Library management system

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IST 104 Project

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LMS

☒ INTRODUCTION

Introduction

A Library Management System (LMS) is a software application that helps libraries manage their collections more efficiently. It is a comprehensive system that enables librarians to manage, organize, and maintain books and other materials in the library, as well as the circulation of those materials. LMS software makes it easy to catalog books, track borrowing and return dates, monitor overdue books, and manage fines, among other things. The system is designed to provide an efficient, user-friendly interface that helps librarians streamline their operations and improve their service to library patrons.

Purpose

The purpose of the Library Management System is to provide a centralized platform for libraries to manage their collections effectively. The system enables librarians to automate various library operations such as book acquisition, cataloging, circulation, and reporting. With the help of an LMS, libraries can ensure that their collections are always up-to-date and easily accessible to library patrons. The system also helps librarians save time and effort by automating routine tasks, allowing them to focus on more critical activities like providing assistance to library patrons.

Scope

- The Library Management System is a software application for managing library collections.
- It is designed for different types of libraries, including school, public, academic, and special libraries.
- The system can be customized to meet the specific needs of each library.
- It manages all types of materials, including books, periodicals, multimedia, and other resources.

References

- **Doctor Ghada's lecture pdfs**
- **Doctor Shady's section pdfs**
- **https://projectsinventory.com/**

❖System Request Template

System Request		
Project Name:	Library management system	
Project Sponsor:	Name	
	Dept.	management
	Phone	
	E-mail	
Business Need:	Library management system to help readers and writers.	
Business Requirement:	Functional: 1- contains most of the sections (can be increased) . 2- contain all books, old and new or copies of them. 3-Maintain system. Non-functional 1- Design a website to help readers and writers. 2- Developing system to manage disabled people. 3- Fast respond to users.	
Business Value:	1- Earn 8000$ per month. 2- Improved User satisfaction. 3- increasing demand for the library.	
Special issues or constraints	1- The system must be in place within the 3 months. 2- Budget does not exceed 50000$ per.	

❖SWOT

Strength	Weakness
• Ability to organize the library completely and make it suitable for users. • Easy to use and access information. • Ability to store large amounts of data and information. • Improving the effectiveness of library management and internal processes.	• Dependence on technology which can sometimes lead to system crashes and data loss. • Need for regular updates and maintenance to ensure system stability. • The cost of implementing and maintaining the system can be high.
Opportunities	**Threats**
• Integration with other systems to improve library services and provide more personalized experiences. • Expansion into new markets and libraries. • Offering cloud-based solutions to enhance accessibility and flexibility.	• Competition from other library management systems. • Cybersecurity risks and data privacy threats. • Changes in user behavior and preferences. • Lack of financial resources for some libraries to implement and maintain the system.

❖ feasibility analysis

Technical Feasibility Study:

The technical feasibility study for a library system involves evaluating the hardware, software, and network requirements necessary to implement the system. The following factors should be considered:

1. Hardware Requirements: The library system requires a server to store data and manage user requests. The server should have sufficient processing power, memory, and storage capacity to handle the expected load.

2. Software Requirements: The library system requires software to manage the database, user interface, and other functions. The software should be compatible with the hardware and operating system used by the library.

3. Network Requirements: The library system requires a network infrastructure to connect users to the server. The network should be reliable and secure to prevent unauthorized access or data loss.

Organizational Feasibility Study:

The organizational feasibility study for a library system involves evaluating the impact of implementing the system on existing organizational structures and processes. The following factors should be considered:

1. Staffing Requirements: The library system may require additional staff to manage the database, user requests, and other functions.

2. Training Needs: Existing staff may require training on how to use the new system effectively.

3. Workflow Changes: Implementing a new library system may require changes in existing workflows and processes.

4. User Acceptance: Users may resist using a new library system if it is perceived as difficult or inconvenient.

Economical Feasibility Study:

The economic feasibility study for a library system involves evaluating the costs associated with implementing and maintaining the system over time. The following factors should be considered:

1. Implementation Costs: This includes hardware, software, network infrastructure, and any consulting or training fees associated with implementing the new system.

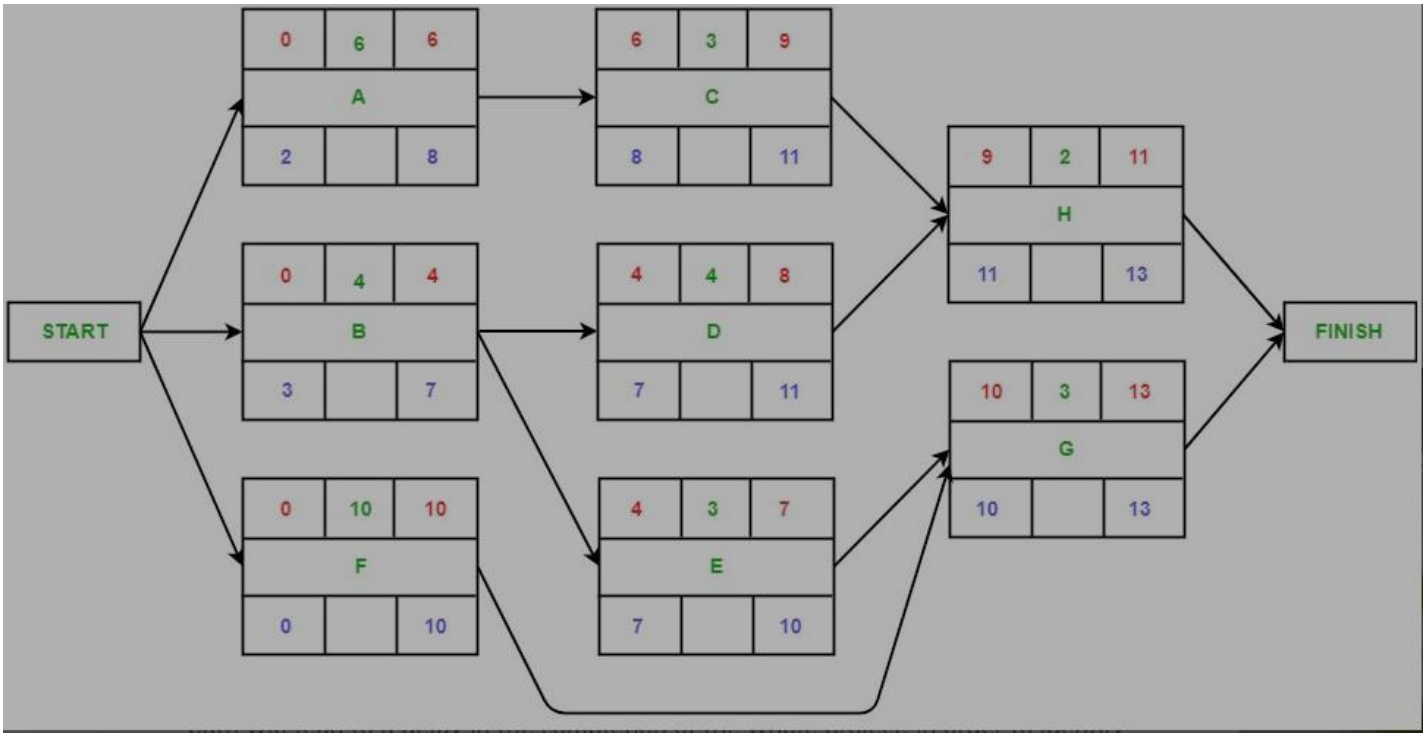
2. Operating Costs: This includes ongoing maintenance costs such as software updates, hardware upgrades, and staffing costs.

3. Return on Investment (ROI): A cost-benefit analysis can help determine whether implementing a new library system will provide sufficient ROI over time.

4. Funding Sources: The library system may require funding from external sources such as grants or donations to cover implementation and operating costs.

❖Project plan

Activity	Duration (in weeks)	Precedents
A	6	–
B	4	–
C	3	A
D	4	B
E	3	B
F	10	–
G	3	E, F
H	2	C, D



❖Requirements

Functional requirements:

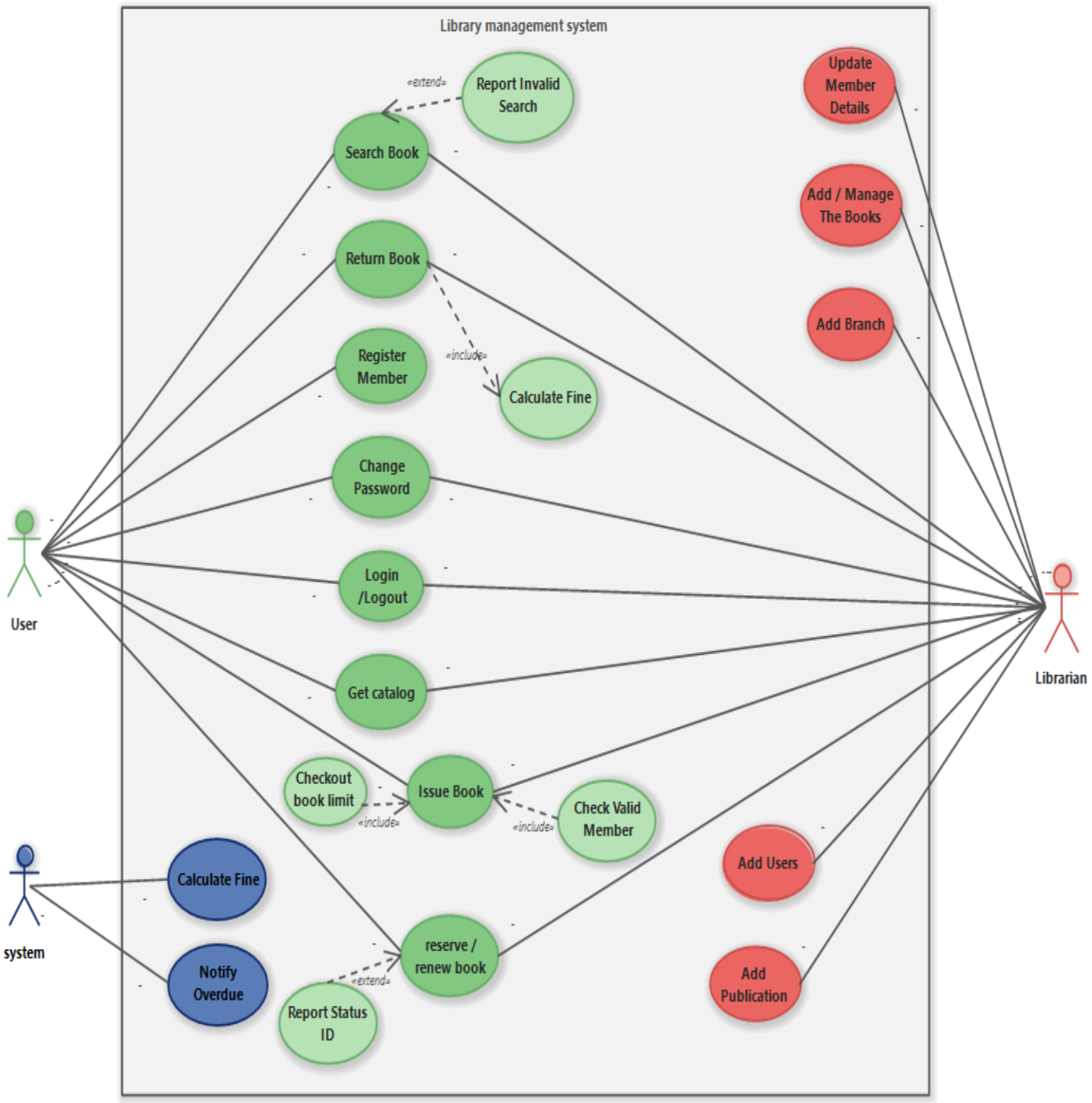
1. Allow users to search for books.
2. Allow librarian to search for books by title , author , subject or publication date.
3. Allow users to return book.
4. Allow users to register members.
5. Allow users to login and logout.
6. Allow librarian to login and logout.
7. Allow users to get catalog.
8. Allow users to reserve and renew book.
9. Allow librarian to reserve and renew book.

10. Allow the librarian to add and remove new members.
11. Librarian can add and manage the books.
12. Allow system to notify overdue.
13. Allow system to calculate fine.
14. Allow librarian to issue book.
15. Check-out book: To borrow a book from the library.
16. Student can Change Password.
17. librarian can Change Password.
18. librarian Add Publication.
19. librarian Add Users.
20. librarian Add Branch.
21. Allow librarian Update Member Details.
22. Allow librarian Enter New Book.

Non-Functional requirements:

1. Performance
2. Security
3. Scalability
4. Ease of Use
5. Accessibility

❖Use case


Library management system
Report Invalid Search
«extend»
Search Book
Return Book
Register Member
«include»
Calculate Fine
Change Password
Login /Logout
Get catalog
Checkout book limit
«include»
Issue Book
«include»
Check Valid Member
reserve / renew book
«extend»
Report Status ID
Update Member Details
Add / Manage The Books
Add Branch
Add Users
Add Publication
User
Librarian
system
Calculate Fine
Notify Overdue

❖ Use case description

Use Case Name : Login	**ID:** 1	**Importance Level:** High
Primary Actor: user, manager	**Use Case Type:** Essential	
Stakeholders and Interests: User-wants to log in Librarian-wants to log in		
Brief Description: This use case describes how a user log in into the system		
Pre-condition: The user should land on the login page		
Post-condition: The is logged to the system		
Trigger: User enters user name and password **Type:** External		
Relationships: **Association:** User, Librarian **Include:** Check username and password **Extend:** Refuse **Generalization:**		
Normal Flow of Events: 1. The user open the login page 2. The user enter his/her username and password 3. The system checks the user name and password 4. The user is logged into the system		
SubFlows:		
Alternate/Exceptional Flows: 1. The user enter his/her username or password wrong		

Use Case Name : change password	**ID:** 2	**Importance Level:** High
Primary Actor: user, Librarian	**Use Case Type:** Essential	

Stakeholders and Interests:

User Want to change the account password
Librarian Want to change the account password

Brief Description: This use case describes the ability to change password from the old one to another one.

Pre-condition: The old password must be correct

Post-condition: The new password changed correctly

Trigger: User enters old password and new password

Type: External

Relationships:

Association: User, Librarian

Include:

Extend:

Generalization

Normal Flow of Events:

1-User or manager or employee logs into the accounts.
2-User or manager or employee goes to the setting.
3-User or manager or employee selects ”change account password”
4-User or manager or employee inserts the old password.
- The old password must be correct.

5-User or manager or employee writes the new password.
- The new password must be acceptable.

6-User or manager or employee rewrites the new password correctly.
7-User or manager or employee returns back to the login page.

SubFlows:

Alternate/Exceptional Flows:

1. User or manager or employee enters the old password incorrectly

Use Case Name : User search for A Book	**ID:** 3	**Importance Level:** High
Primary Actor: user	**Use Case Type:** Essential	
Stakeholders and Interests: users And librarian		
Brief Description: The use case is use for search on the wanted book		
Pre-condition: The User go to search bar		
Post-condition: The user have checked for the availability of the book and reserved it .		
Trigger: User or librarian enters name the book or publication. **Type:** External		
Relationships: **Association**: user, librarian **Include**: **Extend**: search by tittle ,search by publication date ,search by author and search by subject name **Generalization**:		
Normal Flow of Events: 1. The user open the login page 2. The user enter his/her username and password 3. The system checks the user name and password 4. The user is logged into the system		
SubFlows:		
Alternate/Exceptional Flows: • The Book Name entered by user is wrong		

Use Case Name : User sends return book request	**ID:** 4	**Importance Level:** High
Primary Actor: user	**Use Case Type:** Essential	

Stakeholders and Interests:

1. User Wants to return book
2. librarian Accept request

Brief Description: The use case describe how the user can return a book

Pre-condition: the user must log in and send return Request.

Post-condition: The user can return the book by acceptance of the librarian.

Trigger: The user clicks on the "Return Book" button.

Type: External

Relationships:

Association: user, librarian

Include:

Extend:

Generalization:

Normal Flow of Events:

1. The user log in
2. The user send return request
3. User enter book ID
4. Verify Book ID
5. check For Delays
6. Pay Fine
7. update book
8. confirm Request
9. book Is returned

SubFlows:

Alternate/Exceptional Flows:

1- The librarian Refuse the return request

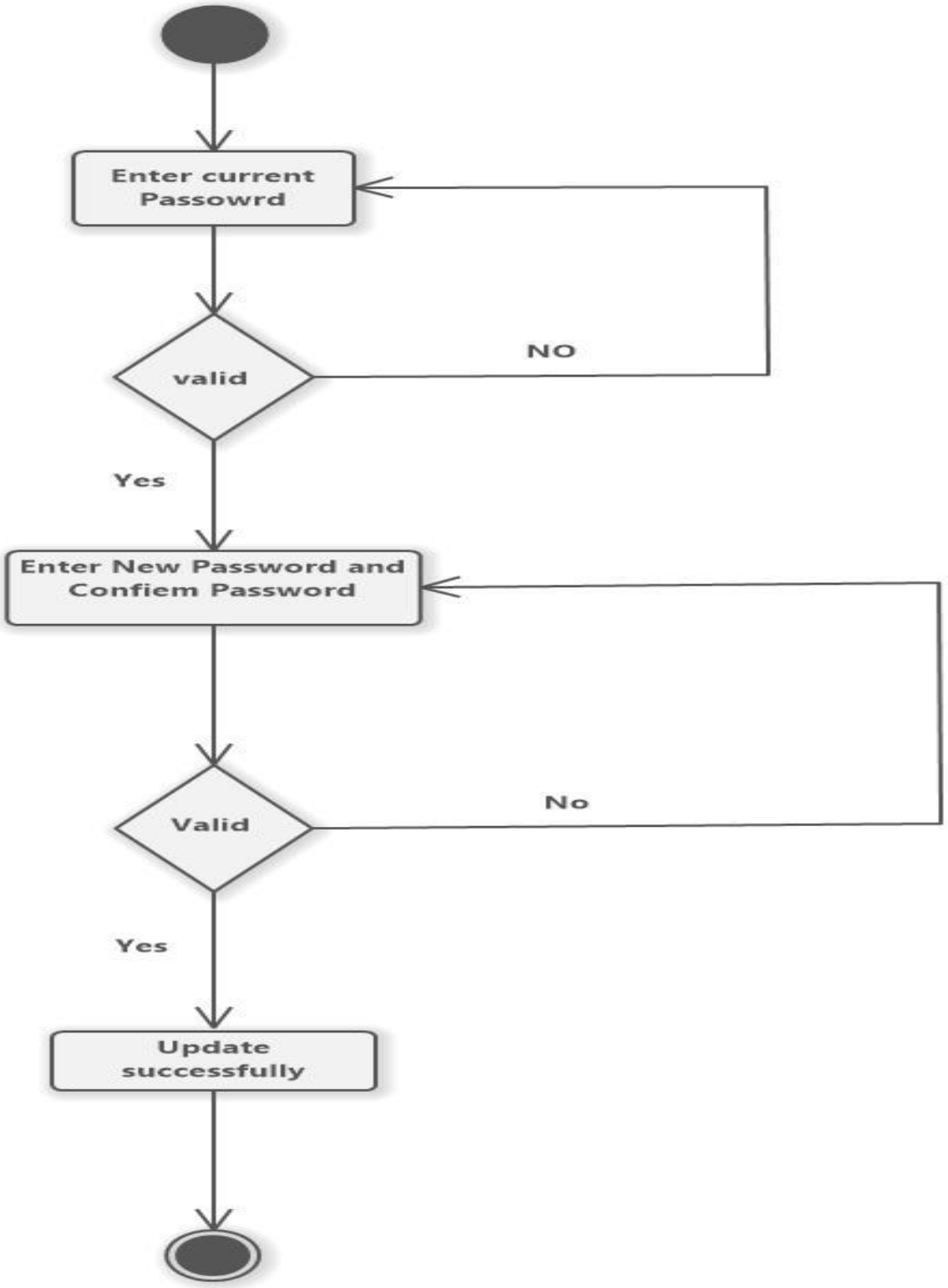
2- The user Didn't pay the fine

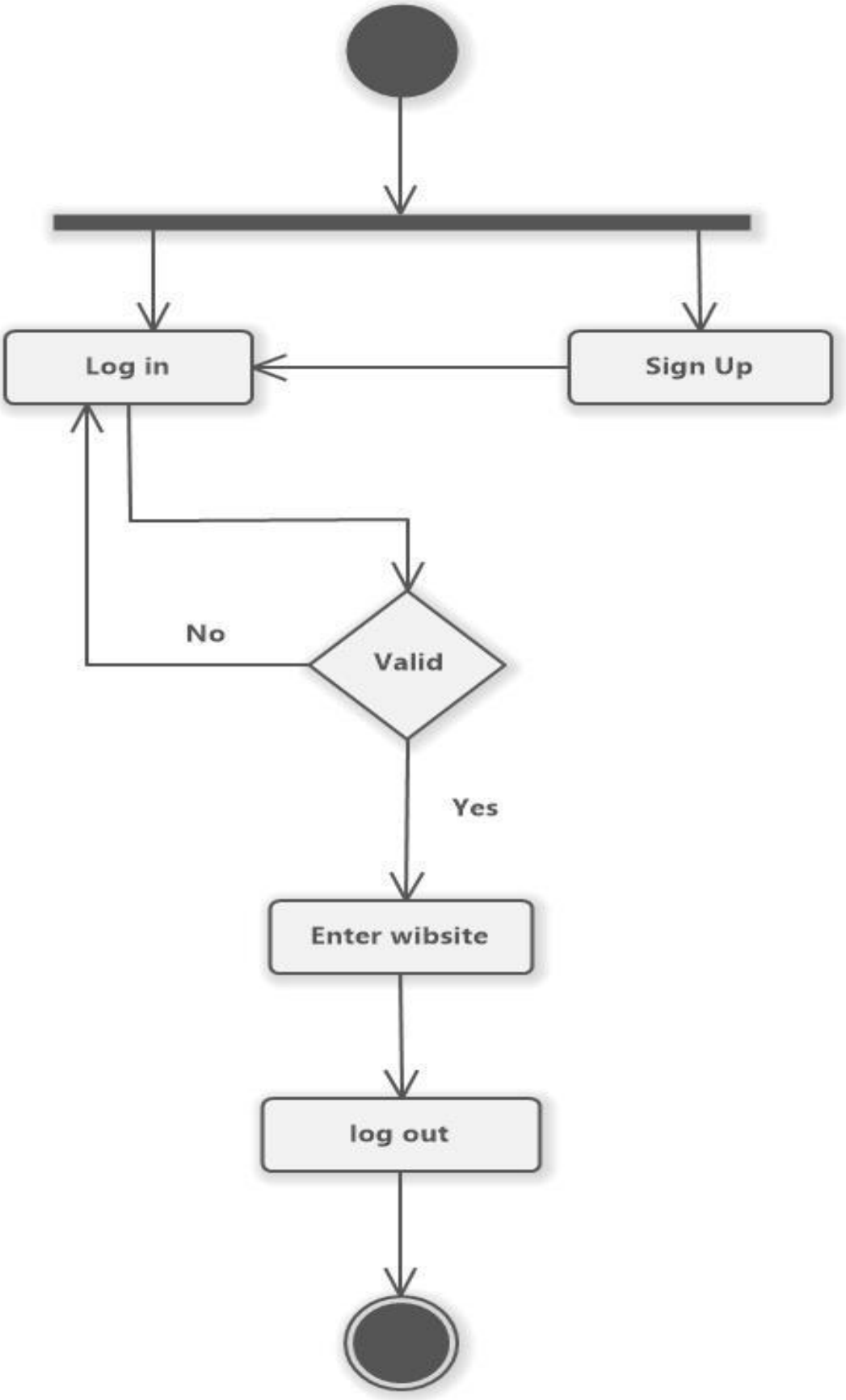
Use Case Name : Add new Branch	**ID:** 5	**Importance Level:** High
Primary Actor: Librarian.	**Use Case Type:** Essential	
Stakeholders and Interests: librarian		
Brief Description: The librarian Wants to add new Branch of books .		
Pre-condition: There wasn't a new branch .		
Post-condition: New Branch was Added .		
Trigger: The manager clicks on the "Add Branch" button. **Type:** External		
Relationships: **Association**: librarian **Include**: **Extend**:		
Normal Flow of Events: 1-librarian Send add new branch . 2-Librarian enter branch name and books . 3-Confirm branch details . 4- Add new branch .		
SubFlows:		
Alternate/Exceptional Flows: 1. There Is no free Space		

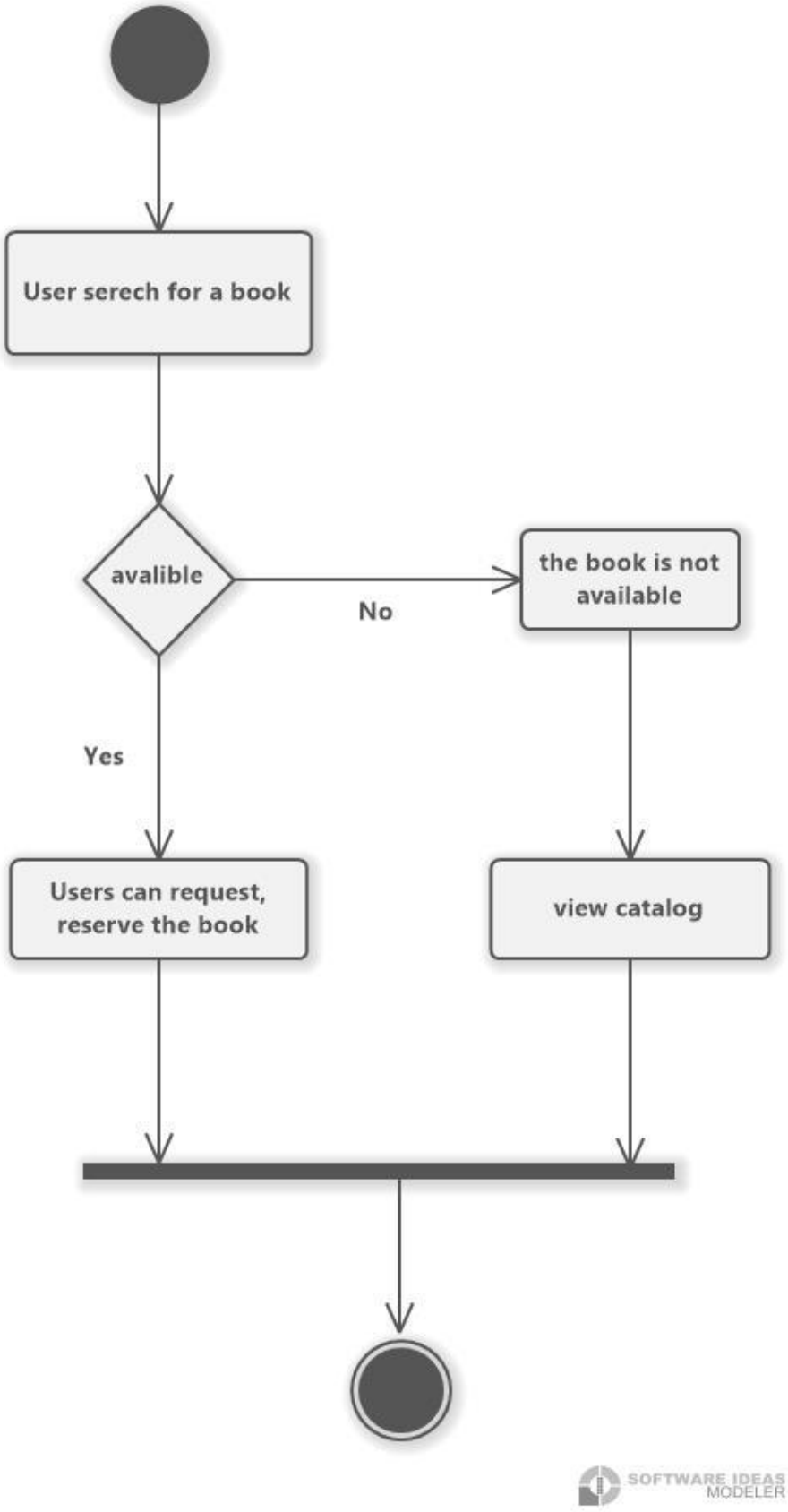
❖Testing For Non-Functional requirements

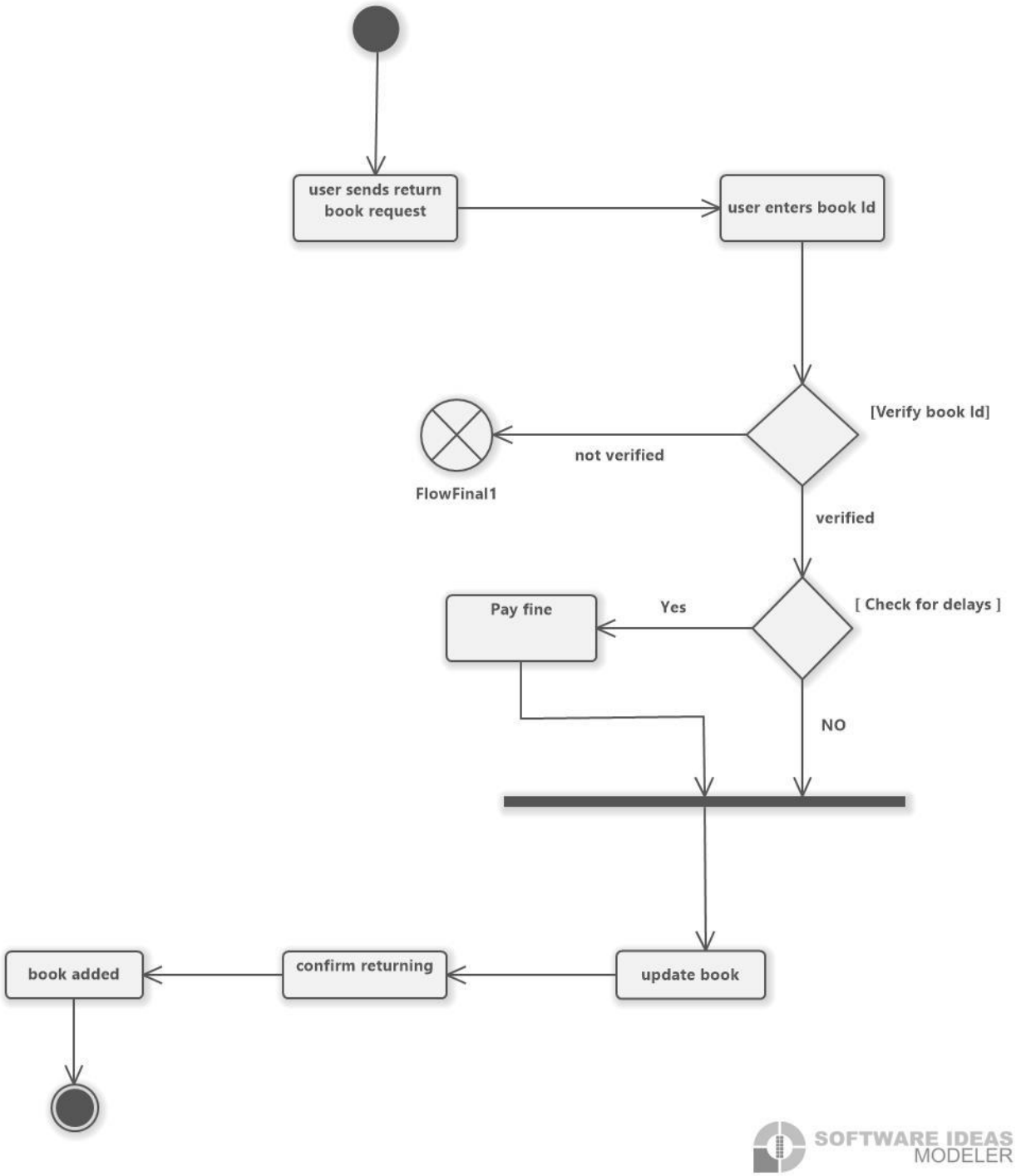
Non-Functional requirements	testing
Performance	• The Server would be able to perform desired tasks in reasonable unit of time.
Security	• The system would provide access to only legitimate users. It will be secure on network and only authorized person can use it.
Scalability	• The proposed system would be scalable to support extended number of users
Ease of Use	• The proposed system would be user-friendly and would provide Graphical User Interface (GUI).
Accessibility	• The proposed system would be GUI-based desktop application installed on computing root node (server) running the application.

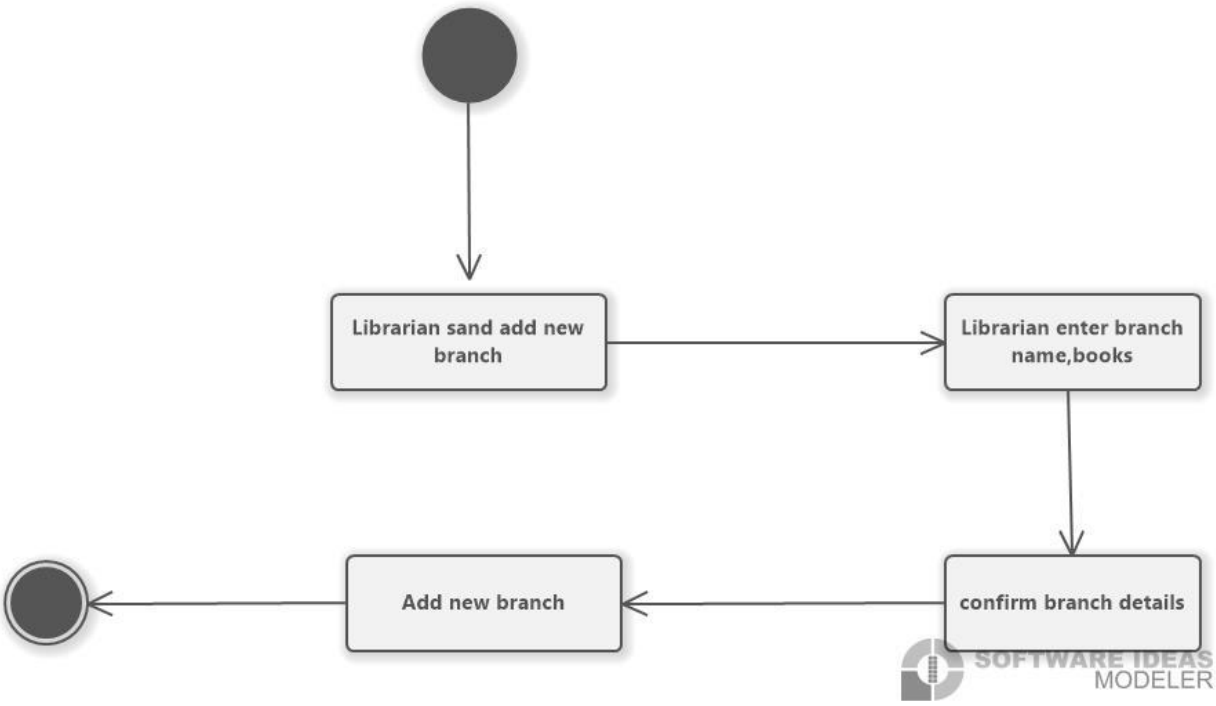
❖activity diagram



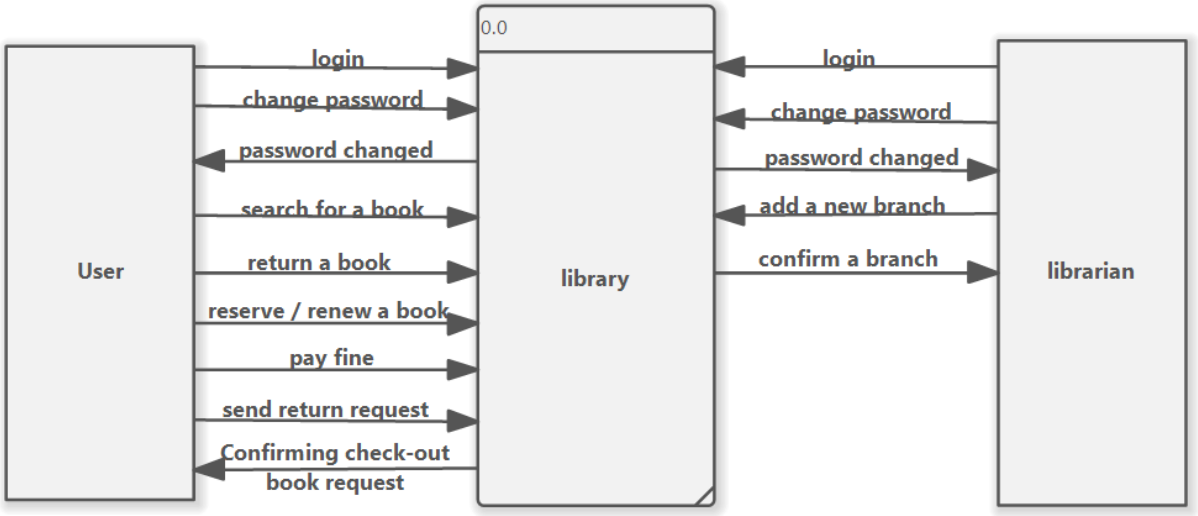



User serech for a book
avalible
No
the book is not available
Yes
Users can request, reserve the book
view catalog
SOFTWARE IDEAS MODELER


user sends return book request
user enters book Id
[Verify book Id]
not verified
FlowFinal1
verified
Pay fine
Yes
[Check for delays]
NO
book added
confirm returning
update book
SOFTWARE IDEAS MODELER

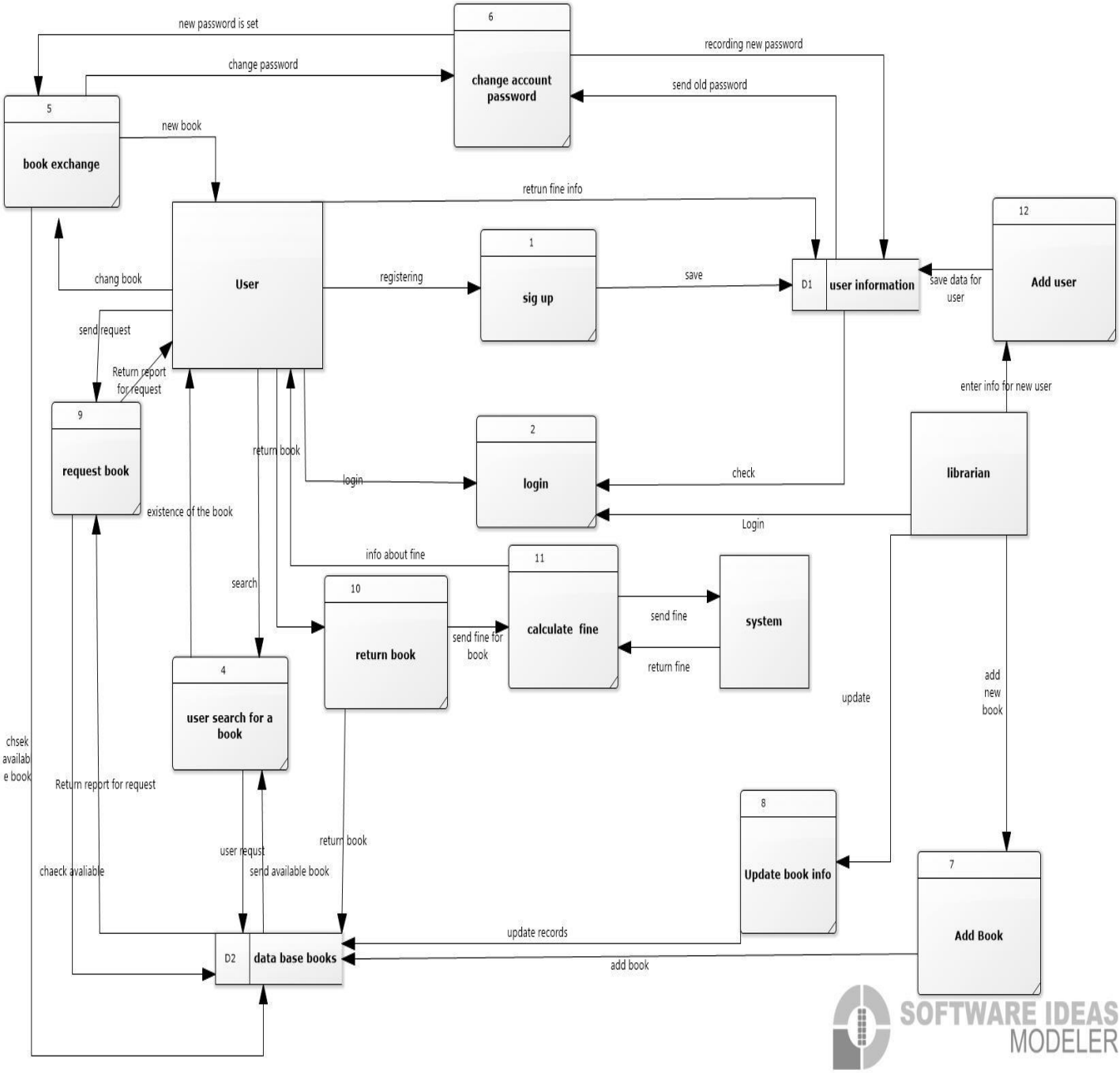


❖ Context diagram

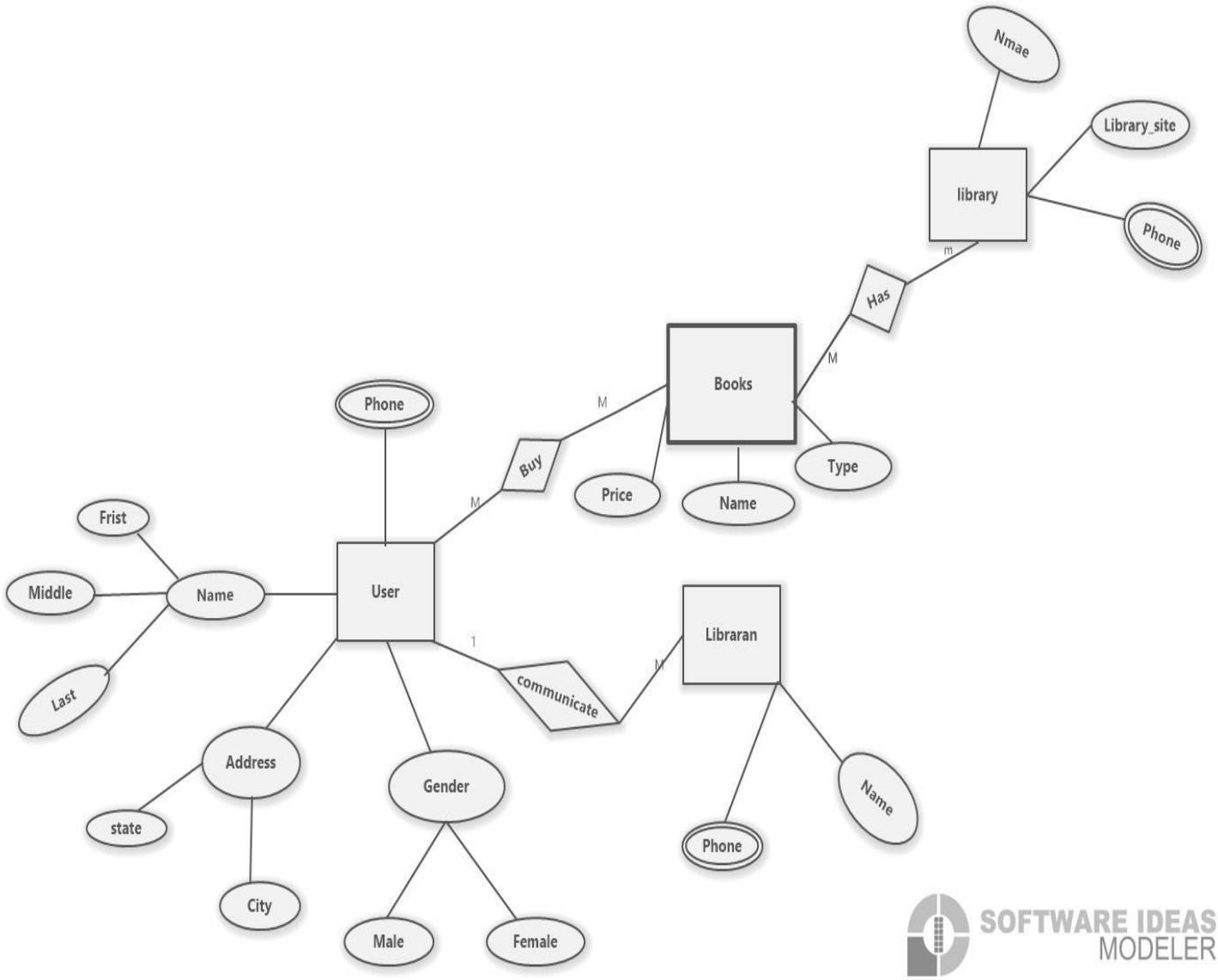


❖ Data flow diagram (DFD)

Level 0:



❖ Entity relationship diagram (ERD)



❖Data dictionary

Entities DD:

Entity name:	Login
Description:	User and librarian login using username and password
Alternate name:	None
Input data flows:	User Interface (UI)
Output data flows:	Authentication Process or Login Module

Entity name:	Change password
Description:	This data flow describes the information required to change a user's password in the system.
Alternate name:	None
Input data flows:	Entity "User"
Output data flows:	Process "Change Password"

Entity name:	User search for A Book
Description:	The process by which a library user searches for a book in the library's catalog.
Alternate name:	Book search, Catalog search
Input data flows:	Entity "User"
Output data flows:	Process "Library catalog search"

Entity name:	Return Book
Description:	Records the details of a book returned by the user.
Alternate name:	None
Input data flows:	Entity "User"
Output data flows:	Process "Record Returned Book Details"

Entity name:	Add new Branch
Description:	This data flow describes the process of registering a new branch in the library management system.
Alternate name:	None
Input data flows:	Entity "librarian"
Output data flows:	Process "Enter branch data"

Entity name:	User
Description:	the entity represents a user who log into the system
Alternate name:	visitor
Input data flows:	searching for a book, changing password, reserving / renewing a book and paying fines
Output data flows:	Book checkout confirmation Password change confirmation Book reservation/return confirmation Payment fine

Entity name:	Librarian
Description:	Responsible for managing the entire system
Alternate name:	Employee in library
Input data flows:	Adding a new branch, changing a password
Output data flows:	Confirmation of branch addition Password change confirmation

Data store name:	User information
Abbreviation:	D1
Description	Only authorized part of the system Responsible for storing all user's data
Alternate names:	Visitor file
Volume:	More information
Input data flows:	Recording new password, save data user and return fine flow Adding books: • Receiving book information to be added to the database. Checking a specific book: • Querying the database to retrieve information about a particular book. Returning a book: • Updating the database to mark a book as returned.
Output data flows:	Checking for login and send old password. Sending information about a specific book: • Retrieving and providing book information in response to a request. Generating a return report: • Creating a report to confirm the successful return of a book.

Data store name:	Data base books
Abbreviation:	D2
Description	Send and check a variable book
Alternate names:	
Volume:	Stores a large collection of books with their respective data.
Input data flows:	Adding books: • The process of adding book information to the database. Checking a specific book: • Querying the database to retrieve information about a particular book. Returning a book: • Updating the database to mark a book as returned.
Output data flows:	Sending information about a specific book: • Retrieving and providing book information as requested. Return report for a book request: • Generating a report to confirm the successful return of a book.