ONLINE LIBRARY SYSTEM

TABLE OF CONTENTS

1. INTRODUCTION

1.1 PURPOSE

1.2 SCOPE

1.3 DESCRIPTION

2. FUNCTIONAL REQUIREMENTS

3. NON-FUNCTIONAL REQUIREMENTS

- 3.1 USABILITY REQUIREMENT
- 3.2 SECURITY REQUIREMENT
- 3.3 SOFTWARE REQUIREMENTS

4. USE CASE ANALYSIS

5. ENTITY DESCRIPTION

6. ARCHITECTURE SCOPE

1. INTRODUCTION

1.1 PURPOSE

- The purpose of this project is to provide a friendly environment to maintain the details of books and library members.

  The Library System is a package to be used by Libraries to improve the efficiency of Librarians, Library Users.
- The system provides books catalogue and information to members and helps them decide on the books to borrow from the library.
- The Librarian can keep the books catalogue updated all the time so that the members get the updated information all the time.

1.2 SCOPE

- The document only covers the requirements specifications for the online Library System.
- This document does not provide any references to the other component of the online Library System.
- All the external interfaces and the dependencies are also identified in this document.

1.3 Description

- The Online Library System is a web-based application designed to manage library operations efficiently. It provides functionality for both librarians and normal users, enabling librarians to manage books, user accounts, and borrowed requests, while allowing normal users to search for books, borrow them, and view their borrowing history. The system ensures that only approved users can log in, and it offers features such as filtering books by ISBN and rack number, generating reports, and sending notifications. With a user-friendly interface and robust backend architecture, the Online Library System aims to streamline library management processes and enhance user experience.

2. FUNCTIONAL REQUIREMENTS

The Online Library System must have the following functional requirements:

Librarian Functions:

1.Manage Books:

Create, Read, Update, and Delete (CRUD) operations for books.

Ability to filter books by ISBN and rack number.

2.Manage User Accounts:

Approve or reject user registration requests.

3.Manage Borrowed Requests:

View and process requests for borrowing books.

Set limits on the number of books a user can borrow.

Set return dates for borrowed books.

4.Reports:

Generate reports on borrowed and available books.

Normal User Functions:

1.Registration:

Register for an account.

Approval required from librarian to activate the account.

Book Search:

Search for books using various attributes.

2.Borrowing Books:

Send a request to borrow a book to the librarian.

View a list of borrowed books.

3.Authentication:

Login and logout from the system.

3. NON-FUNCTIONAL REQUIREMENTS

3.1 Usability Requirements

- The user interface should be interactive, simple and easy to understand. The system should prompt for the user and administrator to login to the application for proper input criteria.

3.2 Security Requirements

- The OLS should provide databases' modification only for the librarian after proper authorization. The system shall accommodate high number of books and users without any fault.

3.3 Software Requirements

- Database - MYSQL is used as database as it easy to maintain and retrieve records by simple queries which are in English language which are easy to understand and easy to write.
- Development tools and Programming language- React Framework used to develop webpages and styling work and Java Spring Boot for backend development.

4. USE CASE ANALYSIS

Name	Login
Actors	Librarian/User
Preconditions	Existence of database and correctly installed web-based server.
Description	When program is opened using browser the user sees login page.

Name	Manage User Accounts
Actors	Librarian
Preconditions	Existence of database and correctly installed web-based server.
Description	Manages the users and their actions.

Name	Manage Books
Actors	Librarian
Preconditions	Existence of database and correctly installed web-based server.
Description	Manages the books in the library.

Name	Manage Reports
Actors	Librarian
Preconditions	Existence of database and correctly installed web-based server.
Description	Manages the request by users (approval/rejection)

Name	View borrowed books
Actors	User
Preconditions	Existence of database and correctly installed web-based server.
Description	User can request for books issuing or can return the issued books.

Name	Search books
Actors	User
Preconditions	Existence of database and correctly installed web-based server.
Description	User can search for the required books.

Name	Request to borrow/return
Actors	User
Description	User can request to borrow books or can return the issued books.

5. ENTITY DESCRIPTION

1.User

Field	Data type	Default	Key
User_Id	Int(11)	Not NULL	Primary key
Name	VARCHAR(255)	Not NULL	
email	VARCHAR(255)	Not NULL	
Address	VARCHAR(255)	NULL	
password	VARCHAR(255)	Not NULL	
phone	Int(11)	NULL	
valid	Bit(1)	Null	

2.LIBRARIAN

Field	Data type	Default	Key
Librarian_Id	Int(11)	Not NULL	Primary Key
Name	VARCHAR(255)	NULL	
password	VARCHAR(255)	NULL	
email	VARCHAR(255)	NULL	

3. BOOK

Field	Data type	Default	Key
ISBN	Int(11)	Not NULL	Primary key
Title	VARCHAR(255)	Not NULL	
Author	VARCHAR(255)	Not NULL	
Rack_no	VARCHAR(255)	Not NULL	
Avl_copies	Int(11)	Not NULL	

4.Borrowed BOOK

Field	Data type	Default	Key
Borrow_Id	Int(11)	Not NULL	Primary key
User_Id	Int(11)	Not NULL	Foreign Key
Isbn	Int(11)	Not NULL	Foreign Key
status	Int(11)	Not NULL	

6. Architecture Scope

1. High-Level Overview:

The architecture of the online library system is designed to support the management of books, user accounts, and borrowing activities. It comprises several key components, including the user interface, application logic, database management system, and external integrations.

2. System Decomposition:

User Interface (UI): Responsible for presenting the system's functionality to users and capturing their input. This includes web pages for browsing books, user registration, and borrowing requests.

Application Logic: Implements the business rules and processes of the system. It includes modules for book management (CRUD operations), user authentication, request handling, and report generation.

Database Management System (DBMS): Stores and manages persistent data required by the system. The database schema includes tables for books, users, borrowed books, and system configuration.

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3. Design Rationale:

The chosen architecture emphasizes modularity, scalability, and maintainability. It leverages a three-tier architecture (presentation, application, and data layers) to separate concerns and facilitate future enhancements. The decision to use a relational database (e.g., MySQL) was made to ensure data consistency, integrity, and efficient querying capabilities.

4. Subsystem Responsibilities:

UI Layer: Handles user interactions, input validation, and presentation logic. It communicates with the application layer to fetch or update data.

Application Layer: Implements business logic, including authentication, authorization, and core functionalities like book management and borrowing workflows.

Data Layer: Manages data persistence and access. It interacts with the database management system to perform CRUD operations and execute queries.

5. Collaboration:

The UI layer communicates with the application layer through RESTful APIs endpoints.

The application layer interacts with the data layer using an ORM (Object-Relational Mapping) framework or raw SQL queries.

External integrations are managed through service interfaces or API clients, ensuring seamless communication with third-party systems.