PROJECT [Readers Hub]

SOFTWARE REQUIREMENTS SPECIFICATION

A. DEPARTMENT OF COMPUTER SCIENCE
Forman Christian College (A Chartered University)

TITLE PAGE

A. Title:

   Readers Hub

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1. Introduction and Background

1.1 Product (Problem Statement):

Readers Hub is a comprehensive online platform catering to book lovers of all ages. It aims to provide a space for users to read books, write reviews, recommend books, engage in discussions, and connect with nearby bookstores. Additionally, the platform will feature an *AI chatbot* and advanced search capabilities.

1.2 Background:

The domain of Readers Hub revolves around fostering a community of book enthusiasts and promoting a love for reading. It addresses the growing need for a centralized platform where users can explore, discuss, and discover new books easily.

1.3 Scope:

This *SRS* covers the development of the Readers Hub platform, including its core features such as book reading, review writing, recommendation system, discussion groups, AI chatbot integration, bookstore connectivity, and advanced search functionality.

1.4 Objective(s)/Aim(s)/Target(s):

- Create a user-friendly platform for reading, reviewing, and discussing books.
- Implement an AI chatbot to enhance user interaction and support.
- Enable users to connect with nearby bookstores for easy access to books.
- Develop a recommendation system based on user preferences and reading history.
- Ensure a safe and positive environment for users through content moderation.

1.5 Challenges:

- Balancing user privacy with personalized recommendations.
- Implementing effective content moderation algorithms to maintain a safe community.
- Integrating with various booksellers' *API*s for seamless purchasing experiences.

1.6 Learning Outcomes

- Understanding user behavior and preferences in the context of book reading.
- Implementing AI-driven features for enhanced user engagement.
- Developing robust content moderation mechanisms.

1.7 Nature of End Product

Readers Hub will be a web-based platform accessible from desktop and mobile devices. It will feature an intuitive user interface with seamless navigation and interactive elements to facilitate a rich reading experience.

1.8 Completeness Criteria

The project will be considered complete when all core features, including book reading, review writing, discussion groups, recommendation system, AI chatbot, bookstore connectivity, and advanced search, are fully functional and tested. Additionally, content moderation systems should be in place to ensure a safe user environment.

1.9 Business Goals

- Increase user engagement and retention on the platform.
- Foster partnerships with bookstores to drive sales and support local businesses.
- Establish Readers Hub as a go-to destination for book enthusiasts online.

1.10 Related Work/ Literature Survey/ Literature Review:

- **Online Book Communities:**

  Several existing platforms such as Goodreads, LibraryThing, and Shelfari provide online spaces for book lovers to connect, share recommendations, and engage in discussions. These platforms offer valuable insights into user preferences, community dynamics, and features that promote user interaction.

- **AI Chatbots in Customer Service:**

  The use of AI chatbots in customer service has become increasingly prevalent across industries. Research indicates that chatbots can enhance user experience by providing instant support, answering FAQs, and guiding users through processes. Integration of natural language processing (*NLP*) and machine learning algorithms has led to more sophisticated chatbot systems capable of understanding and responding to user queries.

- **E-commerce Integration with Bookstores:**

  Several e-commerce platforms and marketplaces have integrated with bookstores to offer a wide selection of books to customers. Studies have examined the impact of such integrations on user convenience, sales volume, and the relationship between online and offline book retail.

1.11 Document Conventions

- **Formatting:**
  - Headings: Times New Roman, 14pt, Bold
  - Subheadings: Times New Roman, 12pt, Bold
  - Body Text: Times New Roman, 12pt
  - Bullet Points: Standard round bullet points.
  - Italicization: Used for emphasis on key terms or concepts

- **Terminology:**
  - "User" refers to individuals registered on the Readers Hub platform.
  - "Bookstore" refers to physical or online stores selling books.
  - "AI Chatbot" refers to the artificial intelligence-driven chatbot integrated into the platform for user support.
  - "Content Moderation" refers to the process of monitoring and filtering user-generated content to ensure compliance with community guidelines.

2. Overall Description

2.1 Product Features

2.1.1 A way for readers to install the database.

2.1.2. A way for readers to install the server app.

2.1.3. A way for readers to install the front-end application.

2.1.2 Database

2.1.2.1. Stores previous states for all the tables and changes made in the tables.

2.1.2.2. Can store the readers log in information at every time.

2.1.2.3. Can store the reader’s logging out every time.

2.1.2.4. Can store the reader registering to make an account.

2.1.2.5. Can store the reader’s personal information.

2.1.2.6. Can store the reader's username and password.

2.1.2.7. Can store the readers reading history.

2.1.2.8. Can store the readers text chain.

2.1.2.9. Can store the ratings given to a book.

2.1.2.10. Can store the reviews given to a book.

2.1.2.11. Can store the readers books in to be read shelf.

2.1.2.12. Can store the readers books in have read shelf.

2.1.2.13. Can store the readers' books on a Wishlist shelf.

2.1.2.14. Can store the readers books in the current reading shelf.

2.1.3. Readers Portal

2.1.3.1. User Registration and Authentication

2.1.3.2. Secure user registration

2.1.3.3. Authentication mechanisms for user privacy and security

2.1.3.4. User Profile Management

2.1.3.5. Management of personal information

2.1.3.6. Management of reading preferences

2.1.3.7. Management of activity history

2.1.3.8. Book Catalogue.

2.1.3.9. Comprehensive book catalogue.

2.1.3.10. Categorization of books by genre, author, publication date, etc.

2.1.3.11. Personalized book recommendations based on user preferences and reading history.

2.1.3.12. Recommendation algorithms considering genre, author, ratings, and user reviews.

2.1.3.13. will have interactive Features.

2.1.3.14. Rating and reviewing of books.

2.1.3.15. Discussion forums for literary discussions

2.1.3.16. Seamless integration with online bookstores

2.1.3.17. Direct purchase of recommended books from the platform

2.1.4. Session App

New Version

The product features of the Reader's Hub App are categorized into four main sections:

- Install
- Database
- Readers Portal
- Session App

The Install section provides readers with the means to install the database, server app, and front-end application.

2.2 User Classes and Characteristics

- **IT Personnel:**
    - Technical Skill: Has full understanding of the system, and working knowledge of *SQL*
    - Frequency of Use: Low
    - Education Level: At least formal training or some college
    - Privileges: Administrator privileges has access to all parts of the system and can directly access the database.
    - Experience with System: High
    - Product Functions: Run database queries, add new modifications.
- **Readers:**
    - Technical Skill: Low to Medium
    - Frequency of Use: Multiples time a day
    - Education Level: Not specific
    - Privileges: Access to all the functions provided by the app.
    - Experience with System: High
    - Product Functions: View and categorize the books, join text chains, rate and review the books.

2.3 Operating Environment

2.3.1. Database:

The database will exist on a Microsoft Windows Server that runs MSSQL 2022.

2.3.2. Application:

The main user application will be built as a web based system. Users will access it through a browser and login window.

2.3.3. Session App:

The session application will be hosted on laptops with Windows OS on mobile phone with IOS and Android software.

2.4 Design and Implementation Constraints

2.4.1. Database:

Database needs to be available to internal sources for queries. The customer would like the database to be able to be easily modified in the future for other teams to upgrade the system or do work on it.

2.4.2. Application:

Features need to be supportable in a web application, security features and security design must address this reliance on the web. Additionally, both the design and the implementation need to be usable by all readers.

2.4.3. Session App:

The app will have a location constraint that will allow it to be accessed by users in Pakistan only.

2.5 Assumptions and Dependencies

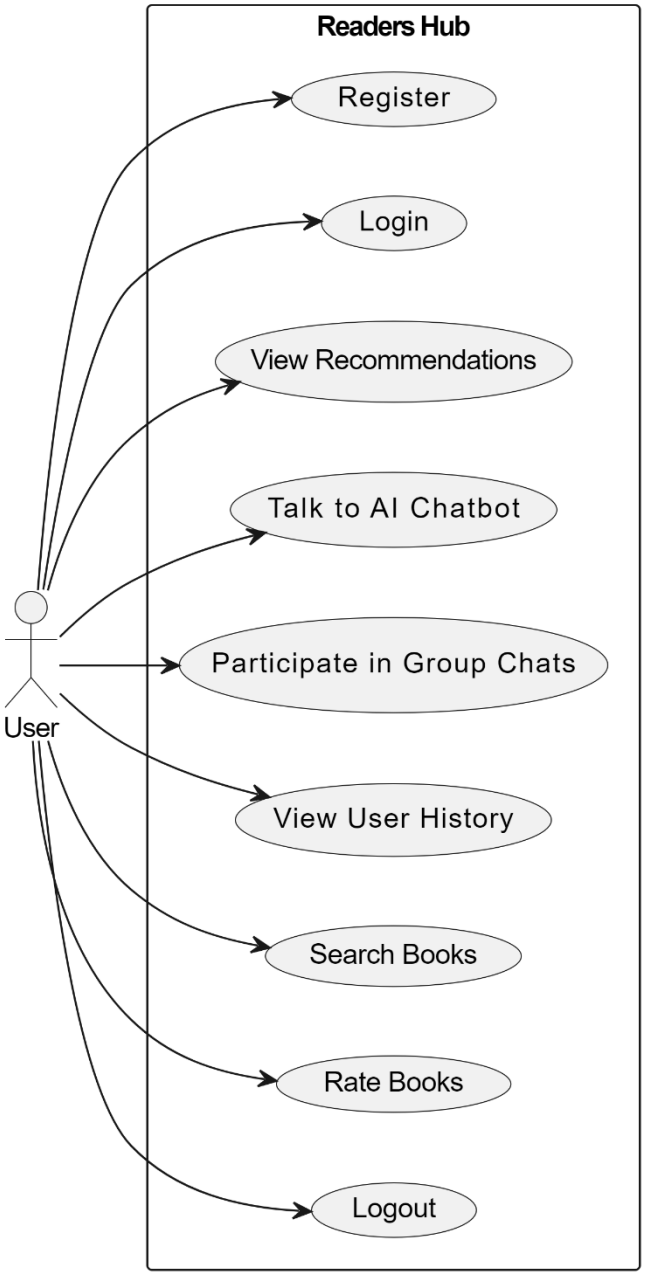
2.5.1. Database:

The use of MS-SQL for the Reader's hub App depends upon a Microsoft Windows operating system. This is the platform where our database will be hosted and managed.

2.5.2. Application:

The Reader's hub App is dependent on the users internet connection. It will also depend upon the functioning of the *"Spring" model*, upon which the Reader's Portal App is being built. We assume users can use internet browsers. We also assume that the app continues to track user reading sessions and preferences in much the same way they do now.

3. Functional Requirements



3.1 User Registration

Table 1: UC-1

Identifier	Register an account	
Purpose	Allow users to register an account on the Readers Hub platform.	
Priority	High	
Pre-conditions	User has access to the internet and the Readers Hub website.	
Postconditions	User account is successfully created and can be used to access platform features.	
Typical Course of Action		
S#	**Actor Action**	**System Response**
1	User fills out registration form with required details.	System verifies information and creates user account
2	User receives confirmation email with account activation link	System sends confirmation email
3	User clicks on activation link to activate account	System activates user account
4	User logs in using newly created credentials	System grants access to user dashboard
Alternate Course of Action		
S#	**Actor Action**	**System Response**
1	User enters existing email during registration	System prompts user to log in or recover password
2	User attempts to register with an invalid email format	System prompts user to enter a valid email address
3	User attempts to register with a username that is already in use	System notifies user that the username is taken and prompts them to choose a different one

3.2 Book Search and Recommendation

Table 2: UC-2

Identifier	Search for books	
Purpose	Allow users to search for books and receive personalized recommendations.	
Priority	High	
Pre-conditions	User is logged in to their account on the Readers Hub platform.	
Postconditions	User receives search results or recommendations based on their preferences.	
Typical Course of Action		
S#	**Actor Action**	**System Response**
1	User enters search query or selects preferences for recommendations	System processes user input
2	System retrieves relevant books from database	System displays search results or recommendations
3	User selects a book from the search results or recommendations	System displays detailed information about the selected book
4	User reads the book online	System opens the book in a reader interface, allowing the user to start reading immediately
Alternate Course of Action		
S#	**Actor Action**	**System Response**
1	User selects "View All" option without entering search query	System displays all available books
2	User selects "Random Recommendation" option	System generates a random book recommendation
3	User decides to refine search by applying additional filters	System provides options to filter search results by criteria such as genre, author, or publication date

3.3 AI chatbot functionality

Table 3: UC-3

Identifier	Chatbot interaction	
Purpose	Allow users to interact with a chatbot for various tasks.	
Priority	Medium	
Pre-conditions	User is logged in to their account on the Readers Hub platform.	
Postconditions	User receives assistance or information from the chatbot.	
Typical Course of Action		
S#	**Actor Action**	**System Response**
1	User initiates conversation with the chatbot	System greets the user and asks for their query
2	User asks a question or requests assistance	System provides relevant information or assistance
3	User follows up with additional questions	System continues the conversation and provides further assistance
Alternate Course of Action		
S#	**Actor Action**	**System Response**
1	User asks a question not within the chatbot's capabilities	System informs the user that it cannot provide assistance for the query
2	Chatbot encounters an error during interaction	System notifies the user of the error and suggests alternative actions

3.4 Viewing user history

Table 4: UC-4

Identifier	View User History	
Purpose	Allow users to view their reading history on the Readers Hub platform.	
Priority	Low	
Pre-conditions	User is logged in to their account on the Readers Hub platform.	
Postconditions	User can see a list of previously accessed books or reading materials.	
Typical Course of Action		
S#	**Actor Action**	**System Response**
1	User navigates to the "History" section of their account	System displays a list of previously accessed books or reading materials
2	User selects a specific item from the history	System provides more details about the selected item
Alternate Course of Action		
S#	**Actor Action**	**System Response**
1	User has no reading history available	System notifies the user that there is no history available

3.5 Book rating functionality

Table 5: UC-5

Identifier	Rate books	
Purpose	Allow users to rate books they have read on the Readers Hub platform.	
Priority	High	
Pre-conditions	User is logged into their account on the Readers Hub platform and has accessed a book.	
Postconditions	User's rating is recorded and contributes to the book's overall rating on the platform.	
Typical Course of Action		
S#	**Actor Action**	**System Response**
1	User selects a book they have read	System displays options to rate the book
2	User chooses a rating for the book	System records the user's rating and updates the book's overall rating
Alternate Course of Action		
S#	**Actor Action**	**Systdem Response**
1	User attempts to rate a book without reading it	System prompts the user to confirm if they have read the book before rating it
2	User provides an invalid rating	System informs the user that the rating must be within a specific range and prompts them to correct it

3.6 Group chat functionality

Table 6: UC-6

Identifier	Join group chats	
Purpose	Allow users to participate in group discussions or chats on the Readers Hub platform.	
Priority	Medium	
Pre-conditions	User is logged in to their account on the Readers Hub platform.	
Postconditions	User can engage in discussions with other users in group chats	
Typical Course of Action		
S#	**Actor Action**	**System Response**
1	User navigates to the "Group Chats" section	System displays a list of available group chats
2	User selects a group chat to join	System adds the user to the selected group chat
3	User sends a message in the group chat	System delivers the message to all members of the group
Alternate Course of Action		
S#	**Actor Action**	**System Response**
1	User attempts to join a full group chat	System notifies the user that the group chat is full and suggests other available chats

3.7 Requirements Analysis and Modeling

Include the following analysis models:

- Use-Case Diagram
- Entity-Relationship Diagram
- Abstract Class Diagram
- Sequence Diagram (at least model interactions between system and external world)

Additional diagrams may be added, such as state diagram, data flow diagram, decision table, or event table, depending on the project's complexity and requirements.

4. Nonfunctional Requirements

4.1 Performance Requirements

1. Database Performance:

The database must be available 99% of the time during peak hours and 95% of the time during off-peak hours to ensure uninterrupted access to data. Database queries should meet the following criteria: No query should exceed 5 seconds with only one active database connection, ensuring prompt responses to user requests. On average, a query should take less than 0.5 seconds with only one active database connection, maintaining efficient performance. No query should take more than 10 seconds with fewer than 25 active database connections, preventing delays during high traffic. On average, a query should take less than 2 seconds with fewer than 25 active database connections, ensuring responsiveness under varying loads.

2. Application Performance:

The Reader's Hub Platform should offer a responsive user experience. No page should take more than 2 seconds to load with only one user online, ensuring swift navigation. On average, no page should take more than 0.5 seconds to load with only one user online, providing a seamless browsing experience. No page should ever take more than 5 seconds to load, preventing user frustration. On average, no page should take more than 2 seconds to load, maintaining efficiency across different scenarios. The Reader's Hub Platform should be accessible via an internet connection 99.9% of the time during peak hours, ensuring consistent availability.

3. Session App:

The fingerprint scanning feature should recognize registered users with an accuracy of 95%, ensuring reliable user authentication. Return scanning results within 1 second, minimizing authentication time. The Session App should be operational 99.9% of the time, regardless of an internet connection, ensuring continuous availability for users.

4.2 Safety Requirements

1. **Database Safety:**

- **Loss Prevention:**

  Data from the database must never be transmitted to unauthenticated sources, safeguarding against unauthorized access, data breaches, and potential loss or damage to sensitive information.

- **Safeguards:**

  Implement robust authentication mechanisms and encryption protocols to ensure data integrity and confidentiality, thereby preventing unauthorized access and ensuring compliance with relevant data protection regulations such as *GDPR, HIPAA*, or *CCPA*.

2. **Application Safety:**

- **Harm Mitigation:**

  The Reader's Hub Platform must never disclose user information to unauthorized users, mitigating the risk of privacy breaches, identity theft, and potential harm to users.

- **Safeguards:**

  Implement access controls, encryption, and strict user authentication mechanisms to protect user data and privacy. Ensure compliance with relevant privacy laws and regulations such as GDPR, CCPA, or COPPA to mitigate risks and prevent unauthorized access to user information.

3. **Session App Safety:**

- **Harm Prevention:**

  The Session App must never disclose user information to unauthorized individuals, preventing potential harm, identity theft, or unauthorized access to sensitive data.

- **Safeguards:**

  Implement strong authentication measures, data encryption, and access controls to maintain confidentiality and privacy. Adhere to applicable privacy regulations and standards to ensure the safety and security of user information. Compliance with industry standards such as ISO 27001 or SOC 2 may be necessary to obtain safety certifications and demonstrate adherence to best practices in data protection and security.

4.3 Security Requirements

1. **Database Security:**

- **Data Protection:**

  Implement encryption at rest to safeguard sensitive data stored in the database, ensuring confidentiality and protection against unauthorized access or breaches.

- **Secure Communication:**

  All requests and data transfers between the server and the database must occur over an *SSL* connection, encrypting communication to prevent interception or tampering.

- **Access Control:**

  Restrict access to the database to devices within the same network, enhancing security and preventing unauthorized access from external sources.

2. **Application Security:**

- **Data Encryption:**

  Ensure all communication between the server and the Reader's Hub Application is conducted over SSL to protect data during transmission, mitigating the risk of data interception or manipulation.

- **User Identity Authentication:**

  Implement robust user authentication mechanisms to verify the identity of users accessing the application, preventing unauthorized access, and protecting user privacy.

3. **Session App Security:**

- **Data Protection:**

  Encrypt user information stored locally on the computer running the Session App to safeguard sensitive data from unauthorized access or theft.

- **Secure Communication:**

  All communication between the server and the Session App must be performed over SSL, ensuring the secure transmission of information, and preventing data interception or tampering.

- **Compliance and Certifications:**

  Adhere to relevant security regulations such as GDPR, HIPAA, or *PCI DSS*, and ensure compliance with industry standards for data protection and privacy. Obtain security certifications such as *ISO 27001* or *SOC 2* to demonstrate adherence to best practices in security and privacy.

4.4 Additional Software Quality Attributes

1. **Reliability:**

   Ensure the product operates consistently and reliably under various conditions, minimizing downtime and disruptions to user experience.

2. **Maintainability:**

   Design the product with clear, modular architecture and well-documented code to facilitate easy maintenance and updates by developers.

3. **Usability:**

   Prioritize ease of use and intuitive interfaces to enhance user satisfaction and reduce learning curves, ultimately improving adoption and engagement.

4. **Testability:**

   Develop the product with built-in testing capabilities and clear test cases to facilitate thorough and efficient testing processes, ensuring product quality and reliability.

5. **Robustness:**

   Implement robust error handling and fault tolerance mechanisms to handle unexpected situations gracefully, minimizing the impact of failures on user experience.

6. **Interoperability:**

   Ensure compatibility with other systems and platforms to facilitate seamless integration and interoperability, enabling smooth data exchange and functionality across different environments.

7. **Portability:**

   Design the product to be easily deployable and adaptable to various environments and configurations, allowing for flexible usage and scalability.

8. **Adaptability:**

   Enable the product to evolve and adapt to changing requirements and technologies, ensuring long-term relevance and usability for users and developers alike.

5. Revised Project Plan

The Reader's Hub Site project has seen significant progress since its initial phase. The roles and responsibilities have been clearly defined for each member. Extensive research and analysis have been carried out, focusing on existing platforms catering to book enthusiasts, as well as exploring personalized book recommendations and community engagement features.

6. References

https://www.perforce.com/blog/alm/how-write-software-requirements-specification-srs-document

https://asana.com/resources/software-requirement-document-template

https://www.goodreads.com/

https://www.librarything.com/

Appendix A: Glossary

- **AI Chatbot**: A computer program designed to simulate conversation with human users, especially over the internet. It uses artificial intelligence (AI) algorithms to understand and respond to natural language inputs.
- **APIs**: Application Programming Interfaces are sets of protocols, tools, and definitions that allow different software applications to communicate with each other. They enable integration and data exchange between different systems.
- **Integration of Natural Language Processing (NLP)**: NLP is a field of artificial intelligence that focuses on the interaction between computers and humans through natural language. Integration of NLP involves incorporating algorithms and models that enable the system to understand, interpret, and generate human language.
- **SQL**: Structured Query Language is a domain-specific language used in programming and designed for managing data held in a relational database management system (RDBMS), or for stream processing in a relational data stream management system (RDSMS).
- **"Spring" Model**: Refers to the Spring Framework, which is an open-source framework for building modern Java-based enterprise applications. It provides comprehensive infrastructure support for developing Java applications.
- **GDPR, HIPAA, or CCPA**: These are regulations regarding data protection and privacy. GDPR (General Data Protection Regulation) is a European Union regulation, HIPAA (Health Insurance Portability and Accountability Act) is a US law governing healthcare data, and CCPA (California Consumer Privacy Act) is a California state law protecting consumer privacy.
- **SSL**: Secure Sockets Layer is a standard security protocol for establishing encrypted links between a web server and a browser in online communication.
- **PCI DSS**: Payment Card Industry Data Security Standard is a set of security standards designed to ensure that all companies that accept, process, store, or transmit credit card information maintain a secure environment.
- **ISO 27001 or SOC 2**: ISO 27001 is an international standard for information security management systems (ISMS), outlining best practices for managing security risks. SOC 2 (System and Organization Controls 2) is a framework for managing and securing data in the cloud, focusing on five key areas: security, availability, processing integrity, confidentiality, and privacy.