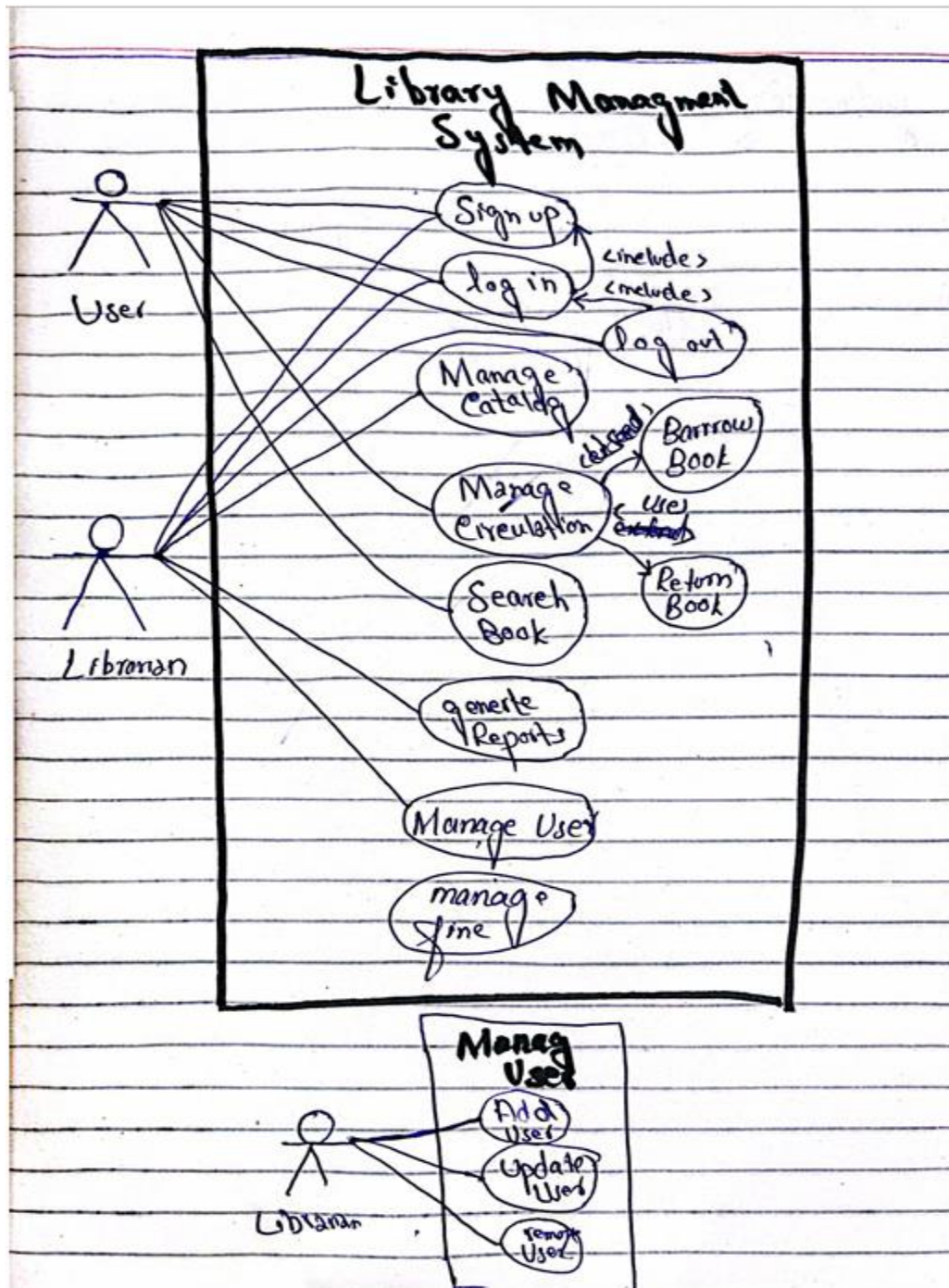# LIBRARAY MANAGEMENT SYSTEM

Muhammad Asim Ilyas

FA22-bse-111

Use Case Diagrame

Use Case: Search Book

1. Use Case Name

Search Book

2. Primary Actor

User (Library patron, bookstore customer, or any individual searching for a book)

3. Stakeholders and Interests

- **User**: Wants to find books efficiently based on specific criteria.
- **System Administrator**: Wants the system to perform searches efficiently without overloading resources.
- **Content Providers**: Want their books to be easily discoverable.

4. Preconditions

- The user has access to the system (logged in if necessary).
- The system is connected to the book database/catalog.
- The book database is up-to-date.

5. Postconditions

- **Success Postcondition**: A list of books matching the search criteria is displayed to the user.
- **Failure Postcondition**: The user is informed that no matching books were found.

6. Main Success Scenario (Basic Flow)

1. **User initiates a book search** by selecting the "Search" option on the system interface.
2. **System displays the search interface**, prompting the user to enter search criteria.
3. **User enters search criteria**, which may include one or more of the following:
   - Title
   - Author
   - ISBN
   - Keywords
   - Genre/Category
   - Publication Date
4. **User submits the search request** by clicking the "Search" button.
5. **System validates the search criteria** to ensure they are in the correct format.
6. **System queries the book database** using the provided criteria.
7. **System retrieves a list of matching books** from the database.
8. **System displays the list of matching books** to the user, including basic information:
   - Book Title
   - Author
   - Thumbnail Image
   - Brief Description
9. **User selects a book** from the list to view detailed information.
10. **System displays detailed information** about the selected book:
    - Full Description
    - Availability Status
    - User Reviews (if applicable)
    - Option to reserve or purchase the book

7. Extensions (Alternative Flows)

3a. User Enters Invalid Search Criteria

- **3a1.** System detects invalid or improperly formatted search input.
- **3a2.** System prompts the user to correct the search criteria, displaying an error message indicating the issue.
- **3a3.** User corrects the input and resubmits the search request.

6a. System Experiences Database Error

- **6a1.** System fails to connect to the book database.

- **6a2.** System displays an error message to the user explaining that the search cannot be completed at this time.
- **6a3.** System logs the error and notifies the system administrator.
- **6a4.** User may choose to retry the search at a later time.

7a. No Matching Books Found

- **7a1.** System finds no books matching the search criteria.
- **7a2.** System informs the user that no results were found.
- **7a3.** System suggests alternative actions:
    - Modify search criteria
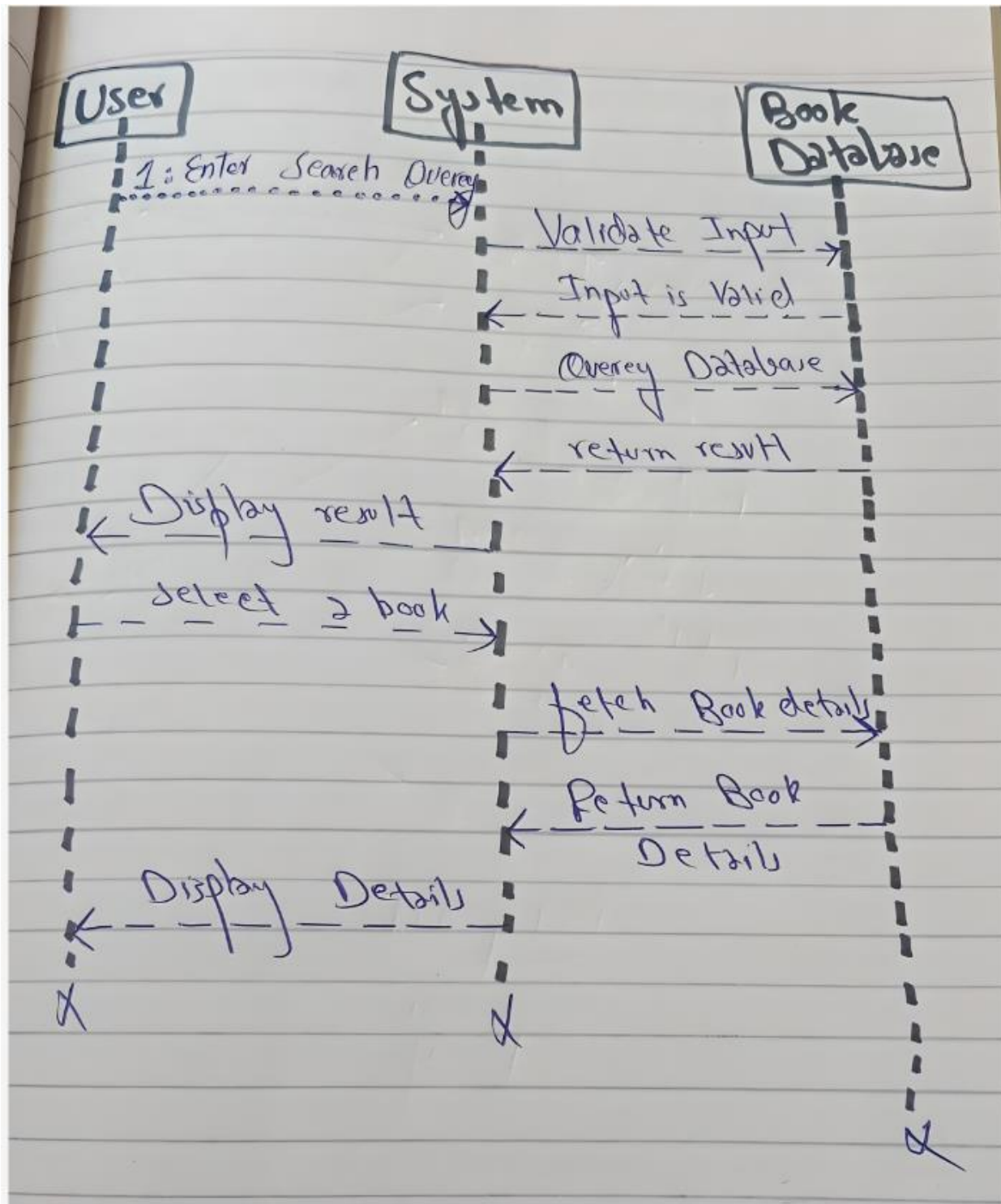   - Browse popular books
    - Contact support for assistance

9a. User Does Not Select a Book

- **9a1.** User decides not to select any book from the results.
- **9a2.** User returns to the search interface to:
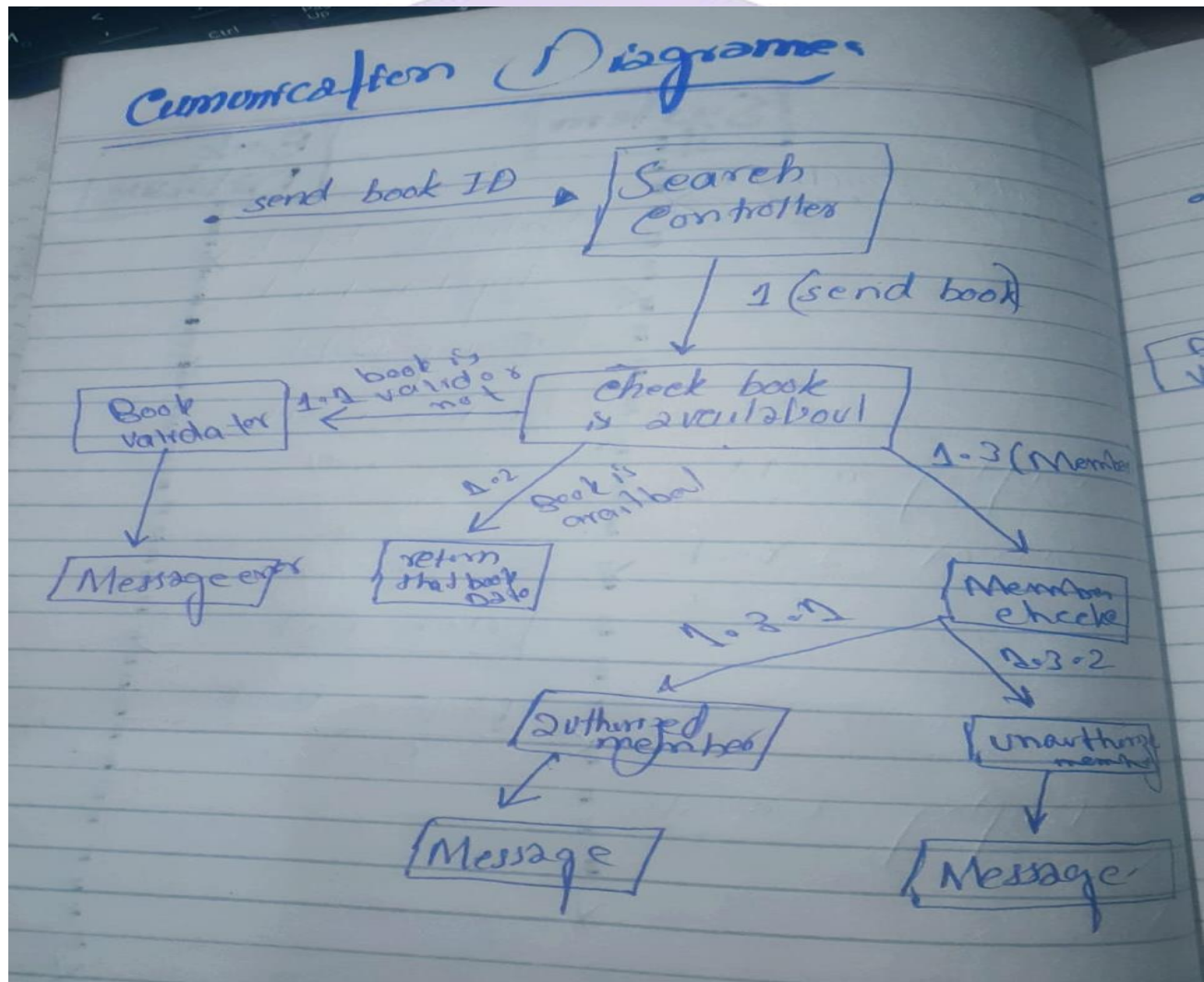   - Perform a new search
    - Exit the search function

8. Special Requirements

- **Performance**: The system should return search results within **2 seconds** under normal load conditions.
- **Usability**:
    - Search interface should be intuitive and user-friendly.
    - Support for autocomplete and spell-check suggestions when entering search criteria.
- **Scalability**: Ability to handle a large number of concurrent search requests without degradation in performance.
- **Accessibility**: Compliant with accessibility standards (e.g., WCAG 2.1) to support users with disabilities.
- **Internationalization**: Support for multiple languages and character sets in search queries and results.
- **Security**:
    - Protect user data during the search process.
    - Prevent SQL injection and other types of attacks through input validation.
- **Advanced Search Features**:
    - Filters for price range, publication date, ratings, etc.
    - Option to sort results by relevance, popularity, or newest arrivals.

Sequence diagrame:

Cumunication Diagrame:

Class diagrame: