

Columbus Metropolitan Library Catalog Software

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System Implementation

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Problem Statement:

The purpose of the library management system is to alleviate many of the problems librarians and patrons can experience. The library management system should be capable of allowing patrons to see the available media catalog, reserve media and add themselves to a waitlist if something is already checked out. Librarians should also be able to update the catalog easily, including adding new media, editing existing media, and removing media entirely. In order to check something out or reserve, a patron must have a valid library membership, which they can sign up for in the app.

Glossary of Terms:

- **Media**
 - *Refers to any books, DVD's, CD's, magazines that are present in the library's system*
- **Catalog**
 - *Refers to the collection of all available media at the library*
- **Patron**
 - *Anyone not employed by the library that accesses the software*
- **Reserve**

- *Patrons can reserve media to be picked up*

- **Waitlist**

- *A list containing all patrons who have requested to reserve a specific piece of media (Chronological Order)*

System Requirements

No.	Priority Weight	Description
REQ-1	HIGH	Library catalog should be able to support up to 20,000 entries; the average collection size of a library
REQ-2	HIGH	Patrons can reserve media
REQ-3	HIGH	Library staff can add new media
REQ-4	HIGH	Staff can remove media
REQ-5	HIGH	Staff can edit existing media
REQ-6	HIGH	Patrons can add themselves to waitlists
REQ-7	MEDIUM	Patrons can create a new membership
REQ-8	LOW	media listings contain photos if available
REQ-9	MEDIUM	Search queries can be filtered
REQ-10	HIGH	Sign-In page can differentiate from employee and patron

REQ-11	HIGH	Media catalog is searchable by name
REQ-12	MEDIUM	Layout of site is intuitive and easy to use
REQ-13	HIGH	Search and update functions are handled for errors
REQ-14	MEDIUM	Database is flexible and scalable, in case of additional library branches being added, or an increase in the size of the catalog
	UI REQUIREMENTS	
REQ-15	HIGH	Log-in page that works for both employees and patrons
REQ-16	HIGH	Search-bar on homepage
REQ-17	HIGH	Search results page
REQ-18	HIGH	Edit/add/remove media page for employees

REQ-15:**Columbus Metropolitan Library**

Log-In

email

password

Submit

REQ-16:

Search...

☒ All Media

☐ Books

☐ CD's

☐ DVD's

REQ-17:

Search...

Media Title Author	ISBN Available? Y/N <div>Reserve</div>
Media Title Author	ISBN Available? Y/N <div>Reserve</div>
Media Title Author	ISBN Available? Y/N <div>Reserve</div>
Media Title Author	ISBN Available? Y/N <div>Reserve</div>
Media Title Author	ISBN Available? Y/N <div>Reserve</div>

REQ-18

Add Media

Media Title	Author
ISBN	Date Published
Media Type ▼ Book DVD CD	Quantity
Submit	Description...

Plan of Work

So far I have set up my development environment on both my desktop and laptop so that I may continue my work from wherever. This included setting up a github repository and getting mySQL servers running on both machines and downloading VSCode to use as a code editor. Next I ran some basic tests to make sure everything was working properly.

This week I have set up a skeleton database to get the basic structure in place. Next week I will further refine the DB and attempt to implement a basic catalog view to ensure the DB was created correctly.

Stakeholders

- Patrons
- Librarians
- Library Manager
- Library Director
- Local Donors/Sponsors
- Local Government

Actors & Goals

Primary Actors:

- Patrons: Can use their library membership to reserve, waitlist, and check out media included in the library's catalog
- Library Manager/Librarians: Can add new media to the catalog, and remove or edit existing media

Secondary Actors:

- System Admin: Can make changes to database of members in case of any errors, as well as directly edit catalog if needed
- System: Keeps track to available media, waitlists, and employee/patron account information

Use Cases

Patron:

- View catalog: browse and search the library's catalog (6)
- Reserve media: Reserve available media for check-out (4)
- Waitlist media: Add patron to waitlist for unavailable media (2)
- Login: Use unique credentials to verify membership (2)

Library Employee (Librarian, Library Manager):

- View catalog: browse and search the library's catalog (6)
- Login: Use employee ID to execute employee only commands (2)
- Edit Catalog: Add/Remove/Edit the library's catalog of media (4)
- Return Media: Mark media as being returned and available in catalog (4)

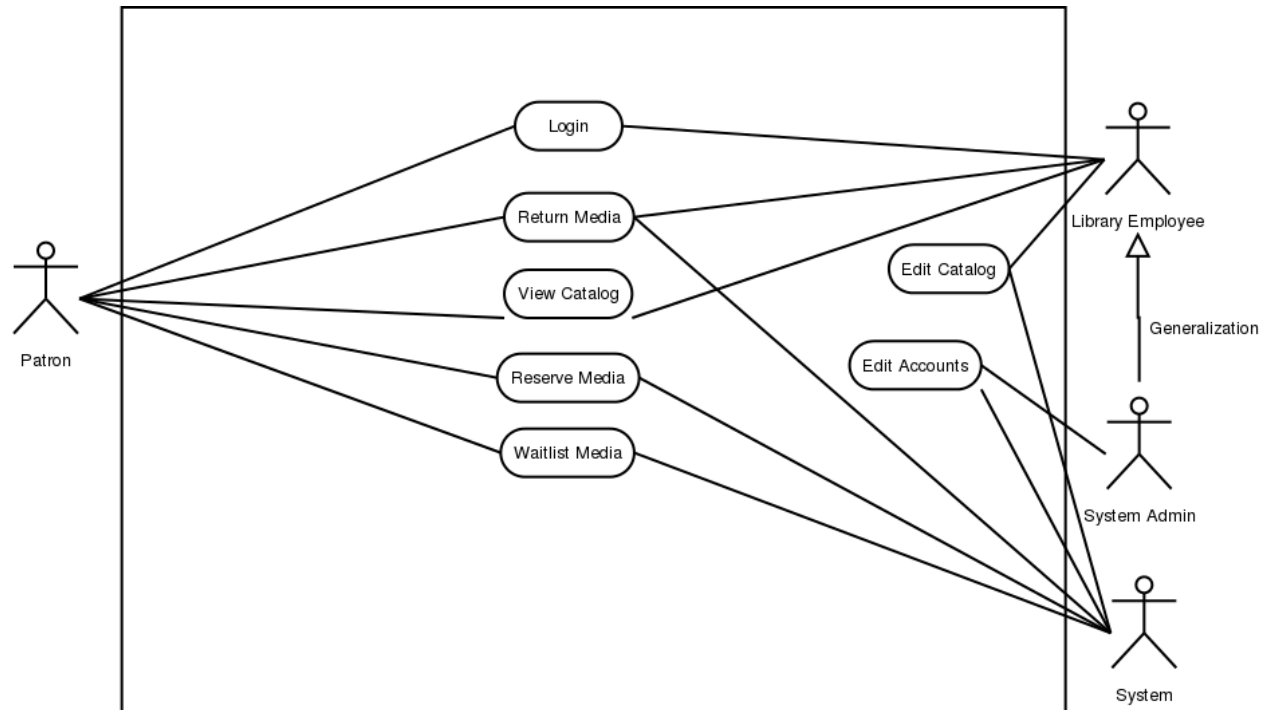
System Admin:

- Edit Accounts: Make changes to user and employee accounts (2)

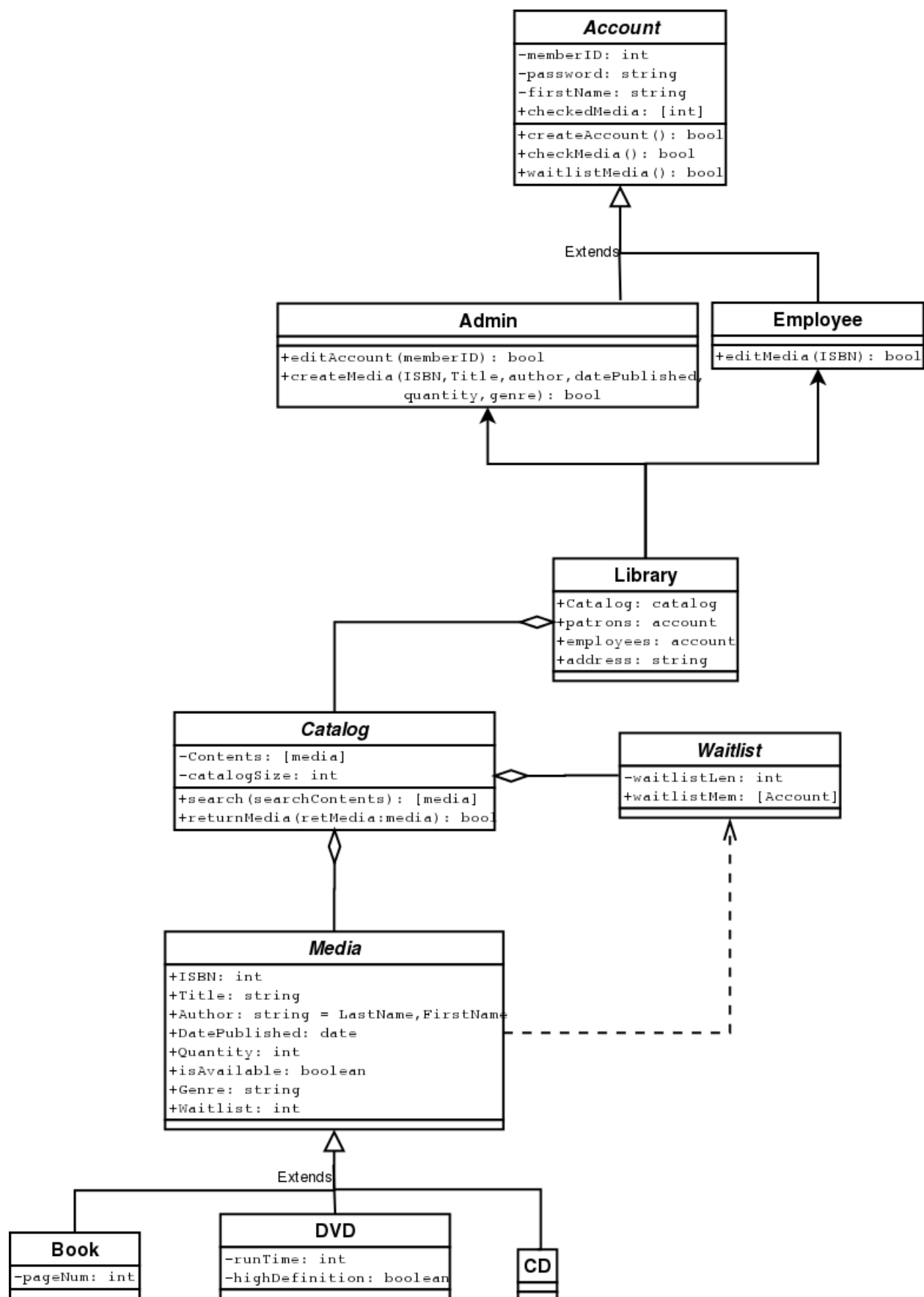
System:

- Show available: Track media quantities to show what is available (2)
- Waitlist Media: Track waitlists and which patrons are on them (2)
- Reserve Media: Track which media specific patrons have reserved (4)

Use Case Diagram



Class Diagram

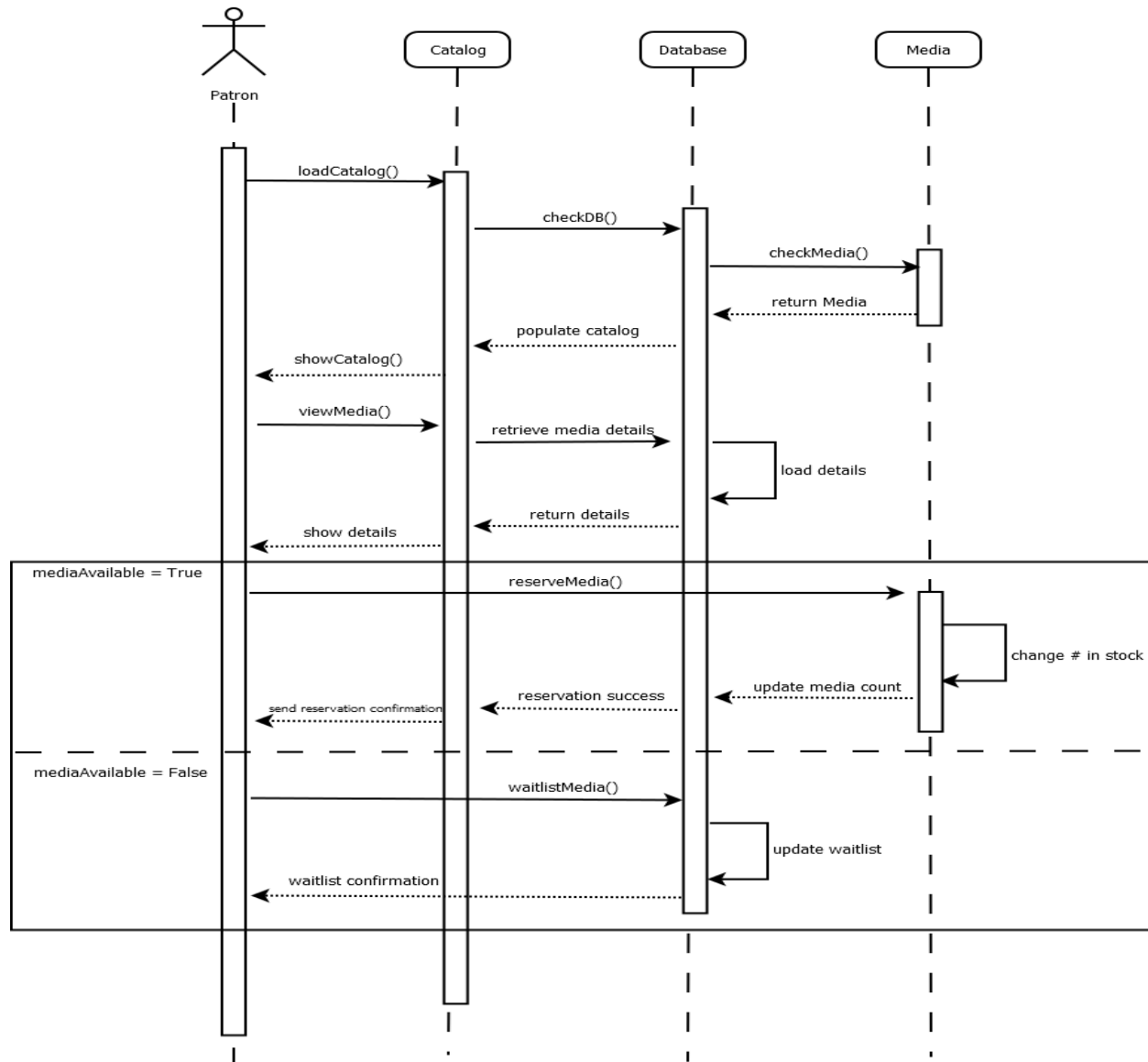


Sequence Diagrams

Reserve & Waitlist Media

Actor: Patron

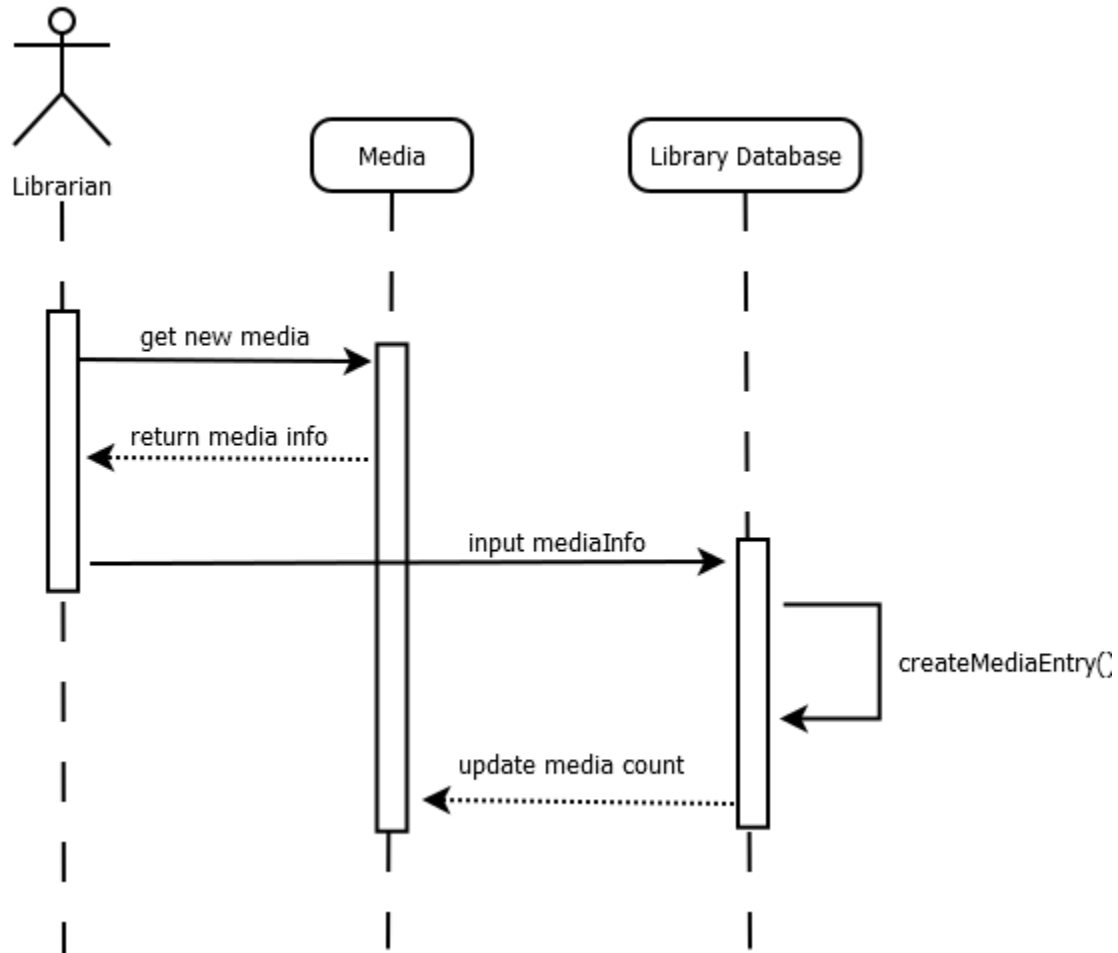
Objects: Catalog, Database, Media



Add new Media to catalog

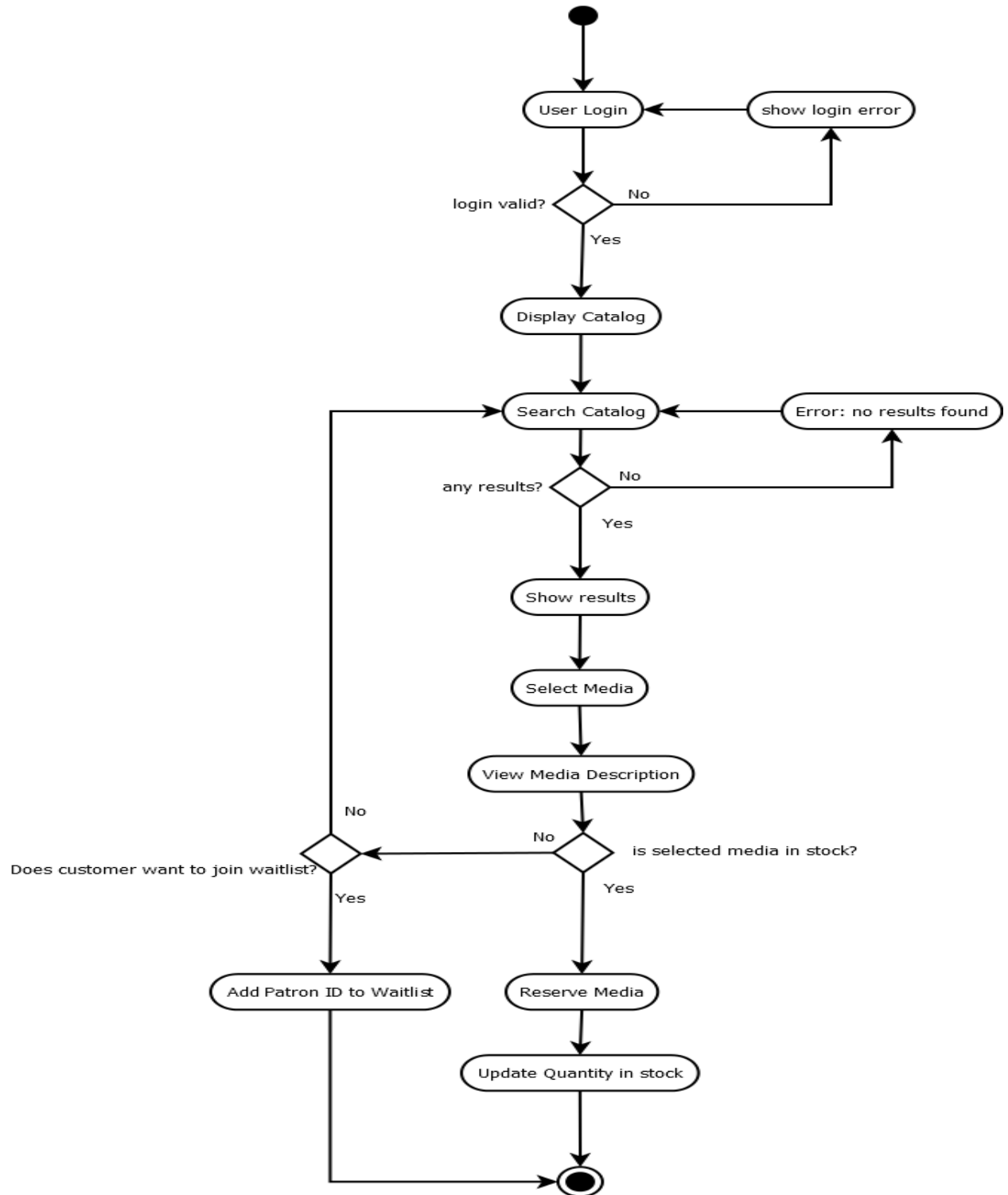
Actor: Librarian

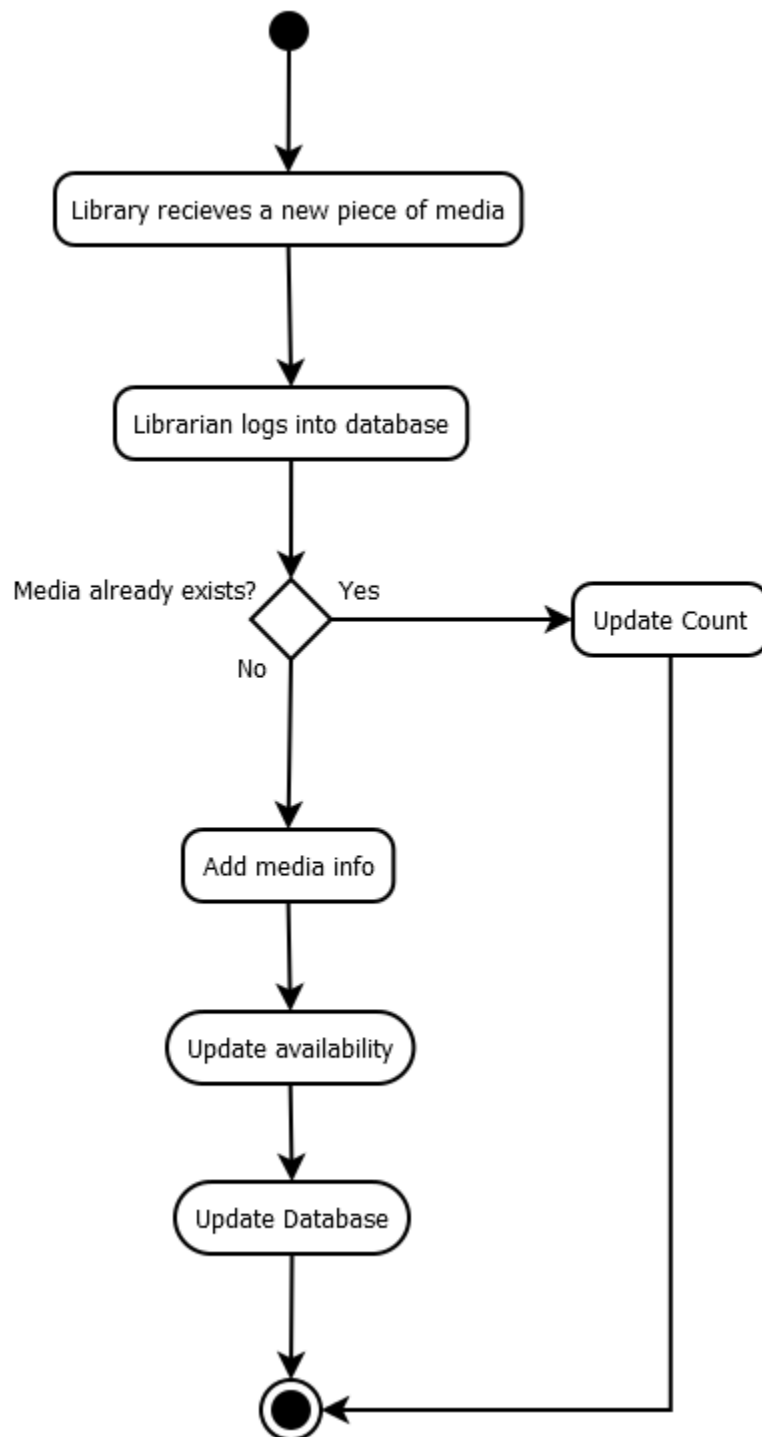
Objects: Media, Library Database



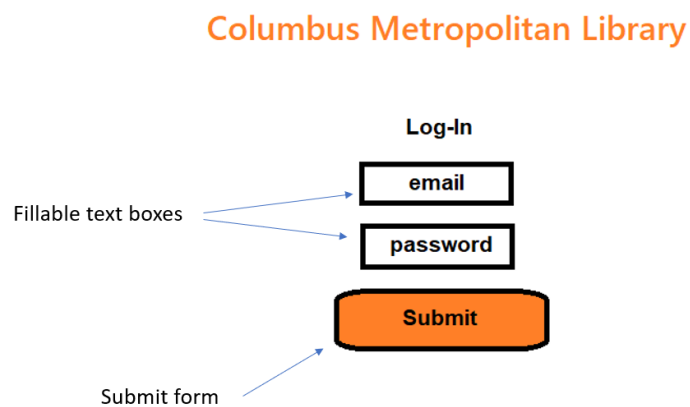
Activity Diagrams

Reserve or Waitlist Media



Update Media Entry

Log-in page:

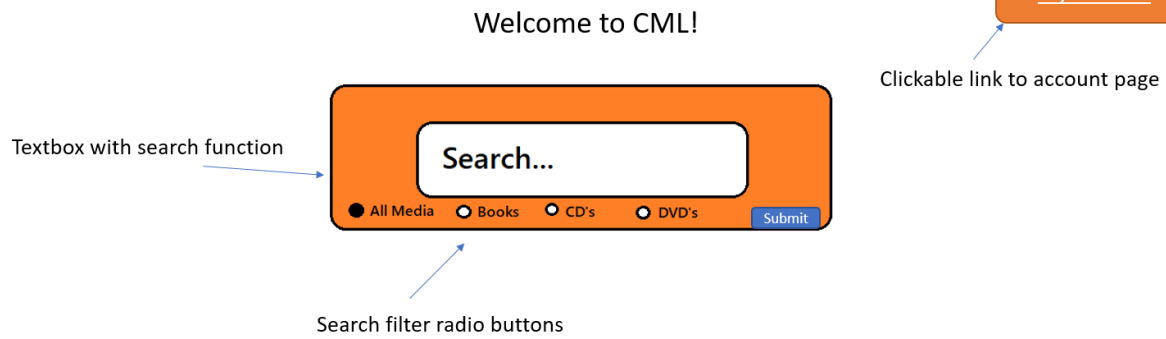


On log-in failure



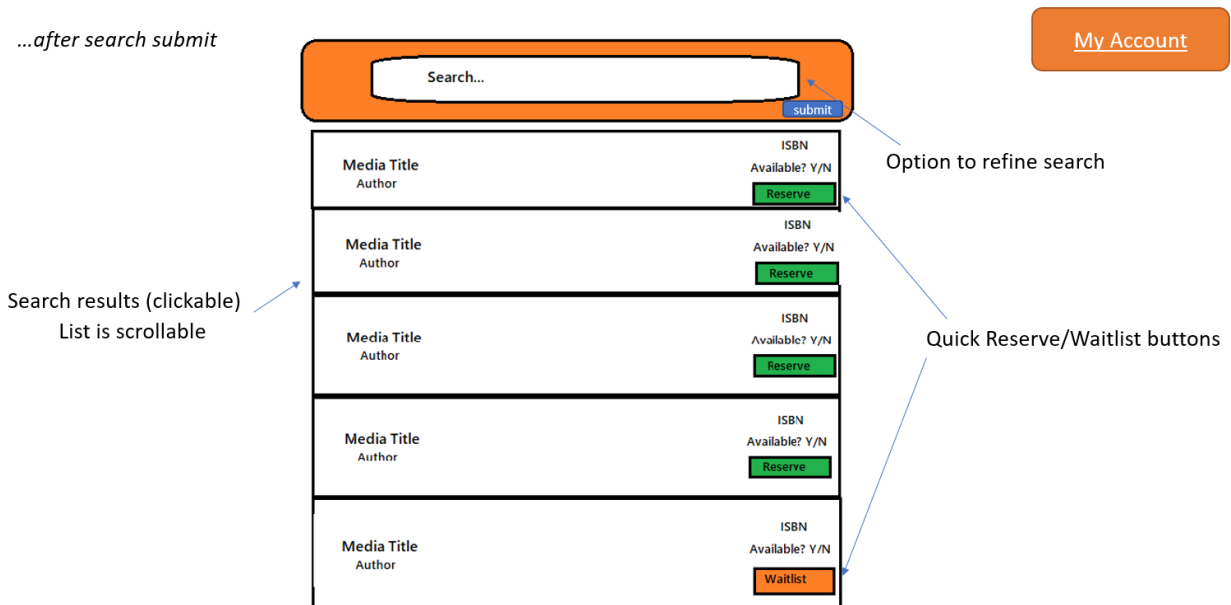
Homepage

...after login success



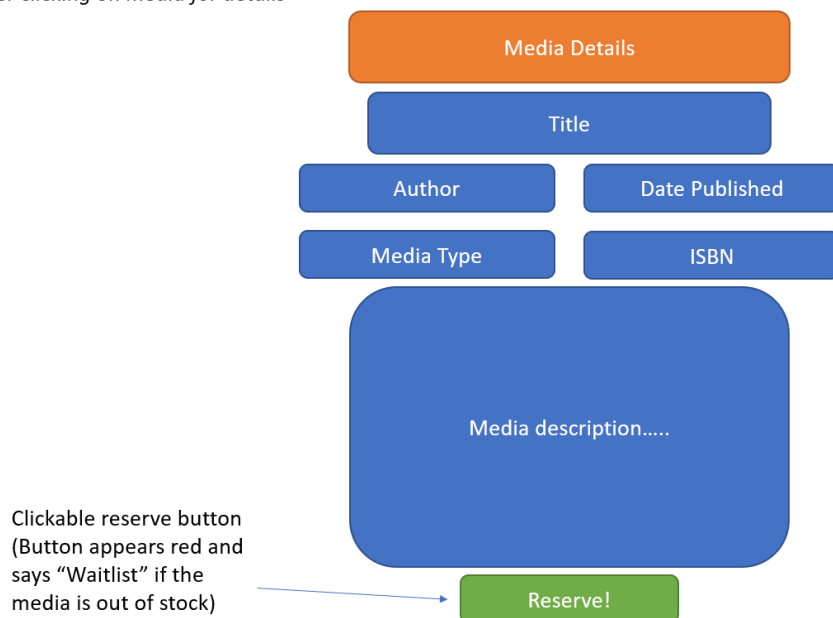
Search Results

...after search submit



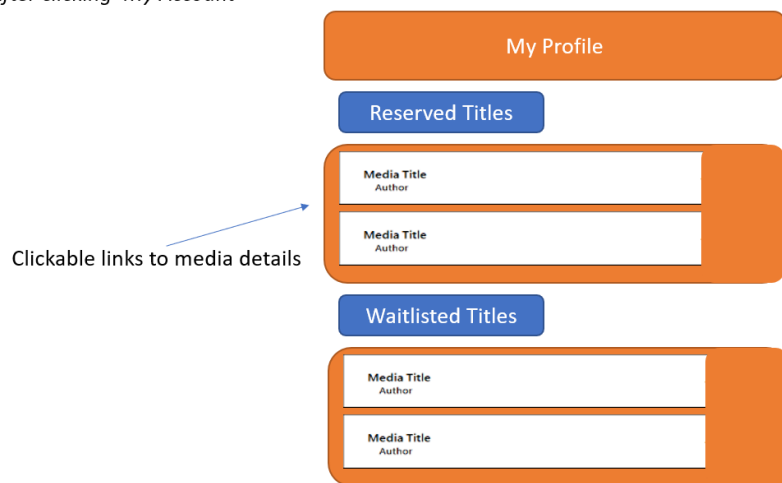
Media Details

...After clicking on media for details



Profile Page

...After clicking 'My Account'



Traceability Matrix

System Requirements

No.	Priority Weight	Description
REQ1	4	Login/Log-out for librarians and patrons
REQ2	3	Improve look and feel of program
REQ3	4	Expand database to store employee info and new media types
REQ4	5	Filtered sort for catalog
REQ5	2	Add search functionality to main catalog page
REQ6	5	Waitlist, Reserve system for patrons

Use Cases

No.	Description
UC1	Librarians can quickly locate which catalog entry needs to be updated/removed
UC2	Patrons are able to search for available media
UC3	Librarians and patrons can sign in with their unique credentials
UC4	Patrons can waitlist and reserve media
UC5	Patrons can view which media they have reserved or waitlisted
UC6	Librarians can edit and view waitlists

Tracability matrix

Req't	PW	UC1	UC2	UC3	UC4	UC5	UC6
REQ1	4			X			
REQ2	3	X					
REQ3	4		X				
REQ4	5	X	X				
REQ5	2	X	X				
REQ6	5				X	X	X

User Interface Design and Implementation

Changes to Design

Aside from changes to the color scheme of the website, there have only been a few adjustments made to the original UI specifications. The most major difference between the initial UI specification and what is currently implemented is the layout of the Media Details screen. I have opted for a much more simple and less cluttered appearance of this page, and combined it with the edit media page, so that there is more consistency.

Screenshots

CML Catalog

Catalog ViewAdd

ISBN	Media title	Media Author	Genre	Available?	
2739850123	Freakonomics	Steven D. Levitt	Fiction	NO	EditDelete
2830592344	Sapiens	Yuval Noah Harari	Nonfiction	YES	EditDelete
3738593012	1984	George stankwell	Nonfiction	YES	EditDelete
3784922913	The Da Vinci Code	Dan Brown	Fiction	YES	EditDelete
3859301029	The Hunger Games	Suzanne Collins	Fiction	YES	EditDelete
5823092221	Fahrenheit 451	Ray Bradbury	Fiction	YES	EditDelete
7582393020	The Alchemist	Paul Coelho	Fiction	YES	EditDelete
8939278138	To Kill a Mockingbird	Harper Lee	Fiction	YES	EditDelete
9018374582	Lord of the Flies	William Golding	Fiction	NO	EditDelete
27398501236930	Freakonomics	Steven D. Levitt	Nonfiction	NO	EditDelete
28305923442813	Sapiens	Yuval Noah Harari	Nonfiction	YES	EditDelete
37385930123829	1984	George Orwell	Fiction	YES	EditDelete
37849229136786	The Da Vinci Code	Dan Brown	Fiction	YES	EditDelete
27398501236930	Freakonomics	Steven D. Levitt	Nonfiction	NO	EditDelete

Edit Media Entry

Edit Book

ISBN

2739850123

Author

Steven D. Levitt

Quantity

0

Published Year

2005

Title

Freakonomics

Genre

Fiction

Description

blah blah blah word count word count

Add Media

Design of Tests

Test Cases:

- Employee Login
 - Wrong credentials
 - Correct credentials
- Search for media
 - Media doesn't exist
 - Successful search
 - Broad search with multiple results
- Add new media
 - Media already exists error
 - Successful addition to catalog
 - Form validation prevents invalid entry
- Edit media
 - Form validation
 - Successful edit

Test Coverage

Based on what is currently implemented, these tests will cover every main use case. In future versions of the web app, more use cases will be added, such as reserving or waitlisting media, and doing filtered searches of the media database.

Integration Testing Strategy

For testing this web app, the big bang testing strategy will be used. This will be appropriate for this web app because it is a fairly small and self-contained system, so segmented styles of testing will not be necessary.