Emily Weed
System Design
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System Sequence & Activity Diagrams: Library Management System
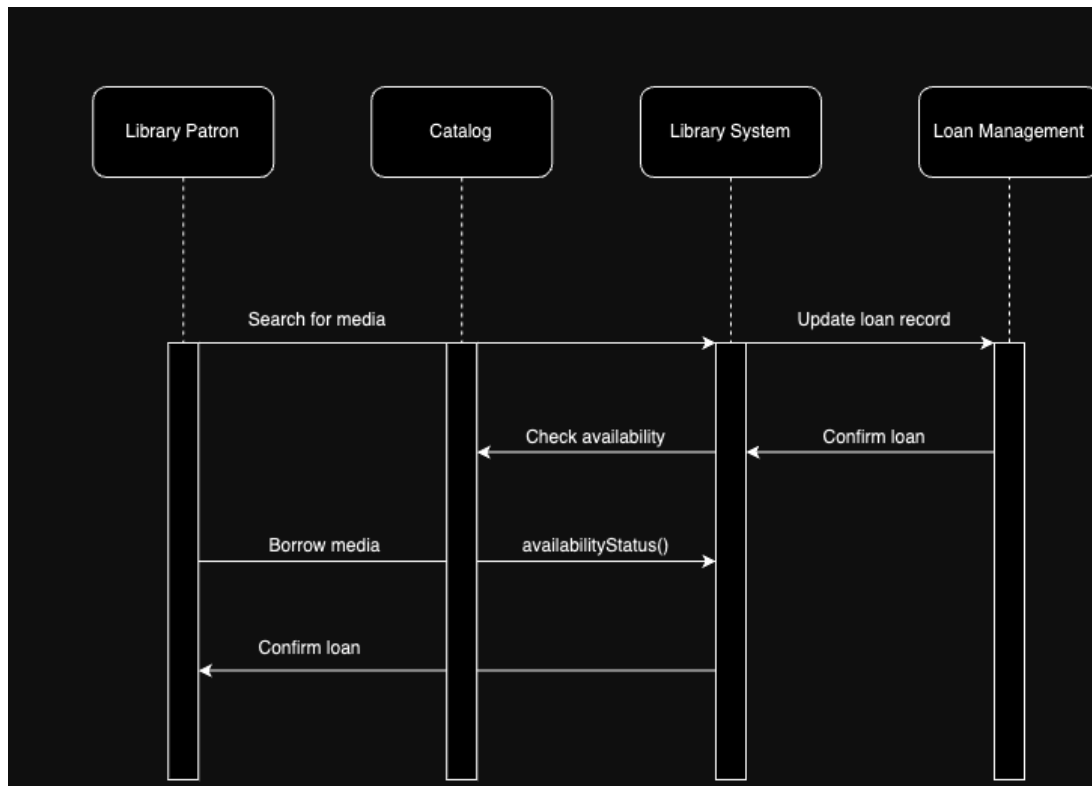
Use Case: Borrow Media

System Sequence

Actor: Library Patron

Objects: Library system, catalog, loan management

Steps:

1. The patron searches for their desired media in the library system.
2. The system checks the catalog to check availability.
3. The catalog returns availability status.
4. If the media is available, the patron requests to borrow the media.
5. The system processes the loan request.
6. The loan management system updates the loan records.
7. The system confirms the loan.

Activity Diagram

Initial: Patron searches for media.

Final: Confirmation that the media is borrowed.

Actions:

1. Patron searches for the media.
2. The system checks the catalog for its availability.
3. If the media is not available, the process ends.
4. If the media is available, the patron requests to borrow it.
5. The system processes the request.
6. Updates to the loan records.
7. Confirmation that the media is borrowed.
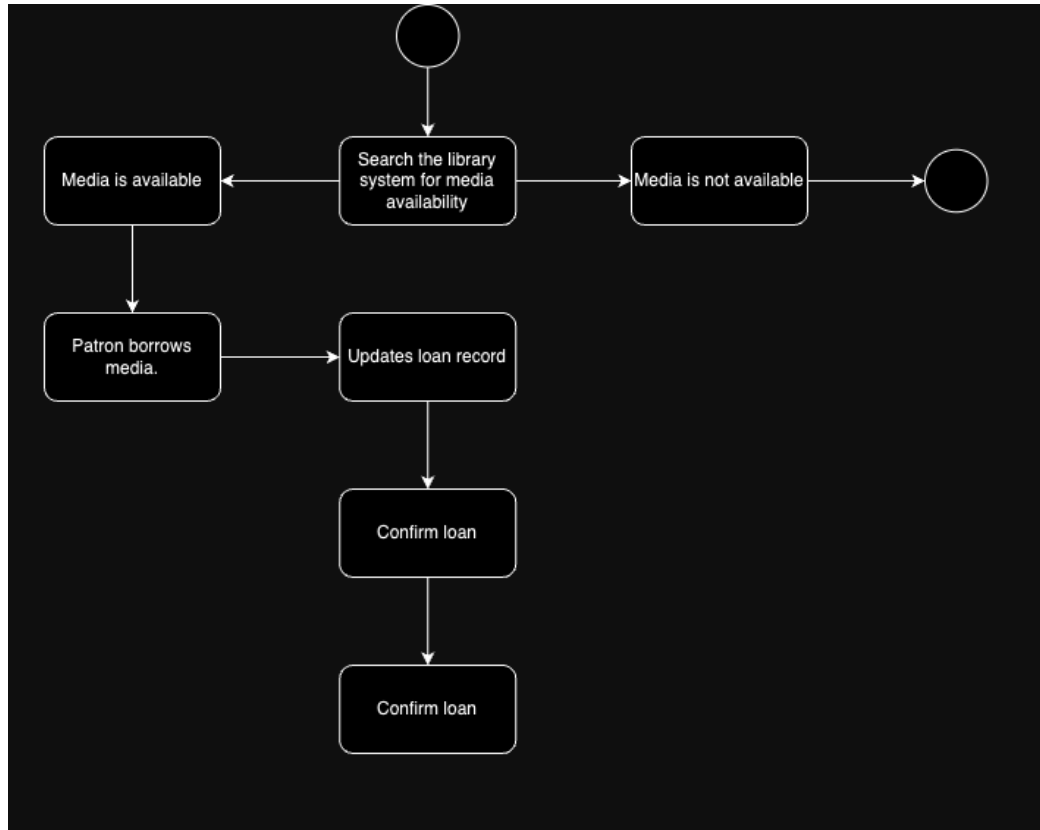
Use Case: Return Media

<u>System Sequence</u>

Actor: Library Patron

Objects: Library system, loan management

Steps:

1. The patron initiates the return process.
2. The system verifies the borrowed media.
3. The loan management system checks if the media is overdue.
4. If it is overdue, the system calculates a fine.
5. The loan management system updates the return status.
6. The catalog updates the media's availability.

7. The system confirms the return.
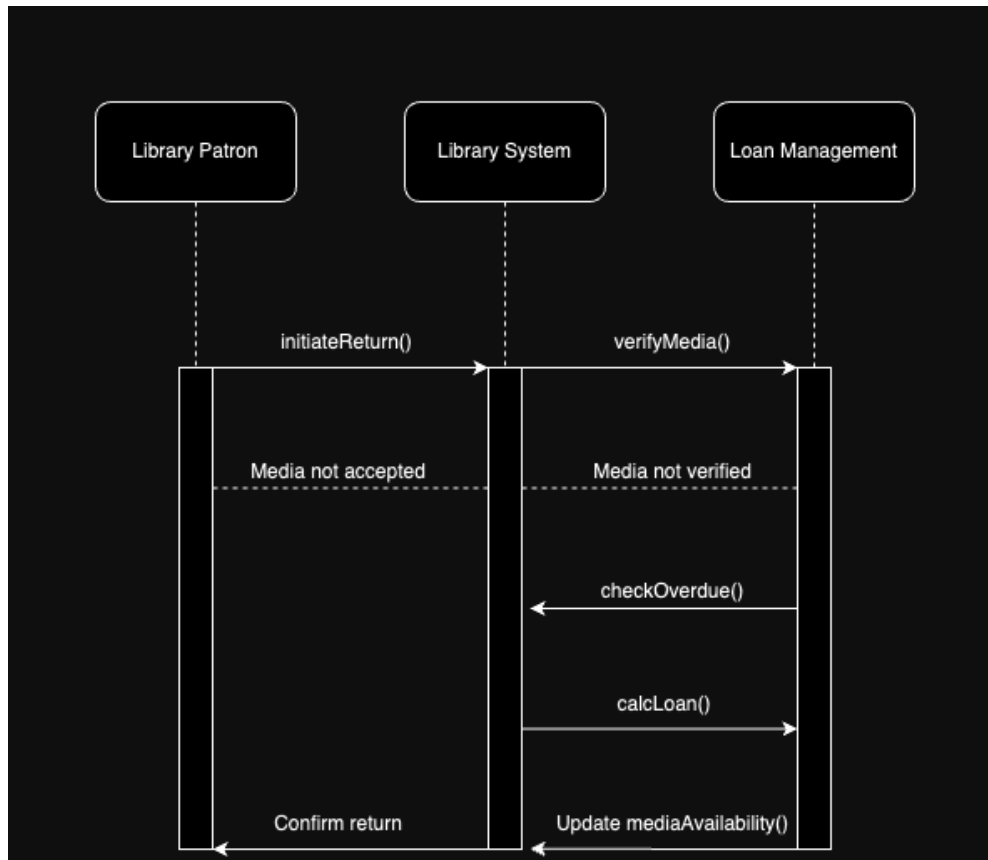
Activity Diagram

Initial: Patron initiates the return process

Final: Media is returned, and catalog is updated

Actions:

1. Patron starts the return process.
2. The system verifies the media details.
3. Check if the media is overdue.
4. If overdue, calculate the fine.
5. Update the loan record.
6. Update the catalog to mark the media as available.
7. Confirm the return to the patron.

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                                    ●

                            ┌──────────────────────┐
                            │ Patron initiates return │
                            └──────────────────────┘
                                        │
                                        ▼
┌──────────────────┐    ┌──────────────────────┐    ┌──────────────────┐    ○
│ Media is in catalog │◄──│ Verify borrowed       │──►│ Media is not in  │──►
└──────────────────┘    │ media is in catalog   │    │ catalog          │
                        └──────────────────────┘    └──────────────────┘
            │
            ▼
┌────────────────┐  Overdue  ┌──────────────────────┐
│ Calculate fine │◄──────────│ Check overdue status  │
└────────────────┘           └──────────────────────┘
            │                           │ Not overdue
            │                           ▼
            │                ┌──────────────────────┐
            └───────────────►│ Update return status  │
                             └──────────────────────┘
                                        │
                                        ▼
                             ┌──────────────────────┐
                             │ Update media          │
                             │ availability          │
                             └──────────────────────┘
                                        │
                                        ▼
                             ┌──────────────────────┐
                             │ Confirm return        │
                             └──────────────────────┘
```