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PROBLEM STATEMENT

We need to develop a software for automating various activities of a small book shop. From a discussion with the owner of the book shop, the following user requirements have been arrived at:

BAS should help the customers query whether a book is in stock. The users can query the availability of a book either by using the book title or by using the name of the author. If the book is not currently being sold by the book shop, then the customer is asked to enter full details of the book for procurement of the book in future. If a book is in stock, the exact number of copies available and the rack number in which the book is located should be displayed. If a book is not in stock, the query for the book is used to increment a request field for the book. The manager can periodically view the request field of the books to arrive at a rough estimate regarding the current demand for different books. BAS should maintain the price of various books. As soon as a customer selects a book for purchase, the sales clerk would enter the ISBN number of the book. BAS should update the stock, and generate the sales receipt for the book. BAS should allow employees to update the inventory whenever a new supply arrives. Also upon request, BAS should generate sales statistics (viz., book name, publisher, ISBN number, number of copies sold, and the sales revenue) for any period. The sales statistics will help the owner to know the exact business done over any period of time and also to determine the inventory level required for various books. The inventory level required for a book is equal to the number of copies of the book sold over a period of two weeks multiplied by the average number of days it takes to procure the book from its publisher. Every day the book shop owner would give a command for the BAS to print the books which have fallen below the threshold and the number of copies to be procured along with the full address of the publisher.

SOFTWARE REQUIREMENTS SPECIFICATION

BAS, Version 1.0

Jan 20, 2022

A BOOKSHOP AUTOMATION SYSTEM

TABLE OF CONTENTS

1. Introduction

The Bookshop Automation Software (BAS) will automate various operations in a bookshop. These operations would, in general, include order processing, stock management, accounts management and analytics. Also, the BAS will provide the ability to search any book using the book title or the author's name that is available in the shop. If a book is not available in the stock, the system will ask the customer to enter full details of the book so that it can be procured in the future and increment a request field for the book. BAS will help the manager periodically view the request field of the books to analyse the current demand for different books from the store.

1.1. Purpose

This SRS defines External Interface, Performance, and Software System Attributes of the Bookshop Automation Software (BAS). It is intended to be read by project managers, developers and team members who want to get an overview of the project, its scope and overall details of modules in the system, or anyone who would like to make the next version of this system can prefer this SRS.

1.2. Scope

The scope of this project, Book-Shop Automation Software, is to develop software to automate the entire book purchasing process, manage records, calculate the demand of various books, generate sales statistics, and other essential tasks that the manager requires. The system will save lots of time as it will perform all the necessary functions for purchasing books and maintaining the records in much lesser time. As a result, both the customer and the store staff will be benefited.

1.3. Conventions

This SRS manuscript is a low-level detailed documentation for the Book-shop Automation System.

1. The references have been kept in APA7 format,
2. The document has been written in the Times New Roman font with sizes 14, 13 and 12.

1.4. Definitions, Acronyms and Abbreviations

Check Appendix A: Glossary.

1.5. References

1. Mall, R. (2015). *Fundamentals of Software Engineering*. PHI Learning Private Limited.
2. Wikimedia Foundation. (2021, November 17). *Software requirements specification*. Wikipedia. Retrieved January 20, 2022, from https://en.wikipedia.org/wiki/Software_requirements_specification

3. Institute of Electrical and Electronics Engineers (IEEE). (1998). *830-1998 - IEEE Recommended Practice for Software Requirements Specifications*.

1.6. Overview

1.6.1. Section 1 discusses the purpose and scope of the software.

1.6.2. Section 2 describes the overall functionalities and constraints of the software and user characteristics.

1.6.3. Section 3 details all the requirements needed to design the software.

2. Overall Description

2.1. Product Perspective

The Book Shop Automation System shall be a self-reliant software that uses Python as its underlying technology. All system pages shall follow a consistent theme and clear structure.

The system should minimise errors through checkboxes by limiting the amount of text input from the user. It should locate the error messages beside the error input, highlighting and telling the user how to solve them. If a system error occurs, it provides the contact methods. The page should display the project process in different colours to reflect the various states. Each user level will have its interface and privilege to manage and modify the project information.

User interface elements will be easy to understand. When users look at the interface, they will clearly understand which pane is used for which purpose. The system will clearly specify each task of an interface. For example, when the user presses any button on the interface, they will know which operations are done by pressing this button.

Since the application must run on a PC, the primary hardware interfaces for this system would be a monitor, keyboard and mouse.

2.2. Product Functions

The bookshop automation system provides the following facilities and services:

1. Searching for books by title or by the name of author
2. Checking the number of available books (for selected readers)
3. Each sold book with the date of sale and whether the customer has paid
4. Full billing support and different password protected employee accounts
5. The server database is protected from unauthorised modifications
6. Print bills with currency sign
7. Unique design with functional user interface
8. Generate sales statistics for any period
9. Improve store business with various reports and statistics
10. Estimate current demand for different books

2.3. User Characteristics and Classes

There are five types of users that interact with the system: customer, sales clerk, employee, manager and the book shop owner. Each of these five types of users has a different use of the system, so each has its requirements.

1. **Customer:** will only use the system to find a book. This means that the user should get the exact number of copies available and the rack number in which the book is located.
2. **Sales Clerk:** would help the sales processes.
3. **Employee**: would update the stock.
4. **Manager:** would check the current demands of different books. So all the search queries by the customers and the sales records are to be appropriately maintained.
5. **Owner:** manages the overall system.

2.4. Operating Environment

The proposed software is intended to run on a client/server model network. A client/server can deliver better performance than the file server system because a client application and database server work together to split the processing load of applications (thus the term distributed processing).

1. Hardware requirements
    a. 40 GB HDD Free Space
    b. 1 GB RAM
    c. Pentium IV
    d. Monitor
    e. Keyboard
    f. Mouse (Optional)
2. Software requirements
    a. Operating system: Windows 7 or later
    b. Python >= 2.8

2.5. Constraints

1. The system is based on menu-driven interfaces. The menu selection will be done by using the mouse and the keyboard keys.
2. Confirmation messages on taken actions, input acceptance and error conditions will be displayed after each input.
3. Error messages will be displayed at the time of detection of input errors and system errors.

2.6. Assumptions and Dependencies

While cost estimation of the proposed system, it has been assumed that the cost of hardware and that of the license of the Operating System and backend will be met by the client (the store). Hence only the cost incurred for the proposed software is included therein.

The following are identified as potential risk factors or dependencies:

1. Non-availability of required resources
2. Power cuts
3. Slippage of schedule due to unpredictable holidays, etc.

3. External Interface Requirements

3.1. User Interfaces

The user interface provides 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. For example, when users press any button on the interface, they should know which operations are done by pressing this button.

The user interface should be easy to learn. When users use the user interface, they should know which element is used for which operations. If the user interface is tough to learn by the user, then teaching the interface activity would take a long time, and hence there will be an extra cost for teaching the user interface of the product to the user.

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. Colours will be selected clearly. Thus the eyes of users won't be tired.

3.2. Hardware Interfaces

The hardware interface for the user would be any PC having a configuration of P-IV and above 2GB HDD for loading any OS so that BAS could interact with the system without any problem. The main interface would be the monitor, keyboard and mouse.

3.3. Software Interfaces

Book Shop Automation Software will use a database for storing and management of records. So access to the database management system is required. When such an event occurs, the system establishes a connection to the database management system; once the connection is created, the client program can communicate with the database management system.

A library called sqlite3 provides an application programming interface (API), which allows client-side programs to call database management systems, so long as the PC has the necessary software installed. Any query results are sent back to the user, which can process or display the result as needed

3.4. Communications Interfaces

For communications sockets on TCP shall be used. A client program creates a socket on its end of the communication and attempts to connect that socket to a server. When the connection is made, the server creates a socket object on its communication end. The client and server can now communicate by writing to and reading from the socket.

The following steps occur when establishing a TCP connection between two computers using sockets:

1. The server instantiates a ServerSocket object, denoting which port number communication is to occur on.
2. The server invokes the `accept()` method of the `ServerSocket` class. This method waits until a client connects to the server on the given port.
3. After the server is waiting, a client instantiates a Socket object, specifying the server name and port number to connect to.
4. The constructor of the Socket class attempts to connect the client to the specified server and port number. If communication is established, the client now has a Socket object capable of communicating with the server.
5. On the server-side, the `accept()` method returns a reference to a new socket on the server that is connected to the client's socket.

After the connections are established, communication can occur using I/O streams. Each socket has both an OutputStream and an InputStream. The client's OutputStream is connected to the server's InputStream, and the client's InputStream is connected to the server's OutputStream.

3.5. Access Interfaces

All the users of the system should have a username/password logging mechanism to access it. Although signing in of the customer is optional. Depending on the role of the user, he/she should get the corresponding system access level.

4. System Features (Functional Requirements)

4.1. R1. Check for availability of book

Description:

When a customer selects this option he is required to enter a book title or the author’s name of the book. The system would search the books in the books register based on the

keywords. After making the search the system should output the details of all the books based on the details given.

R1.1:	Select query book availability option **Input**: "query book availability" option is clicked **Output**: User prompted to enter the keywords
R1.2:	Search for book name and display result
	Input: Book title or the author name **Output**: Display details of all the books, no. of copies available and the rack no. where the book is located
Processing:	Search the books in the book register based on the keywords, if the book is not currently being sold by the book shop, then the customer is asked to enter full details of the book for procurement of the book in future. If a book is in stock, the exact number of copies available and the rack number in which the book is located should be displayed. If a book is not in stock, the query for a book is used to increment a request field for the book

4.2. R2. View request

Description:

Once the manager selects this option, the system displays the current demand for different books.

Precondition	Manager is logged in
R2.1:	Select view request option **Input:** "Find Trends" option is clicked **Output:** Display the current demand of different books
Processing:	Displays the books list if any requests are present otherwise it gives no pending requests

4.3. R3. Purchase Book

Description:

Once the customer selects this option the system will ask to enter the ISBN no. of books sold. And the system will take the prices of books from inventory and generates the bills and updates the stock and generate the sales receipt for the book.

R3.1:	Select purchase option **Input:** *Purchase* option is clicked **Output:** Prompt message to the salesclerk to enter the ISBN number of the selected book
R3.1:	Generate sales receipt
	Input: Enter the ISBN number of selected book **Output:** Gets the price from inventory and prints the sales receipt and

	updates the stock
Processing:	Generates the bill based on the ISBN number of book selected by customer

4.4. R4. Update Stock

Description:

Once the employee selects this option, he would be asked to enter the list of new book name.

Precondition	Employee is logged in
R4.1:	Select update inventory option **Input:** "update inventory" option is clicked **Output:** Employee will be prompted to enter the details of books
R4.2:	Updating the inventory
	Input: Employee will enter the details of the book that is procured for the first time **Output:** Generates the ISBN number for the new books
Processing:	Updates the inventory by generating ISBN numbers of the books and updating the other details such as the rack number, publisher, book name, and price.

4.5. R5. Generate Sales Statistics

Description:

Once the manager selects this option, he will be informed about the exact business done over any period of time. It also calculates the inventory level required for various books.

Precondition	Manager is logged in
R5.1:	Select generate sales statistic option **Input:** Select "generate sales statistic" option **Output:** System will generate the sales statistics
Processing:	System calculates the inventory level required for a book which is equal to the number of copies of the book sold over a period of two weeks multiplied by the average number of days it takes to procure the book from its publisher. Generate and display it.

4.6. R6. Check Threshold Books

Description:

The book shop owner would give a command for the BAS to print the books which have fallen below the threshold and the number of copies to be procured along with the full address of the publisher.

Precondition	Owner is logged in

R6.1:	Select check shortage option **Input:** Select "check shortage" option **Output:** The books which have fallen below the threshold and the number of copies to be procured along with the full address of the publisher.
Processing:	Checks the books which have fallen below the threshold, calculates the number of copies to be procured along with the full address of the publisher

5. Other Non-Functional Requirements

5.1. Performance Requirements

5.1.1. Capacity

5.1.1.1. The Software will be accessible at all times

5.1.2. Dynamic Requirements

5.1.2.1. The response time for menu changes will be no more than 3 seconds.

5.1.2.2. The time for searching for a book will not be more than 3 seconds.

5.1.2.3. The time to print the stock valuation will not be more than 3 seconds.

5.1.2.4. The time taken to update the database or get information from the database will not be more than 2 seconds.

5.1.2.5. The time to prompt message boxes will not be more than 2 seconds.

5.1.3. Quality

5.1.3.1. The primary objective is to produce quality software. As the quality of a piece of software is difficult to measure quantitatively, the following guidelines will be used when judging the quality of the software:

1. *Consistency* All codes will be consistent concerning the specified style
2. *Test cases* – The unit testing set will thoroughly test all functionality

5.1.3.2. The prioritisation of the software quality attributes is assumed as follows

1. *Accurate and hence reliable*
2. *Secured*
3. *High performance*
4. *Compatibility*

5.2. Software System Attributes

5.2.1. Reliability

5.2.1.1. The memory system shall be of a non-volatile type.

5.2.2. Security

5.2.2.1. The password shall be 6-14 characters long.

5.2.2.2. Passwords shall not contain customers' names as they are easy to be hacked.

5.2.2.3. Passwords can contain digits, hyphens and underscores.

5.3. Business Rules

5.3.1. *Customer*: The one who purchases books from the bookshop should have minimal access to the system.

5.3.2. *Sales Clerk*: The one who enters purchase details in the bookshop. He must have the next higher level of access to the system after the customer.

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

5.3.4. *Manager*: The person who views the current demand for different books. He must have the next higher level of access to the system after the employee.

5.3.5. *Book Shop Owner*: The owner of the shop. He must have access to the entire system.

6. Appendices

6.1. Appendix A: Glossary

Term	Definition/Expansion
TCP/IP	Transmission Control Protocol/Internet Protocol
BAS	Book shop Automation System
API	Application Programming Interface