

# **WEB DEVELOPMENT**

## **A PROJECT REPORT**

*Submitted by*

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*In partial fulfillment for the award of the degree of*

## **BACHELOR OF ENGINEERING**

*in*

**Information & Communication Technology Department**

**L. J. Institute of Engineering & Technology**

**Ahmedabad**



**Gujarat Technological University, Ahmedabad**

**[May - 2023]**



**L. J. Institute of Engineering & Technology**  
**Ahmedabad**

**CERTIFICATE**

This is to certify that the project report submitted along with the project entitled **Web Development** has been carried out by **Beldar Mugish Mohammadsabir** under my guidance in partial fulfillment for the degree of Bachelor of Engineering in **Information & Communication Technology**, 8<sup>th</sup> Semester of Gujarat Technological University, Ahmadabad during the academic year 2022-23.

Prof. Dixa Koradia

**Internal Guide**

Prof. Prayag Patel

**Head of the Department**

## **Company certificate**



**L. J. Institute of Engineering & Technology**  
**Ahmedabad**

## DECLARATION

We hereby declare that the Internship report submitted along with the Internship entitled **Web Development** submitted in partial fulfillment for the degree of Bachelor of Engineering in **Information & Communication Technology** to Gujarat Technological University, Ahmedabad, is a bonafide record of original project work carried out by me at Rapidops Inc. under the supervision of Pradhyuman Sarkar and that no part of this report has been directly copied from any students' reports or taken from any other source, without providing due reference.

Name of the Student

Mugish Beldar

Sign of Student

\_\_\_\_\_

## ACKNOWLEDGEMENT

It is great pleasure for me to undertake this Internship as software engineer intern and a project at Rapidops Inc. I feel highly doing the project entitled “Web Development”. I offer my sincere appreciation for the learning opportunities provided by Rapidops Inc.

I am very grateful and would like to thank my supervisor and external guide Mr. Pradhyuman Sarkar who has been mentoring me through the whole journey of this project and internship. I would also like to thank Prof. Prayag Patel, Head of Department and Prof. Dixa Koradia, my Internal guide for their continued support.

This Internship and project would not have completed without their enormous help and worthy experience. Whenever I was in need, they were there behind me. Although, this report has been prepared with utmost care and deep rooted interest. Even then I accept respondent and imperfection. This opportunity has proved to be very useful to me in a way of taking responsibilities and enhancing my coding skills and becoming more code friendly. And for that I am very glad.

Mugish Beldar  
(190320132004)

DATE: 22th April,2023.

## ABSTRACT

*In growing country, India, employers go through many difficulties especially those who are a scarce of employees and find it hard to manage the company records. They often get perplexed with the amount of data they have to manage and record in different files. The project I worked on during this internship at SKP Software was to solve the above faced issue. The company works of creating software for its clients.*

*Web development is a complex process that requires a wide range of technologies and tools. In addition to HTML, CSS, and JavaScript, modern web development often involves working with server-side technologies like Node.js, message brokers like Kafka, and database management systems like MySQL.*

*In summary, modern web development requires a deep understanding of a wide range of technologies and tools, including Node.js, Kafka, and MySQL. By leverag these technologies, developers can build scalable, high-performance web applications that can handle the demands of today's digital world.*

*The Web Application is used for storing all the data of stocks exchanged for a garment industry. Additionally, the data about the transaction of payment and reception is all a feature included in the web application. Various components learnt during the internship are also implemented in the project like TreeView, GridView.*

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## **LIST OF ABBREVIATION**

Following is the list of abbreviations used in the report:

### **Abbreviation**

HTML

CSS

JS

SDLC

WWW

### **Full Form**

Hyper Text Markup Language

Cascading Style Sheet

Java Script

System Development Life Cycle

World Wide Web

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## **1.0 OVERVIEW OF THE COMPANY**

### **1.1 HISTORY**

Rapidops Inc. is a technology, transformation, and analytics company. We help clients design, engineer, and launch advanced digital products and platforms that enable them to thrive and achieve more for their customers. Since 2008, our team has delivered thousands of projects and hundreds of digital products that are touching millions of lives daily, solving tough problems, and changing the way people live, work, and engage. We operate in retail, manufacturing & supply chain, healthcare, and technology industries. We are working with companies like Dassault Systemes, Harris Teeter, BigCommerce, FlexTG, and Tresata.

We have also launched our own digital platforms like Salesmate.io, used by thousands of businesses across the globe. We can translate your vision, challenges, and ideas into market-leading digital products in record time. Due to our end-to-end and cross-functional expertise in strategy, design, engineering, analytics, AI/ML, IoT, and DevOps, we are a partner of choice to discover and monetize new digital and data opportunities of any size, shape, or scale.

Rapidops is recognized as one of the fastest-growing companies in the USA and has featured in the prestigious Inc. 5000 list for 2019, 2020 and 2021. It also ranked as the 5th fastest growing company in Charlotte by Business Journal. Reach out to us to discover and monetize your digital opportunities, or connect with us to stay updated with digital trends and powerful insights.

### **1.2 DIFFERENT PRODUCT/SCOPE OF WORK**

As I mentioned earlier, the company is product based organization, it makes large scale software for its clients. It only works with big data. The main feature of the products this company creates is the management of huge database. It has a highly skilled team for organization and maintenance. It creates Application Software only or can also be defined as business software.

### 1.3 Organization Chart

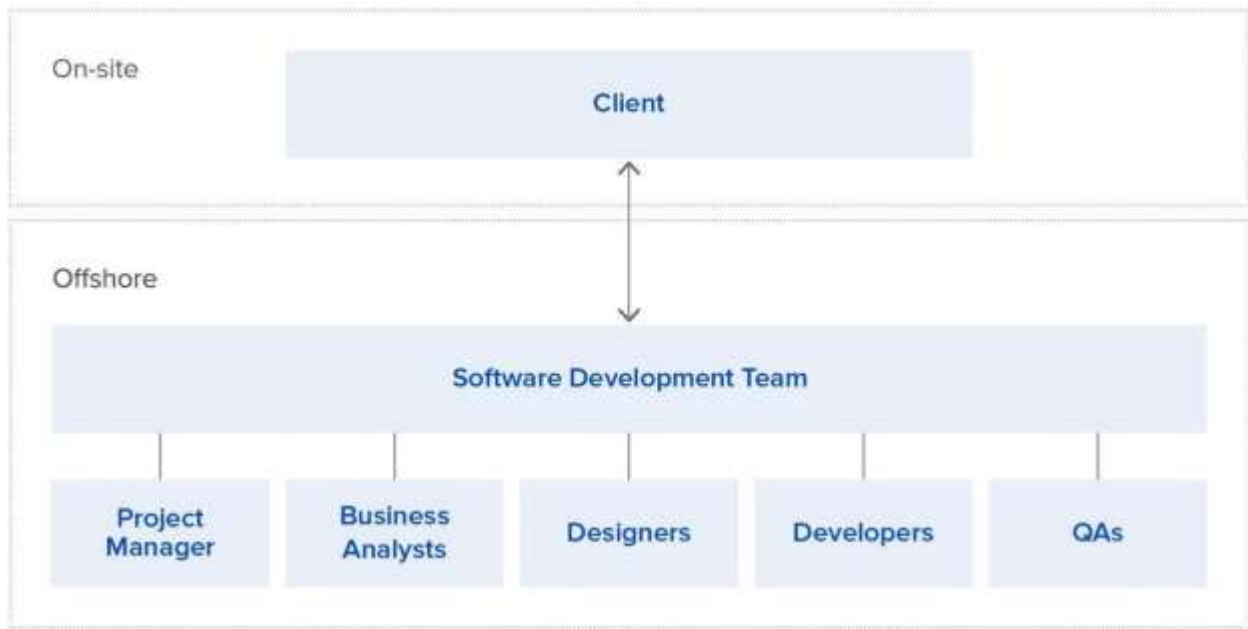


Figure 1.1 Organization Chart

## **2.0 OVERVIEW OF DIFFERENT PROCESS BEING CARRIED OUT IN COMPANY**

### **2.1 DETAILS ABOUT THE WORK BEING CARRIED OUT IN EACH DEPARTMENT**

- **Client:[Not necessarily a department of the company]:**

A client is someone who request for a software either of personal or professional use. The client is the person who specifies the requirements in the product and is responsible for the user stories.

- **Project Manager:**

Project managers are accountable for planning, organizing, and cheerleading the employees. These gate keepers ensure customer satisfaction, push documentation, and efficiently optimize the workflow.

- **Business Analyst:**

Although the responsibilities of business analysts can differ on the waterfall and agile projects, strive to help guide businesses. They do this by gathering, analyzing, developing, and documenting business requirements. In a broader sense, they bridge the gap between the business and IT to improve efficiency.

- **Quality Assurance engineers:**

They are more than just testing a feature or a product. These specialists advocate for the quality of a product by monitoring each stage of software development, debugging, and defining corrective measures.

- **Designer:**

UI/UX designer creates user-friendly and intuitive interactions by building a route that logically flows from one stage to the next. A user interface designer focuses on the user's visual experience that goes with that route.

**Developer:**

Software developers are the creative, brainstorming eminence grise that power computer programs of all kinds. Among their daily duties are software development and testing, upgrading, quality monitoring, and documenting all processes for future reference.

## **2.2 LIST THE TECHNICAL SPECIFICATIONS OF MAJOR EQUIPMENT USED IN EACH DEPARTMENT**

List of major equipment used in each department individually is not provided to us by the company. Hence, I have specified the equipment I used as a software developer intern:

Back end and Frontend coding: Visual Studio 2022

Framework and library :- HTML, CSS, JavaScript, Nodejs, Kafka

Database: Mysql, Cockroachdb

## **2.3 SCHEMATIC LAYOUT OF SEQUENCE OF OPERATION FOR MANUFACTURING OF END PRODUCT**

The process of developing a software is done via following the basic SDLC rule which is proved to be most efficient while developing a software. Hence, the company uses the same SDLC technique for developing a software.

The below given process is a schematic representation of the sequence of stages that the software development team undertakes to produce a software. It is basically a SDLC with a use of differently chosen words.

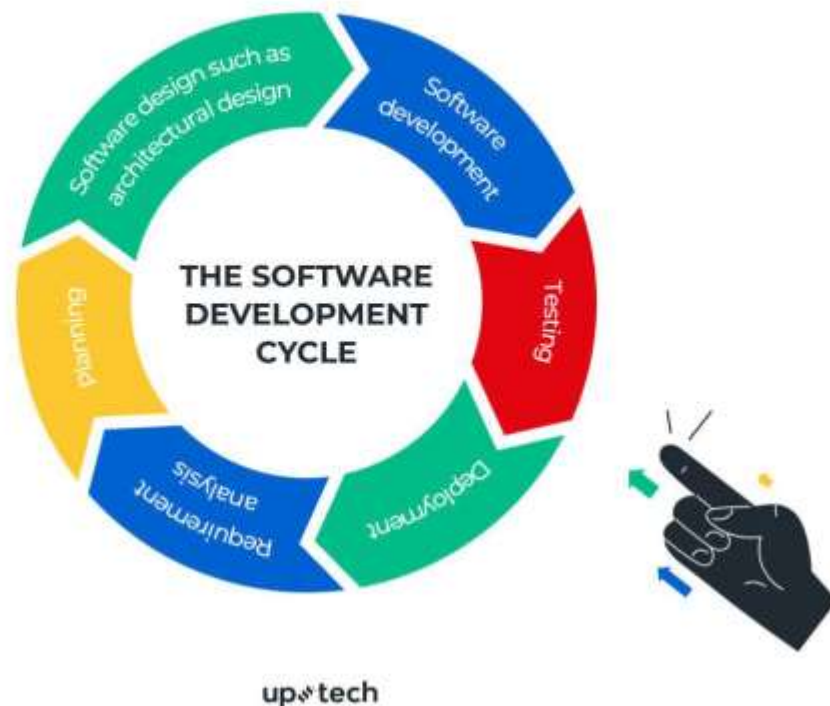


Figure 2.1 SDLC

## 2.4 DETAILS ABOUT EACH STAGE OF PRODUCTION

### 1. Gather the information about Requirements:

While starting any software development project this is the most essential part of the whole process and therefore the company first get a clear idea about the functional and non-functional requirements. This is the responsibility of the project manager to communicate the requirements distinctly to the development and designer team.

### 2. Start with the Front-end design:

It is the role of UI/UX designers of the company. Once the requirements about the design and user interface is understood the team starts with developing the visual solution of the product. This part of the process is known as user interface design, and it stands for how users perceive the app.



### 3. Focus on Coding:

In the third step, we finally get down to coding the concepts listed above. Here, the development team implements all models, business logic, and service integrations specified in the prior stages. The coding stage is usually the longest, as it is the cornerstone of the whole process. The development team follows the software requirements to build a product that lives up to the stakeholder's expectations.

### 4. Review of the product by QA team:

At the QA stage, the testing specialists discover and inform about the problems that arise while using the system. The testing frameworks may vary depending on the project, including automation and/or manual testing.

### 5. Operation Stage/ Deployment Stage:

Finally, the application goes on to be deployed in a live environment. This stage involves deployment, support, and maintenance necessary to keep the system functional and up-to-date.

## **3.0 INTRODUCTION**

### **3.1 INTRODUCTION TO INTERNSHIP AND PROJECT**

An internship is a period of work experience offered by an employer to give students or recent graduates exposure to the working environment, often within a specific industry or field. Internships can be paid or unpaid and can vary in length from a few weeks to several months.

One popular type of project that interns might work on is an email client project. An email client is a software application that allows users to send, receive, and manage their email messages. Interns working on an email client project may be involved in developing new features, improving existing functionality, or troubleshooting technical issues.

Interns working on an email client project may work closely with a team of software developers, designers, and quality assurance professionals. They may be responsible for writing code, testing software, or creating user interfaces. They may also have the opportunity to learn about the software development life cycle and gain experience using industry-standard tools and technologies.

Overall, an internship that includes an email client project can be an excellent opportunity for students or recent graduates to gain valuable work experience, learn new skills, and make important connections in their chosen field.

### **3.2 PURPOSE**

The purpose of an email client project can vary depending on the specific goals and objectives of the project. Generally, the aim of an email client project is to create or improve a software application that enables users to manage their email messages effectively.

The project may involve developing new features that enhance the functionality of the email client, such as improved search capabilities, better filtering options, or a more user-friendly interface.

Alternatively, the project may focus on fixing bugs or addressing performance issues to improve the overall reliability of the application.

An email client project may also have a specific target audience in mind, such as business professionals, students, or casual users. In such cases, the project may focus on developing features or functionalities that are tailored to the needs of that particular user group.

Additionally, an email client project may have broader goals related to software development best practices, such as improving code quality, increasing testing coverage, or adopting new technologies or tools.

Overall, the purpose of an email client project is to create or improve an application that provides users with a reliable, efficient, and user-friendly way to manage their email messages.

### 3.3 OBJECTIVES

The objectives of an email client can vary depending on the specific goals and requirements of the project. However, some common objectives of an email client include:

- Providing a reliable and secure way for users to send, receive, and manage their email messages.
- Enhancing user productivity by offering features that help users organize and manage their emails effectively.
- Improving the user experience by creating a user-friendly interface and intuitive design.
- Supporting different email protocols and integrating with other applications and services to provide a seamless communication experience for users.
- Ensuring compatibility with various devices and platforms, including desktops, laptops, smartphones, and tablets.

Overall, the objectives of an email client are to provide users with a reliable, secure, and efficient way to manage their email messages, while also offering features that enhance productivity, collaboration, and the user experience.

### 3.4 PROJECT SCOPE

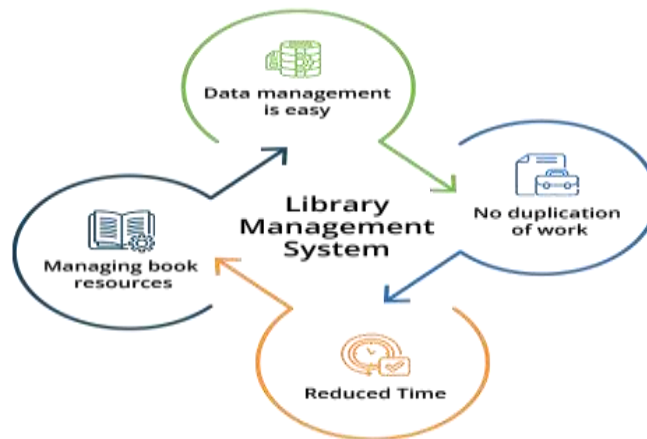


Figure 3.1 Project Scope

### 3.5 TECHNOLOGY AND LITERATURE REVIEW

- The front end used in my project is HTML, JavaScript, CSS and the back end used is Nodejs and mysql, cockroachdb, sequelize .
- I followed the Spiral Model for developing this Project and whole Project will be developed using the SDLC scenario.

#### I. HTML and CSS

HTML is the foundation of all web pages. Without HTML, you wouldn't be able to organize text or add images or videos to your web pages. HTML is the beginning of everything you need to know to create engaging web pages! You will learn all the common HTML tags used to structure HTML pages, the skeleton of all websites. You will also be able to create HTML tables to present tabular data efficiently. However, CSS is used for the styling of the HTML pages. Hence, I have used HTML along with ASP Components and CSS to create the structure of Web Application.

#### II. JAVASCRIPT

JavaScript is a high-level, interpreted programming language that is widely used for creating dynamic and interactive web applications. It was initially created in 1995 by Brendan Eich while he

was working at Netscape Communications Corporation, and it has since become one of the most popular programming languages in the world. JavaScript can be used for a wide range of tasks, including client-side scripting, server-side scripting, and developing desktop and mobile applications. It is primarily used for adding interactivity to web pages, such as validating user input, creating animations and visual effects, and manipulating the Document Object Model (DOM). JavaScript is a versatile language that can be used in combination with other web technologies, such as HTML and CSS, to create rich, engaging web experiences for users.

### **III. Node Js**

Node.js is an open-source, cross-platform, server-side runtime environment for executing JavaScript code outside of a web browser. It was initially created in 2009 by Ryan Dahl, and it has since become a popular choice for building scalable, high-performance web applications. Node.js uses an event-driven, non-blocking I/O model, which makes it well-suited for building real-time, data-intensive applications that require high concurrency. It also has a large and active community of developers who contribute to its ecosystem of modules and tools, making it easy to build and deploy complex applications. Node.js can be used to create various types of applications, including web servers, command-line tools, and desktop applications. It is particularly well-suited for building modern web applications that rely heavily on real-time data, such as chat applications, streaming services, and online games. Overall, Node.js is a powerful and flexible tool for building server-side applications using JavaScript.

### **IV. MySql**

MySQL is a popular open-source relational database management system (RDBMS) that is widely used for building web applications. It was first released in 1995 and has since become one of the most widely used database management systems in the world, particularly in the context of web development. MySQL is known for its reliability, scalability, and flexibility, and it can be used for a wide range of applications, from simple web blogs to large-scale enterprise systems.

MySQL uses Structured Query Language (SQL) to manage and manipulate data, and it supports a wide range of SQL commands, such as SELECT, INSERT, UPDATE, and DELETE. It also supports

features like transactions, indexes, stored procedures, and triggers, which make it a powerful tool for managing complex data.

MySQL is free to use and is available under the GNU General Public License (GPL). It can be installed on a wide range of platforms, including Windows, Linux, and Mac OS X, and it can be used with a variety of programming languages, such as PHP, Python, and Java. With its combination of flexibility, scalability, and ease of use, MySQL is an excellent choice for building web applications that require a robust and reliable database management system.

## **V. CockroachDB**

CockroachDB is a distributed SQL database that is designed to handle global scale, high availability, and strong consistency. It was first released in 2015 by Cockroach Labs and is inspired by Google's Spanner database. CockroachDB uses a unique architecture that allows it to distribute data across multiple nodes in a cluster while maintaining ACID-compliant transactions and strong consistency guarantees. This means that data can be accessed and modified from any node in the cluster, and changes are propagated to all other nodes in real-time, ensuring that all replicas are always up-to-date. CockroachDB is also designed to be highly available, with built-in fault tolerance mechanisms that ensure that the database remains operational even in the face of node failures or network partitions. It is a cloud-native database that can be deployed on-premises or in the cloud, making it a popular choice for large-scale, mission-critical applications. CockroachDB supports standard SQL syntax, making it easy for developers to integrate with their existing applications and tools.

## **3.6 PROJECT/INTERNSHIP PLANNING**

The systems development life cycle (SDLC) is a conceptual model used in Project Management that describes the stages involved in an information system development project, from an initial feasibility study through maintenance of the completed application. SDLC can apply to technical and non-technical systems. In most use cases, a system is an IT technology such as hardware and software. Project and program managers typically take part in SDLC, along with system and software engineers, development teams and end-users.

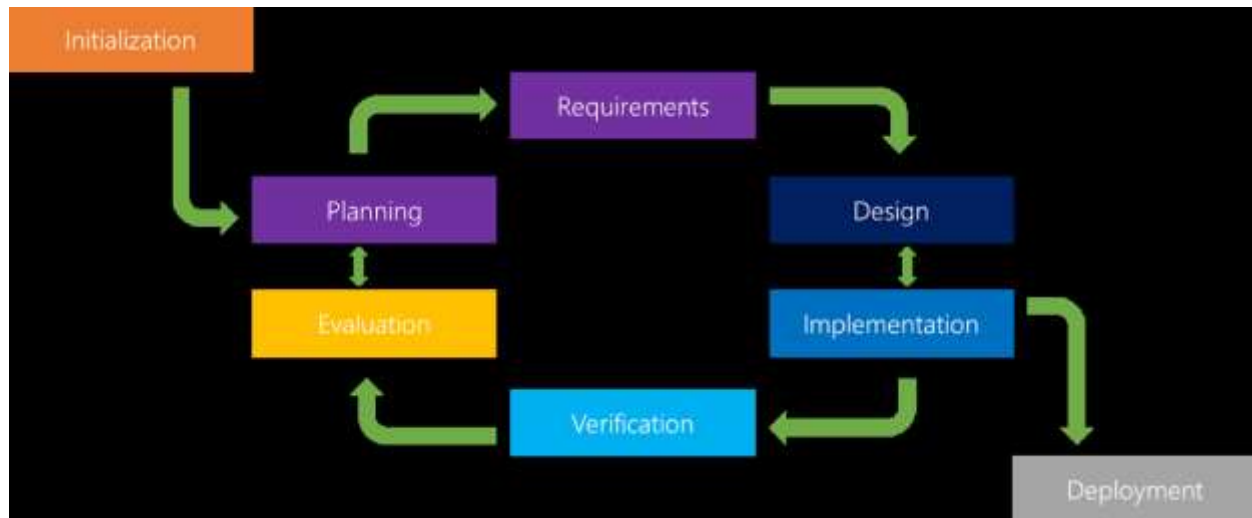


Figure 3.2 Iterative model

## **4.0 SYSTEM ANALYSIS**

### **4.1 STUDY OF CURRENT SYSTEM**

- When I started my internship, I was assigned to work on a system that is currently a desktop application for inventory management. There are various generally available inventory management systems socially available on online platform to make any organizations job easier to keep track of the stock available to them.
- General systems I have come across for inventory management have some common features like view stock available history of stock exchange management etc. but most of those systems are just limited to that.
- The system I was assigned to work on was a web application version of the same desktop application the company made for inventory management.

### **4.2 PROBLEM AND WEAKNESSES OF CURRENT SYSTEM**

Some common problems and weaknesses of current library management systems include:

1. Limited functionality: Some library management systems may lack certain features and functionalities that are necessary for modern libraries. This can lead to inefficiencies and difficulties in managing library resources.
2. Manual data entry: Many library management systems still rely on manual data entry, which can be time-consuming and error-prone. This can lead to inaccurate or incomplete data, which can impact the overall effectiveness of the system.
3. Poor integration: Some library management systems may not integrate well with other systems, such as digital repositories or online databases. This can lead to difficulties in accessing and managing digital resources.



4. Security vulnerabilities: Library management systems may be vulnerable to security threats, such as hacking or data breaches. This can put sensitive library data at risk and compromise the privacy of library patrons.

5. Inflexibility: Some library management systems may be inflexible and difficult to customize or adapt to the needs of different libraries. This can limit the ability of librarians to optimize the system for their specific needs.

6. High costs: Some library management systems may be expensive to implement and maintain, which can be a barrier for smaller libraries with limited budgets.

Addressing these issues requires the implementation of a modern library management system that offers advanced features, such as automated data entry, robust security features, and easy integration with other systems. Additionally, a modern library management system should be flexible, customizable, and cost-effective, to meet the needs of libraries of all sizes and types.

## **4.3 FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS**

### **Functional Requirement**

#### **1. Cataloging and indexing**

- Ability to catalog and index library resources
- Include metadata such as title, author, publisher, and ISBN/ISSN numbers

#### **2. Circulation management**

- Handle the circulation of library resources
- Allow borrowing, lending, and returning of items
- Manage fines and fees for overdue items

#### **3. User management**

- Create and manage user accounts
- Track user borrowing history

- Manage user profiles and preferences

#### 4. Search and discovery

- Provide users with an easy-to-use interface for searching and discovering library resources
- Include advanced search features such as keyword, author, and subject searches
- Allow filtering and sorting of search results

#### 5. Reporting and analytics

- Provide librarians with detailed reporting and analytics tools
- Track resource usage, user behavior, and other key metrics

#### 6. Integration with other systems

- Ability to integrate with other library systems, such as digital repositories and online databases
- Allow for easy data transfer between systems

#### 7. Security and access control

- Robust security and access control features
- Include role-based access control, data encryption, and user authentication

#### 8. Customizability and scalability

- Customizable and scalable to meet the specific needs of each library
- Accommodate growth and changes in the future

### **Non-Functional Requirement**

#### 1. Performance

- Able to handle a large number of concurrent users and transactions
- No compromise on speed or response times

#### 2. Reliability

- Reliable and available at all times
- Ensure users can access resources whenever they need them

### 3. Scalability

- Able to scale to accommodate growth and changes in the future
- Accommodate an increase in the number of library resources or users

### 4. Usability

- User-friendly and intuitive interface
- Clear and easy-to-use, requiring minimal training

### 5. Accessibility

- Accessible to all users, including those with disabilities
- Comply with accessibility standards and guidelines

### 6. Security

- Secure system with appropriate measures in place
- Protect against unauthorized access, data breaches, and other security threats

### 7. Interoperability

- Able to integrate with other systems and technologies
- Facilitate seamless data exchange and resource sharing

### 8. Maintainability

- Easy to maintain and update
- Clear documentation and support resources available to library staff

By meeting these non-functional requirements, a library management system can provide a reliable, user-friendly, and secure service to library users while also being easy to maintain and scale for future growth.

## **4.4 SELECTION APPROACHES AND JUSTIFICATION**

Selection approaches and justification for a learning management system (LMS) may include:

1. **Needs Assessment:** Conducting a thorough needs assessment to identify the specific requirements and goals of the organization, faculty, and students is critical. This approach will help determine the necessary features and functionalities of the LMS.
2. **Research and Analysis:** Conducting extensive research and analysis of available LMS options is essential to finding a system that meets the identified needs. Factors to consider may include pricing, technical requirements, scalability, user interface, and compatibility with other systems.
3. **Consultation:** Consulting with stakeholders, such as faculty and students, can provide valuable insights into the needs and expectations of the users. This feedback can help ensure the LMS meets their needs and is user-friendly.
4. **Piloting:** Piloting a few LMS options can provide a real-world test of the system and identify any potential issues before making a final selection. Piloting can also help gain buy-in from stakeholders and ensure the LMS meets their needs.
5. **Vendor Evaluation:** Evaluating the vendor's history, experience, and customer service record is crucial. The vendor should have a solid track record of providing quality products and support services to customers.
6. **Cost-Benefit Analysis:** Conducting a cost-benefit analysis can help identify the LMS that provides the most value for the organization. This analysis should consider both the initial and ongoing costs of the system and the potential benefits in terms of improved learning outcomes, increased productivity, and reduced administrative burden.
7. **Customizability and Scalability:** A good LMS should be customizable and scalable to meet the specific needs of the organization. It should also be able to accommodate growth and changes in the future.

Overall, these selection approaches and justifications are necessary to ensure that the LMS meets the needs of the organization, faculty, and students while also being user-friendly, scalable, and cost-effective.

## **5.0 SYSTEM DESIGN**

### **5.1 SYSTEM DESIGN AND METHODOLOGY**

System design plays a very crucial role in an application. It is the process of defining the components, modules, interfaces, and data for a system to satisfy the specified requirements

The desktop application (current system) provided by the company had a very distinctive as well as a user friendly design. It consists of tool bars, menu bars with n number of menus and submenus present. Some of the snapshots of the current system are as follow:

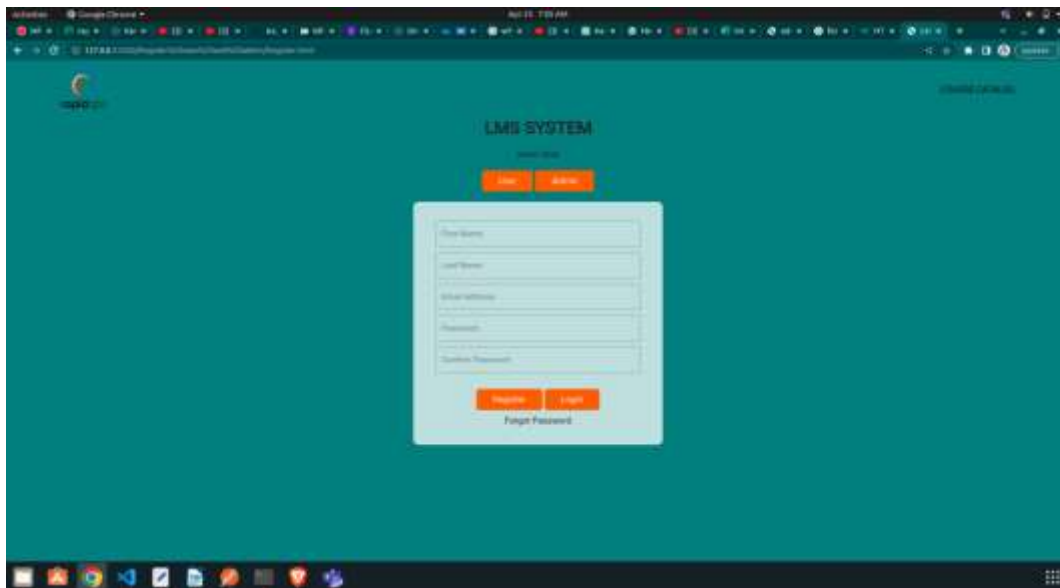


Figure 5.1 Registration page for user and admin

Creating a registration page is a crucial part of any website or application. It allows new users to sign up and access the site or application, while also providing a way for administrators to manage and monitor user accounts. When creating a registration page, you'll need to collect certain information from users, such as their name and email address, and create a database to store this information securely. Additionally, you'll need to implement validation and security measures to ensure that the data collected is accurate and protected from potential threats. By creating a well-designed and secure registration page, you can provide a positive user experience while protecting the sensitive information of both users and administrators.

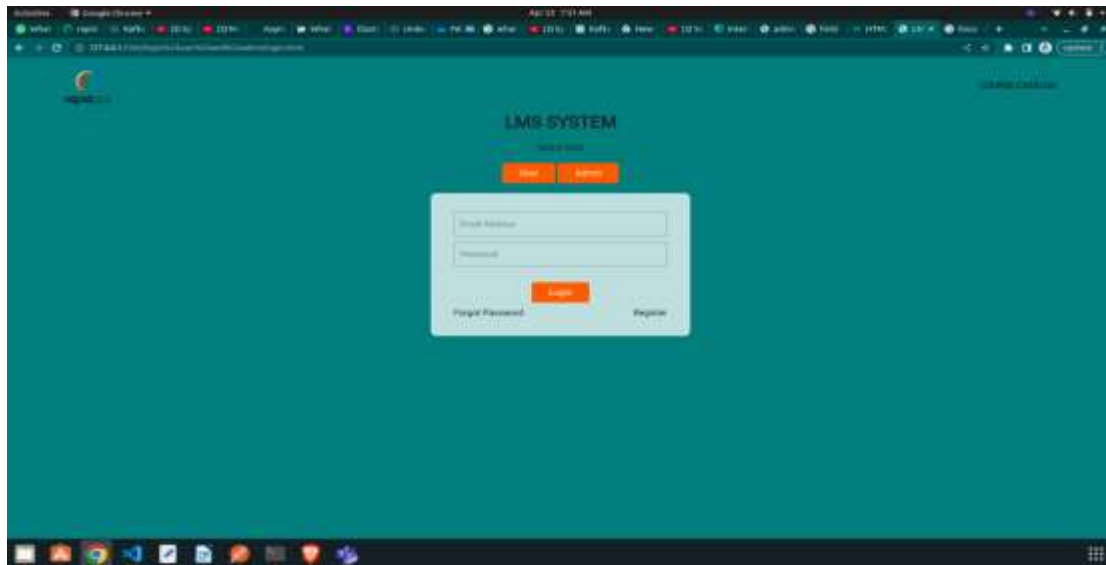


Figure 5.2 Login page for user and admin

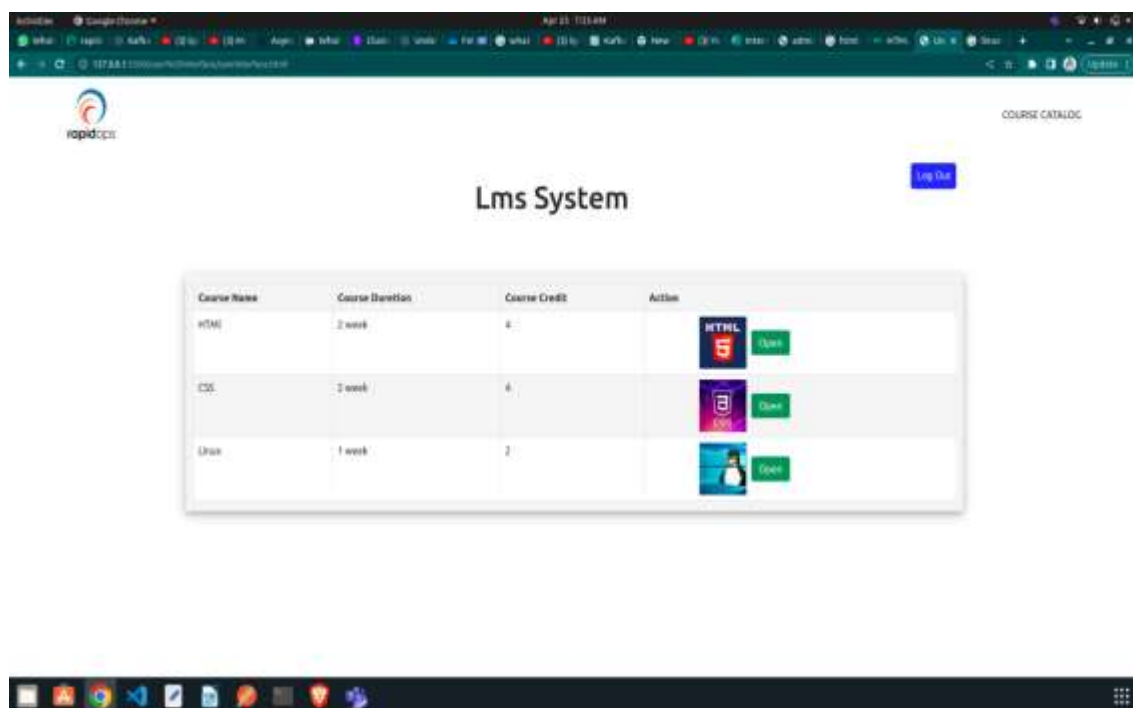


Figure 5.3 User Interface

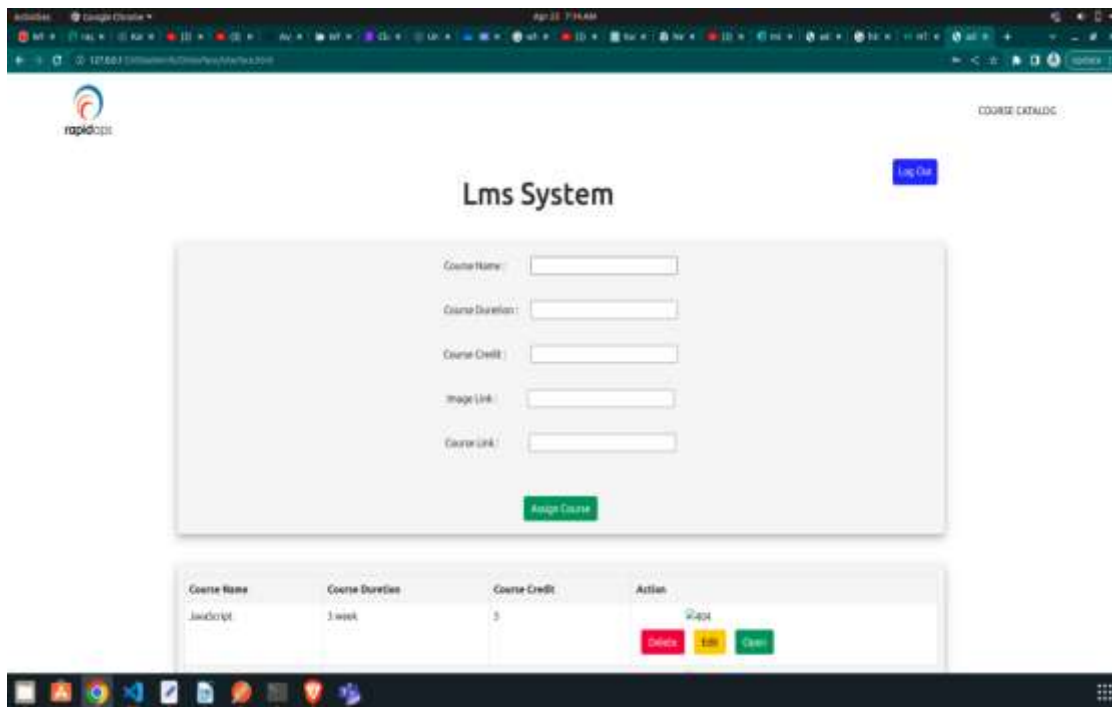


Figure 5.4 Admin Interface

In a learning management system, the admin panel provides a way for administrators to manage the content and users of the system. CRUD operations (Create, Read, Update, Delete) are essential for managing this content. Administrators can create new content, such as courses, lessons, or quizzes, or modify existing content. They can also manage user accounts, including creating new accounts, updating user information, and deleting accounts as needed.

The CRUD operations are typically performed through a user-friendly interface that allows administrators to easily view and manage the content and users. These operations are also often integrated with various access control mechanisms to ensure that only authorized administrators can perform them.

By using CRUD operations in a learning management system, administrators can efficiently manage the content and users, allowing the system to run smoothly and effectively.

## 5.2 DATABASE DESIGN / DATA STRUCTURE DESIGN

Local storage and session storage are two mechanisms available in modern web browsers that allow web developers to store data on the client-side using JavaScript. Both storage options provide a way for web applications to persist data even after the user has closed the web page or refreshed the browser.

Local storage is designed to store data without an expiration date. This means that the data stored in local storage will persist even after the user has closed the browser or shut down their device. Local storage is typically used to store user preferences, login credentials, or any other data that needs to be accessed across different sessions.

Session storage, on the other hand, is designed to store data only for a single browser session. This means that the data stored in session storage will be deleted when the user closes the browser. Session storage is typically used to store temporary data, such as shopping cart items or form data, that only needs to persist for the duration of the session.

```

▼ [{adminFirstName: "admin2", adminLastName: "admin2", adminEmail: "admin2@gmail.com",...}]
  ▼ 0: {adminFirstName: "admin2", adminLastName: "admin2", adminEmail: "admin2@gmail.com",...}
    adminCpassword: "admin2@123"
    adminEmail: "admin2@gmail.com"
    adminFirstName: "admin2"
    adminLastName: "admin2"
    adminPassword: "admin2@123"
  ▼ 1: {adminFirstName: "admin3", adminLastName: "admin3", adminEmail: "admin3@gmail.com",...}
    adminCpassword: "admin3@123"
    adminEmail: "admin3@gmail.com"
    adminFirstName: "admin3"
    adminLastName: "admin3"
    adminPassword: "admin3@123"
  ▼ 2: {adminFirstName: "admin1", adminLastName: "admin1", adminEmail: "admin1@gmail.com",...}
    adminCpassword: "admin1@123"
    adminEmail: "admin1@gmail.com"
    adminFirstName: "admin1"
    adminLastName: "admin1"
    adminPassword: "admin1@123"
  ▼ 3: {adminFirstName: "admin4", adminLastName: "admin4", adminEmail: "admin4@gmail.com",...}
    adminCpassword: "admin4@123"
    adminEmail: "admin4@gmail.com"
    adminFirstName: "admin4"
    adminLastName: "admin4"
    adminPassword: "admin4@123"
  ▼ 4: {adminFirstName: "admin5", adminLastName: "admin5", adminEmail: "admin5@gmail.com",...}
    adminCpassword: "admin5@123"
    adminEmail: "admin5@gmail.com"
    adminFirstName: "admin5"
    adminLastName: "admin5"
    adminPassword: "admin5@123"

```

Figure 5.5 Admin Data



```

▼ [{userFirstName: "iser2", userLastName: "user2", userEmail: "user2@gmail.com",...}]
  ▼ 6: {userFirstName: "iser2", userLastName: "user2", userEmail: "user2@gmail.com",...}
    userCpassword: "user2@123"
    userEmail: "user2@gmail.com"
    userFirstName: "iser2"
    userLastName: "user2"
    userPassword: "user2@123"
  ▼ 1: {userFirstName: "user1 ", userLastName: "user1", userEmail: "user1@gmail.com",...}
    userCpassword: "user1@123"
    userEmail: "user1@gmail.com"
    userFirstName: "user1 "
    userLastName: "user1"
    userPassword: "user1@123"
  ▼ 2: {userFirstName: "user3", userLastName: "user3", userEmail: "user3@gmail.com",...}
    userCpassword: "user3@123"
    userEmail: "user3@gmail.com"
    userFirstName: "user3"
    userLastName: "user3"
    userPassword: "user3@123"
  ▼ 3: {userFirstName: "user4", userLastName: "user4", userEmail: "user4@gmail.com",...}
    userCpassword: "user4@123"
    userEmail: "user4@gmail.com"
    userFirstName: "user4"
    userLastName: "user4"
    userPassword: "user4@123"
  ▼ 4: {userFirstName: "user5", userLastName: "user5", userEmail: "user5@gmail.com",...}
    userCpassword: "user5@123"
    userEmail: "user5@gmail.com"
    userFirstName: "user5"
    userLastName: "user5"
    userPassword: "user5@123"

```

Figure 5.6 User Data

## 5.3 INPUT/ OUTPUT AND INTERFACE DESIGN

### 5.3.1 User and Admin Registration

User registration in a learning management system typically involves creating a new user account that will be used to access the system. The user registration form will typically require users to enter basic information such as their name, email address, and a password. Once the user account is created, users can then access the learning management system to view courses, lessons, and quizzes.

Admin registration in a learning management system involves creating a new administrative account that will be used to manage the system. The admin registration form will typically require administrators to enter more detailed information, such as their job title, department, and contact information. Once the admin account is created, administrators can access the administrative panel to manage the content and users of the system.

Both user and admin registration in a learning management system should include measures to ensure the security of user data, such as password encryption and validation. Additionally, it's important to have clear and concise registration forms that are easy for users and administrators to understand.

Overall, user and admin registration are important parts of a learning management system, allowing users and administrators to access and manage the system in a secure and efficient manner.

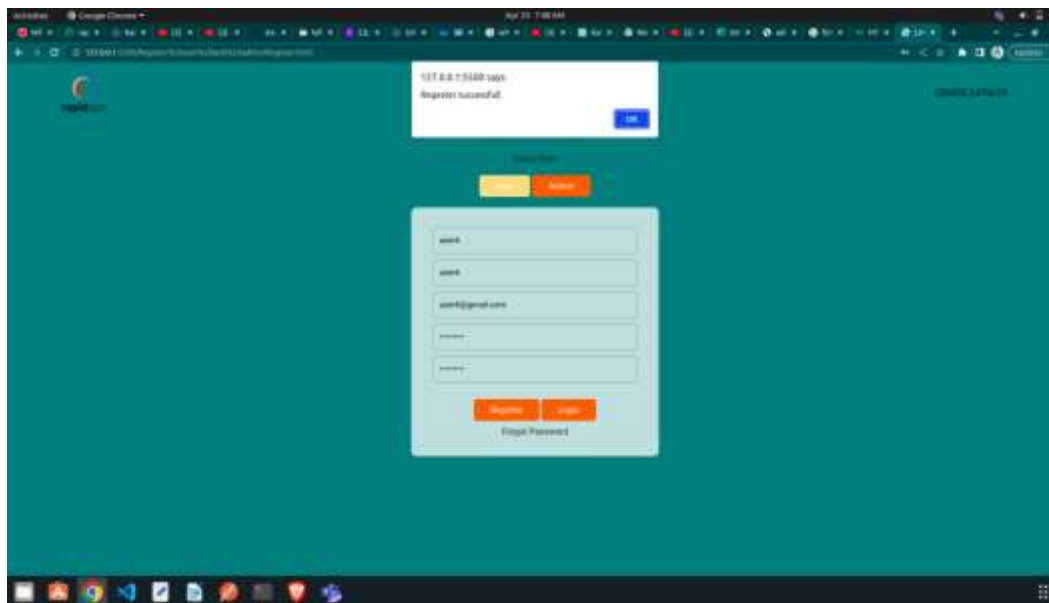


Figure 5.7 User And Admin Registration

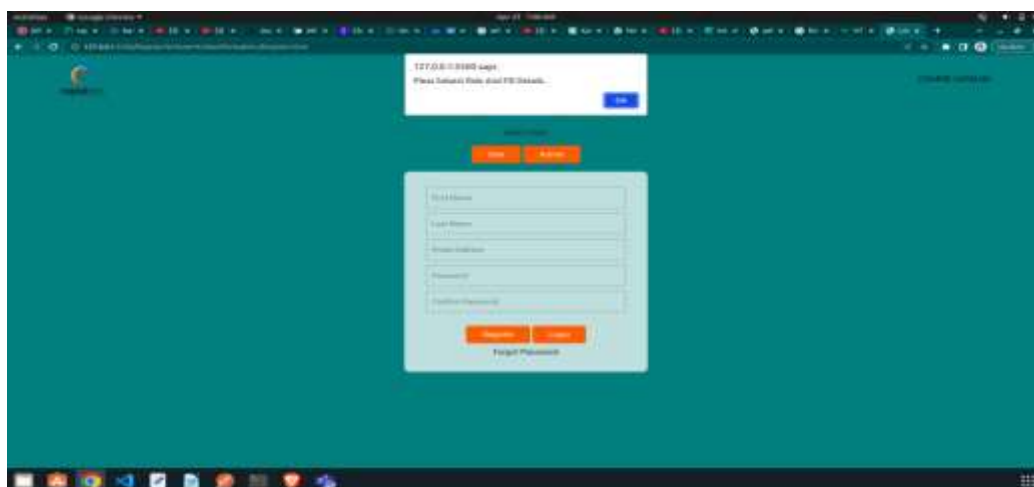


Figure 5.8 Role Selection

### 5.3.2 User and Admin Login

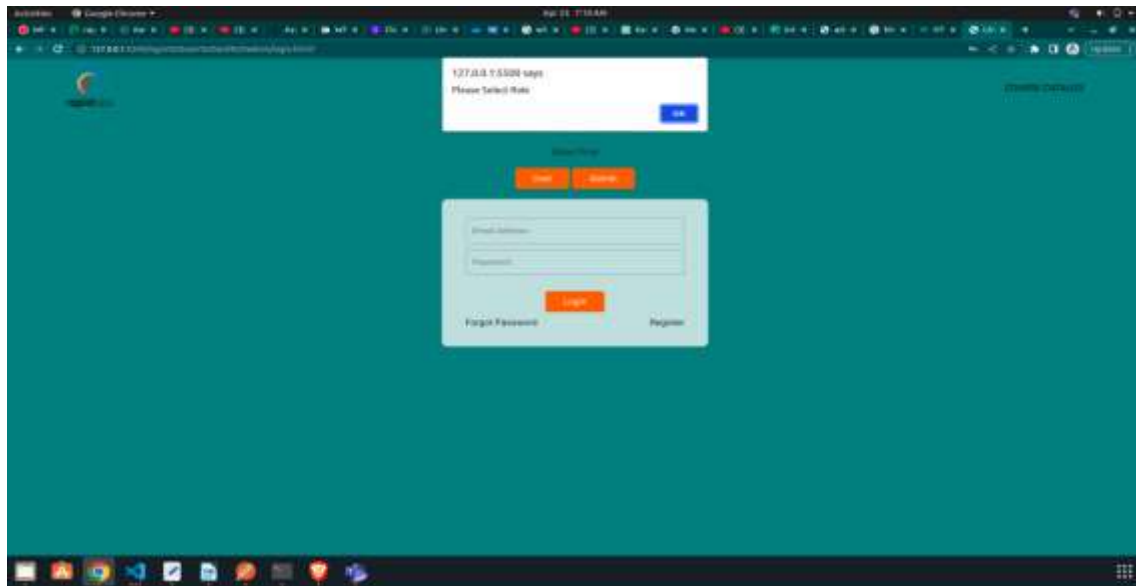


Figure 5.9 Login Without Selecting Role

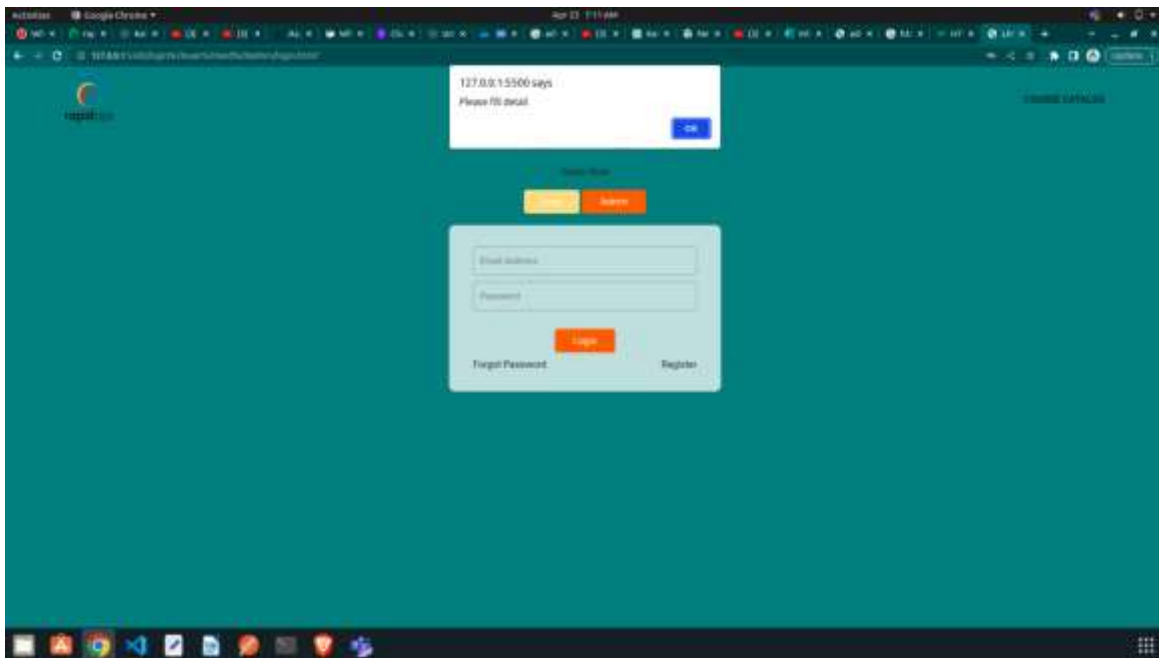


Figure 5.10 Login Without Filling Details

### 5.3.3 User Interface

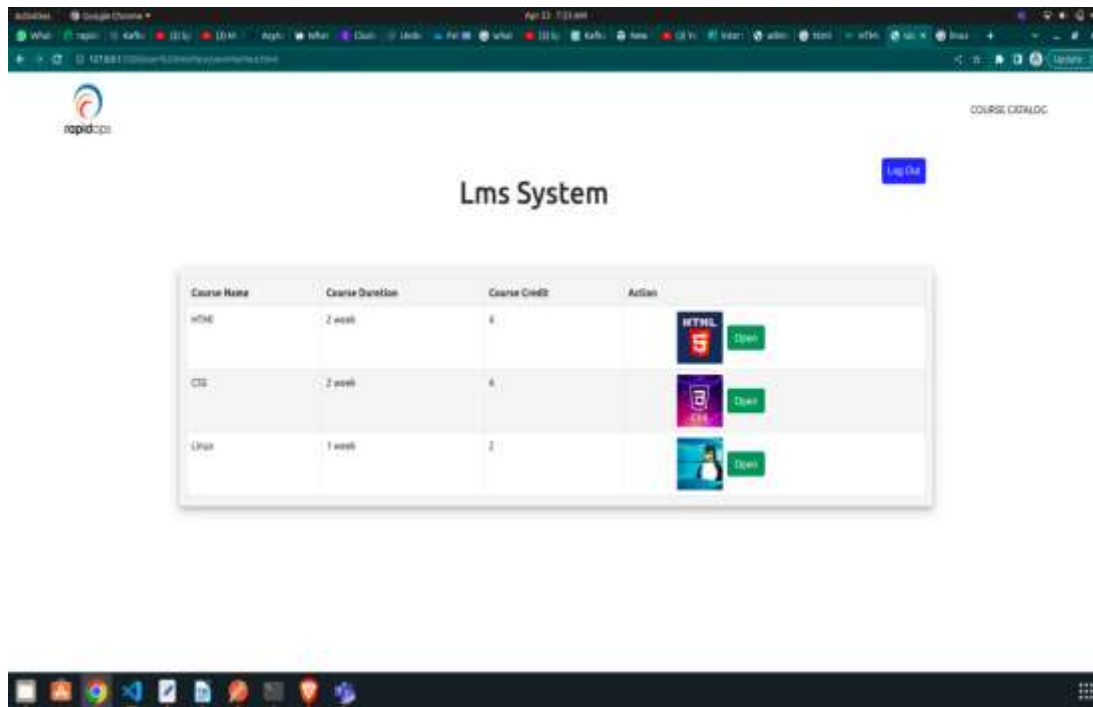


Figure 5.11 User Interface

### 5.3.4 Admin Interface

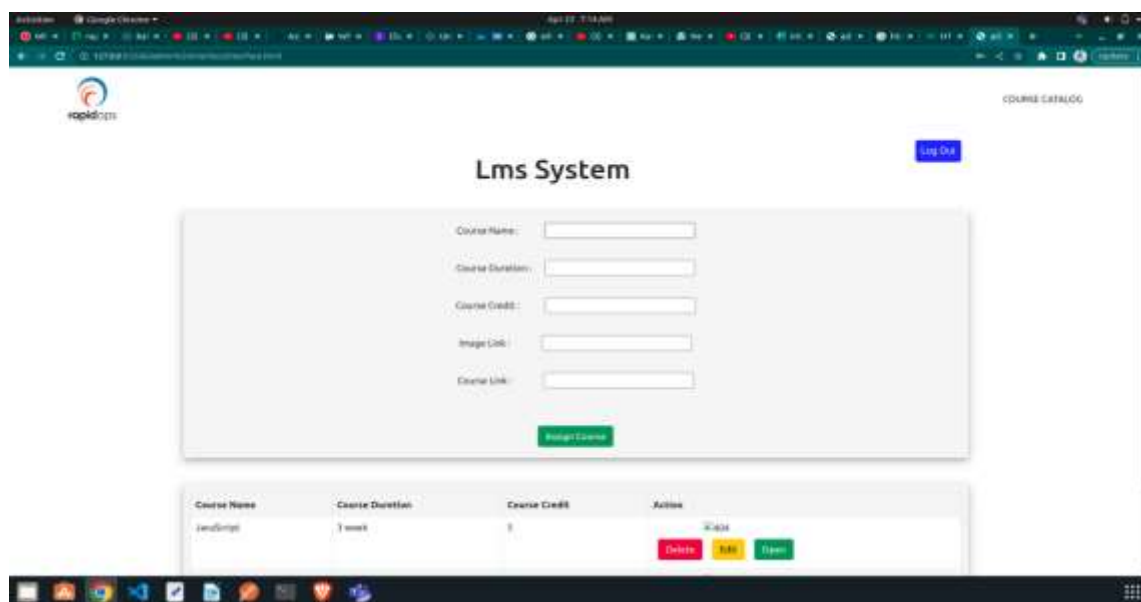


Figure 5.12 Admin Interface For Assign A Course

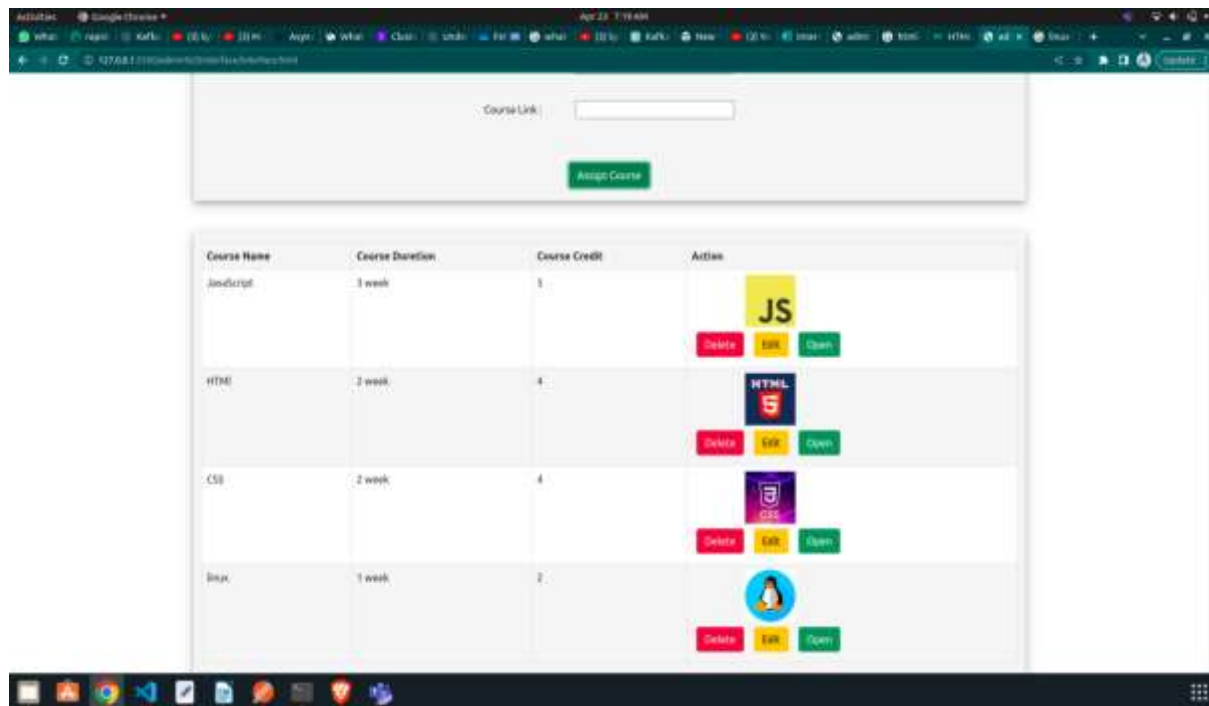


Figure 5.13 Admin Interface For Edit, Update And Delete A Course

## **6.0 IMPLEMENTATION**

### **6.1 IMPLEMENTATION PLATFORM/ ENVIRONMENT**

The next step after the completion of system design was to start implementing the ideas, layout, features, and functionalities of the system based on the requirements.

The two main software that were used by us for the development of the system were:

1. **Microsoft Visual Studio 2019 :-**

Visual Studio Code (VS Code) is a free, cross-platform code editor developed by Microsoft. It has become one of the most popular code editors in recent years due to its rich feature set, ease of use, and flexibility. Here are some key features of VS Code:

2. **Crome :-**

Google Chrome is one of the most widely used web browsers and is also a popular choice for web developers. Here are some features of Google Chrome that make it a useful tool for web development:

### **6.2 PROCESS/ PROGRAM/ TECHNOLOGY/MODULE SPECIFICATIONS TECHNOLOGY SPECIFICATIONS**

HTML, CSS, and JavaScript are three essential technologies used in web development.

HTML (Hypertext Markup Language) is a markup language used to structure and present content on the web. It provides a way to define the structure of web pages using elements such as headings, paragraphs, and lists, and it also allows for the inclusion of images, videos, and other multimedia content.

CSS (Cascading Style Sheets) is a stylesheet language used to describe the presentation of HTML or XML documents. CSS allows web developers to control the layout, fonts, colors, and other visual

aspects of web pages, making it possible to create attractive and consistent designs across multiple pages and devices.

JavaScript is a programming language used to create interactive and dynamic web pages. It can be used to add functionality to web pages, such as form validation, dynamic image sliders, or pop-up dialogs. JavaScript code can be included directly in HTML pages, or it can be used to create standalone scripts that can be loaded by web pages.

LocalStorage is a feature in modern web browsers that allows web developers to store data on the client-side (i.e., on the user's computer) in key-value pairs. This data persists even after the user closes the browser, which makes it useful for storing user preferences or other small amounts of data that need to be accessed frequently by the web page. LocalStorage can be accessed using JavaScript, which makes it easy to read, write, and delete data stored in the browser.

### 6.2.1 Code Snippet for LMS System

```
login user and admin > login.html > ...
3
4 <head>
5   <meta charset="UTF-8">
6   <meta http-equiv="X-UA-Compatible" content="IE=edge">
7   <meta name="viewport" content="width=device-width, initial-scale=1.0">
8   <title>LMS System</title>
9   <link rel="stylesheet" href="../../Register user and admin/Register.css">
10  <style>
11    #fp {
12      float: left;
13    }
14
15    #reg {
16      float: right;
17    }
18  </style>
19 </head>
20
21 <body>
22   <div class="navbar">
23     <div class="logo">
24       
25     </div>
26     <div class="text">COURSE CATALOG</div>
27   </div>
28
29   <div id="header" style="text-align: center; margin-bottom: 110px;">
30     <h1>LMS SYSTEM</h1>
31     <p>Select Role</p>
32     <button id="user">User</button>
33     <button id="admin">Admin</button>
```

Figure 6.1 Login page html

```

login user and admin > login.js > @ adminPage
45  userarray.map(user) => {
46    if (
47      user["userEmail"] == document.getElementById("email").value &&
48      user["userPassword"] == document.getElementById("pass").value
49    ) {
50      alert("success");
51      location.href = "../user interface/userInterface.html";
52    }
53    if (result == false) {
54      alert("Wrong Email And Password");
55    }
56  });
57  result = true;
58 }
59 }
60
61 // Function for redirecting to admin page
62 function adminPage() {
63   if (
64     document.getElementById("email").value == "" ||
65     document.getElementById("pass").value == ""
66   ) {
67     alert("Please fill detail");
68   } else {
69     let adminarray = JSON.parse(localStorage.getItem("admin"));
70     adminarray.map(admin) => {
71       if (
72         admin["adminEmail"] == document.getElementById("email").value &&
73         admin["adminPassword"] == document.getElementById("pass").value
74       ) {
75         alert("success");
76         location.href = "../admin interface/interface.html";
77       }

```

Figure 6.2 Login page JS

```

login user and admin > Register.html > ...
1  <!-- HTML for Register page -->
2  <!-- CSS for Register page -->
3  <!-- JS for Register page -->
4  <!-- PHP for Register page -->
5  <!-- SQL for Register page -->
6  <!-- ... -->
7
8  <title>LMS System</title>
9  <link rel="stylesheet" href="/Register.css">
10
11
12 </head>
13
14 <body>
15   <div class="navbar">
16     <div class="logo">
17       
18     </div>
19     <div class="text">COURSE CATALOG</div>
20   </div>
21
22   <div id="header" style="text-align: center; margin-bottom: 10px;">
23     <h1>LMS SYSTEM</h1>
24     <p>Select Role</p>
25     <button id="user">User</button>
26     <button id="admin">Admin</button>
27   </div>
28   <br>
29   <form action="../login user and admin/login.html">
30     <div class="main-parent">
31       <div class="form-wrap">
32
33         <div class="single-input">
34           <input type="text" placeholder="First Name" id="fname">
35         </div>
36         <div class="single-input">
37           <input type="text" placeholder="Last Name" id="lname">
38         </div>
39         <div class="single-input">
40           <input type="email" placeholder="Email Address" id="email">
41         </div>

```

Figure 6.3 Registration page HTML





[illegible]

Figure 6.6 Admin page HTML

```

1  @media (min-width: 768px) {
2      margin: 0;
3      padding: 0;
4      box-sizing: border-box;
5  }
6
7  .navbar {
8      display: flex;
9      justify-content: space-between;
10     margin: 10px 100px;
11 }
12
13 .text {
14     align-self: center;
15 }
16
17 #login {
18     padding: 8px 10px;
19     /* background-color: #f0f2f2; */
20     outline: none;
21     border: none;
22     color: #fff;
23     font-family: 'Roboto', sans-serif;
24     font-size: 16px;
25     cursor: pointer;
26     border-radius: 5px;
27     margin-bottom: 10px;
28 }
29
30 #2 {
31     text-align: center;
32     font-size: 30px;
33     padding: 40px 0;
34 }

```

### Figure 6.7 Admin page CSS

```

admin interface > interface.js > ...
5   var courseCredit = document.getElementById("courseCredit").value;
6   var courseLink = document.getElementById("courseLink").value;
7
8   if (
9     courseName == "" ||
10    courseDuration == "" ||
11    courseCredit == "" ||
12    courseLink == ""
13  ) {
14    return false;
15  }
16  return true;
17 }
18
19 // function for empty value setter
20 function emptyValueSet() {
21   document.getElementById("courseName").value = "";
22   document.getElementById("courseDuration").value = "";
23   document.getElementById("courseCredit").value = "";
24   document.getElementById("imageLink").value = "";
25   document.getElementById("courseLink").value = "";
26 }
27
28 // function for show data in table
29 function showData() {
30   let list;
31   if (localStorage.getItem("list") == null) {
32     list = [];
33   } else {
34     list = JSON.parse(localStorage.getItem("list"));
35   }
36
37   var html = "";
38

```

Figure 6.8 Admin page JS

```

user interface > userInterface.html > ...
7   <meta name="viewport" content="width=device-width, initial-scale=1">
8
9   <!-- Bootstrap CSS -->
10  <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.2/dist/css/bootstrap.min.css" rel="stylesheet"
11    integrity="sha384-EVSTON3/vzrpGIAAnDQqJP4IL19D956v4Zlt6GTW7xpd3YD55VahHgnaCOMLASjC" crossorigin="anonymous">
12
13  <title>User</title>
14
15  <!-- custom CSS -->
16  <link rel="stylesheet" href=".../admin_interface/interface.css">
17
18  <style>
19    tbody>tr:nth-child(odd) {
20      background-color: #ffffff;
21    }
22  </style>
23 </head>
24
25 <body>
26   <div class="navbar">
27     <div class="logo">
28       
29     </div>
30     <div class="text">COURSE CATALOG</div>
31   </div>
32
33   <div class="container">
34     <button style="float: right;" id="logout" class="btn-primary mt-3">Log Out</button>
35     <h2 class="title">LMS System</h2>
36     <div class="row mt-3 tab" style="background-color: #whitesmoke;">
37       <div class="col-12 mt-3">
38         <table class="table table-bordered" id="crudTable">
39           <thead style="background-color: #whitesmoke;">
40             <tr>

```

Figure 6.9 User page HTML

```

8
9
10 var html = "";
11
12 list.forEach(function (element, index) {
13     html += "<tr>";
14     html += "<td>${element.courseName}</td>";
15     html += "<td>${element.courseDuration}</td>";
16     html += "<td>${element.courseCredit}</td>";
17     html += "<td><img id = 'courseImage' src='${element.imageLink}' alt='484'>";
18     html += "<button onclick='openCourse(${index})' class='btn btn-success m-2'>Open</button></td>";
19     html += "</tr>";
20 });
21 document.querySelector("#crudTable tbody").innerHTML = html;
22 }
23 document.onload = showData();
24
25 // function for logout
26 document.querySelector("#logout").onclick = function () {
27     location.href = "../login user and admin/login.html";
28 };
29
30 // function for open course
31 function openCourse(index) {
32     let array = JSON.parse(localStorage.getItem("list"));
33     console.log(array);
34     let obj = array[index];
35     location.href = obj["courseLink"];
36 }

```

Figure 6.10 User page JS

### 6.3 RESULT ANALYSIS/ COMPARISONS/DELIBERATIONS

1. User engagement and feedback: Analyzing user engagement data, such as the number of logins, the frequency and duration of usage, and user feedback through surveys or reviews can help evaluate the effectiveness of the LMS in meeting user needs and preferences. This data can also be used to identify areas for improvement.
2. Learning outcomes: Evaluating the impact of the LMS on learning outcomes, such as student or employee performance, test scores, or skill development can provide insights into the effectiveness of the learning materials and assessments provided by the system.
3. Feature comparison: Comparing the features and functionalities of the LMS against other similar systems in the market can help identify areas where the LMS is lacking or areas where it excels. This information can be used to improve the LMS or to identify opportunities for differentiation in the market.

4. Cost-effectiveness: Comparing the cost of implementing and maintaining the LMS against the benefits it provides can help evaluate its cost-effectiveness. This can include considering factors such as the return on investment, the cost of alternative solutions, and the total cost of ownership over the lifetime of the system.

5. Usability and accessibility: Analyzing user behavior and feedback, as well as conducting usability testing, can provide insights into how usable and accessible the LMS is for users with different needs and preferences. This information can be used to improve the design and functionality of the system to better meet the needs of all users.

Overall, analyzing user engagement and feedback, evaluating learning outcomes, comparing features and functionalities against other systems, considering cost-effectiveness, and assessing usability and accessibility are all important aspects of result analysis, comparisons, and deliberations for a learning management system.

## **7.0 CONCLUSIONS AND DISCUSSIONS**

### **7.1 OVERALL ANALYSIS OF INTERNSHIP/ PROJECT**

1. Project scope: The scope of the project should be clearly defined to ensure that it meets the requirements of the organization and the target audience. It should also be feasible within the given timeline and budget.
2. Project planning: A detailed project plan should be created that includes timelines, milestones, and deliverables. This plan should be regularly reviewed and updated to ensure that the project stays on track.
3. User needs assessment: A thorough assessment of user needs should be conducted to ensure that the LMS meets the needs and preferences of the target audience. This can include conducting surveys, interviews, or focus groups with stakeholders and end-users.
4. User interface design: The user interface should be designed to be intuitive and user-friendly, with clear navigation and easy-to-use features. It should also be accessible to users with different needs and preferences.
5. Content development: High-quality learning materials should be developed that are relevant to the target audience and meet their learning needs. These materials should be engaging, interactive, and provide opportunities for learners to practice and apply what they have learned.
6. Testing and evaluation: The LMS should be tested thoroughly to ensure that it functions properly and meets the needs of the target audience. User feedback should be gathered and used to improve the system.
7. Maintenance and support: The LMS should be regularly maintained and updated to ensure that it continues to meet the needs of users. Technical support should be available to users to address any issues or concerns.

Overall, an internship/project for a learning management system should be well-planned, user-focused, and continuously evaluated and improved to ensure that it meets the needs of users and provides a high-quality learning experience.

## **7.2 PROBLEMS ENCOUNTERED AND POSSIBLE SOLUTIONS**

1. User engagement: One of the major challenges with LMS is keeping users engaged. Learners may get bored or frustrated if the content is not engaging or if the system is difficult to use. A possible solution could be to incorporate interactive and gamified elements into the learning materials to make the experience more enjoyable and engaging for learners.

2. Technical issues: Technical issues such as system crashes, slow load times, or software bugs can be frustrating for users and impact their learning experience. The development team should conduct thorough testing to identify and fix any technical issues before launching the system. Additionally, regular maintenance and updates can help prevent technical issues from arising in the future.

3. Accessibility: The LMS should be accessible to all learners, regardless of their abilities. This includes features such as screen reader compatibility, adjustable text size, and color contrast options. The development team should conduct user testing with individuals with disabilities to ensure that the system is accessible to all learners.

4. Content quality: The quality of the learning materials is crucial to the success of the LMS. Poor quality content can lead to disengagement and a negative user experience. The development team should conduct a thorough review of the learning materials to ensure that they are accurate, relevant, and engaging.

5. System integration: The LMS may need to integrate with other systems, such as a student information system or HR system. Integration issues can arise if the systems are not compatible. The development team should conduct thorough testing to ensure that the systems are integrated properly.

6. Data security: Data security is a critical issue for any system that stores sensitive information. The development team should implement robust security measures, such as encryption and access

controls, to protect user data from unauthorized access or breaches.

Overall, these are some of the common problems that can be encountered during the development of an LMS. Addressing these issues proactively can help ensure the success of the system and provide a positive user experience for learners.

### **7.3 SUMMARY OF INTERNSHIP / PROJECT WORK**

As a result of all the time and efforts put into the development of the web application, we were finally able to create a system that was a one stop solution for all the manufacturers in the Garment Industry to keep a record of their stocks, materials, transactions, employees and many more. We were able to create a user friendly and easy to access interface that also protected the user's privacy and data security.

The 12-week internship programme with Rapidops Inc. was a great opportunity of learning and getting a first hand experience with the industry's method and working techniques. The internship made us aware of the vast number of options the industry has to offer. Furthermore, being trained under such an experienced mentor like Mr Pradhyuman Sarkar was a blessing in itself. Physically, working on a project made us aware about every minute detail and effort that goes into the development process. It was a great opportunity to practically implement everything that we have learnt till date. Also learning and working with new languages like node js and mysql was a thrilling experience. We are sure the training and the experience we have had at Rapidops Inc. will help us greatly in our future endeavors.

### **7.4 LIMITATION AND FUTURE ENHANCEMENT**

Talking about the drawbacks of the system we could say that overall we were able to create a web application that was an efficient duplication of the desktop application. Although on getting the feedback from the users we realized that there were certain limitations to the system such as lack of homepage, the insertion process takes a little time to process completely, some flaws in



the designing, etc. We look forward to work more on the system and resolve all the above listed issues.

For the future of the system we envision the following:

- To provide more security to the system.
- To create a mobile application to provide better access
- To incorporate multiple companies or agencies in one centralized system
- Increase the database capacity of the system and make it more efficient

## **REFERENCES**

During the course of project we took help from certain external sources. Some of them are as follow:

- <https://www.geeksforgeeks.org/>
- <https://stackoverflow.com/>
- <https://www.w3schools.com/>
- <https://www.youtube.com/c/SwiftLearn>
- <https://www.youtube.com/c/CodAffection>
- <https://www.youtube.com/kudvenkat>