Software Requirements Specification

for

Bookshop Automation Software

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

The purpose of this document is to describe the design of a web application for a Bookstore Automation Software (BAS), catering to the operational needs of bookshops. The BAS aims to automate various book-keeping activities, including inventory management, book procurement, sales tracking, and customer interactions. This version of the application marks its initial release, encompassing an end-to-end system with all required interfaces and a corresponding backend for seamless interaction.

1.2 Document Conventions

This document follows standard conventions for documenting software requirements, including clear delineation of sections, use of formal language, and adherence to industry standards such as IEEE standards for SRS documentation. In the writing of this document the following typographical conventions were followed.

- Heading
  - Font: Times New Roman
  - Font size: Heading 1-18, Heading 2-14
  - Bold letters
- Body
  - Font: Times New Roman
  - Font size: 12

Term	Definition
Threshold value	The quantity of books sold over a period of two weeks + a constant number (20)
Customer	A person who is querying for the book in the bookstore with the motivation of buying it.
Manager	A person who has the super user access of the software and can view the sales statistics as well as order for new books and alter the inventory

Employee	A person who only has access to alter the inventory of the bookstore
BAS	Bookshop Automation system

1.3 Intended Audience and Reading Suggestions

The intended audience for this document includes:

1. Development Team:

The development team, consisting of software engineers, programmers, and designers, will utilize this document to understand the detailed specifications and architectural design of the BAS, guiding them in the accurate implementation of its functionality.

2. Stakeholders:

Owners, managers, and investors interested in the BAS will benefit from understanding its scope and potential benefits, enabling them to assess its market potential, competitive advantages, and impact on business operations.

3. Users:

Bookstore staff will rely on this document to grasp the BAS's functionalities for inventory management, sales tracking, and customer interactions, while customers will understand how to use the BAS for book search, cart management, and generating bills efficiently.

Reading Suggestions:

- For a high-level overview, stakeholders and users may focus on the Introduction, Product Scope, and References sections.
- Developers and technical personnel should delve into detailed sections such as Functional Requirements, Non-Functional Requirements, and System Models.

1.4 Product Scope

The BAS is designed to automate various processes within a bookstore, including inventory management, book procurement, sales tracking, and customer interactions. It aims to streamline operations, improve efficiency, and enhance customer experience by providing accurate information about book availability, facilitating easy procurement, and generating insightful reports for business decision-making. This software will be very useful to the large bookshops as well as the customers. The system will save lots of time as it will perform all the necessary tasks for purchasing books and maintaining the records in much less time. As a result, both the customer and the shop owner will be benefited. Therefore, this software will be very economical in every respect.

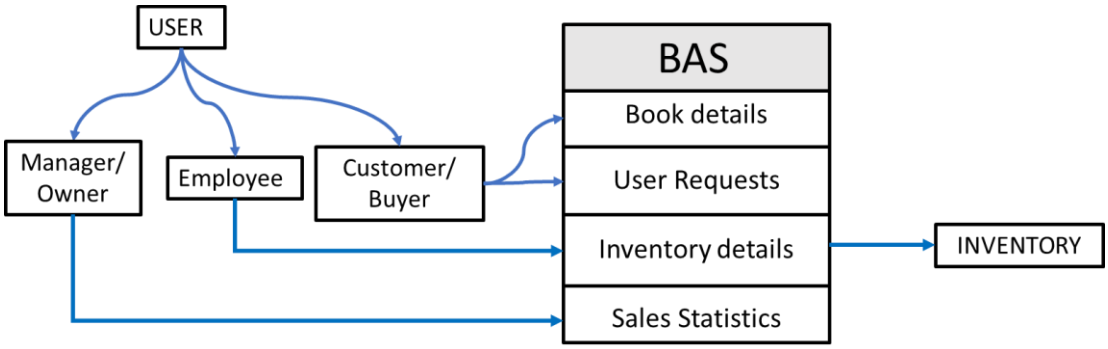
1.5 References

IEEE. IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements Specifications. IEEE Computer Society, 1998.

2. Overall Description

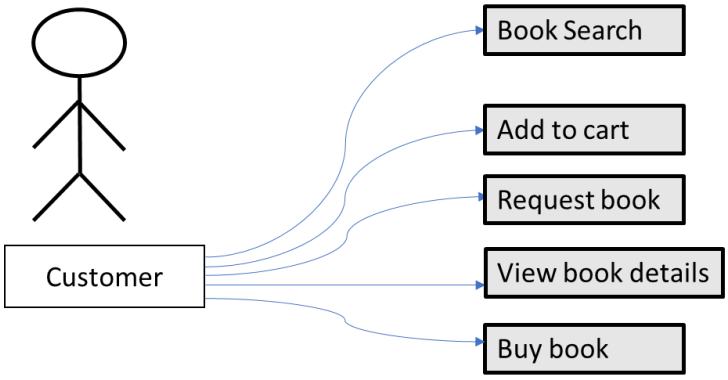
2.1 Product Perspective

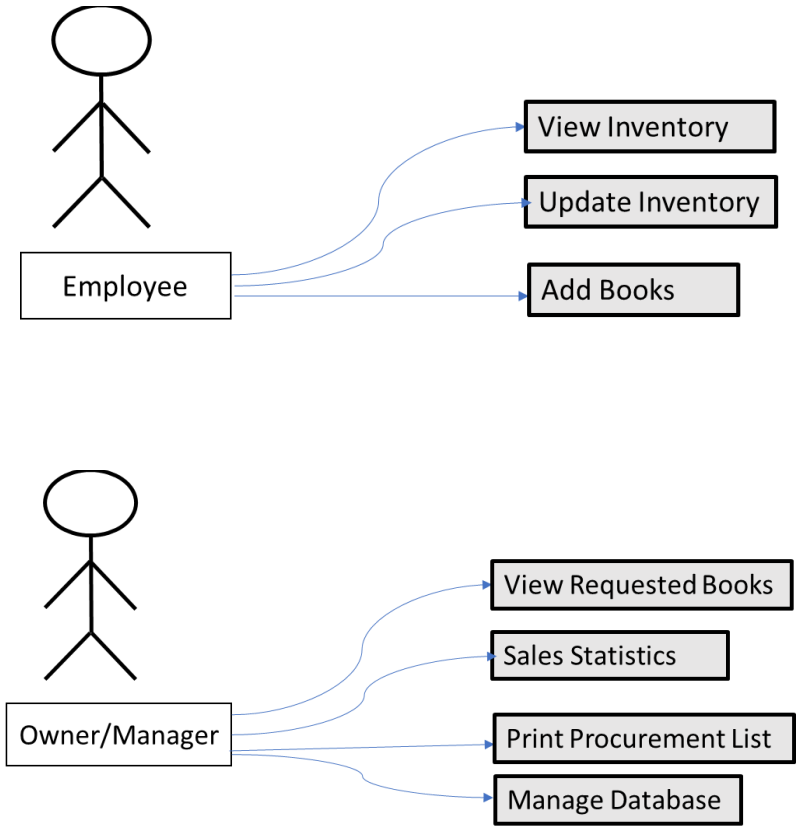
The Bookstore Automation Software (BAS) described in this SRS is a standalone product developed to streamline and automate various bookkeeping activities within a bookstore environment. It is not a replacement for any existing system but serves as a self-contained solution for managing bookstore operations. The BAS is designed to address the needs of bookstore management by automating tasks related to inventory management, sales tracking, customer interactions, and procurement. It operates within the context of a bookstore environment, providing a user-friendly interface for both staff and customers. The following diagram shows the major components of the overall system and the subsystem interconnections.



2.2 Product Functions

The product functions of the bookstore automation software are designed to cater to the diverse needs of its users, ensuring seamless interaction and efficient operation within the bookstore environment. Each user class is provided with specific functionalities optimized to streamline their tasks and enhance their experience within the system. The following diagrams show the different use cases for different users.





2.3 User Classes and Characteristics

The bookstore automation software caters to a diverse range of users, each with unique roles and responsibilities within the bookstore ecosystem. Three primary user classes have been identified to interact with the system efficiently:

1. Regular Customers:

Regular customers may use the bookstore automation software frequently, depending on their reading habits and book purchases. They utilize functions such as searching for books, adding them to the cart, and making purchases. They may vary in technical expertise, but typically have basic computer skills to navigate the user interface.

2. Employees:

Employees access the system regularly to update inventory and add new books. They primarily utilize functions related to inventory management, such as updating stock levels, adding new books to inventory, and receiving procurement orders. They have intermediate to advanced technical skills related to inventory management systems and database operations. They may have educational backgrounds or experience in logistics, inventory management, or related fields.

3. Bookshop Manager/Owner:

Bookshop managers access the system regularly to analyse sales data, produce procurement lists, and manage user requests. They have intermediate to advanced technical skills, particularly in data analysis and system administration. Bookshop managers have elevated privileges allowing them to access the complete database. Additionally, they have overall access to all management functions within the system.

2.4 Operating Environment

The Bookstore Automation Software (BAS) is designed to operate within a specific environment to ensure optimal performance and compatibility. The operating environment encompasses the hardware platform, operating system, and other software components or applications with which the BAS must interact seamlessly.

Hardware Platform:
The BAS is developed to operate on standard hardware configurations commonly found in modern computing environments. It is compatible with both desktop PCs and

Operating System and Versions:
The BAS is designed to be platform-independent, allowing it to run on various operating systems commonly used in business environments. It is compatible with the following operating systems and their respective versions:

- Microsoft Windows (Windows 10 and above)
- macOS (macOS 10.12 Sierra and above)
- Linux (Ubuntu 18.04 LTS and above, CentOS 7 and above)

Web browsers:
The BAS is accessed through a web interface and is compatible with major web browsers such as Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari.

2.5 Design and Implementation Constraints

1. Integration with external applications, such as payment gateways, inventory management systems, and book publishers' databases, will impose constraints on data exchange formats, APIs, and communication protocols. Compatibility with third-party interfaces and adherence to industry standards will dictate the design and implementation of integration mechanisms.
2. Developers are limited to using **Python** for providing the backend services for the web application for the following reasons:

   C++ and **Java** do not possess easy to use, batteries included frameworks like **Python**. The development time available for this project is less than two weeks. This necessitates the usage of pre-built mechanisms and libraries that **Python** possesses like **Django**.

2.6 User Documentation

The web application will possess a self-documenting, easy to use interface that does not require a specific set of manuals for any of the users. All the relevant information regarding the usage of the web application will be placed at the appropriate locations inside the different webpages and proper messages are displayed whenever and wherever needed.

2.7 Assumptions and Dependencies

- It is assumed that all the systems are connected on a same network because the software requires a local network or wi-fi to integrate with all the systems or machines on which it is used and run so as to update any changes or purchases made in real-time.
- The network should not have significant downtimes that can affect the utility of the application and its ability to handle incoming requests.
- It is also assumed that Users must input the accurate spelling of the book title or author name to obtain successful search results within the system.

3. External Interface Requirements

3.1 User Interfaces

User interface is used to provide communication between users and the system. When users look at the interface, they should understand which pane is used for which purpose. Each task of an interface should be specified clearly and users should use them correctly. The interface actions and elements should be consistent. When users press any button, required actions should be done by the system. The screen layout and colour of the user interface should be appealing. It has been required that every form's interface should be user friendly and simple to use.

The Book-shop Automation Software should have a user-friendly interface that allows customers to query the availability of books, employees to manage inventory and shop owner to check sales statistics.

1. Home Page
2. Search Page
3. Book detail page
4. Procurement page
5. Sales statistics page
6. Generate bill page
7. View requests page
8. Print below threshold page
9. Employee Login: The employee login page should allow authorized personnel to access the inventory management and sales statistics features of the software. The page should include the following options:
    - Username and password fields
    - Option to log in as a manager or employee

3.2 Hardware Interfaces

1. The hardware used for this needs to be server computer with a processor fast enough to handle a large number of requests simultaneously. Preferably a multicore system with distributed processes across the core will be suitable.

2. Solid state drives instead of hard disks to boost the speed of information retrieval. Enables faster request handling.

3. RAID systems to manage data redundancy. Ensures no user data is lost because of storage device failures by maintaining redundant copies as backup.

4. A bill generation machine to produce a physical bill.

3.3 Software Interfaces

The Bookshop Automation Software requires a web browser and works on any operating system. The database is stored locally on a server machine using SQLite. The system or user (laptop or PC) needs to be connected to the same network as the server to access the webapp.

3.4 Communications Interfaces

All communication will take place through a web browser using the standard HTTPS protocol.

4. System Features

4.1 Book Query and Availability

4.1.1 Description and Priority

This feature allows users to query the availability of books either by title or author. It is of high priority rated 9/10 as it forms the core functionality of the system, enabling users to search for books efficiently.

4.1.2 Stimulus/Response Sequences

- **Stimulus:** User enters a book title or author name in the search bar.
    - **Response:** System retrieves matching books from the database and displays them in cards below the search bar.
- **Stimulus:** User clicks on a book card to view its details.
    - **Response:** System displays detailed information about the selected book, including its title, author, image, availability status, price, rack number, ISBN, and description.

4.1.3 Functional Requirements

REQ-1: The system shall provide a search bar on the homepage for users to enter book titles or author names.

REQ-2: Upon entering a query, the system shall retrieve matching books from the database based on title or author name.

REQ-3: The system shall display search results in the form of cards containing essential book information, such as title, author, and availability status.

REQ-4: The system shall handle cases where no matching books are found and display a "not found" message to the user.

REQ-5: Book searching and viewing details shall be accessible without requiring user login, ensuring a seamless browsing experience for all users.

4.2 User Management

4.2.1 Description and Priority

User management is a fundamental feature required for every other functionality in the system. It includes user authentication, registration, and logout processes. Each user is provided with a separate cart for storing selected items. Upon transaction completion, the user account and associated cart are deleted to maintain data privacy and streamline system

resources. This feature is of high priority, rated 9/10, as it forms the basis for user interaction and data segregation.

4.2.2 Stimulus/Response Sequences

- **Stimulus:** User attempts to access any feature requiring authentication.
  - **Response:** If the user is not logged in, the system prompts the user to log in or register.
- **Stimulus:** User selects the option to register.
  - **Response:** System presents a registration form for the user to fill in their details. If the provided email is unique, the system creates a new user account and grants access to the requested feature.
- **Stimulus:** User selects the option to log in.
  - **Response:** System presents a login form requesting the user's email. If the email is found in the system, the user is logged in and granted access to the requested feature.
- **Stimulus:** User logs out of their account.
  - **Response:** The system clears the user's session and redirects them to the homepage.

4.2.3 Functional Requirements

REQ-1: The system shall provide a login interface for users to authenticate their identity.

REQ-2: Upon successful login, the system shall grant access to features requiring authentication.

REQ-3: If a user does not have an account, the system shall provide a registration option.

REQ-4: The system shall allow users to log out of their accounts, clearing their session and protecting their privacy.

4.3 Book Request

4.3.1 Description and Priority

This feature enables customers to make two types of requests:

- Request for a book not present in the database, prompting the customer to enter full details for future procurement.
- Request for additional copies of a book with insufficient stock.

It is of medium priority, rated 6/10, as it provides additional functionality for customer engagement and assists in maintaining an up-to-date inventory based on customer demand.

4.3.2 Stimulus/Response Sequences

- **Stimulus:** User selects the option to request a book not present in the database.
    - **Response:** System prompts the user to enter full details of the book, including title, author, publisher, ISBN, and any other relevant information related to customer so that he could be contacted later.
- **Stimulus:** User selects the option to request additional copies of a book with insufficient stock.
    - **Response:** System prompts the user to specify the required quantity of the book. On submission the request is stored in the database
- **Stimulus:** Manager selects the option to view requested books.
    - **Response:** The system displays a list of requested books, including details such as title, author, requested quantity and the user's details who requested for this book

4.3.3 Functional Requirements

REQ-1: The system shall allow customers to submit their request for a new book, which will be stored for future procurement.

REQ-2: Customers shall be able to submit their request for additional copies of a book, which will be used to replenish stock in the future.

REQ-3: Upon successful submission of a book request, the system shall provide confirmation to the customer and acknowledge receipt of the request.

REQ-4: After procurement of the book the request is deleted, and the customer is contacted so that they could collect the book they wanted.

4.4 Cart Management

4.4.1 Description and Priority

This feature allows users to add books to their cart for later purchase, remove items from the cart, and send the cart items as a wish-list via email. It is of high priority with a rating of 8/10 as it facilitates the shopping experience and prepares users for checkout.

4.4.2 Stimulus/Response Sequences

- **Stimulus:** User adds a book to the cart.
    - **Response:** The book is added to the user's cart.
- **Stimulus:** User removes a book from the cart.
    - **Response:** The book is removed from the user's cart.
- **Stimulus:** User selects the option to send the cart items as a wish-list.
    - **Response:** The system generates an email containing the cart items along with their respective rack numbers and sends it to the user's email.

- **Stimulus:** Employee initiates the cleanup of abandoned carts after a fixed period (e.g., 5 days).
    - **Response:** The system identifies and deletes all carts that have been inactive for the specified period.

4.4.3 Functional Requirements

REQ-1: The system shall allow users to add books to their cart for purchasing by specifying the required quantity. It should also allow the user to remove books from cart.

REQ-2: The system shall handle the event when required quantity is greater than present stock

REQ-3: The system should be able to display the cart items in a page

REQ-4: The system shall ensure that each user has a separate cart to store selected items.

REQ-5: User accounts and associated carts shall be deleted automatically upon transaction completion to maintain data privacy.

REQ-6: An employee interface shall provide functionality to delete abandoned users and their carts on a regular basis (5 days), minimizing storage of additional data.

4.5 Sales Management

4.5.1 Description and Priority

The Sales Management feature encompasses the process of completing book purchases, generating bills, and maintaining comprehensive sales records. It also includes the functionality to generate graphical data for revenue earned over specific periods. As this feature is critical for business operations and analysis, it holds a high priority rating of 9/10.

4.5.2 Stimulus/Response Sequences

- **Stimulus:** User clicks on "Proceed to Buy" after collecting books.
    - **Response:** The system generates a bill using the bill machine and sends it to the user's email. The purchase details are added to the database for sales analysis.
- **Stimulus:** Manager selects the option to view sales and revenue data.
    - **Response:** The system prompts the manager to enter the desired date range. Upon submission, it generates and displays the corresponding sales data and graphical revenue analysis.

4.5.3 Functional Requirements

REQ-1: The system shall provide users with the option to proceed with buying the books.

REQ-2: Upon clicking "Proceed to Buy," the system shall complete the payment and generate a bill using the bill machine.

REQ-3: After successful payment, the system shall update inventory records to reflect the sale and generate a confirmation email to the user.

REQ-4: Details of the purchase/sale transaction shall be added to the database for sales analysis.

REQ-5: The system shall enable the owner to view orders placed between any two dates.

REQ-6: The system shall generate graphical data depicting revenue earned over specific periods.

4.6 Inventory Management

4.6.1 Description and Priority

The inventory management feature ensures efficient tracking of book stock levels, facilitates the adjustment of inventory based on sales, and provides insights into stock procurement needs. It is crucial for maintaining optimal inventory levels and meeting customer demands promptly. This task is of moderate priority with a rating of 7/10.

4.6.2 Stimulus/Response Sequences

- **Stimulus:** When a book is sold, the system automatically updates the inventory to reflect the reduced stock level.
    - **Response:** The inventory database is promptly adjusted to ensure accurate stock records.
- **Stimulus:** Upon the arrival of new book supplies,
    - **Response:** The system updates the inventory with the incoming stock quantities.
- **Stimulus:** Manager selects the option to view books below the threshold level for procurement.
    - **Response:** The system generates a report listing books below the threshold along with the required number of copies and the full address of the stockist/vendor for procurement.

4.6.3 Functional Requirements

REQ-1: The system shall update the inventory level after every successful transaction

REQ-2: Upon receiving new book supplies, the system shall update the inventory with the incoming stock quantities.

REQ-3: The system shall calculate the threshold level for each book based on historical sales data.

REQ-4: The system shall identify books below the threshold level, indicating the need for procurement.

REQ-5: For every book, the system shall maintain details of the stockist/vendor based on the publisher of the book.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The Bookshop Automation Software must meet the following performance requirements to ensure optimal functionality and user satisfaction:

1. Response Time: The system should respond to user actions within 2 seconds under normal load conditions. This includes loading pages, executing search queries, and processing transactions.

2. Concurrent Users: The system should support at least 20 concurrent users accessing the system simultaneously without experiencing significant slowdowns or performance degradation.

3. Data Retrieval Speed: Searches for books in the inventory should return results within seconds, regardless of the size of the database.

4. Data Storage Capacity: The software should be able to handle a database size of up to 10,000 books and associated metadata without impacting performance. Additional scalability measures should be implemented to accommodate future growth.

5. Real-Time Updates: Changes made to the inventory, such as adding or removing books, should be reflected in real-time across all connected devices to ensure consistency and accuracy of information.

6. Error Handling: The system should gracefully handle errors and exceptions without crashing or losing data. Error messages should be informative and user-friendly to assist in troubleshooting.

5.2 Safety Requirements

Safety requirements for the Bookstore Automation Software (BAS) are essential to mitigate risks and ensure the security of data and transactions. These safety requirements include:

1. All sensitive customer information, including personal details and payment data, shall be encrypted using industry-standard encryption algorithms during transmission and storage.
2. The system shall regularly backup all critical data, including inventory records, customer information, and transaction logs, with automated backup schedules and off-site storage options.
3. The system shall deploy an intrusion detection system to detect and alert administrators about potential security breaches, abnormal activities, or suspicious behaviour within the network.
4. The system shall require customers to complete necessary payments and receive transaction receipts before allowing them to exit the shop premises. Verifying payments before customers leave the shop helps prevent loss due to unpaid transactions or fraudulent activities, ensuring that all purchases are properly accounted.

5.3 Security Requirements

The employees have their dedicated login credentials and thus breach of credentials would lead to data breach and manipulation, but to a limited extent. The admin has access to all the data. Any compromise of the admin(manager) login credentials would lead to direct access to all the information of the bookstore. He also has the data of users (for temporary basis) and the data of employees. In case an employee loses his/her credentials, the admin can change or update the employee credentials.

5.4 Software Quality Attributes

The prioritization of the software quality attributes is assumed as under:

- Accurate and hence reliable
- Secured
- High performance
- Compatibility

5.5 Business Rules

Customer: The one who purchases books from the bookshop. He must have very limited access to the system.

Employee: The one who updates the inventory. He must have the next higher level of access to the system after the clerk.

Book Shop Owner/Manager: The person who views the current demand of different books and analyses the overall sales and statistics of the bookshop. He must have access to the entire system.

6. Other Requirements
Appendix A: Analysis Models

CLASS DIAGRAM