
Software Requirements Specification

for

**<LIBRARY MANAGEMENT
SYSTEM>**

Version 1.0 approved

Prepared by <Ratnesh Asati>

<MITS Gwalior>

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

<we have to prepare a library management system for institute MITS Gwalior.in this we provide a comprehensive description of the software system's requirements, functionalities, and constraints. The SRS serves as a reference document that outlines the project's scope, goals, and specific features that the library management system should possess.>

1.2 Document Conventions

<it's important to follow a standardized documentation convention to ensure clarity, consistency, and ease of understanding for all stakeholders involved. Here are some commonly used conventions for documenting an SRS for a library management system: Document Formatting, Headings and Subheadings, Numbering, Lists, Tables, Bold or Italics, Cross-References, Consistent Terminology, Diagrams and Figures, page numbering.>

1.3 Intended Audience and Reading Suggestions

< The Intended Audience section in the Software Requirements Specification (SRS) for a library management system outlines the specific stakeholders for whom the document is intended. It helps clarify who should read and refer to the SRS during the various stages of the project. Here's a description of the intended audience and some reading suggestions for each group:

1. Developers/Technical Team:

- These individuals are responsible for designing, developing, and implementing the library management system.
- Reading Suggestions: Developers should carefully review the Functional Requirements, Non-Functional Requirements, Use Cases, System Architecture, and Data Model sections. These sections provide detailed information about the desired functionality, technical specifications, system behavior, and data structure.

2. Project Managers:

- Project managers oversee the planning, coordination, and execution of the library management system development project.
- Reading Suggestions: Project managers should focus on the Overview section to understand the project's goals, objectives, and scope. They should also review the Functional Requirements, Non-Functional Requirements, and System Architecture sections to ensure the project aligns with the desired functionality, quality attributes, and overall system design.

3. Librarians and Library Staff:

- Librarians and library staff are the primary users of the library management system and play a crucial role in its daily operations.

- *Reading Suggestions: Librarians and library staff should primarily refer to the Use Cases and User Interfaces sections. These sections provide a detailed understanding of how the system will support their tasks, such as cataloging, circulation, patron management, and reporting. The User Interfaces section will give insights into the system's user interface design and usability.*

4. Testers:

- *Testers are responsible for verifying the functionality, performance, and usability of the library management system through testing activities.*
- *Reading Suggestions: Testers should closely examine the Functional Requirements, Non-Functional Requirements, and Use Cases sections. These sections provide a clear understanding of the system's expected behavior, performance criteria, and use case scenarios. Testers can use this information to design test cases and ensure comprehensive test coverage.*

5. Documentation Writers:

- *Documentation writers are responsible for creating user manuals, technical guides, and other documentation related to the library management system.*
- *Reading Suggestions: Documentation writers should review the Use Cases, User Interfaces, and System Architecture sections to gain a comprehensive understanding of the system's functionality and user interactions. This knowledge will assist them in creating accurate and user-friendly documentation.*

6. Management and Decision-makers:

- *Management and decision-makers hold overall responsibility for the success of the library management system project and make critical decisions based on the project's requirements and goals.*
- *Reading Suggestions: Management and decision-makers should start with the Overview section to understand the project's purpose, scope, and objectives. They should then focus on the Functional Requirements, Non-Functional Requirements, and System Architecture sections to ensure alignment with organizational goals and requirements.*

While these reading suggestions are provided, it's important for all stakeholders to have a holistic understanding of the library management system. Cross-referencing relevant sections and collaborating with other stakeholders can help gain a comprehensive view of the system's requirements and ensure successful development and implementation.

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1.4 Product Scope

< The software being specified is a Library Management System (LMS). Its purpose is to streamline and automate various library operations, such as cataloging, circulation, patron management, and reporting. The LMS serves as a comprehensive tool for librarians and library staff to efficiently manage library resources and enhance the overall user experience for patrons.

Relevant Benefits, Objectives, and Goals

- *Improved Efficiency: The LMS aims to automate manual processes, reduce paperwork, and streamline library operations. This results in improved efficiency and productivity for library staff, allowing them to focus more on providing quality services to patrons.*
- *Enhanced User Experience: The LMS focuses on providing a user-friendly interface and seamless user experience for library patrons. It enables easy searching and access to library resources, facilitates online reservations and renewals, and provides personalized recommendations and notifications.*
- *Accurate and Up-to-Date Information: The LMS ensures that the library's catalog and information are always accurate and up to date. It helps librarians maintain a comprehensive and organized database of books, periodicals, multimedia materials, and other resources.*
- *Reporting and Analytics: The LMS provides robust reporting and analytics capabilities, enabling librarians to gather valuable insights into library usage, circulation patterns, popular resources, and other metrics. This data can be utilized to make data-driven decisions and optimize library services.*

Relating to Corporate Goals or Business Strategies:

- *Promoting Knowledge Sharing: The LMS aligns with corporate goals of promoting knowledge sharing and providing access to information resources. It enables the organization to efficiently manage and disseminate knowledge assets within the library.*
- *Enhancing Customer Experience: By offering a user-friendly interface, personalized services, and efficient resource management, the LMS contributes to enhancing the customer experience. This aligns with business strategies aimed at attracting and retaining library patrons.*
- *Operational Efficiency: The LMS's automation and streamlining of library operations align with business strategies focused on operational efficiency. It helps optimize resource utilization, reduce administrative overheads, and maximize the productivity of library staff. If a separate Vision and Scope document is available, it should be referred to for more comprehensive details regarding the software's purpose, goals, and alignment with corporate goals or business strategies.>*

1.5 References

<In the Software Requirements Specification (SRS) for the Library Management System, there may be references to other documents or web addresses that provide additional information or context.>

2. Overall Description

2.1 Product Perspective

< origin and context:

- The origin of the product stems from the increasing demand for efficient library management systems in educational institutions, public libraries, and other organizations with extensive collections of books and resources.
- The need for streamlining library operations, enhancing user experiences, and improving resource management has prompted the development of this dedicated software solution. >

2.2 Product Functions

- <User Authentication and Access Control:
 - Allow users to authenticate themselves with appropriate credentials.
 - Implement access control mechanisms to ensure authorized access to system features and data.
- Catalog Management:
 - Enable librarians to create, update, and manage a comprehensive catalog of library resources, including books, periodicals, multimedia materials, etc.
 - Support functionalities like adding new resources, updating resource information, and managing resource categories.
- Circulation Management:
 - Facilitate the process of borrowing and returning library resources by patrons.
 - Manage loan durations, due dates, and overdue fines.
 - Handle reservation requests and manage waitlists.
- Patron Management:
 - Maintain a database of library patrons, including their personal information, membership details, and borrowing history.
 - Enable librarians to register new patrons, update patron information, and manage membership statuses.
- Search and Discovery:
 - Provide robust search capabilities for patrons to find library resources based on various criteria, such as title, author, subject, and keywords.
 - Offer advanced search options, including filters and sorting.
- Reservation and Renewal:
 - Allow patrons to reserve available resources and manage their reservations.
 - Enable patrons to renew borrowed resources within the allowed limits.
- Reporting and Analytics:
 - Generate reports on library usage, circulation statistics, popular resources, and other relevant metrics.
 - Provide data analytics features to gain insights into library operations and make informed decisions.
- Notifications and Reminders:
 - Send automated notifications and reminders to patrons regarding due dates, reservation statuses, and other relevant information.

- *Administrative Functions:*
 - *Provide administrative functionalities for librarians to manage system settings, user roles, and permissions.*
 - *Support administrative tasks like generating reports, managing fines, and configuring system preferences.>*

2.3 User Classes and Characteristics

1. *< Librarian/Administrator:*
 - *Characteristics: Highly knowledgeable about library operations, cataloging, and resource management.*
 - *Responsibilities: Oversee the overall functioning of the library management system, manage system configurations, user roles, and permissions, and generate reports and analytics.*
 - *Importance: Librarians/Administrators are crucial users as they have full access to system functionalities and play a key role in managing and maintaining the library system.*
2. *Library Staff:*
 - *Characteristics: Familiar with library operations and procedures, but may have varying levels of technical expertise.*
 - *Responsibilities: Perform day-to-day tasks such as cataloging resources, managing patron accounts, handling circulation activities, and assisting patrons with their queries and requests.*
 - *Importance: Library staff are important users as they heavily rely on the system to carry out their daily activities efficiently and provide quality services to patrons.*
3. *Patrons/End Users:*
 - *Characteristics: Varied levels of technical expertise, educational backgrounds, and familiarity with library systems.*
 - *Responsibilities: Search for and discover library resources, borrow and return items, manage their accounts, place reservations, and interact with the library system to access the services and resources offered.*
 - *Importance: Patrons are essential users as they are the primary beneficiaries of the library management system, relying on it to find, borrow, and interact with the available resources effectively.>*

2.4 Operating Environment

- *hardware components:*
 - *The software is designed to operate on standard hardware platforms commonly used in the industry, including desktop computers, laptops, and servers.*
 - *The hardware should meet the minimum system requirements specified by the software vendor to ensure optimal performance and usability.*
- *Operating System:*
 - *The software is compatible with multiple operating systems, including but not limited.*

- *Windows: Windows 10, Windows Server 2016/2019*

Software Components and Applications:

- *The Library Management System may need to peacefully coexist and integrate with various software components and applications, such as:*
- *Relational Database Management System (RDBMS): MySQL, PostgreSQL, Oracle, Microsoft SQL Server, etc.*
- *Web Server: Apache, Nginx, Microsoft IIS, etc.*
- *Programming Languages: Java, C#, Python, PHP, JavaScript, etc.*
- *Libraries and Frameworks: Spring Boot, Django, Ruby on Rails, Angular, React, etc.*
- *Security Components: Antivirus software, firewall systems, intrusion detection systems, etc.*

Integration and Compatibility Considerations:

- *The software should be designed to adhere to industry standards and best practices to ensure compatibility and interoperability with the required software components and applications.*
- *Compatibility testing should be conducted to verify the seamless integration and proper functioning of the Library Management System with the coexisting software components.*
- *Dependencies on specific versions or configurations of software components should be documented and communicated to the users and system administrators.>*

2.5 Design and Implementation Constraints

1. < Corporate or Regulatory Policies:

- *Developers must adhere to corporate policies, guidelines, and regulations set by the organization or industry.*
- *Compliance with data privacy laws, security standards, accessibility requirements, and any other relevant policies is essential.*

2. Hardware Limitations:

- *Developers must consider any hardware limitations, such as timing requirements, memory constraints, or specific hardware configurations.*
- *The software should be optimized to work efficiently within the given hardware environment.*

3. Interfaces to Other Applications:

- *The Library Management System may need to integrate with other applications or systems, and developers must consider the compatibility and available interfaces for seamless integration.*
- *Adherence to specific data exchange formats, protocols, or APIs may be necessary for successful integration.*

4. Technology, Tools, and Databases:

- *The use of specific technologies, tools, frameworks, and databases may be mandated by the project or organizational standards.*
- *Developers must follow the guidelines and constraints related to the chosen technologies and tools for development.*

5. Language Requirements:

- If there are specific language requirements for the software development, such as using a particular programming language or platform, developers must comply with these requirements.

6. Security Considerations:

- Developers must incorporate security measures, such as encryption, access control, and authentication mechanisms, to protect sensitive data and prevent unauthorized access.
- Compliance with security standards and best practices is crucial.

7. Design Conventions and Programming Standards:

- Developers must follow established design conventions, programming standards, and coding guidelines specified by the customer's organization.
- This ensures consistency, maintainability, and ease of future enhancements or modifications.

8. Maintenance Responsibility:

- If the customer's organization will be responsible for maintaining the delivered software, developers need to consider this factor while designing and developing the system.
- The software should be designed with maintainability and scalability in mind, and documentation should be provided to assist in future maintenance tasks.>

2.6 User Documentation

1. <User Manuals:

- Comprehensive user manuals providing detailed instructions on how to use the system.
- User manuals may cover various topics, such as system overview, getting started, user interfaces, functionalities, configuration settings, and troubleshooting guides.
- The user manuals may be provided in digital formats (PDF, HTML, or online documentation) for easy accessibility and searchability.

2. Online Help:

- Context-sensitive online help integrated within the software interface.
- Online help provides on-demand assistance to users while they are using the system, offering information about specific features, processes, and user interface elements.
- The online help may be available in a searchable format, allowing users to quickly find relevant information.

3. Tutorials and Walkthroughs:

- Step-by-step tutorials and walkthroughs demonstrating common tasks and workflows in the Library Management System.
- Tutorials may include videos, screenshots, or interactive guides to help users understand and learn how to perform specific actions or utilize advanced features.

4. FAQs and Knowledge Base:

- Frequently Asked Questions (FAQs) document addressing common queries, concerns, and troubleshooting tips.

- A knowledge base or online repository of articles, guides, and best practices to assist users in utilizing the software effectively.

5. Release Notes:

- Documentation detailing the changes, enhancements, and bug fixes introduced in each software release.
- Release notes provide information about new features, improvements, known issues, and any important upgrade instructions.

Known User Documentation Delivery Formats or Standards:

- The user documentation may be delivered in digital formats, such as PDF, HTML, or online documentation accessible through a web browser.
- The documentation may follow established documentation standards, such as the Microsoft Manual of Style for Technical Publications or other industry-standard conventions, to ensure consistency and readability.>

2.7 Assumptions and Dependencies

1. < Third-Party or Commercial Components:

- *Assumption: The SRS assumes the availability and compatibility of specific third-party or commercial components that are planned to be used in the development of the system.*
- *Impact of Incorrect Assumption: If the assumed third-party or commercial components are not available or not compatible as expected, it may require reevaluation of the requirements and alternative solutions may need to be explored.*

2. Development and Operating Environment:

- *Assumption: The SRS assumes a specific development and operating environment, including development tools, libraries, frameworks, and software versions.*
- *Impact of Incorrect Assumption: If the actual development and operating environment differs significantly from the assumed environment, it may affect the feasibility, implementation, and performance of the system. Adjustments or alternative approaches may be required.*

3. Constraints and Limitations:

- *Assumption: The SRS assumes certain constraints and limitations, such as budget constraints, time constraints, resource availability, and technical limitations.*
- *Impact of Incorrect Assumption: If the actual constraints and limitations differ from the assumed ones, it may impact the project's schedule, budget, and overall feasibility. It may require revisiting the requirements and making adjustments to accommodate the new constraints.*

4. Dependencies on External Factors:

- *Assumption: The SRS assumes dependencies on external factors, such as software components or modules from another project, external APIs, or services.*

- *Impact of Incorrect Assumption: If the assumed dependencies are not available, incompatible, or delayed, it may affect the development and integration of the system. Alternative solutions or adjustments may be necessary to address the dependency issues.>*

3. External Interface Requirements

3.1 User Interfaces

1. <User Interface Components:

- *The user interface of the Library Management System will consist of various software components, including but not limited to:*
 - *Login and Authentication Screens: Allows users to securely log into the system using their credentials.*
 - *Navigation Menu: Provides access to different modules and functionalities within the system.*
 - *Search and Browse Interfaces: Enables users to search for library resources based on various criteria such as title, author, keywords, etc.*
 - *Resource Details Display: Shows detailed information about a selected resource, including availability, location, description, etc.*
 - *Account Management: Allows users to view and update their personal information, manage borrowed items, place reservations, etc.*
 - *Reports and Analytics: Provides a user-friendly interface to generate reports and access system analytics.*

2. GUI Standards and Style Guides:

- *The user interface design should follow established GUI standards and style guides to ensure consistency, usability, and a familiar experience for users.*
- *Design elements such as color schemes, typography, iconography, and layout should adhere to the organization's branding guidelines and UI/UX best practices.*

3. Screen Layout Constraints:

- *Screens should be designed to optimize information presentation, readability, and ease of navigation.*
- *Consideration should be given to screen resolutions, aspect ratios, and responsive design principles to ensure compatibility across different devices and screen sizes.*

4. Standard Buttons and Functions:

- *Commonly used buttons and functions should follow standard conventions to enhance user familiarity and ease of use.*
- *Examples include "Save," "Cancel," "Back," "Print," "Help," and "Logout" buttons.*

5. Error Message Display Standards:

- *Error messages should be clear, concise, and provide relevant information to assist users in resolving issues.*

- Consistent error message formatting and language should be followed throughout the system.

6. Keyboard Shortcuts:

- Keyboard shortcuts can enhance user efficiency and productivity.
- Commonly used actions, such as navigating between screens or performing frequently used functions, may have associated keyboard shortcuts.>

3.2 Hardware Interfaces

1. < Supported Device Types:

- The Library Management System should be compatible with various hardware devices commonly used by users, including:
 - Desktop computers
 - Laptop computers
 - Tablets
 - Smartphones

2. Data and Control Interactions:

- The software interacts with hardware components for various purposes, including:
 - Input: Users interact with the software through input devices such as keyboards, mice, touchscreens, or voice recognition systems.
 - Output: The software provides output to users through display devices such as monitors, screens, or projectors.
 - Storage: The software may interact with hardware components responsible for data storage, such as hard disk drives, solid-state drives, or cloud storage services.

3. Communication Protocols:

- The Library Management System may utilize communication protocols to facilitate interactions with hardware components, such as:
 - USB (Universal Serial Bus): For connecting peripheral devices like barcode scanners, card readers, or printers.
 - Network Protocols (e.g., TCP/IP, HTTP): For communication between the software and network devices, enabling access to remote resources or integration with other systems.
 - Bluetooth: For wireless communication with devices like mobile barcode scanners or wireless printers.
 - Wi-Fi: For wireless communication with devices connected to the local network, such as laptops, tablets, or smartphones.

4. Hardware Compatibility:

- The software should be designed to work seamlessly with a wide range of hardware configurations, taking into consideration factors such as processor architecture, memory requirements, and storage capacities.
- Compatibility testing should be conducted to ensure the software functions properly across different hardware environments.

5. Device-Specific Considerations:

- The software should be designed to account for device-specific characteristics, such as screen sizes, touch interactions, or limited processing power in the case of mobile devices.
- Responsive design principles should be employed to optimize the user experience across various devices.>

3.3 Software Interfaces

<Databases:

- The Library Management System may interface with one or more databases to store and retrieve data related to library resources, user information, transactions, and system configurations.
- Specific database management systems (DBMS) and versions should be identified, such as:
 - MySQL 8.0
 - PostgreSQL 13.0

Operating Systems:

- The Library Management System should be compatible with specific operating systems and versions, including:
 - Windows 10

Tools and Libraries:

- The software may utilize various tools and libraries to facilitate its functionality, such as:
 - Programming Languages and Frameworks: Java, Python, .NET, or specific frameworks like Spring or Django.
 - Web Technologies: HTML5, CSS, JavaScript, and front-end libraries like React or Angular.
 - Reporting and Analytics: Integration with tools like Tableau or Power BI for generating reports and visualizing data.

Integrated Commercial Components:

- The Library Management System may integrate with specific commercial components or third-party software, such as:
 - Payment Gateways: Integration with payment processors like PayPal or Stripe for online transactions and fee payments.
 - Barcode Scanners: Integration with hardware or software-based barcode scanners for quick resource identification and check-in/out processes.

Data Items and Messages:

- Data Items: The system may handle various data items, including library resource information (titles, authors, ISBNs, descriptions), user profiles (names, addresses, contact details), transaction records (borrowing, returning), and system configurations (settings, preferences).
- Messages: The system may exchange messages for tasks such as user authentication, resource reservations, notifications (e.g., overdue items), and system alerts.
- The nature of communication may involve synchronous or asynchronous methods, depending on the requirements of specific interactions.

Data Sharing Mechanism:

- Shared data across software components may be achieved through APIs (Application Programming Interfaces) or database queries.
- The implementation of data sharing should adhere to best practices and security guidelines, ensuring proper access controls, data integrity, and confidentiality.>

3.4 Communications Interfaces

< Communication Nature:

- The Library Management System may require services such as:

- *Authentication and Authorization: Integration with authentication services (e.g., LDAP, OAuth) for user login and access control.*
- *Email Service: Integration with an email service provider for sending notifications and communication with users.>*

4. System Features

4.1 User Management:

4.1.1 Description and Priority

- *User Registration: Allows new users to create accounts in the library system.*
- *User Authentication: Enables users to log in securely using their credentials.*
- *User Profile Management: Allows users to view and update their personal information.*

4.1.2 Functional Requirements

REQ-1: login username

REQ-2: login password

4.2 Resource Management:

4.2.1 Description and Priority

- *Resource Catalog: Provides a searchable catalog of library resources, including books, journals, media, etc.*
- *Resource Reservation: Allows users to reserve resources that are currently unavailable.*
- *Resource Checkout/Check-in: Enables users to borrow and return resources efficiently.*

4.2.2 Functional Requirements

REQ-1: books name

REQ-2: date of issuing/returning

4.3 Search and Discovery:

4.3.1 Description and Priority

- *Keyword Search: Allows users to search for resources using keywords, titles, authors, or other criteria.*
- *Advanced Search: Provides advanced search options to refine resource queries based on specific attributes.*
- *Resource Recommendations: Suggests relevant resources based on user preferences or borrowing history.*

4.3.2 Functional Requirements

REQ-1: auto-filled book name after writing 2-3 word of book or author

REQ-2: show issued books

4.4 Borrowing and Returns:

4.4.1 Description and Priority

- *Borrowing Limits: Enforces borrowing limits and rules, such as the maximum number of resources a user can borrow or the loan duration.*
- *Renewals: Supports resource renewal requests, allowing users to extend the borrowing period if permitted.*

- *Overdue Management: Tracks and manages overdue resources, generating notifications and imposing fines if applicable.*

4.4.2 Functional Requirements

REQ-1: limits of issuing books.

REQ-2: generating fine at given time period.

4.5 Reservation and Holds:

4.5.1 Description and Priority

- *Reservation Queue: Manages a queue for reserved resources, providing priority-based notifications to users when a resource becomes available.*
- *Holds Management: Handles resource holds, allowing users to place requests for items currently checked out by others*

4.5.2 Functional Requirements

REQ-1: managed books department-wise.

REQ-2: manage books for faculty.

4.6 Fine management:

4.6.1 Description and Priority

- *Fine Calculation: Calculates fines for overdue resources based on predefined rules and rates.*
- *Fine Payment: Provides mechanisms for users to pay fines online securely.*

4.6.2 Functional Requirements

REQ-1: fine calculation as per rules.

REQ-2: having various payment methods.

4.7 Reporting and Analytics :

4.7.1 Description and Priority

- *Reporting Dashboard: Generates reports and statistics on resource utilization, user activity, popular items, etc.*
- *Analytics Insights: Provides data-driven insights to library administrators for informed decision-making.*

4.7.2 Functional Requirements

REQ-1: update personal details.

REQ-2: updates faculty profile.

4.8 Notifications and Communication:

4.8.1 Description and Priority

- *Email Notifications: Sends automated email notifications to users for events like due date reminders, reservation availability, or overdue fines.*
- *Announcements: Allows administrators to communicate important information and announcements to users.*

4.8.2 Functional Requirements

REQ-1: send details on email.

REQ-2: send availability of books on email.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

<If there are performance requirements for the product under various circumstances, state them here and explain their rationale, to help the developers understand the intent and make suitable design choices. Specify the timing relationships for real time systems. Make such requirements as specific as possible. You may need to state performance requirements for individual functional requirements or features.>

5.2 Safety Requirements

<Specify those requirements that are concerned with possible loss, damage, or harm that could result from the use of the product. Define any safeguards or actions that must be taken, as well as actions that must be prevented. Refer to any external policies or regulations that state safety issues that affect the product's design or use. Define any safety certifications that must be satisfied.>

5.3 Security Requirements

< Hazard Analysis. Risk Assessment. Safety Standards and Regulations. Design for Safety. Safeguards and Action. Preventative Measures. Safety Certifications: Depending on the product type and intended market, certain safety certifications may be required to demonstrate compliance with applicable safety standards. These certifications could be issued by independent testing organizations, such as UL (Underwriters Laboratories).>

5.4 Software Quality Attributes

1. *<Adaptability: The ability of the product to be easily modified or adjusted to accommodate changing requirements or environments.*
 - *Attribute: The product should support a configurable interface that allows users to customize settings according to their specific needs.*
 - *Verifiable attribute: The product should provide a documented API (Application Programming Interface) that allows developers to integrate additional functionality or extensions.>*
2. *Availability: The extent to which the product remains operational and accessible to users over time.*
 - *Attribute: The product should have a documented uptime percentage (e.g., 99.9%) that specifies the maximum allowable downtime.*
 - *Verifiable attribute: Regular monitoring and reporting of system availability, including tracking of unplanned outages and mean time to recover (MTTR).*
3. *Correctness: The accuracy and precision of the product in delivering expected results or outputs.*
 - *Attribute: The product should have a specified margin of error or deviation from expected outcomes.*

- *Verifiable attribute: Conducting thorough testing and validation processes to ensure that the product meets or exceeds defined accuracy benchmarks.*
- 4. *Flexibility: The degree to which the product can accommodate changes or variations in requirements without requiring extensive modifications.*
- *Attribute: The product should support customizable workflows or configurations to adapt to different user preferences.*
- *Verifiable attribute: Demonstrating the ability to modify specific aspects of the product without impacting core functionality or stability.*

5.5 Business Rules

5.6 <security,speed,availability,portability,encryption,visibility,operability,recoverability,attractive web-page. >

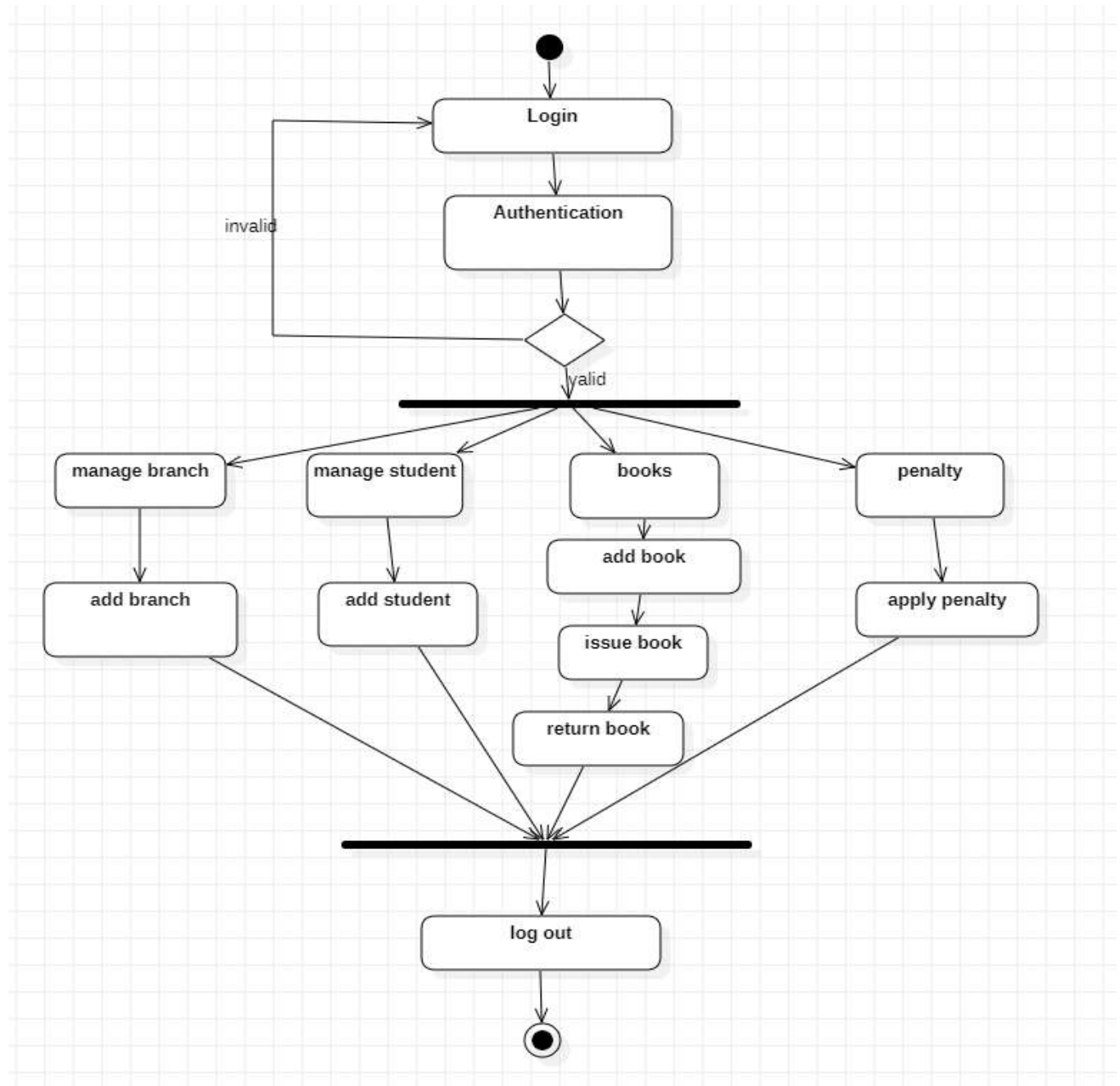
6. Other Requirements

Appendix A: Glossary

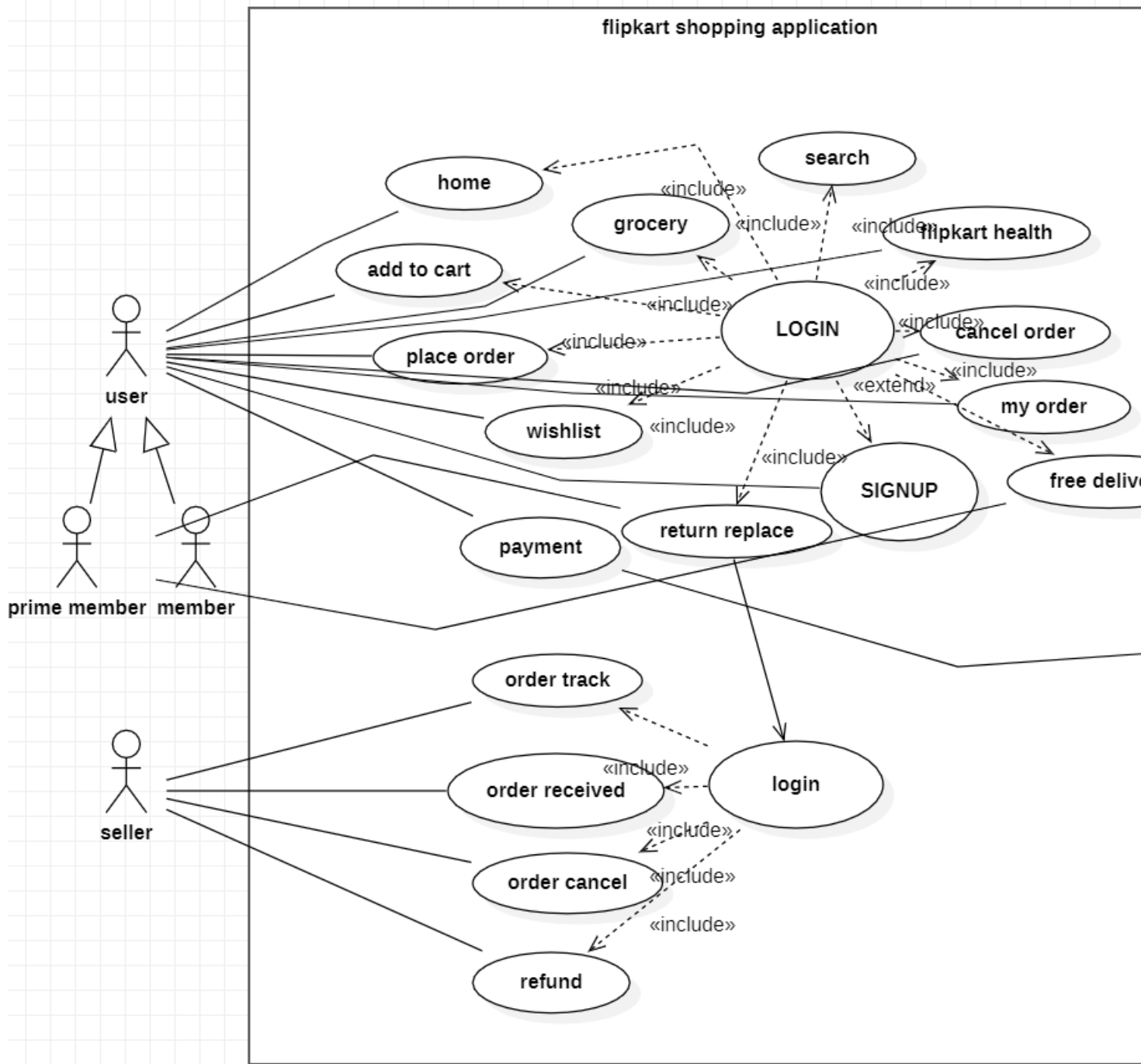
<Define all the terms necessary to properly interpret the SRS, including acronyms and abbreviations. You may wish to build a separate glossary that spans multiple projects or the entire organization, and just include terms specific to a single project in each SRS.>

Appendix B: Analysis Models

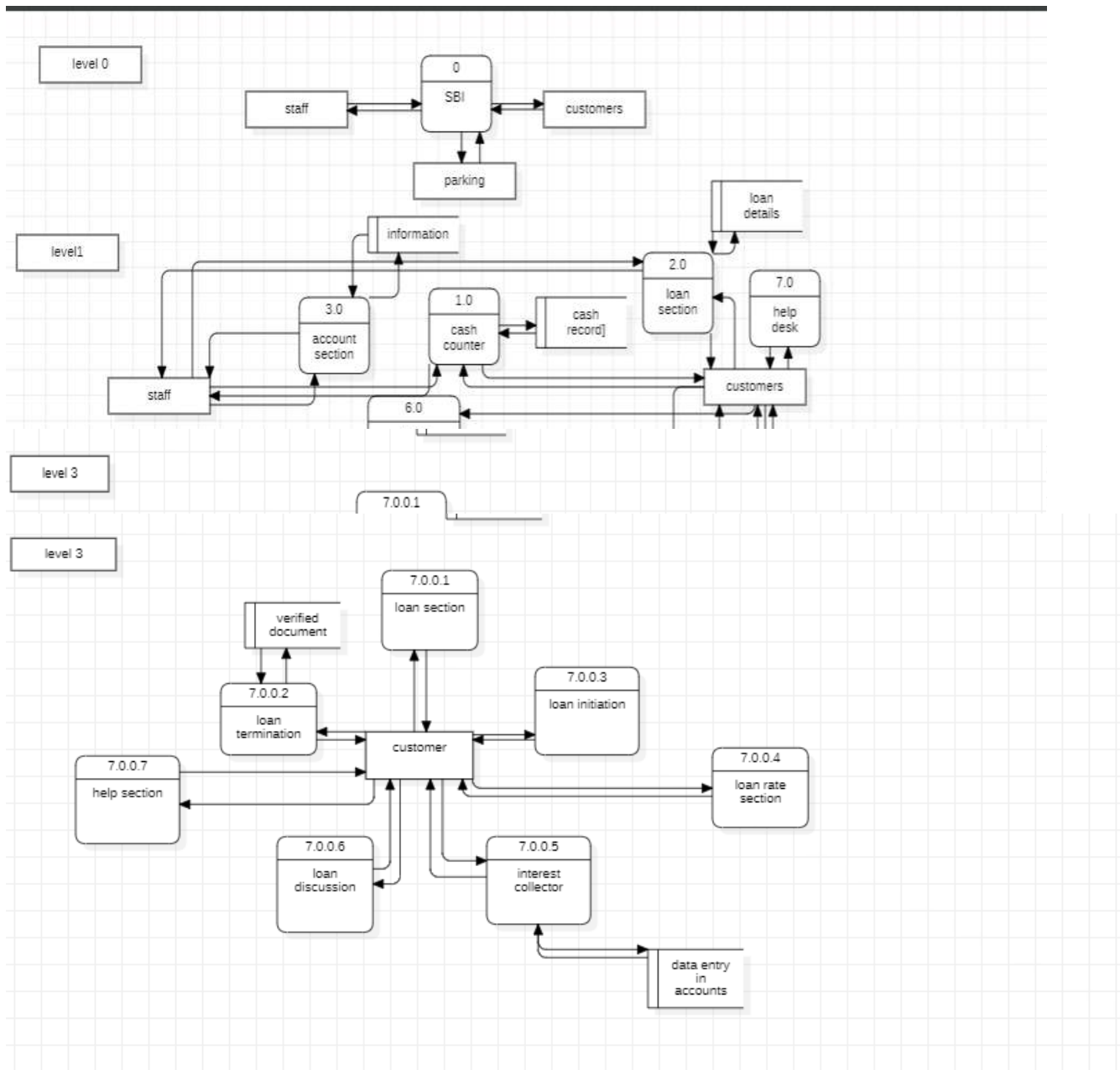
ACTIVITY MODEL

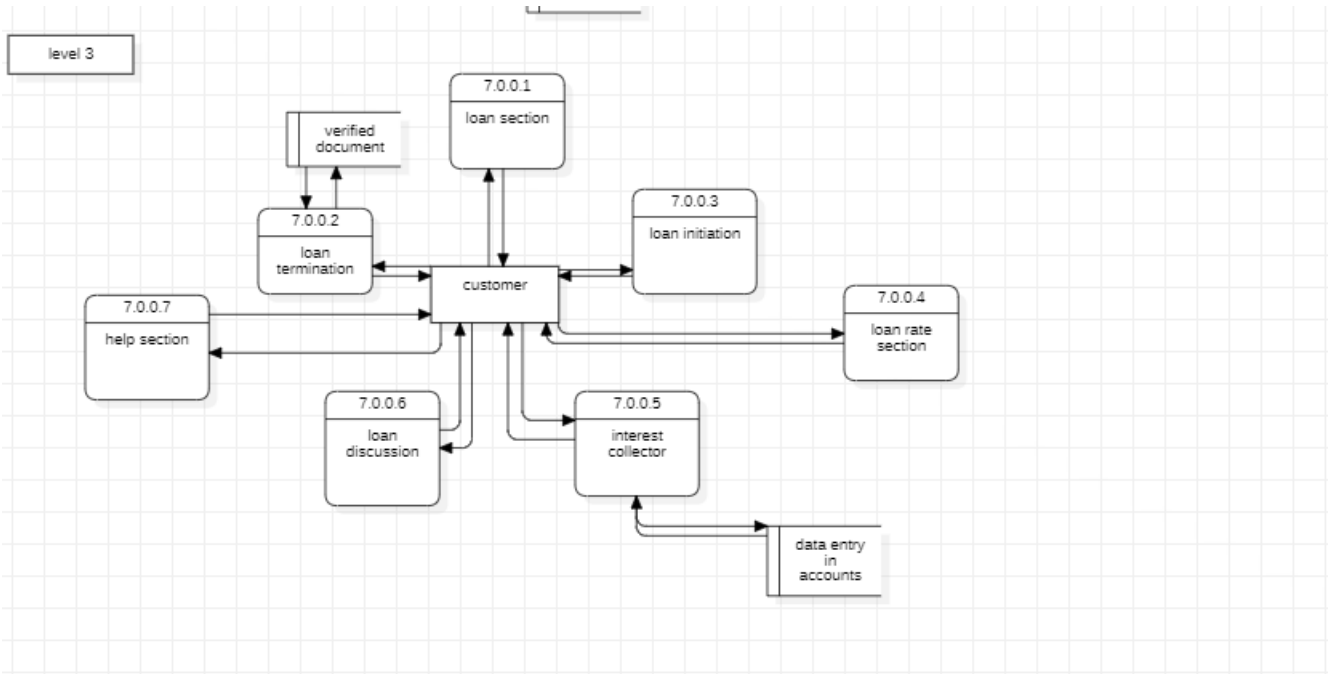


USE-CASE MODEL

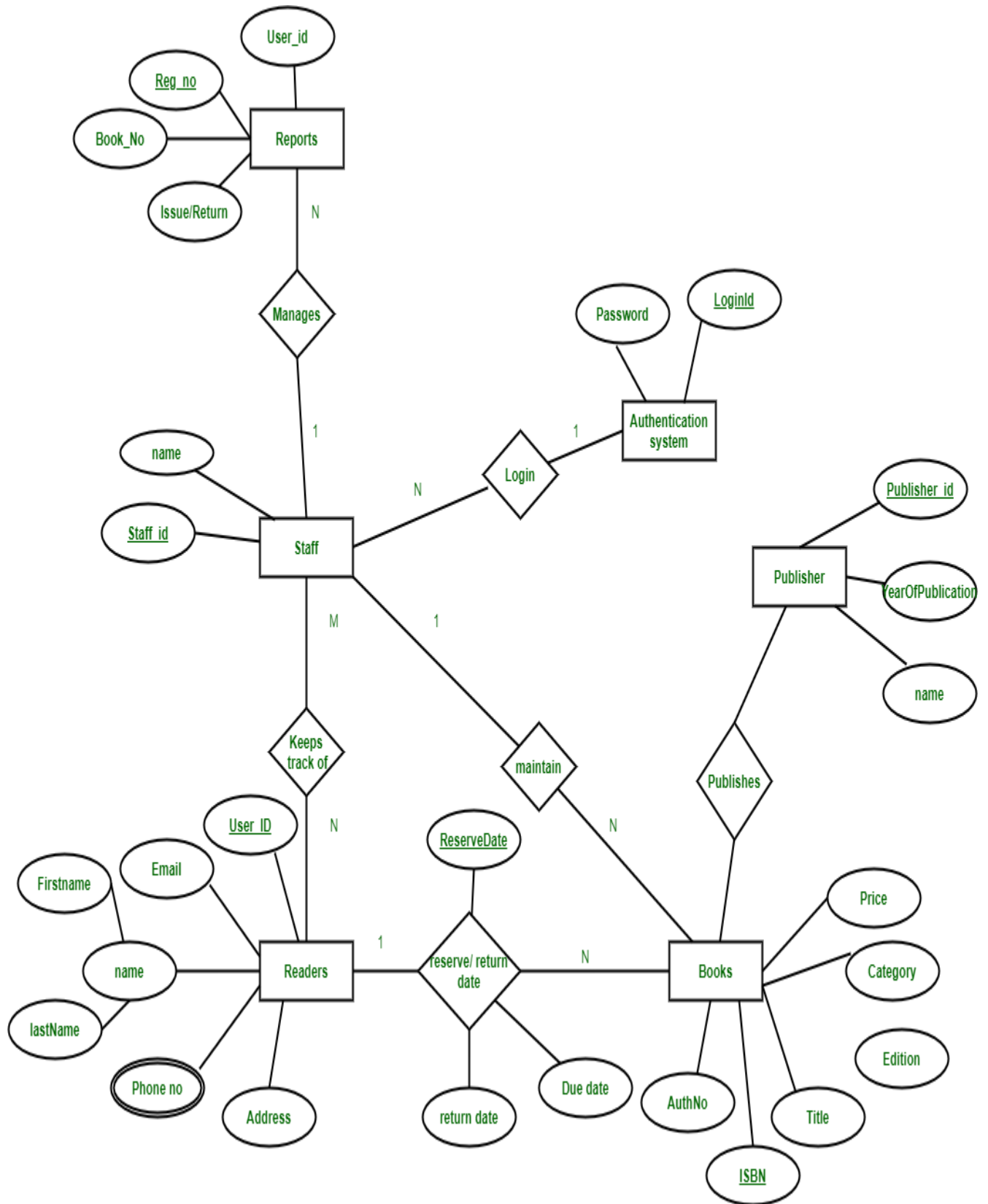


DFD MODEL





E-R DIAGRAM



Appendix C: To Be Determined List

<Collect a numbered list of the TBD (to be determined) references that remain in the SRS so they can be tracked to closure.>

: Library Management System:

Functional:

- ① Books Name
- ② Date of Issue
- ③ Date of Returning
- ④ student's Name
- ⑤ student's Branch (ID)
- ⑥ interface of webpage
- ⑦ Scanner on Card
- ⑧ show Issued Book

Non functional:

- ① security for login password
- ② speed for searching Books
- ③ Auto filled Book Name after entering 3-4 words.
- ④ Attractive webpage (interface)
- ⑤ easy to use interface
- ⑥ updated with time
- ⑦ Availability
- ⑧ performance
- ⑨ portability
- ⑩ Encryption
- ⑪ Recoverability
- ⑫ Backup, continuity
- ⑬ visibility
- ⑭ Operability
- ⑮ Reduce overall costs

Functional:

- ⑨ update personal details
- ⑩ change password
- ⑪ Payment option for late submission.
- ⑫ Manage Teacher's profile.
- ⑬ Separates books into categories
- ⑭ show Time for Issuing books
- ⑮ show Time for returning books.
- ⑯ show late Submission fee.
- ⑰ showing category for other people
- ⑱ showing charges per day for external people.
- ⑲ Manage accounts of external people.
- ⑳ easily availability of Books.

ASSIGNMENT-02 (0901EC221087)

Q: Explain with the help of examples, the type of problems for which you would adopt the waterfall model of software development and the type of problems for which you adopt the spiral model.

	Problems	Waterfall	Spiral
1)	approach:	Linear	Iterative & Risk-driven
2)	key phase:	Requirement gathering, Designing, Coding, Testing, Deployment	Requirement gathering, Risk associates, Implementation, Deployment
3)	Risk factor:	X	✓
Example: 4)	Calculator app. (Small project)	✓	X
5)	Library Management	✓	X
6)	Project with changing business priorities	X	✓
7)	Large scale e-commerce platform	X	✓

ASSIGNMENT -03

EN: NO. 0901EC221087 (Ratnesh Ascoli)

Dt. _____

Pg. _____

Q.3 Differentiate between waterfall & prototype Model.

Waterfall Model

- It is also known as linear sequential life cycle Model.
- It is best suited when the customer requirements are clear.
- Flexibility to change in waterfall Model is difficult.
- Requirements are gathered at this beginning and change are difficult to accommodate later on.
- Projects can take longer and be costly due to limited opportunities for iteration & changes.

Prototype Model

- This model is called Rapid throw away model.
- It is best suited when the requirements are not clear & supposed to be change.
- Flexibility to change in prototype Model is easy.
- Requirements are refined through feedback & iteration, making it easier to accommodate changes.
- Projects can be completed more quickly & at a lower cost due to iterative & incremental approach.

How to write Test

Project Name	Bank Management system
Module Name	Login
Created By	Ratnesh Asati
Creation Date	6/27/2023
Reviewd By	Test Lead
Reviewd Date	4/27/2023

S.No.	Test Scenario ID	Test Scenario Description	Test Case ID	Test Case Description	Test Steps / Execution Steps	Preconditions
1	TS_01	Verify the login functionality of Bank login page	TC_01	Enter a valid username and valid password	1. Enter valid username 2. Enter valid password 3. Click on login button	Valid URL of Bank Test Data
2	TS_01	Verify the login functionality of Bank login page	TC_02	Enter a valid username and invalid password	1. Enter valid username 2. Enter invalid password 3. Click on login button	Valid URL of Bank Test Data

Cases

		Expected result = Actual result then Status will be Pass					
Test Data	Post Conditions	Expected Result	Actual Result	Status	Executed By	Executed Date	Comments (If any)
Username: Gmail@2000 Password:hello@123	User should able to see the home page	Successful login	Successful login	Pass	Tester_ID01	6/29/2023	No comment
Username: Gmail@2000 Password:hiiii@126	An error message "Invalid username or password"	A popup message box to show an error "Invalid username/pass word"	A popup message box to show an error "Invalid username/pa ssword"	Pass	Tester_ID01	6/29/2023	No comment

3	TS_01	Verify the login functionality of Bank login page	TC_03	Enter an invalid username and valid password	1. Enter invalid username 2. Enter valid password 3. Click on login button	Valid URL of Bank Test Data
4	TS_01	Verify the login functionality of Bank login page	TC_04	Enter an invalid username and invalid password	1. Enter invalid username 2. Enter invalid password 3. Click on login button	Valid URL of Bank Test Data
5	TS_02	Verify the "compose a mail" functionality of Bank	TC_05	Enter a valid address of the receiver	1. Click on the compose button. 2. Enter the valid address of the receiver. 3. Click on the send button.	Valid URL of Bank Test Data
6	TS_02	Verify the "compose a mail" functionality of Bank	TC_06	Not Enter address of the receiver	1. Click on the compose button. 2. Not Enter address of the receiver. 3. Click on the send button.	Valid URL of Bank Test Data
7	TS_02	Verify the "compose a mail" functionality of Bank	TC_07	Enter a invalid address of the receiver	1. Click on the compose button. 2. Enter an invalid address of the receiver. 3. Click on the send button.	Valid URL of Bank Test Data

Username: Gmail@gmail.com Password:hello@123	An error message "Invalid username or password"	A popup message box to show an error "Invalid username/pass word"	Successful login	Fail	Tester_ID01	6/29/2023	No comment
Username: Gmail@gmail.2000 Password:hiii@000	An error message "Invalid username or password"	A popup message box to show an error "Invalid username/pass word"	Successful login	Fail	Tester_ID01	6/29/2023	No comment
Username: Rikki@mitsgwalior.in	User should able to send the mail.	Successfully send	Successfully send	Pass	Tester_ID01	6/29/2023	No comment
Nil	User should able to send the mail.	Successfully send	Successfully send	Fail	Tester_ID01	6/29/2023	No comment
Username: bulbul@gmail.com	Mail Can not be sent	An error message "Invalid username"	An error message "Invalid username"	Pass	Tester_ID01	6/29/2023	No comment

8	TS_02	Verify the "compose a mail by attaching a file" functionality of Bank	TC_08	Attach any multimedia file	1. Click on the compose button. 2. Enter the valid address of the receiver. 3. Click on the attach a file. 3. Click on the send button.	Valid URL of Bank, Test Data, Any multimedia file
9	TS_02	Verify the "compose a mail by attaching a file" functionality of Bank	TC_09	Attach any multimedia file	1. Click on the compose button. 2. Enter the invalid address of the receiver. 3. Click on the attach a file. 3. Click on the send button	Valid URL of Bank, Test Data, Any multimedia file
10	TS_02	Verify the "compose a mail by attaching a file" functionality of Bank	TC_10	Attach any multimedia file	1. Click on the compose button. 2. Not Enter the address of the receiver. 3. Click on the attach a file. 3. Click on the send button	Valid URL of Bank, Test Data, Any multimedia file

Username: Rikki@mitsgwalior.in Multimedia file: Word, PDF, Excel, Image file	File should be send successfully	Successfully send	Successfully send	Pass	Tester_ID01	6/29/2023	No comment
Username: Bulbul@mitsgwalior.in Multimedia file: Word, PDF, Excel, Image file	Mail Can not be sent	An error message "Invalid username"	An error message "Invalid username"	Pass	Tester_ID01	6/29/2023	No comment
Multimedia file: Word, PDF, Excel, Image file	Mail Can not be sent	An error message "Enter username"	An error message "Enter username"	Pass	Tester_ID01	6/29/2023	No comment

11	TS_02	Verify the "compose a mail by attaching a file" functionality of Bank	TC_11	Attach any multimedia file	1. Click on the compose button. 2. Not Enter the address of the receiver. 3. Click on the attach a file. 3. Click on the send button	Valid URL of Bank, Test Data, Any multimedia file
12	TS_03	Verify the " View balance" functionality of Bank	TC_12	Enter the valid MPIN	1. Click on the button. 2. Enter the valid mpin of the receiver.	Valid URL of Bank, Test Data
13	TS_03	Verify the " View balance" functionality of Bank	TC_13	Enter the invalid MPIN	1. Click on the button. 2. Enter the invalid mpin of the receiver.	Valid URL of Bank, Test Data
14	TS_03	Verify the " View balance" functionality of Bank	TC_14	Not Enter MPIN of the receiver	1. Click on the button. 2. Not Enter the mpin of the receiver.	Valid URL of Bank, Test Data

Multimedia file: Word, PDF, Excel, Image file	A pop up box with " enter the address of the receiver	A pop up box with " enter the address of the receiver	Successfully Send	Fail	Tester_ID01	6/29/2023	No comment
MPIN: 225635	User should able to see the balance	User should able to see the balance	Success	Pass	Tester_ID01	6/29/2023	No comment
MPIN:215466	User not able to see balance	Unsuccess	Unsuccess	Pass	Tester_ID01	6/29/2023	No comment
nil	User should not able to see the balance	Unable to see the balance	Success	Fail	Tester_ID01	6/29/2023	No comment

15	TS_04	Verify the " password reset" functionality of bank	TC_15	Enter valid username	1. Click on the button. 2. Enter the valid username of the receiver.	Valid URL of Bank, Test Data
16	TS_04	Verify the " password reset" functionality of bank	TC_16	Enter invalid username	1. Click on the button. 2. Enter the invalid username of the receiver.	Valid URL of Bank, Test Data
17	TS_04	Verify the " password reset" functionality of bank	TC_17	Not Enter any username	1. Click on the button. 2. Not Enter any username of the receiver.	Valid URL of Bank, Test Data
18	TS_04	Verify the " password reset" functionality of bank	TC_18	Enter valid username	1. Click on the button. 2. Enter the valid username of the receiver.	Valid URL of Bank, Test Data

Username: Gmail@2000	User Should Receive reset link & instructions	User should able to see the balance	Success	Pass	Tester_ID01	6/29/2023	No comment
Username: Gmail@gmail.com	User Should not Receive reset link & instructions	An error message "Invalid username"	An error message "Invalid username"	Pass	Tester_ID01	6/29/2023	No comment
Nil	An error message "Enter username & old password"	An error message "Enter username & old password"	Received reset link	Fail	Tester_ID01	6/29/2023	No comment
Username: Gmail@2000	An error message "Invalid username"	User Should not Receive reset link & instructions	Received reset link & instructions	Fail	Tester_ID01	6/29/2023	No comment

19	TS_05	Verify the "Remember me" functionality of bank	TC_19	Enter a valid username or valid password	1. Enter valid username or Enter valid password 2. Select from saved username & password 3. Click on login button	Valid URL of Bank Test Data
20	TS_05	Verify the "Remember me" functionality of bank	TC_20	Enter a valid username or valid password	Enter valid username or Enter valid password 2. Select from saved username & password 3. Click on login button	Valid URL of Bank Test Data
21	TS_06	Verify the "Account session timeout" functionality of bank	TC_21	Enter an valid username and valid password	1. Enter valid username 2. Enter valid password 3. Click on login button	Valid URL of Bank Test Data
22	TS_06	Verify the "Account session timeout" functionality of bank	TC_22	Enter an valid username and valid password	1. Enter valid username 2. Enter valid password 3. Click on login button	Valid URL of Bank Test Data

Username: Gmail@2000 Password:hello@123	a pop up message " saved username and password"	User should able to see the home page	User should able to see the home page	Pass	Tester_ID01	6/29/2023	No comment
Username: Gmail@2000 Password:hello@123	A message "Enter username & password"	User should able to see the home page	a pop up message " please enter username & password"	Fail	Tester_ID01	6/29/2023	No comment
Username: Gmail@2000 Password:hello@123	User automatically logged out & prompted to login again	User automatically logged out & prompted to login again	Successfully logged out	Pass	Tester_ID01	6/29/2023	No comment
Username: Gmail@2000 Password:hello@123	User automatically logged out & prompted to login again	User automatically logged out & prompted to login again	Successfully not logged out	Fail	Tester_ID01	6/29/2023	No comment

23	TS_07	Verify the " Exceeding maximum login attempts" functionality of bank	TC_23	Enter incorrect login credentials multiple times	1. Enter valid username 2. Enter invalid password 3. Click on login button	Valid URL of Bank Test Data
24	TS_07	Verify the " Exceeding maximum login attempts" functionality of bank	TC_24	Enter incorrect login credentials multiple times	1. Enter valid username 2. Enter invalid password 3. Click on login button	Valid URL of Bank Test Data
25	TS_07	Verify the " Exceeding maximum login attempts" functionality of bank	TC_25	Enter correct login credentials multiple times	1. Enter valid username 2. Enter valid password 3. Click on login button	Valid URL of Bank Test Data

Username: Gmail@2000 Password:hll@11254	A pop up message" Account locked "	Account locked after multiple attempts	Successfully Account locked	Pass	Tester_ID01	6/29/2023	No comment
Username: Gmail@2000 Password:hll@11254	A pop up message" Account locked "	Account locked after multiple attempts	A error message " enter valid login credentials	Fail	Tester_ID01	6/29/2023	No comment
Username: Gmail@2000 Password:hello@123	User should able to see the home page	User should able to see the home page	Account locked contact your bank	Fail	Tester_ID01	6/29/2023	No comment