

Project Analysis & Requirements Document

SE 342 01 SOFTWARE VALIDATION AND TESTING

Midterm Project Name: Library Borrowing and Reservation System

Date: November 24, 2025

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1. Introduction

The purpose of this document is to define the functional and non-functional requirements for the "Library Borrowing and Reservation System." These requirements aim to guide the design, development, and validation stages.

A. Analysis & Requirements

2. Functional Requirements

The system must support specific behaviors and functions for the identified actors.

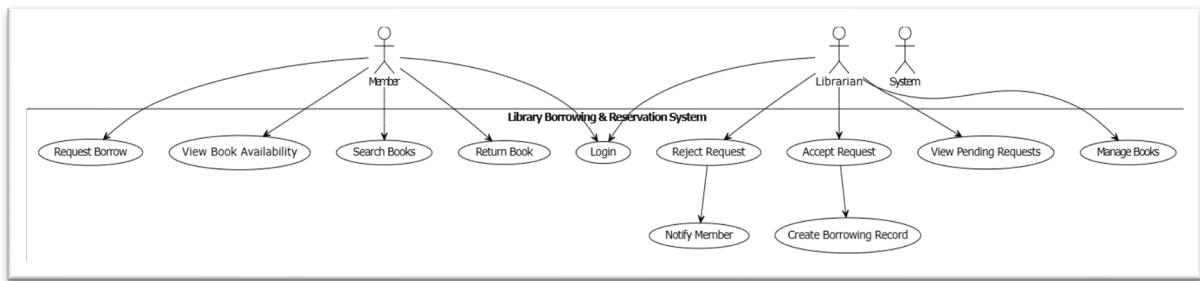
| Item Type | Item Name | Description |
|------------|--|---|
| Epic | Authentication & Security | Covers all processes related to secure login, authorization, and role-based access control. |
| User Story | Login Page | Interface development to allow Library Members and Librarians to log in securely. |
| Sub-task | Design Login with Figma | Creating the UI/UX design of the login screen using Figma tools. |
| Sub-task | Implement Input Validation | Validating user credentials (e.g., email format, empty fields) on both frontend and backend. |
| User Story | Role Based Access Control | Implementation of logic to restrict system access based on user roles (Librarian vs. Member). |
| Sub-task | Define Librarian vs Member Permissions | Documenting specific access rights and menu visibility for each user role. |
| Sub-task | Create User Roles Table in Database | Creating the necessary database tables to store user roles and permissions. |
| Epic | Book Catalog | Development of modules for searching, filtering, and viewing book details/availability. |

| Item Type | Item Name | Description |
|------------|---|--|
| User Story | Book Search Module | Functionality allowing members to search for books by title, author, or category. |
| Sub-task | Design Search Box and Filters | UI design for the search bar and category filtering options. |
| Sub-task | Write SQL Queries for Title/Author Search | Writing optimized SQL queries to retrieve books based on search keywords. |
| User Story | Availability Display | Feature to display the current real-time stock status of books (Available/Borrowed). |
| Sub-task | Backend for Stock Checking | Backend logic to check the database for the current count of available book copies. |
| Sub-task | Add Borrow or Not Indicators to UI | Visual UI indicators (e.g., Green/Red labels) showing if a book can be borrowed. |
| Epic | Borrowing and Reservations | Management of the core borrowing workflow, including requests and approvals. |
| User Story | Borrow Request Functionality | Logic allowing a logged-in member to request to borrow a specific book. |
| Sub-task | Create "Borrow Request" Button Action | Frontend and backend logic triggered when the user clicks "Borrow". |
| Sub-task | Prevent Double Borrowing Logic (Validation) | System check to ensure a user cannot borrow the same copy of a book twice. |
| User Story | Librarian Dashboard | Administrative interface for librarians to view and manage pending requests. |
| Sub-task | Design List View for Pending Requests | UI design for the table listing all pending borrow/reservation requests. |
| Sub-task | Develop "Accept/Reject" Buttons | Implementation of button functionality to approve or deny requests. |
| Epic | Epic 4: System Architecture | Technical foundation work, including system modeling and database schema creation. |
| User Story | System Diagrams Creation | Creation of UML diagrams to visualize system actors and workflows. |
| Sub-task | Draw Use Case Diagram | Visualizing the interactions between Actors (Member, Librarian) and System cases. |
| Sub-task | Draw Sequence Diagram for Borrowing Flow | Creating a diagram showing the timeline of messages during the borrowing process. |
| User Story | Database Setup | Establishment of the database structure and initial data seeding. |
| Sub-task | Prepare schema.sql File | Writing the SQL script to create all necessary tables and relationships. |
| Sub-task | Generate Dummy Data | Inserting sample data (books, users) into the database for testing purposes. |
| | | |

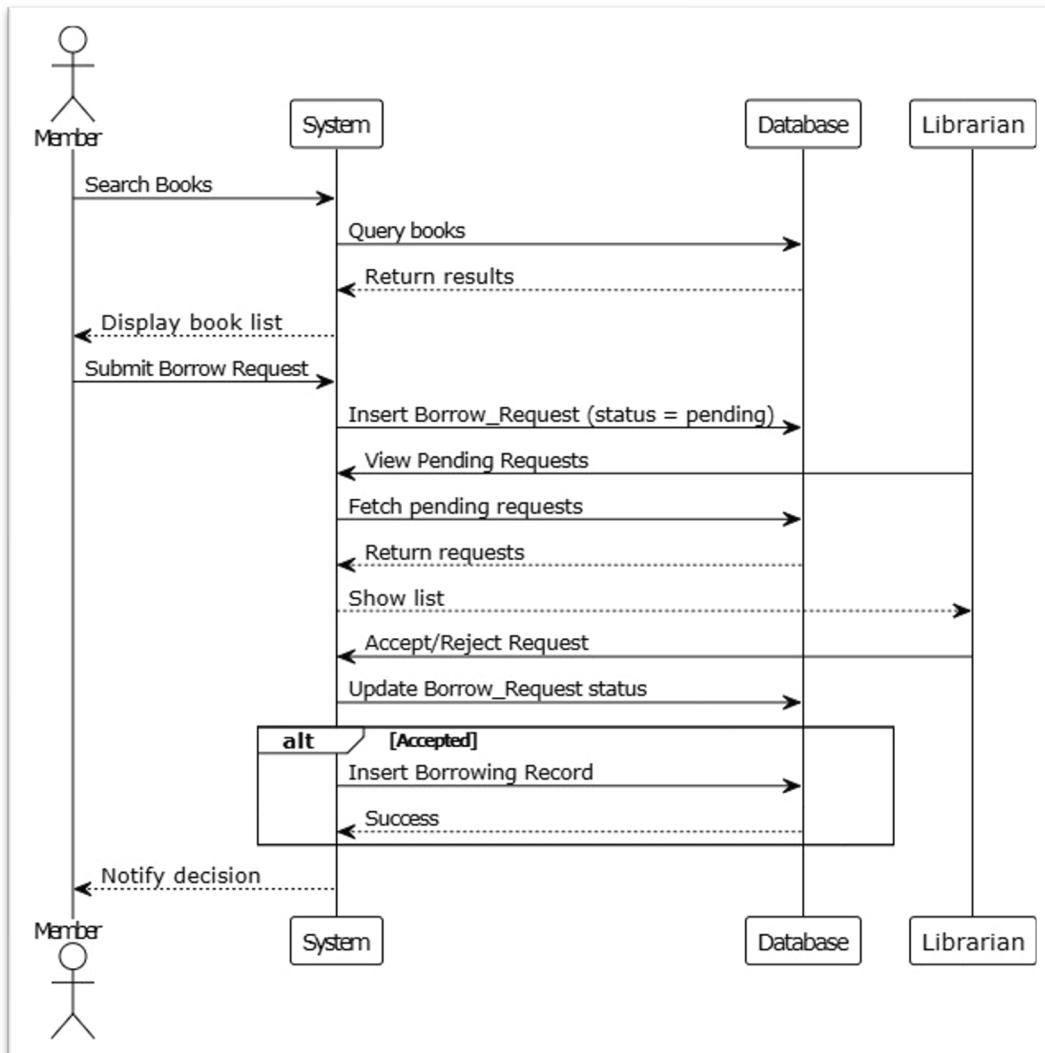
| Requirement Type | Requirement Name | Description |
|-------------------------|-------------------------|--|
| Functional | Book Search | Member can search books by title, author, or category. |
| Functional | Reservation System | Member can reserve a book if it is currently unavailable. |
| Functional | Borrowing Logic | Member can borrow available books via the system interface. |
| Functional | Validation Rule | System prevents double borrowing of the same copy by the same user. |
| Functional | Approval Workflow | Librarian can approve or reject borrowing and reservation requests. |
| Functional | Stock Automation | System updates book availability status automatically after approval. |
| Functional | History Tracking | Member can view a list of their current and past borrowings. |
| Functional | Due Date Calculation | System calculates return due dates automatically upon approval. |
| Non-Functional | Performance | System response time must be less than 3 seconds for queries. |
| Non-Functional | Security | Secure login and authorization must be enforced for all users. |
| Non-Functional | Compatibility | System must be cross-browser compatible (Chrome, Firefox, Edge). |
| Non-Functional | Usability | Interface must be user-friendly and intuitive for non-technical users. |
| Non-Functional | Data Integrity | Data consistency must be ensured across all database transactions. |

B. System Diagrams

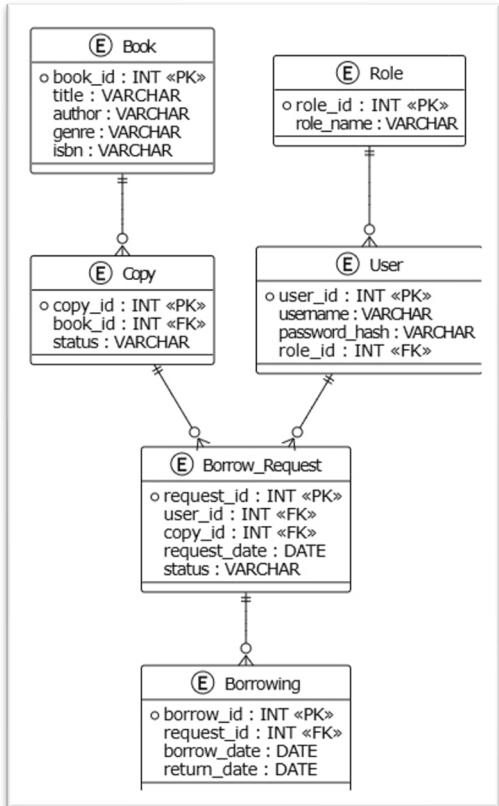
1. USE CASE DIAGRAM



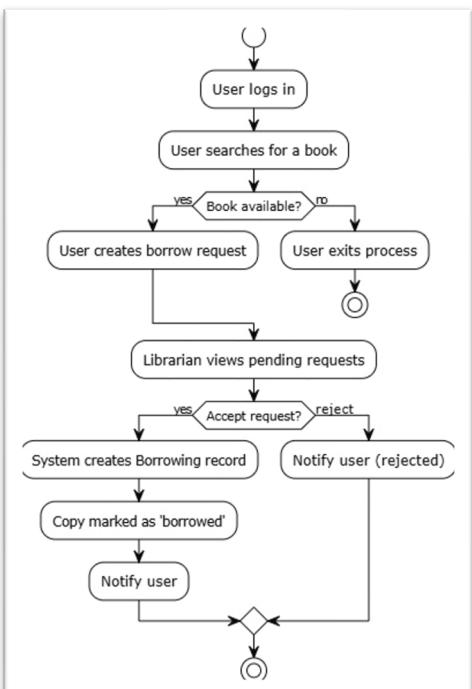
2. SEQUENCE DIAGRAM



3.ERD DIAGRAM



4.Activity Diagram



C. JIRA Project Management

Spaces

Library Borrowing and Reservation System ...

Summary Timeline Backlog **Board** Calendar List Forms Goals All work > Development

Search board Filter

| TO DO | IN PROGRESS | DONE |
|---|--|--|
| Borrow Request Functionality BORROWING AND RESERVATIONS Dec 5, 2025 LBRS-17 | Book Search Module BOOK CATALOG Nov 27, 2025 LBRS-11 | Login Page AUTHENTICATION & SECURITY Nov 24, 2025 LBRS-3 |
| Librarian Dashboard BORROWING AND RESERVATIONS Dec 6, 2025 LBRS-20 | Availability Display BOOK CATALOG Nov 28, 2025 LBRS-12 | Role Based Access Control AUTHENTICATION & SECURITY LBRS-8 |
| System Diagrams Creation SYSTEM ARCHITECTURE Dec 10, 2025 LBRS-25 | | |
| Database Setup SYSTEM ARCHITECTURE Dec 10, 2025 LBRS-24 | | |

Spaces

Library Borrowing and Reservation System ...

Summary Timeline **Backlog** Board Calendar List Forms Goals All work > Development > Code > Security > Releases More +

Search backlog Filter

LBRS Sprint 1 24 Nov – 8 Dec (8 work items)

| Work Item | Status | Due Date | Assignee |
|--------------------------------------|-------------|----------|----------|
| LBRS-3 Login Page | DONE | Nov 24 | |
| LBRS-8 Role Based Access Control | DONE | | |
| LBRS-11 Book Search Module | IN PROGRESS | Nov 27 | |
| LBRS-12 Availability Display | IN PROGRESS | Nov 28 | |
| LBRS-17 Borrow Request Functionality | TO DO | Dec 5 | |
| LBRS-20 Librarian Dashboard | TO DO | Dec 6 | |
| LBRS-25 System Diagrams Creation | TO DO | Dec 10 | |
| LBRS-24 Database Setup | TO DO | Dec 10 | |

+ Create

Search by title, author, or category...

All

Science

History

Fiction

Technology

Found 8 books



Introduction to Quantum Mechanics

David J. Griffiths

Available



The Art of Computer Programming

Donald E. Knuth

Borrowed



A Brief History of Time

Stephen Hawking

Available



1984

George Orwell

Available

My Library

Manage your borrowed books and reservations

Active Loans 2

My Reservations 1

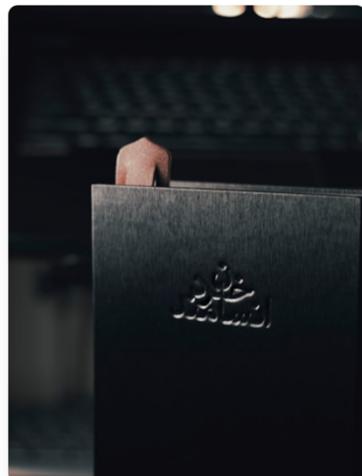
| Book Info | Borrowed Date | Due Date | Status | Action |
|--|---------------|--------------|--|-----------------------------------|
|  The Art of Computer Programming Donald E. Knuth | Nov 4, 2025 | Nov 19, 2025 |  Overdue | Request Extension |
|  1984 George Orwell | Nov 19, 2025 | Dec 4, 2025 |  Active | Request Extension |

My Library

Manage your borrowed books and reservations

[Active Loans 2](#)[My Reservations 1](#)

| Book Info | Reserved Date | Estimated Available | Queue Position | Action |
|--|---------------|---------------------|----------------|------------------------------|
|  Sapiens: A Brief History of Humankind Yuval Noah Harari | Nov 19, 2025 | Nov 25, 2025 | #2 in queue | View Details |

[← Back to Search](#)

A Brief History of Time

Stephen Hawking

ISBN: 978-0553380163

Category: Science

Published: 1988

[Available](#)[Confirm Borrow](#)

Due Date: December 9, 2025



Library System

Browse Books

My Library

admin

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The Art of Computer Programming

Donald E. Knuth

ISBN: 978-0201896831

Category: Technology

Published: 1997

On Loan

[Reserve Book](#)

Estimated available: November 27, 2025

Estimated wait time: 3 days

