SRS document for online library management system

Research Proposal · October 2022

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SEE PROFILE

Bachelor of Information Communication Technology Honours Degree

Faculty of Technology

University of Sri Jayewardenepura

Software Engineering – Semester 1

Assignment 1

Name: S.K.Wasana Sampath

Index: ICT 21/ 909

Assignment - 01

Assume that you have been recently appointed as a software engineer of an information systems organization. The first job assigned to you was to do the requirement engineering part of a new software development project (A list of examples for software project ideas is given in the annexure I).

You are requested to produce the following for a development of software of your interest.

1. A feasibility assessment on the aspects on functional feasibility, technical feasibility, financial feasibility, operational feasibility, organizational feasibility and human resources feasibility (10 marks)
2. Software Requirement Specification document (In line with the format given) **(50 marks)**
3. Write down the steps of 3 main scenarios and alternative scenarios **(15 marks)**
4. Activities of the software process model should be explained relevant to your project **(15 marks)**
5. Use case diagram. **(10 marks)**

ONLINE LIBRARY MANAGEMENT SYSTEM

(1)

❖ **Functional feasibility**

- We should identify the functionalities before developing the system and should figure out the possibilities of doing those processes.
    - A system administrator can add new users or books to the system.
    - An administrator can remove users or books from the system.
    - An administrator can see which registered users are available online at that moment.
    - A new user can register on the system themselves.
    - A user can reserve a book.
    - A librarian can issue a book.
    - A user can read e- books.

❖ **Technical feasibility**

- This section describes the technical specs that the system should have.
- There is a computer in the library that is available with a multiuser system. It has 4GB of RAM, a 500GB hard drive, and Windows 10 as its operating system.

❖ **Financial feasibility**

- We calculate the below expenditures.
    - ➢ The cost of operations of the existing manual library system.
    - ➢ The cost of operations of the proposed internet-based system.
        - The cost of creating the suggested system.
        - Concerning the advantages of the suggested system.
- So, according to the above details, it reveals that the new system is more profitable than the existing manual system.

❖ **Operational feasibility**

- This describes how easy it is to use this system.
- This is an easy-to-use, simple application that can be used anywhere at any time.
- So, this is a user-friendly application.
- This system can be easily used by a person who does not have any computer literacy too.

❖ **Organizational feasibility**

- The system will be established with the support of the organizational staff.
- The system engineers will provide training to the library staff.
- Due to the easiness of this system, all users can use the system without any trouble.
- A user manual will be provided to the new users.

❖ **Human resources feasibility**

- In this section, we discussed the person who interacts with the admin side of the system.
- This describes the people who participate in the system's activities.
- The librarian and other staff may enrol with the system by updating the books' info, users' info, and others.

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(3)

Main scenarios :

- **User Registration and Login.**
  1. Fill in the registration form.
  2. Make a username and a password.
  3. Verify the user account by email.
  4. Make use of the provided username and password to log in to the system.

- **Add a book to the system.**
  1. The system administrator should fill out the detailed form for adding the book to the system.
  2. Make up a book ID.
  3. Update the database.

- **Issue a book**
  1. The system administrator has to sign in.
  2. The administrator (librarian) should see the requests made by readers (users).
  3. Then the administrator should release the books if it is possible.
  4. The admin should see the available book list to see the possibility of releasing the book.
  5. After releasing the book, the admin should update the database.

Alternative Scenarios :

- **Check the availability of a book**
  1. The user should login to the system.
  2. Search for the book by its name or according to another method.

3. See the book status.

- **Reset the user password**

1. Click on the “Forgot password” button.
2. Fill in the answers to the security questions asked.
3. Verify it using the email.
4. After that, type in a new password.

- **See the due date**

1. First, log into the library system.
2. Then, see your borrowed book list.
3. There is the date you borrowed and the date you should bring it back.

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(4)

The waterfall model is used here. Because this is a linear process.

1. **Requirement gathering, analysis and definition.**
   - Requirements for the library management system are collected by using the following methods.
     - Questionnaire
     - Interviews
     - Prototypes
     - Random people interviewed
     - Observation
   - Then those requirements were categorized by requirements analysts according to functional and non-functional requirements basically. By studying requirements, the system’s basic functions and services were established. As well as the system’s constraints were established by studying and analysing requirements gathered.

2. **System and software design.**
   - By establishing the overall system architecture, the technologies and developers allocate the requirements to either hardware or software systems.
   - The architecture team creates the architectural diagrams and design documents.
   - The developers use Java Script, MySQL and other languages in this stage.

3. **Implementation and unit testing**
   - The issues in the system are solved here.
   - Here, the system components are developed separately. After the development, they were checking for bugs.

- This process was done repeatedly until all the bugs disappeared.
- Each requirement is tested one by one.
- The validation process is responsible for fulfilling the customer's requirements.

4. Integration and system testing

- The separately developed components are integrated by the testing engineers and tested in an integrated hardware and software environment. Here, check whether the system is working according to the specific requirements. This is done by testing engineers and experts.

5. Operation and maintenance.

- While the system is released to users, the users' new requirements and the issues that occur at this stage are resolved.

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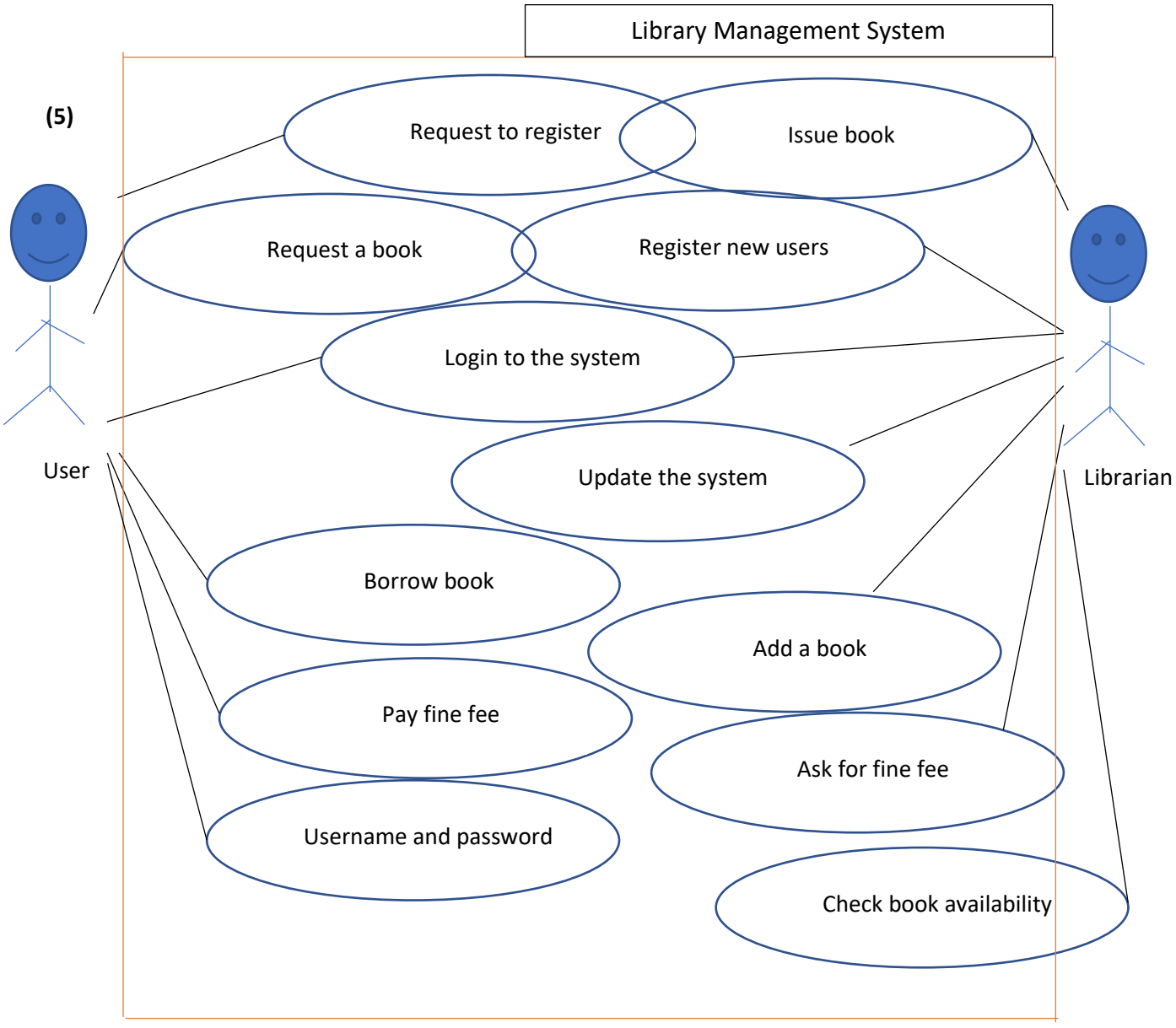


SRS DOCUMENT

FOR

ONLINE LIBRARY MANAGEMENT SYSTEM

Table of Contents

1. Introduction

1.1 Purpose

The purpose of this application is to automate all the library activities. This document gives a detailed description of the library management system according to the client's mentioned way. This system manages the library participants. This system manages the books that the library has and the borrowed ones. Readers can see what the available books are and can also reserve books without physically visiting the library. All the activities inside the library can be maintained through this system. This application was developed after a number of research studies.

1.2 Document Conventions

IEEE standards are followed.

- Main heading: Calibri, Bold
- Sub-heading: Calibri, Bold
- Main points: Calibri, Regular, Using bullets or underlined
- Writing: Calibri, Regular

The following is the list of conventions used in this system.

1.3 Intended Audience and Reading Suggestions

The intended audience for this document is the system designer, the administrative staff of the library, the system developer, tester, the system analysis, software architect, maintenance engineer, and users who are directly or indirectly involved with the project.

1.4 Product Scope

This system basically updates a manual library management system into an internet-based system by allowing any person who has a mobile device to be logged into the system. So, users can know the availability of the books that they require and can reserve them online through their mobile phones, without physically visiting the library.

1.5 References

Websites:

- www.wikipedia.org
- https://dipeshagrawal.files.wordpress.com/2018/07/srs-library-management-system.pdf
- https://www.studocu.com/row/document/comsats-university-islamabad/software-engineering/srs-srs-of-a-library-management-system/10336391
- https://studylib.net/doc/25528819/srs-document-format
- https://www.slideshare.net/ANASNAIN/17337071-srslibrarymanagementsystem
- https://www.geeksforgeeks.org/use-case-diagram-for-library-management-system/
- http://users.csc.calpoly.edu/~csturner/courses/308w09/Ch9_DocReqts.pdf
- https://sari-energy.org/wp-content/uploads/2016/07/SumitPresentation.pdf
- https://www.slideshare.net/mitwa1990/library-management-system-waterfall-model

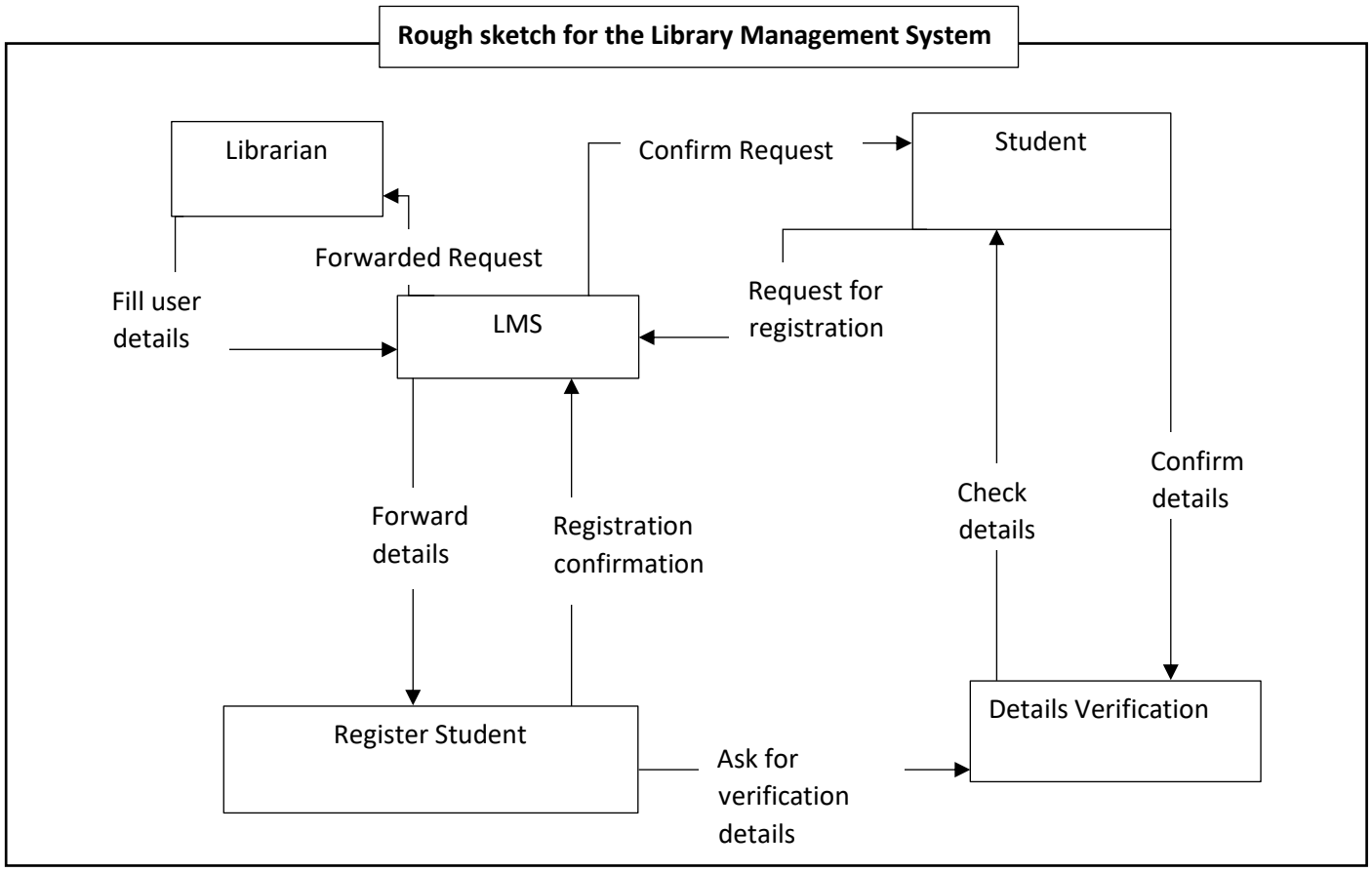
Books:

- Software Engineering, Seventh Edition Ian Sommerville.
- IEEE Std. 830-1998: IEEE Recommended Practice for Software Requirements Specifications.
- SRS document of “LIBRARY MANAGEMENT SYSTEM FOR St. JOHN'S COLLEGE JAFFNA”.

2. Overall Description

2.1 Product Perspective

The main objective of this document is to illustrate the requirements of this project. This system is a replacement for a manual system of library management that makes tasks easy. This proposed system provides search facilities for books' names, ISBNs, author's names and others to make readers' lives easier and also provides the option to download e-books for e-book readers.



2.2 Product Functions

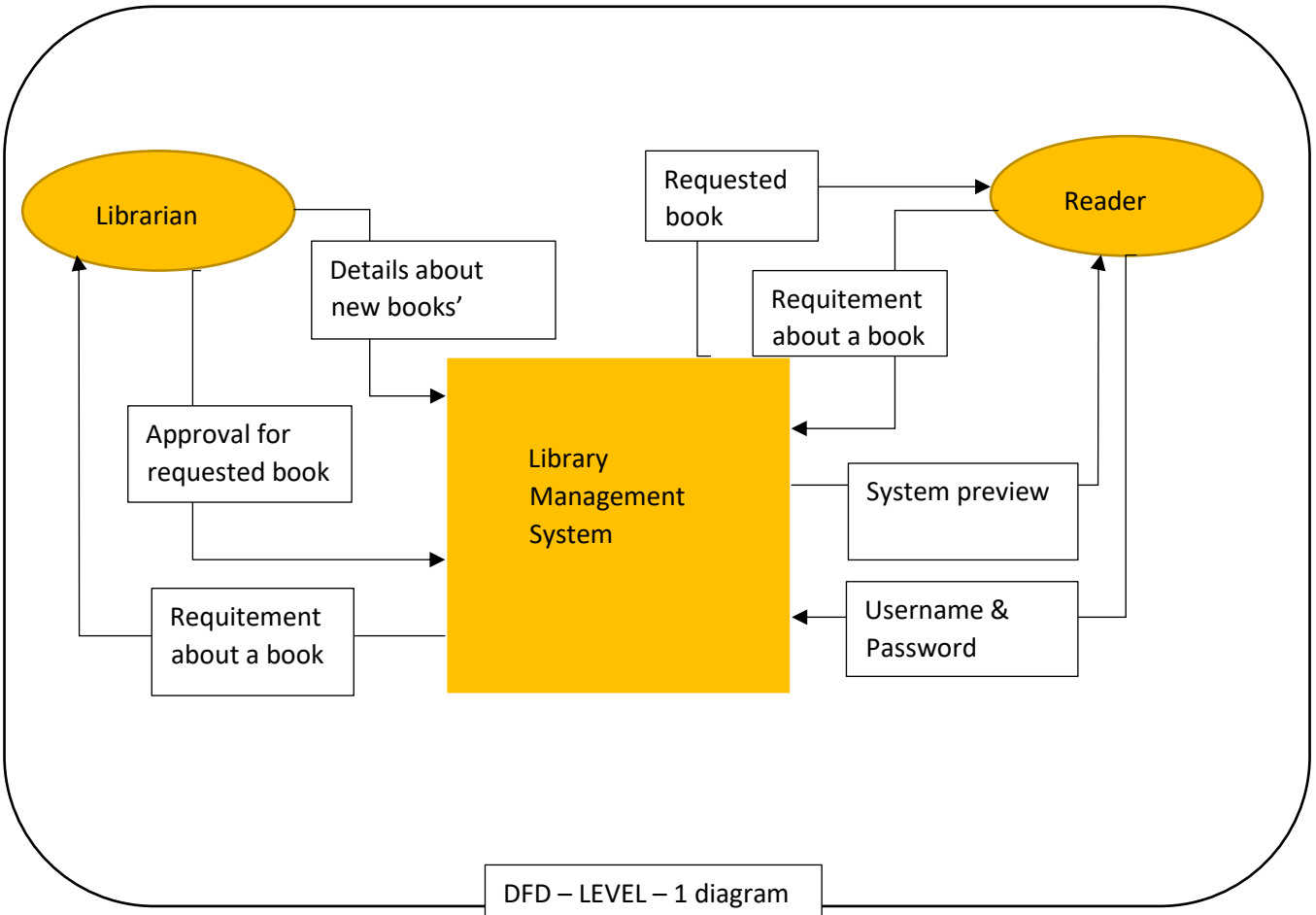
This system is used mainly by the librarian and the readers. The following features are available,

Librarian:

- Issue a book to a reader.
- Can view books according to each category.
- Add books and information about the books to the database and edit the information in the existing books.
- Can access all the accounts of the library participants.

Readers:

- Can view each category of books available in the library.
- Can view the available books category wise.
- Can obtain a library account.
- Can put in a request for a new book.



DFD – LEVEL – 1 diagram

2.3 User Classes and Characteristics

There are two different users who will be using this product.

- The librarian who acts as the administrator of the system.
- The readers who are accessing the library online.

Features available to the librarian are,

- A librarian can issue a book to the student.
- Can view the books available in the library in different categories.
- Can view the books available in each category.
- Can take the books returned by students.
- Add books and information about the books to the database.
- Edit the information in the existing books.
- Can look at the report of the books that have been issued.
- Can access all of the students' accounts.

Features available to users (readers) are,

- Can view each category of books available in the library.
- Can create their own account in the library.
- Can view the books issued to him previously.
- Can view the history of the previously issued books.
- Can search for a particular book.
- Can put in a request for a new book.

2.4 Operating Environment

The product will be operated on the Windows platform. As a result, the system should have a high-speed internet connection and the ability to run in any popular web browser (Microsoft Internet Explorer, Google Chrome, Mozilla Firefox).

Hardware requirements for the server PC

- RAM greater than 4GB
- HDDs larger than 500GB
- Basic input and output devices (monitor, mouse, keyboard, printer)
- Barcode scanner (as an additional device).

Software requirements for the server PC

Use Windows 7 or higher as an operating system, or Linux.

2.5 Design and Implementation Constraints

This product was developed using ASP.

This system can also run-on Android devices.

The backend database for this is SQL Server.

This product uses a login feature to make certain functionalities available to just certain readers.

2.6 User Documentation

There is a user manual that we have provided to you.

2.7 Assumptions and Dependencies

The assumptions

- The coding should be error free
- The system should be user-friendly so that it is easy to use for the users.
- The information about users, books and libraries must be stored in a way that can be easily accessed through the internet.
- The system should have enough storage capacity and provide fast access to the database.
- The system should provide a search facility and support quick transactions.
- The library system is open 24 hours a day.
- Users may access the site from any computer that has Internet browsing capabilities and an internet connection.
- Users must have their correct usernames and passwords to enter into their online accounts and take actions.
- The hardware and the network connection never fail.

The dependencies

- The specific hardware and software requirements for the product will be tested.
- On the basis of listing requirements and specifications, the project will be developed and tested.
- The end users (admins) should have a proper understanding of the product.
- The information of all the users must be stored in a database that can be easily accessed by the library system.
- Any update regarding the book from the library is to be recorded in the database and the data entered should be correct.

3. External Interface Requirements

3.1 User Interfaces

The system provides a complex platform for users to enter account information and login to their accounts. For users who enter the wrong account information, an error will pop up to show that. New users who want to register in the library and become members can simply sign up. If a user forgets their password, they can retrieve their password after answering a security question.

This system produces a graphical user interface for both the user and the administrator.

- It makes it easier to view quick reports like books issued and returned in a particular time period.
- It provides stock verification and a search facility for various criteria.
- The administrator must be able to customise the user interface.
- The design should be straightforward.
- A standard template should be followed by all the different interfaces.
- The user management module should be able to interact through the user interface.
- The login and logout modules must have their own user interface.

Login Interface: -

If the user has not yet registered, he can enter his information and register to create an account. Once his account is created, he can 'Login', which asks the user to type in his username and password. If the user enters either their username or password incorrectly, then an error message appears.

Search: -

The member or librarian can enter the type of book he is looking for and the title he is interested in, and then he can search for the required book by entering the book name, categories, and ISBN.

View: -

The Category view shows the categories of books available and provides the ability for the librarian to add, edit or delete a category from the list. librarians.

Control Panel: -

This control panel will allow librarians to add or remove users; add, edit, or remove a resource; and manage lending options.

3.2 Hardware Interfaces

Server side:

- Operating system: Windows 7 or higher or Linux
- RAM greater than 4GB
- HDDs larger than 500GB

Client side:

- Operating system: Windows 7 or higher, Linux, MAC, Android 5.1 or higher
- RAM greater than 4GB
- HDDs larger than 500GB

3.3 Software Interfaces

- Any windows or android OS.
- JDK or JRE must be installed on the system to run the application. In addition to that, the NetBeans or Eclipse IDE should also be installed for easier execution of the application.

3.4 Communications Interfaces

The communications standard that will be used is GUI (Graphical User Interface). This interface must be highly intuitive or interactive because there will not be any assistance for the user who is operating the system. The interface is designed to be very user – friendly, so anyone with very little knowledge of computers can also operate the system. Also, the password should be private. This can be done by using asterisks in the password panel.

4. System Features

This section shows the features, priorities, requirements, and a few other things.

4.1 System Login

4.1.1 Description and Priority

Here, the user's entered username and password have been authenticated.

Priority level: Very high

4.1.2 Stimulus/Response Sequences

5. The user runs the system.
6. The system displays the login page.
7. The user inputs their username and password and clicks on the “login” button.
8. The system authenticates the user’s validity.

4.1.3 Functional Requirements

- The system should only allow users with valid IDs and passwords to enter the system.
- The system should perform an authorization process that decides what level of access each user can access.
- The user should logout after they finish using the system.

4.2 Add a new book

4.2.1 Description and Priority

Here, the system admin can add new books to the system.

Priority level: Very high

4.2.2 Stimulus/Response Sequences

1. The admin logs into his account.
2. The system displays the admin page.
3. The administrator selects the “Upload new books” button.
4. The system previews a list to fill in some details about the new book.
5. The admin fills in the details and uploads the book into the system.
6. The system displays the “Success” message or the “Error” message.

4.2.3 Functional Requirements

- The system should allow the admin to use administration options.
- The system should allow the admin to upload new product details.

4.3 Register a new user

4.3.1 Description and Priority

Here, a new user can register on the system.

Priority level: Very high

4.3.2 Stimulus/Response Sequences

1. The new user should enter into the system.
2. The system displays the “Register” button.
3. The "Register" button should be selected by the user.
4. The system displays the relevant details for you to fill in.
5. The user should fill in the details asked and click on the "Register" button.
6. The system should save the user and should provide a user name.

4.3.3 Functional Requirements

- The system should provide a “Username” and “Password” to the user.
- The system should open a new database for the user and save the user’s data in it.

4.4 Issue a book

4.4.1 Description and Priority

Here, a user can borrow a book from the system.

Priority level: Very high

4.4.2 Stimulus/Response Sequences

1. The user should sign into the system.
2. The system shows its “home page.”
3. The user can select to “borrow books”.
4. The system displays a list of books.
5. The user should select a book.
6. The system should show relevant details and forms to fill in.
7. The user should fill out the application or the form given.

8. The system should issue the book.

4.4.3 Functional Requirements

- The system should update “User ID” and “Book ID” in the database.

5. Other Non-functional Requirements

5.1 Performance Requirements

- Users should be able to use the system 24 hours a day.
- The response time should be less than 2 seconds.

Server side

The proposed system that we are going to develop would meet functionally all the requirements that are specified.

- The performance of the system should be swift and precise.
- The library management system will handle expected and non-expected errors in ways that prevent loss of information and long downtime periods. Thus, it should have inbuilt error testing to identify invalid username and password combinations.
- Large data sets should be manageable for the system. Thus, it should accommodate a high number of books and users without any fault.

5.2 Safety Requirements

The database may crash at any certain time due to a virus or operating system failure. Therefore, it is required to take a database backup.

- The programme will make use of a safe database.
- Normal users can modify only their personal and some other information.
- The system will have different types of users and every user has access constraints.
- Proper user authentication should be provided.
- No one should be able to hack users’ passwords.
- There should be separate accounts for admin and members such that no member can access the database and only the admin has the right to update the database.

5.3 Security Requirements

This is a secured database for the library. There are different user categories. It depends on the category of user how the access rights are decided. It indicates that if a user has administrative privileges, he or she may modify the data, delete, append, etc. All other users, other than library staff, only have the right to retrieve information about the database.

5.4 Software Quality Attributes

The quality of the database is maintained in such a way that it can be very user-friendly to all the users of the database.

Persistent data must be kept in a database by the system. The database ought to be capable of backups. The system's potential to develop will be limited by the lack of necessary software, including web servers, databases, and development tools.

Reliability: - The system has to be fully reliable due to the importance of data and the damage that can be done by incorrect or incomplete data.

Maintainability: - The system should provide automatic notification to patrons by e-mail about items that are overdue, reservation results, availability of reserved items and etc.

Performance: - Database should be updated for better performance. Searching should be fast. Login should be validated within 1 second.

Security: - Payment information should be protected and encrypted. Communication between a server and a user should be secure.

Accuracy: - Real-time information should be accurately provided by the system while accounting for various concurrency problems.

Interoperability: - The digital libraries can exchange and share documents, queries, and services.

Testability: - Testability measures the ability for software to demonstrate its faults. Since a significant amount of money is expended on testing, the system must ensure that the testability of the built system is robust.

5.5 Business Rules

- The readers should borrow books back to the library within 14 days. If not, the system automatically generates a fine payment. If the user (reader) could not borrow back the book, he should pay Rs. 10 per day.
- All users should pay membership fees and renew their membership annually or quarterly. This fee varies from time to time.

6. Other Requirements

Data and Category Requirements

There are various types of users, such as teaching staff, librarians, administrators, students, and so on. Access privileges are determined based on the type of user.

It indicates that if a user has administrative privileges, he or she may edit, delete, or add data. All other users, except the librarian, only have the right to retrieve information about the database. Similar to how there will be various book genres accessible.

The pertinent information for each category of book should be shown. The categories should be coded in the specific format, as should the data associated with each category.

Ethical Requirements

There is a huge user base for a library management system. The system has some of their details, such as emails. So, the system should work in an ethical manner and should operate in that manner.

Appendix A:

Glossary

The following is the list of conventions and acronyms used in this document and the project as well:

Administrator: A login id representing a user with user administration privileges for the software.

User: An all-purpose login ID given to most users.

Clients: The intended users of the software.

SQL: It stands for Structured Query Language, and it is used to retrieve data from a database.

SQL Server: it is a server used to store data in an organised format.

Layer: Represents a section of the project.

Application Logic Layer: the part of the assignment that mentions the Web Server. This is where all computations are completed.

Data Storage Layer: The section of the assignment referring to where all the data is recorded.

Use Case: A broad-level diagram of the project showing a basic overview

A class diagram: It is a type of static structure diagram that describes the structure of a system by showing the system's cases, their attributes, and the relationships between the classes.

Interface: Something used to communicate across different media.

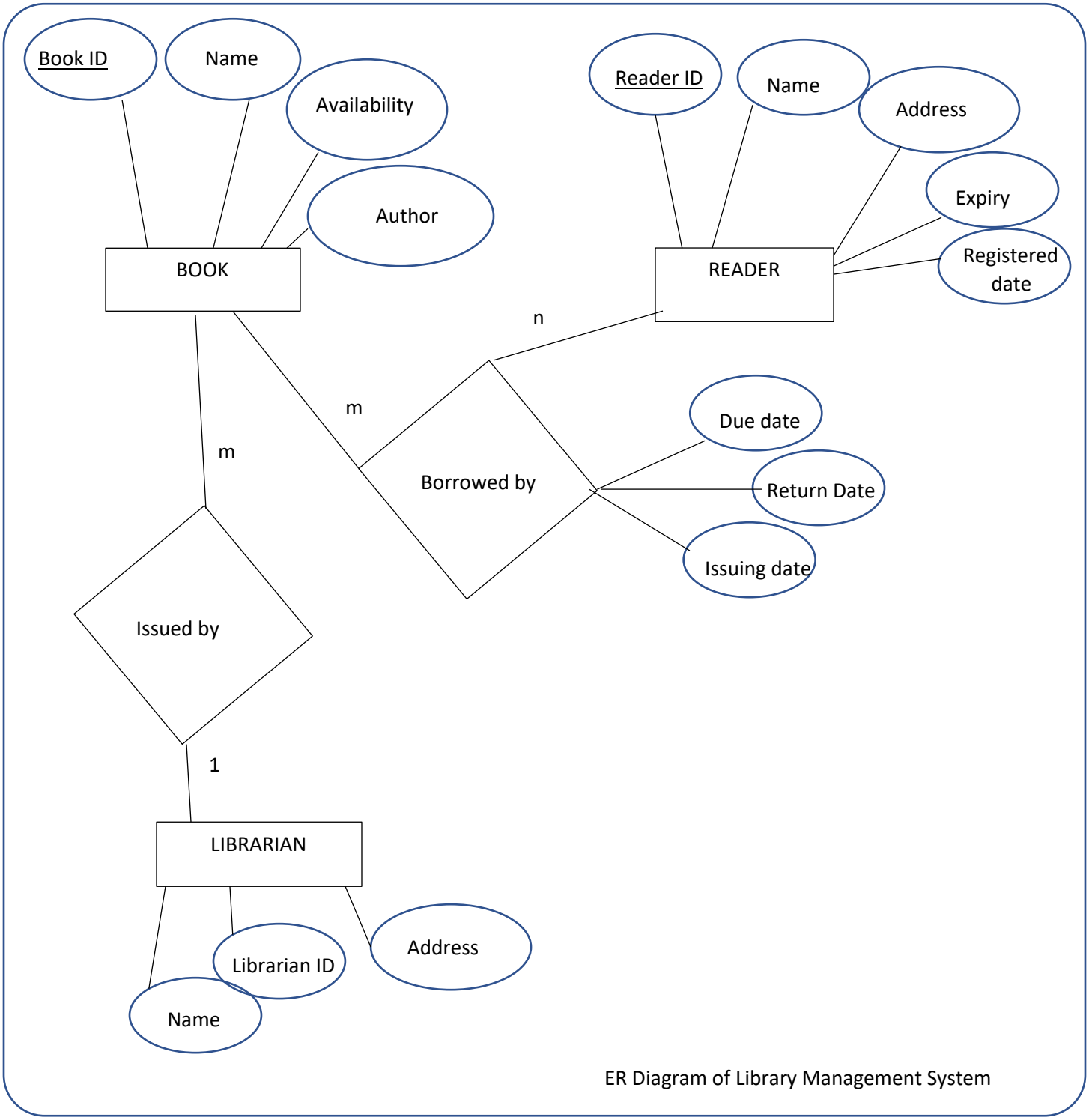
Unique Key: Used to differentiate entries in a database

OS: Operating System

DFD: Data Flow Diagram

ER-Entity Relationship

Appendix B:



ER Diagram of Library Management System

Thank You!!!