Software Requirement Specification

for

Automated Library System

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1. Introduction

1.1 Purpose

Library management system is basically updating the manual library system into a desktop-based application so that the users can know the details of their accounts, availability of books and maximum limit for borrowing. The main objective of this document is to illustrate the requirements of the project Automated Library system. The document gives the detailed description of the both functional and non-functional requirements proposed by the client. The purpose of this project is to provide a friendly environment to maintain the details of books and library members. The main purpose of this project is to maintain an easy circulation system using computers and to provide different reports. This project aims at presenting a simple and clear indefatigable method of running a library which administers every activity of the library in simple and best alternatives. It serves to administer the system in a plain and simple method of report generation needed for all the administrative tasks by the library staff.

1.2 Document Conventions

- Main Section Titles Font: Open Sans Face: Bold Size: 18
- Sub Section Titles Font: Open Sans Face: Bold Size: 12
- Other text Explanations Font: Open Sans Face: Normal Size: 11

1.3 Intended Audience

The document is designed for the developers of the system, Librarians, and administration of faculty of any college and also for any party who is interested.

1.4 Product Scope

The project product to be produced is a Library Management System which will automate the major library operations. Library Management System is basically updating the manual library system into an Internet based application so that the users can know the details of their accounts, availability of books and maximum limit for borrowing. The product will work as a complete user interface for library management process and library usage from ordinary users. Library Management System can be used by any existing or new library to manage its books and book borrowing, insertion and monitoring. It is especially useful for any educational institute where modifications in the content can be done easily according to requirements.

1.5 References

- Software Requirements and Specifications: A Lexicon of Practice, Principles.
- Software Requirements (Microsoft) Second Edition By Karl E.Wiegers
- Software Engineering: A Practitioner's Approach Eighth Edition By Roger S. Pressman

2. Overall Description

2.1 Product Perspective

The structure of the system can be divided into 3 main logical components:

Admin Module- Controls the employees (librarians). Admin can add or remove entries into the system respectively.

Librarian Module- The Librarian will act as the administrator to control members and manage books. The member's status of issue/return is maintained in the library database. The member's details can be fetched by the librarian from the database as and when required.

User (Student) module- The users can verify the availability of the books. They can request an issue/renew/return of books for which they would have to follow certain criteria.

2.2 Product Function :

The Online Library System provides online real time information about the books available in the Library and the user information. The main purpose of this system is to reduce overheads and increase productivity. In short, this system supports keeping the records of all transactions of the books available in the library. This software is capable of managing Book Issues, Returns, Calculating/Managing Fine, Generating various Reports for Record-Keeping according to end user requirements. The Librarian will act as the administrator to control members and manage books. The member's status of issue/return is maintained in the library database. The member's details can be fetched by the librarian from the database as and when required. The valid members are also allowed to view their account information.

The Automated Library System application would have the 3 basic user levels:

Librarian Module :

This module provides functionality for the librarians. It will allow Librarians to issue books to the students. Also they can view a list of books available in each category, check the report of the issued books and have access to student accounts.

- A librarian can issue a book to the member.
- Can view the different categories of books available in the Library
- Can view the List of books available in each category
- Can take the book returned from students
- Can check the report of the existing and issued books
- Can access all the accounts of the students

Admin Module :

This module provides functionality for the power Administrator only. It will allow an Admin to manage the librarians and add or remove entries into the system.

- Add Librarian.
- View All Books in the Library.
- Search for books, shelf-ID and availability
- All information of members and other employees
- All Book Issue History and adding or removing books.

User Module :

This is the simplest module out of all 3 modules. It is designed to be used only by members (students or faculty) , and provides the following functions:

- Can own an account in the library.
- View available books
- Can view the different categories of books available in the Library
- Can view the List of books available in each category
- Can view the books issued to him
- Can put a request for a new book
- Can view the history of books issued to him previously
- Can search for a particular book

2.3 User Classes and Characteristics :

There are 3 user Levels in our Automated Library System:

● Admin : Admin have every access to the library system. Admin is solely responsible for managing library resources and the members. Admin can update the library database and manage the librarians, books and library services.
● Librarians : The librarians sole purpose is to provide quality library services. The Librarian will be acting as the controller of keeping records of issuing books to students and availability of new books. He/she can manage the books database. They can search for availability of books, add the user(student or faculty), issue a book to the user, give services, calculate fine and generate bills.
● Users: Users are a vital part of the system. Users have access to view the available books information. They should be able to reserve the book and cancel it if necessary. Students can access to see book information and track their borrowed books, etc. Users have access to the user service desk portal to forward their inquiry. Users should at least be capable of using the web UI interface.

2.3.1 Add a new User

Description	The function allows the user to add his details to the database to access the application.
Actors	User(Student/Faculty), Librarian
Main flow of events	1.User enters his details like name, email id, phone no. ,location 2. User creates his password 3. User gets a message on successful registration or is redirected to the same page if the details entered are inappropriate.
Post-Condition	The user is successfully registered and can now login to the system to search for available books and reserve it.

2.3.2 Login:

Description	The functionality logs the already registered user and the librarian.
Actors	User(Student/Faculty), Librarian, ,Admin
Pre-Condition	The user must be a registered member.
Main flow of events	1. User enters his username and password. 2. If there is a match in the database, login is successful.
Post-Condition	On successful login the page redirects to the particular profile page.

2.3.3 Check for availability of books:

Description	Users enter the book title and category based on which the website displays available books other details.
Actors	User
Pre-Condition	The user must be a registered member.
Main flow of events	1. Users enter book title based on which system displays available books along with the prices.
Post-Condition	Displays the available books in that time period.

2.3.4 Reserve books:

Description	User accesses the interface and checks the availability of books available for him/her to borrow. Then he can select the book and complete all requested details to complete the booking.
Actors	user(Student), Librarian
Pre-Condition	The user must be a registered member.
Main flow of events	1.User enters the book title that he/she wants and selects the reserve and return date. 2. System displays available books available for the user chosen dates 3. User can see the other books of the same category as well. 4. User select the book and click next button 5. System displays a page to enter user details. User enters all requested details to reserve the book.
Post-Condition	User confirms booking.
Exceptions	User could enter some wrong details because of typo errors.

2.3.5 Cancel a reserved book:

Description	This functionality allows the user to cancel an already reserved book.
Actors	User (Student)
Pre-Condition	The user must be a registered member and the book must be reserved.
Main flow of events	1. Select the reservation id to be canceled. 2. Click the checkbox to confirm the cancellation process and agree to the terms and conditions.
Post-Condition	Reserved books are cancelled successfully and the book status is updated in the database.

2.3.6 Issue book:

Description	This function allows the librarian to issue books to the users as required.
Actors	Librarian
Pre-Condition	Librarian should be a registered member and user to whom the book is to be issued must be a valid member of the library..
Main flow of events	1. Librarian enters the book id of the book to be issued for the student. 2. Librarian allocates the book as per requirement. 3. Click on the submit button.
Post-Condition	On successful submission the database is updated with the issue details.

2.3.7 Calculate fine and generate bill :

Description	This function allows the librarian to calculate fine for the student who has either not returned the book before the deadline or has lost the book.
Actors	Librarian
Pre-Condition	Book is reserved by a student.
Main flow of events	1. The Librarian searches for the student by entering his/her name. 2. If the student has not returned the book, then the librarian calculates a fine for the book based on its actual price and generates a bill. 3. The bill is then sent to the student.
Post-Condition	Total fine is calculated and the bill is displayed on the user account.

2.4 Operating Environment :

- Front End : For developing the project the Java Development Kit (JDK) is being used as implementation language. Java is suited to creating general business programs rather than low level drivers, performance critical or operating system code. Typically it is used for accessing databases or writing networking systems.
- Back End : Back end the databases are built on MySQL which support all SQL queries and which is compatible with a long list of platforms. The MySQL database provides the ultimate in scalability, supporting the capacity to handle deeply embedded applications.
- Operating platform : Library Automation system can operate in Windows/ Linux environment.

2.5 Design and Implementation Constraints

- A Constraint of the system is security, security of the system is constantly developed as security is vital to protect personal and corporate data. The organisation will be responsible for maintaining the software and will receive support from developers with consistent updates to improve and refine the previous version of the code.
- To ensure constant improvements to the system analytical techniques will be used to find the strengths and weaknesses of the system and also the threats to its security and the opportunities that it can use to extend and expand the system to improve efficiency.
- System should sync frequently to the backup server in order to avoid data loss during failure, so it can be recovered. The system should not allow any user to manipulate the database except the admin.Safety and security of the user database is most important. All important details should be encrypted.

2.6 Assumptions and Dependencies :

The assumptions are:-

- The coding should be error free
- The system should be user-friendly so that it is easy to use for the users
- The information of all users, books and libraries must be stored in a database that is accessible by the website .
- The system should have more storage capacity and provide fast access to the database .
- The system should provide search facility and support quick transactions
- The Library System is running 24 hours a day.
- Users may access from any computer that has Internet browsing capabilities and an Internet connection.
- Users must have their correct usernames and passwords to enter into their online accounts and do actions.

The dependencies are:-

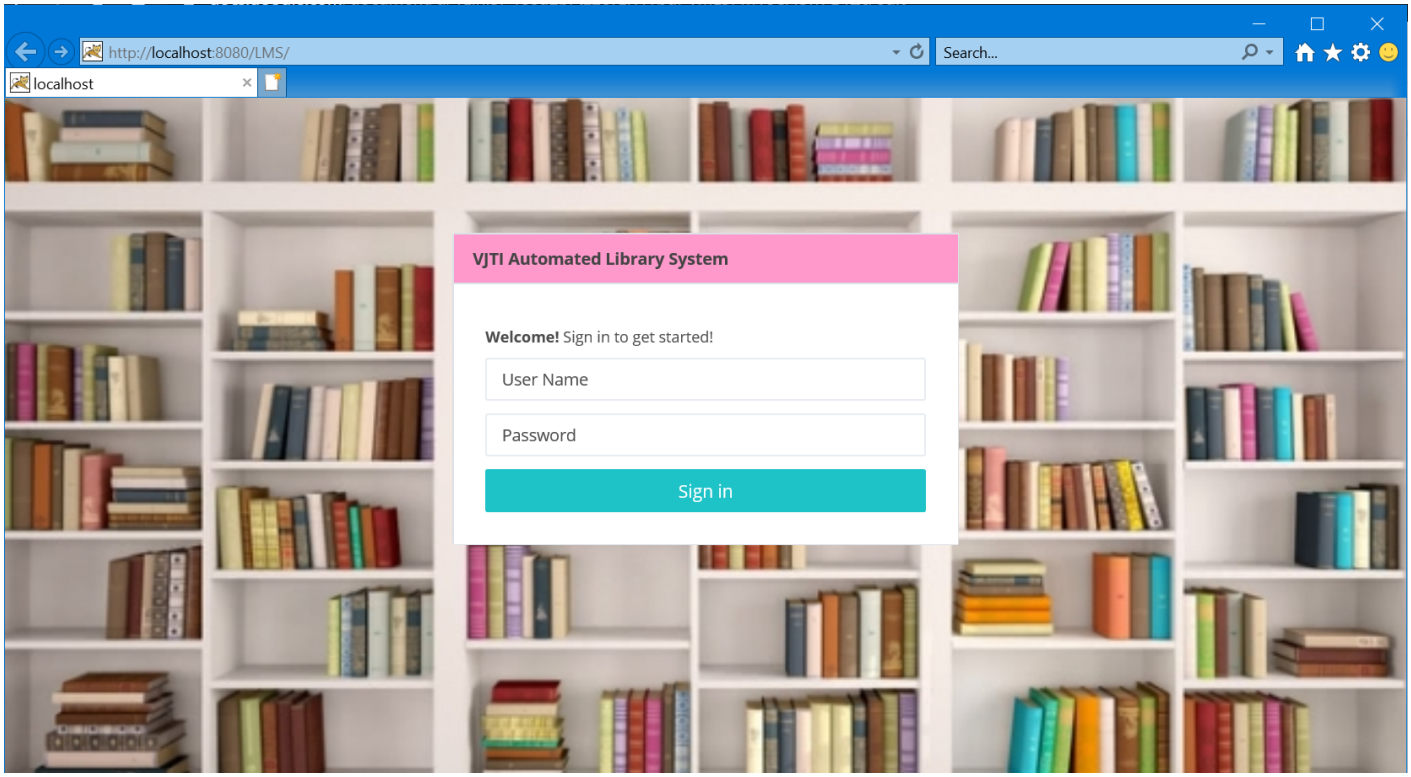
- The specific hardware and software due to which the product will be run
- On the basis of listing requirements and specification the project will be developed and run .
- The end users (admin) should have proper understanding of the product.
- The system should have the general report stored.
- The information of all the users must be stored in a database that is accessible by the Library System.
- Any update regarding the book from the library is to be recorded to the database and the data entered should be correct.

3. External Interface Requirements

3.1 User Interfaces

3.1.1 Login Page:

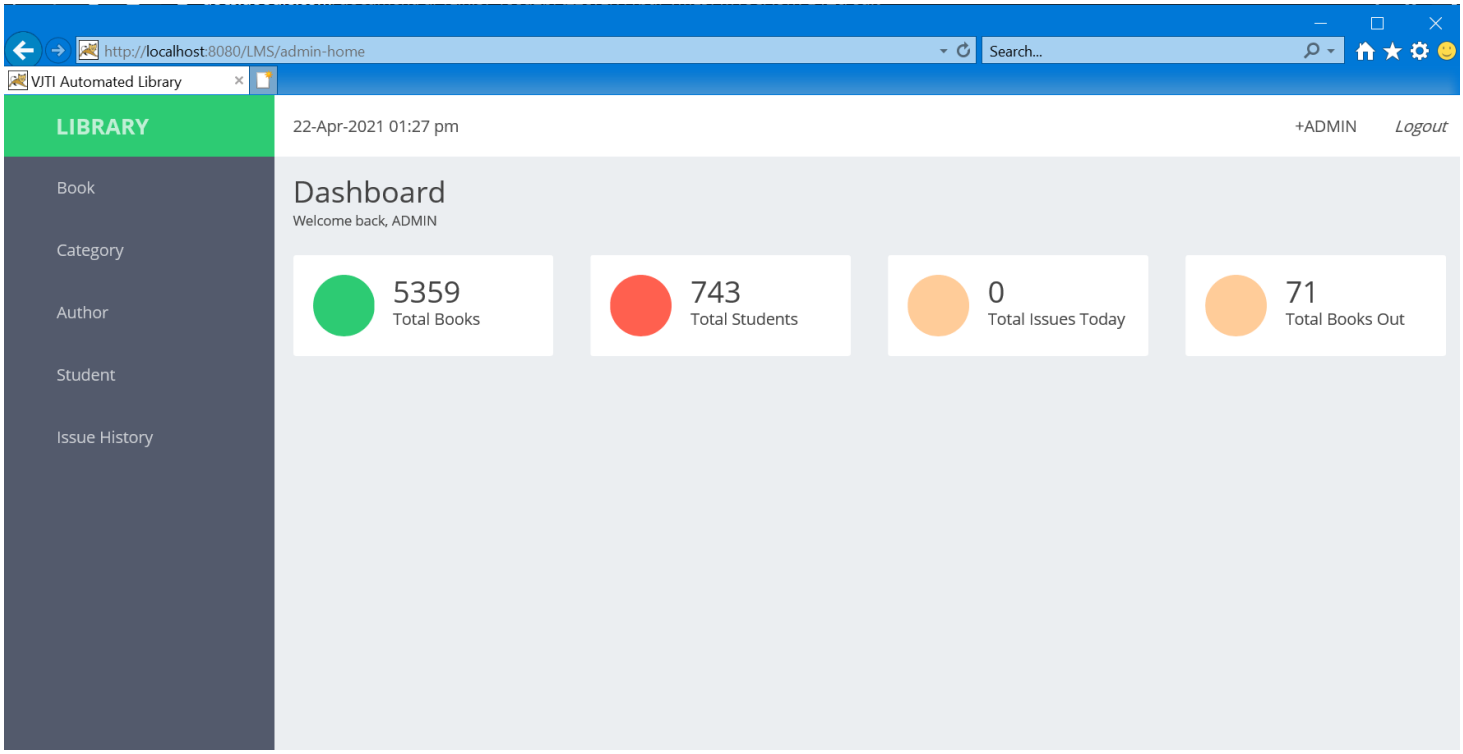
This interface allows a registered user to login to their account using their registered email id and password.If the user entered either his username or password incorrectly then an error message appears.



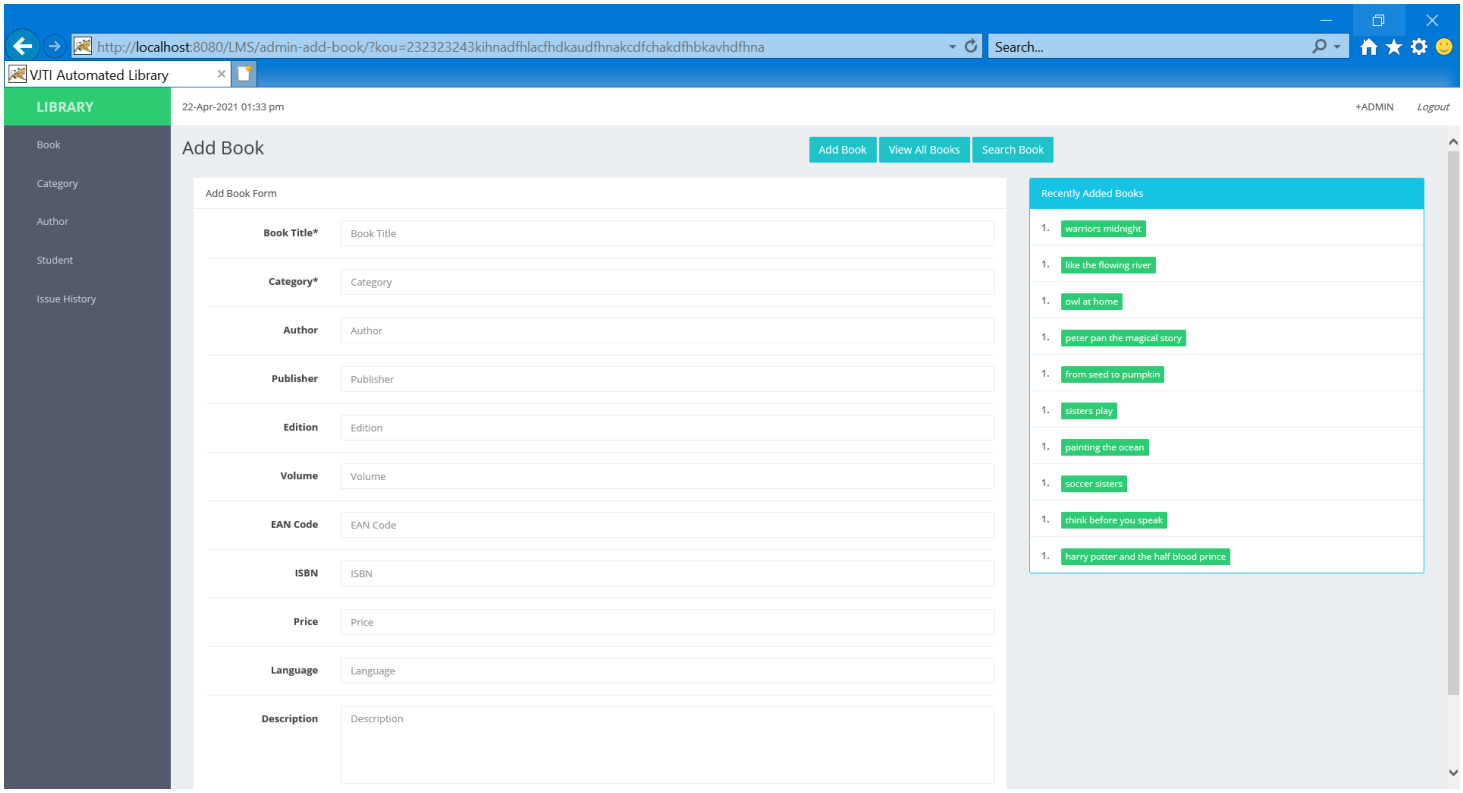
3.1.2 Register Page:

A new user can register and create an account. The user has to provide a name, email, password, a security question to register. The application checks whether the email address is not already present in the database and all the information provided is valid.

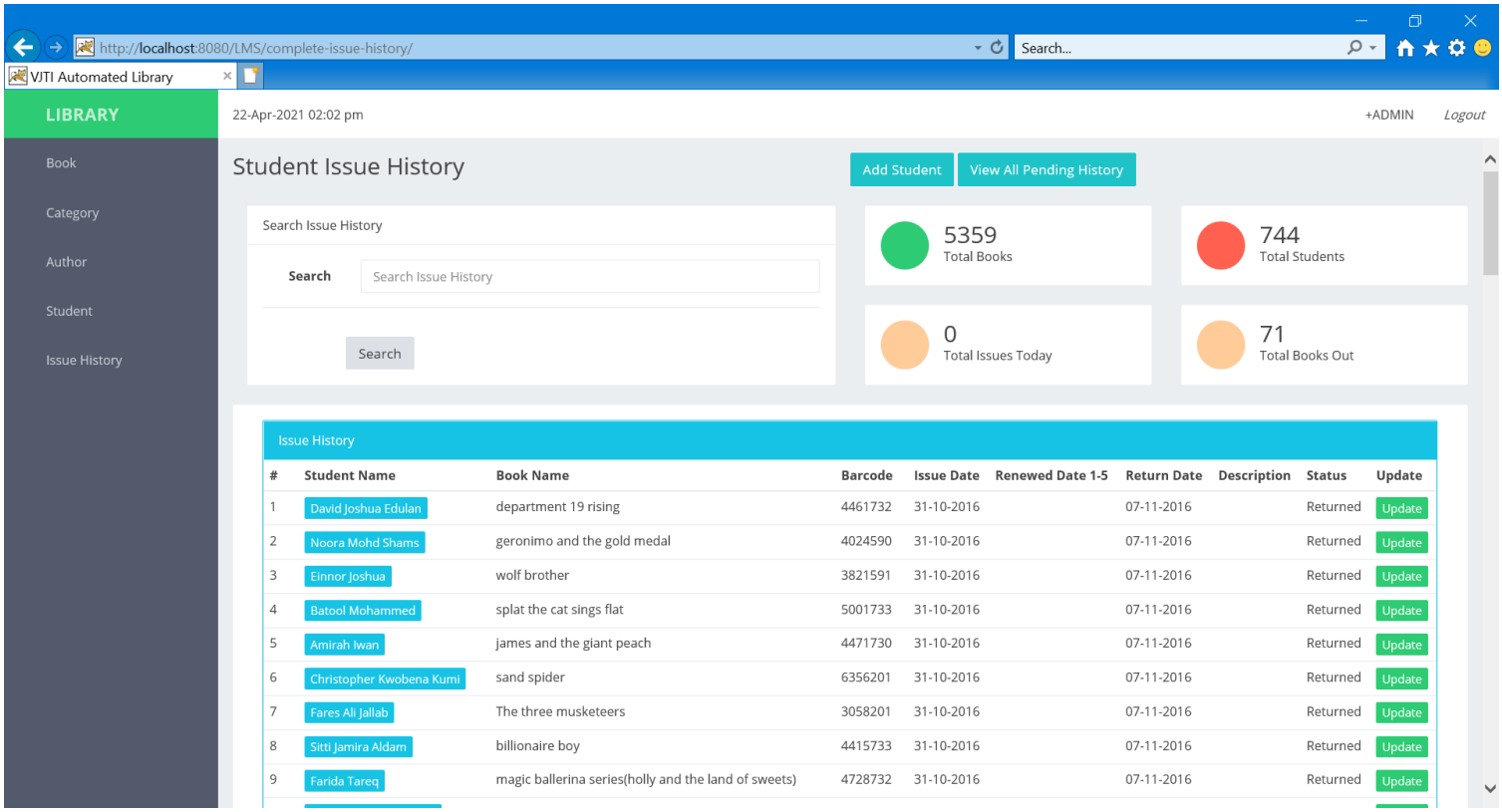
3.1.3 Home Page: This interface allows the admin to add books, add students. Also it allows students to check the available books to borrow. Also librarians can check the records of issued and existing books.



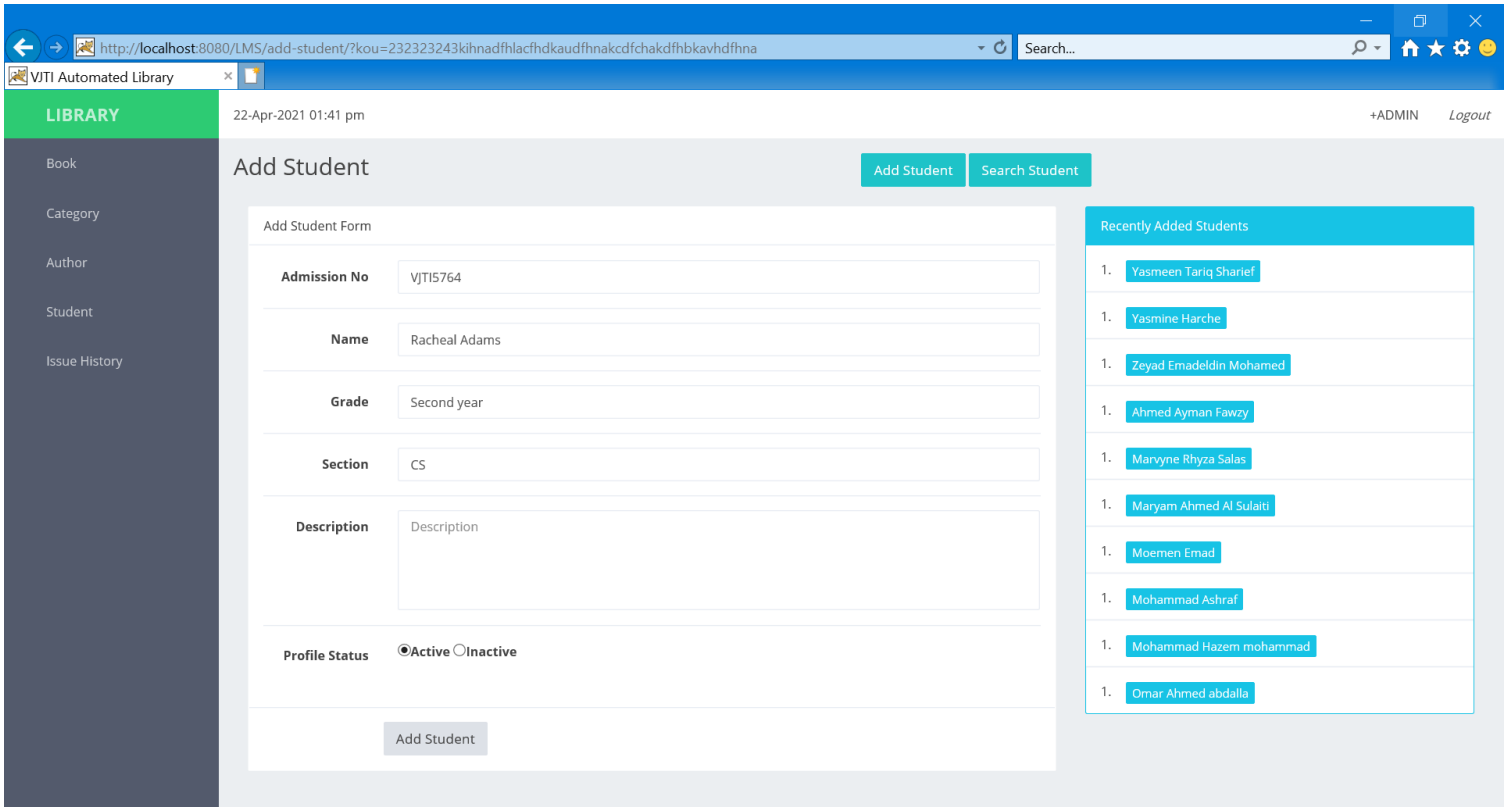
3.1.4 Add Books : This section allows the admin to add new books by entering their details, which are then stored in the database and are available to the students.



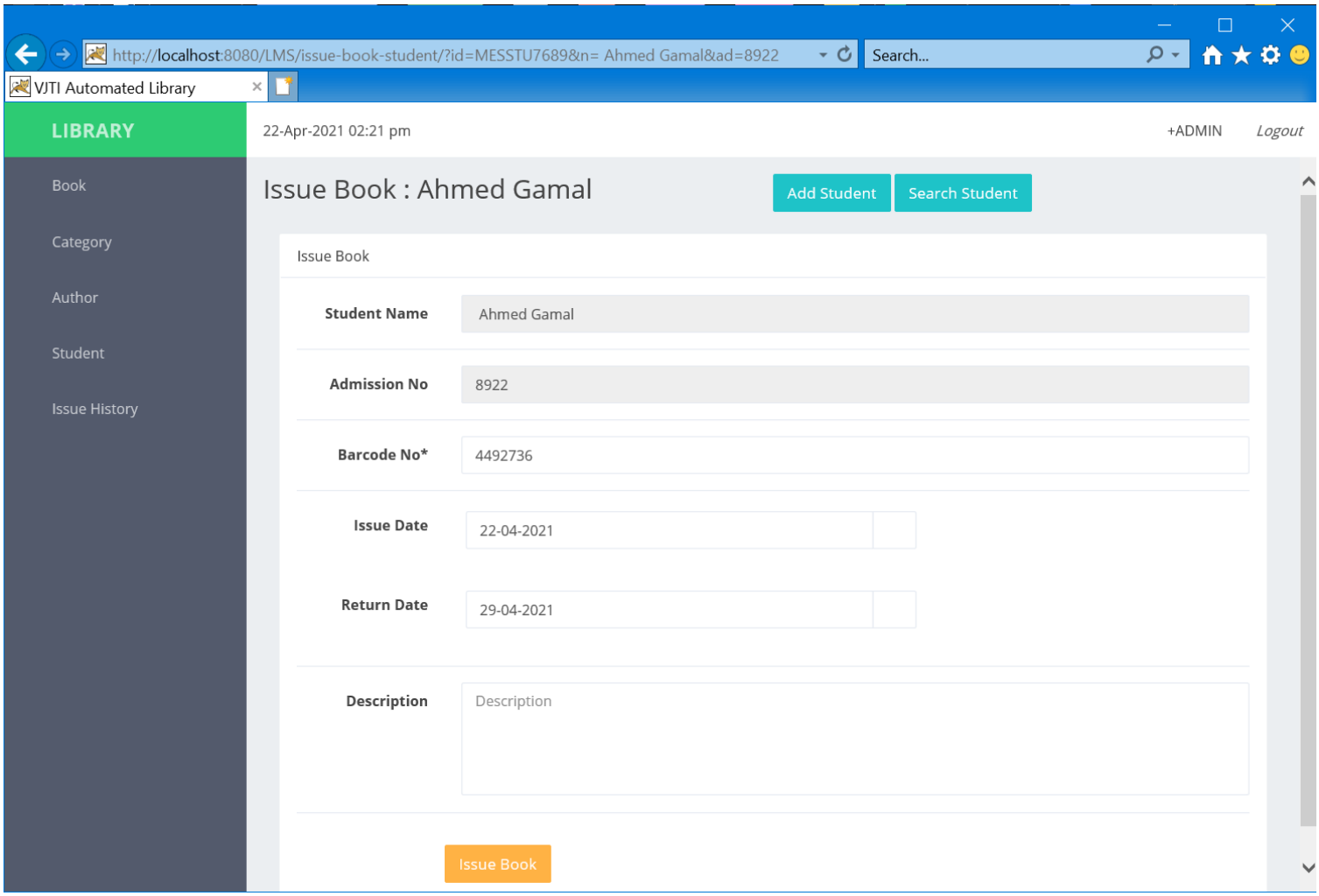
3.1.5 **List of Issued books :** It allows the librarians as well admin to view the list of issued books.



3.1.6 **Add Student details:** This section adds the details of students into the system.



3.1.7 Issue book to a student : This section is for librarians which will allow them to issue a book to the student and keep a record of it. The book status is then updated in the database.



3.1.8 Return Book : This section will allow librarians to take back the issued book from the student

3.1.9 Calculate Fine: This section allows the librarians to calculate fine if any student hadn't returned the book before the deadline or if the student has lost the book.

3.2 Hardware Interfaces

Particulars	Client System	Server System
Operating System	Windows 7,8.1,10, Linux, Mac OS	Windows 7,8.1,10, Linux, Mac OS
Processor	Pentium 4, 1.2 GHz	Pentium 4, 2.6GHz
Hard disk	50 GB	250 GB
RAM	2 GB (Windows 7) 4 GB (Windows 8.1, 10)	8 GB (Windows 7) 16 GB (Windows 8.1, 10)
Internet connection	2 Mbps	10 Mbps

3.3 Software Interfaces

This software package is developed using java as the front end. MySQL as the back end to store the database. Operating System: Windows XP, windows 7 and higher versions. Language: Java Runtime Environment, Net beans 7.0.1 (front end) Database: MS SQL Server (back end)

3.4 Communications Interfaces

The system uses the HTTP. HTTP is the protocol used to transfer data over the web. It is part of the Internet protocol suite and defines commands and services used for transmitting web page data. The client accesses the system through a web browser. Sensitive user data is passed through POST requests, so that it is not easily visible.

4. Functional and Non-functional Requirements

4.1 Functional Requirements :

4.1.1 Register

- FR1. The User should be able to register with their details.
- FR2. The system records ,Name, Email, Password, Address, DOB following user details into the member database.
- FR3. The system shall send verification message to email

4.1.2 Login

- FR4. The system should verify the user email & password against the member database when logging in
- FR5. After login, members should be directed to the Home screen of the particular role of Automated Library System.

4.1.3 Reserve a book

- FR6. The system should enable user to check for availability of books.
- FR7. The system should display if the book is available or not along with recommending some books of the same category.
- FR8. If the issued book is already reserved by another user then the system should display the error message for the current user.
- FR9. The system should allow user to confirm the reservation.
- FR10. The system should record booking details into the database.

4.1.4 Update issue history

- FR11. The system should enable librarian to search for a particular student.
- FR12. The system should enable the librarian to update the status of the student issue history.

4.1.5 Librarian Access

- FR13. The system should allow Librarian to update, add or delete books information into the database.
- FR14.The system should allow Librarian to issue books to the particular user as required.
- FR15.The system should allow Librarian to calculate fine and generate bills for any loss of the book and confirm payment of the user.

4.1.7 Payment Management System

- FR16. The system should allow user to pay bill via online using credit or debit card.

4.2 Non-Functional Requirements:

4.2.1 Usability Requirements

The system shall allow the users to access the system from the phone using an android application. The system uses an android application as an interface. Since all users are familiar with the general usage of mobile app, no special training is required. The system is user friendly which makes the system easy.

4.2.2 Serviceability requirement

The system should be maintained time to time, including tasks such as monitoring the system, repairing problems that arise, adding and removing users from the system, and upgrading hardware and software components.

4.2.3 Manageability requirement

It is the ease with which the administrators can monitor the system, through critical health status exposed through its monitoring capabilities. Proper monitoring by the administrator which includes updating account status, showing a popup if the member attempts to issue a number of books that exceed the limit provided by the library policy, assigning fine to members who skip the date of return.

4.2.4 Security requirement

- System will use a secured database.
- Normal users can just read information but they cannot edit or modify anything except their personal and some other information.
- System will have different types of users and every user has access constraints.
- Proper user authentication should be provided.
- No one should be able to hack users' passwords.

- There should be separate accounts for admin and members such that no member can access the database and only admin has the rights to update the database.

4.2.5 Availability requirement

The system is available 100% for the user and is used 24 hrs a day and 365 days a year. The system shall be operational 24 hours a day and 7 days a week.

4.2.6 Scalability requirement

It describes how the system must grow without negative influence on its performance. This means serving more users, processing more data, and doing more transactions. The website attendancy limit must be scalable enough to support 20,000 users at a time.

4.2.7 Reliability requirement

The system has to be 100% reliable due to the importance of data and the damages that can be caused by
incorrect or incomplete data. The system will run 7 days a week, 24 hours a day.

4.2.8 Maintainability requirement

The system should be maintainable in the sense that if any error occurs, it should be easily rectified and the cost incurred in maintenance should be as low as possible. A commercial database is used for maintaining the database and the application server takes care of the site.

4.2.9 Performance Requirements

The proposed system that we are going to develop will be used as the Chief performance system within the different campuses of the university which interacts with the university staff and students. Therefore, it is expected that the database would perform functionally all the requirements that are specified by the university.

- The performance of the system should be fast and accurate.
- Library Management System shall handle expected and unexpected errors in ways that prevent loss in information and long downtime periods. Thus it should have inbuilt error testing to identify invalid username/password.
- The system should be able to handle large amounts of data. Thus it should accommodate a high number of books and users without any fault.

4.2.10 Safety Requirements

The database may get crashed at any certain time due to virus or operating system failure. Therefore, it is required to take the database backup so that the database is not lost. Proper UPS/inverter facility should be there in case of power supply failure.