 | Browse and search media catalog | FR-1 | Patrons can browse and search the media catalog | High |
| BR-2 | Librarians can add, edit, or remove media items. | FR-2 | Librarians can add, edit, or remove media items | High |
| BR-3 | System tracks available copies for each media item. | FR-3 | System tracks number of available copies per media | High |
| BR-4 | Patrons can place hold requests. | FR-4 | Patrons can place hold requests on unavailable media | Medium |
| BR-5 | Librarians can check items in and out. | FR-5 | Librarians can check out and check in items | High |
| BR-6 | System displays user account details and history. | FR-6 | Patrons can view account info, borrowed items, and holds | Medium |
| BR-7 | Notifications sent when held items become available. | FR-7 | Patrons receive notifications when holds are available | Medium |
| BR-8 | Authentication required for admin access. | FR-8 | Admin must log in using secure credentials | High |
| BR-9 | The system maintains logs of all transactions. | FR-9 | System maintains logs of all checkouts and updates | Medium |
| BR-10 | Catalog and user data backed up daily. | FR-10 | System performs daily data backup | Low |