SOFTWARE ENGINEERING LAB

SUBMITTED BY
Brahmabit Mahapatra
Roll No-715CS1011

Book Shop Automation Software

Software Requirements Specification

NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA

Table of Contents

NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA....2
1. Introduction....4
1.1 Purpose....4
1.2 Scope....4
1.3 Definitions....4
1.4 References....5
1.5 Overview of Developer Responsibilities....5
2. Overall Description....5
2.1 Product Perspective....5
2.2 Product Features....6
2.3 User Characteristics....7
2.4 General Constraints....7
3. Functional Requirements....7
4. External Interface Requirements....10
4.1 User Interfaces....10
4.2 Hardware Interfaces....11
4.3 Software Interfaces....11
4.4 Communications Interfaces....11
4.5 Access Interfaces....12
5. Non Functional Requirements....12
5.1 Performance Requirements:....12
5.2 Safety Requirements:....12
5.3 Security Requirements:....12
5.4 Software quality:....12
5.5 Business Rules:....12
6. DESIGN CONSTRAINTS....13
a) Hardware Requirement....13
b) Software Requirement....13
6.2 Design and Implementation Constraints....13
6.3 User Documentation....14

1. Introduction

1.1 Purpose

The purpose of **Software Requirements Specification (SRS)** document is to describe the external behaviour of the software. Requirements Specification defines and describes the operations, interfaces, performance, and quality assurance requirements. The document also describes the non-functional requirements such as the user interfaces. It also describes the design constraints that are to be considered when the system is to be designed, and other factors necessary to provide a complete and comprehensive description of the requirements for the software. The SRS captures the complete software requirements for the system, or a portion of the system.

The Bookshop Automation Software (BAS) is to automate all operations in a bookshop. Generally it includes the Order Processing, Stock Management and Accounts Management. Also BAS will provide the ability to search any book using the book title or the name of the author that are available in the shop and in case where the book is not available in the stock, it will ask the customer to enter full details of the book for procurement of the book in future and increment a request field for the book.

BAS will help the manager to periodically view the request field of the books so as to arrive at a rough estimate regarding the current demand for different books. Also it maintains the price of various books.

1.2 Scope

The scope of this project Book-Shop Automation Software is to develop a software to automate the entire book purchasing process and the management and maintenance of records like transaction records, calculating the demand of various books, generating sales statistics and other basic tasks that are required by the manager. This software will be very useful to the large book-shops 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 lesser time. As a result both the customer and the shop owner will be benefited. Therefore, this software will be very economical in every respect.

SRS is mainly intended for the project managers, developers and team members who want to get the overview of the project, its scope and higher details of modules in the system. Anyone who would like to make the next version of this system can prefer this SRS. This SRS document includes the overall design description. The reader should read thoroughly from first page to the last page. It includes the purpose, scope, product feature and references along with the hardware & software requirements for this software.

1.3 Definitions

- **BAS** Book Shop Automation Software
- **SRS** Software Requirements Specifications

- **ISBN** International Standard Book Number is a unique 13 digit code for each book. Contains information related to Title, Publisher and Group etc. Different Editions will have different ISBN and ISBN for different copies of same book will be same.
- **SSL** Secured Socket Layer
- **REST** Representational state transfer
- **HTML** Hypertext Markup Language

1.4 References

[1] Fundamental of Software Engineering By Rajiv Mall

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

[3] www.wikipedia.org

1.5 Overview of Developer Responsibilities

The Developer is responsible for designing the architecture, creating the complete application package and providing the training materials

2. Overall Description

2.1 Product Perspective

The BAS is an independently functioning system that automates manual tasks in a Book Shop like answering customer queries, billing, making sales statistics, planning for further orders, locating the books, creating instant procurement orders etc. The system handles and stores all necessary records of books in a database. The user interface is simple for any user to understand when he/she uses it for the first time itself. The software also analyses data and presents it in a useful form for any important stakeholder like the owner and his business associates to take important decisions.

The Book Shop Automation System a complete application package. It is using NodeJS at the back end and HTML and CSS for the frontend. All pages of the system are following a consistent theme and clear structure.

User interface elements are easy to understand. Every functionality is clearly defined in the UI to provide a seamless experience for the user. The user interface is easy to learn. When users use the user interface, they can know which element is used for which operations.

Since the application must run on the PC, the main hardware interfaces for this system would be the monitor, Keyboard and mouse.

Book-shop Automation Systems is a technology that automates the book-shop. This technology has more advantages over manual work.

2.2 Product Features

The book-shop automation system provides the following facilities and services:

- **Query for books:**
  The customer can query for availability of the book by entering its title or the author's name. On availability, the BAS shows the rack number and the number of copies in stock. If the book is not available it may create automatic request for the book

- **Request for book:**
  If the query for the book fails, then this will allow for requesting the book shop to order the book in question by entering the full details of the book (Name, Author's name, ISBN code, Publisher's name). Depending on the number of requests, the Manager may decide to order the book. If the book is not available

- **Update stock and inventory management:**
  When the customer confirms the book, the BAS updates the inventory. Also in case of new arrivals/defective pieces, the BAS updates accordingly. The manager may also view the request list for books

- **View requests:**
  The Manager can view the number of requests for the books and decide on the course of action to be taken.

- **Generate sales receipt:**
  To complete the transaction, the BAS generates a sales receipt for endorsing the transaction.
- **Generate sales statistics:**
  The BAS generates sales statistics based on transactions between any given period. This feature is used by the owner and any other authorised person. This also helps in finding the inventory level.

- **Print the list of books to be bought depending on the inventory level:** 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 stockist.

2.3 User Characteristics

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 different use of the system so each of them has their own requirements.

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.

Sales clerk would help the sales processes.

Employee would update the stock and perform other day-to-day activities on the system.

Manager would check the current demands of different books. So all the search queries by the customers and the sales records are to be maintained properly and can view the current sales statistics.

The **book shop owner** manages the overall system.

2.4 General Constraints

- **SCHEDULE** 1st week of August to 3rd week of November

Due to the time constraint the UI may remain basic

- **LANGUAGE REQUIREMENT** English
- **COST: N/A**
- **RSOURCES:** 1 Application Developer
- **IMPLEMENTATION** 3 –Tier Architecture

3. Functional Requirements

R1. Check for availability of book:

***Description*:**

When customer selects this option he is required to enter book title or the author name of 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 key words
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 key words, if the book is not currently being sold by 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 rack number in which the book is located should be displayed. If a book is not in stock, the query for book is used to increment a request field for the book

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

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 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

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 book details 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 rack number, publisher, book name, and price.

R5. Generate Sales Statistics:

***Description*:**

Once the manager selects this option, he will be informed about exact business done over any period of time. It also calculates 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 equals to number of copies of book sold over a period of two weeks multiplied by average number of days it takes to procure the book from its publisher. And generate statistic according to it. Display it.

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 book which have fallen below the threshold, calculates number of copies to be procured along with the full address of the publisher

4. External Interface Requirements

4.1 User Interfaces

User interface is used to provide communication between users and 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 to any button on interface, they should know which operations are done by pressing this button.

The UI should be a Web-based application UI. This UI may be built using HTML and CSS

The user interface should be easy to learn. When users use the user interface, they should know which element is used to which operations. If the user interface is very hard to learn by the user then teaching the interface activity would take longer 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. When users look at the screen, it will have a nice vision. Colours will be selected clearly, thus eyes of users won't feel tired.

It has been required that every form's interface should be user friendly and simple to use.

4.2 Hardware Interfaces

The hardware interface for the user would be any PC having any configuration able run a web browser supporting JS, HTML and CSS. The main interface would be monitor, keyboard and mouse.

4.3 Software Interfaces

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

A library called *mongoose, with* an application programming interface (API), allows the NodeJS application to interact with the MongoDB database

Through these apis we will be able to manage our database. We will be able to query the data and allow for pagination and other applicable requirements at the middleware level.

4.4 Communications Interfaces

For communications we will be using a RESTful architecture. **Representational State Transfer** (**REST**) is an architectural style that defines a set of constraints to be used for creating web services. Web Services that conform to the REST architectural style, or **RESTful** web services, provide interoperability between computer systems on the Internet. REST-compliant web services allow the requesting systems to access and manipulate textual representations of web resources by using a uniform and predefined set of stateless operations. Other kinds of web services, such as SOAP web services, expose their own arbitrary sets of operations.

"Web resources" were first defined on the World Wide Web as documents or files identified by their URLs. However, today they have a much more generic and abstract definition that encompasses every thing or entity that can be identified, named, addressed, or handled, in any way whatsoever, on the web. In a RESTful web service, requests made to a resource's URI will elicit a response with a payload formatted in either HTML, XML, JSON, or some other format. The response can confirm that some alteration has been made to the stored resource, and the response can provide hypertext links to other related resources or collections of resources. When HTTP is used, as is most common, the operations available are GET, POST, PUT, DELETE, and other predefined CRUD HTTP methods.

4.5 Access Interfaces

All the users of the system should have a username / password logging mechanism to access it. These should be secured timed-tokens. Depending upon the access level provided for the user functionalities will be provided

5. Non Functional Requirements

5.1 Performance Requirements:

- The response time for menu changes will be not more than 3 seconds.
- The time for search for a book will not more than 3 seconds.
- The time to print the stock valuation will not be more than 3 seconds.
- The time taken to update the database or get information from the database will not be more than 2 seconds.
- The time taken to prompt message boxes will not more than 2 seconds.

5.2 Safety Requirements:

All the higher level users should keep their system access credentials secure else an unauthorized personal may exploit the system. If at any point of time someone has compromised his/her login credentials then he/she should report to the system administrator so that he could issue new credentials.

5.3 Security Requirements:

Only the administrators have the authority to edit details in Users and Items tables. No one can enter the system without a username and a password. The passwords when sored should be hashed. Normal system users cannot access the Administrators login. All deleting actions are notified by a message box asking to confirm deletion.

5.4 Software quality:

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

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

5.5 Business Rules:

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

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

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

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

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

6. DESIGN CONSTRAINTS

The proposed software is intended to run on client/server model network. It will work on a 3-Tier architecture. 3-tier architectures provide many benefits for production and development environments by modularizing the user interface, business logic, and data storage layers. Doing so gives greater flexibility to development teams by allowing them to update a specific part of an application independently of the other parts. This added flexibility can improve overall time-to-market and decrease development cycle times by giving development teams the ability to replace or upgrade independent tiers without affecting the other parts of the system.

a) Hardware Requirement

- 10 GB HDD Free Space
- 256 MB RAM
- Pentium IV or above Processor
- Monitor
- Keyboard: Standard
- Mouse: Optional

b) Software Requirement

- MongoDB
- Operating system: Any Linux, Windows, Unix OS
- NodeJS
- Npm

6.2 Design and Implementation Constraints

- The system is based on menu driven interfaces. Menu selection will be done by using the mouse and the key board keys.
- Confirmation messages on taken actions, input acceptance and error conditions will be displayed after each input.
- Error messages will be displayed at the time of detection of input errors and the system errors.
- The server may be secured using SSL certificates.

6.3 User Documentation

All documentation will be made in accordance with requirements.