Web development on EBooks and Library Management System

At SoftTechPark Pvt. Ltd.

[CSC-452]

A final year internship project submitted in partial fulfillment of the requirement for the degree of Bachelor of Science in Computer Science and Information

Technology awarded by Tribhuvan University

Submitted by

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Submitted to

Nagarjuna college of information technology

Department of Computer Science Affiliated to Tribhuvan University

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CERTIFICATE OF APPROVAL

The undersigned certify that they have read and recommended to the Department of Computer Science for acceptance, internship project report entitled "Web development on EBooks and Library Management System at Softtechpark Pvt. Ltd." submitted by Bivek Pandey(T.U. Exam Roll No. 7682/072) in partial fulfillment for the degree of Bachelor of Science in Computer Science & Information Technology.

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Bivek Pandey (T.U. Exam Roll No. 7682/072)

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ABSTRACT

This report contains the details of the different activities carried out during the internship conducted for the three months internship duration.

The main focus of this report is Web Based Online Ebook and Library Management System. The online "Slibrary" is a Web based application intended for Student and Librarian. The main objective of this website is to make it interactive and its ease of use. It is role-based, multi-user ebook and library management system. It would make searching, viewing detail, checking availability of books and sends email and SMS based notification. Student can view the complete detail of each books send notify on available request if currently unvailable. The website provides a features to a Librarian to add a books and ebooks, update and delete them. The main emphasis lies in providing a user-friendly advance library management system's feature. This is a system which maintains the information about the books present in the library, their authors, the members of library to whom books are issued, library staff and all.

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LIST OF ABBREVIATIONS

BSc. CSIT Bachelors in Science in Computer Science and Information Technology

UI User Interface

IDE Integrated Development Environment

QA Quality Assurance

DFD Data Flow Diagram

USB Universal Serial Bus

AJAX Asynchronous Javascript and XML(Extensible Markup Language)

JS Javascript

MVT Model View Template

ER Entity Relation

CHAPTER 1

INTRODUCTION

1.1 Introduction to Internship

The internship is six credit (minimum ten weeks/180 hour long) as a part of the course requirement included in 'Bachelors in Science in Computer Science and Information Technology' a course affiliated by Tribhuvan University. The internship experience expect to enable the students to assist in the resolution of complex problem. Main goal is to assist students in focusing their interests, thus aiding in their professional carrier. It gives students the opportunity to re-examine their career objectives and explore the variety of opportunities in the field of Computer Science and Information Technology. The broad objectives of internship are as follows:

- To test the interest in particular field before permanent commitment are made.
- To develop skills in the application of theory to practical work situations.
- To test the aptitude for a particular career.
- To know the value of time management and interpersonal skills.
- To develop skills and techniques directly applicable to the careers.
- To acquire in depth knowledge of the formal functional activities of a participating organization.

During my internship period, I was introduced to the organizational structure and the professional world. Being the student of BSc. CSIT, I was interested in web-based application development. Therefore, to enhance knowledge in the web-based application development my joined Softtechpark Pvt. Ltd. as an intern. After joining the company I was assigned for a

Elibrary backend development as a junior/trainee developer. During internship period I was involved in the research for backend development and its integration with a front end.

1.1.1 Introduction to Project

Slibrary is a role-based, multiuser, hardware-integrated (USB barcode scanner), online ebook and library management system. The main focus of Slibrary is to provide all the facility that could be provided from advance library to student such as borrowing a books, read a online books, search books, check availability of a books, email and SMS based notifications and information of fines as well as for librarian such as issuing a books to student by scanning a books barcode and student id's barcode, check student activities by scanning a barcode on a individual student id card and print out the fine bills. The Slibrary has been designed to computerize and automate the operations performed over the information about the members, book issues and returns and all other operations. Slibrary has been designed to computerize and automate the operations performed over the information about the members, book issues and returns and all other operations

1.1.2 Scope and Limitation of Project

This project has a great scope in every aspect it can be used to handle an ebook management and student activities within the library. It contains all the advanced feature that is required to maintain entire library of an educational institution. A software solution is never 100% perfect and error free. Like other software systems, this system is also not perfect. After the deploy of product we can't add the new features which can only be modified from the source code. Since the project is developed from Django framework of Python as a script language which is not familiar for many developers. The project is currently developed only for web based platform.

1.1.3 Brief Introduction of Organization

Softtechpark Pvt. Ltd. is a IT based outsourcing company, providing a broad range of services and solutions in strategy, consulting, digital and technology since 2018. It is situated in Tinkune, Kathmandu. Softtechpark Pvt. Ltd. believe in empowering with information, building relationships and taking social responsibilities. To make software easier for people to use and operate, it performs a huge level of testing and debugging through qualified professionals and native users. The main strategy is to discover and analyze the project to find the best possible

solution for a product that contains all the possible current technologies and methodologies and test them in developer and user level.

Softtechpark Pvt. Ltd. mission is to provide a digital solution for database management, data analyzation and visualization, website and application development. For each of the solution Softtechpark Pvt. Ltd. focuses on making it efficient, user friendly as well as cost effective. Softtechpark Pvt. Ltd. works with languages and technologies like PHP with Laravel, Java with spring boot, C# with .NET, React JS, React-Native, WordPress and databases like MYSQL or Postgress and some other development tools.

Softtechpark Pvt. Ltd. follows industry standards of software development approach to deliver the highest level of satisfaction to the client. The team keep themselves updated with new tools and technologies available in the market and implement these technology whenever necessary.

Following are the contact details of the Softtechpark.

Table 1: Contact Details of Organization

Address	Tinkune, Kathmandu, Nepal
Phone Number	01-4111992
Email	info@softtechpark.com
Website	www.softechpark.com

1.1.4 Internship Duration

As per the requirement of the curriculum of B. Sc. CSIT. 8th Semester, the minimum requirement of internship period is 10 weeks/180 hours. It consists of different phase of training or tasks performed with a specific objective for each phase. Each phase shows the progress of

intern in internship. It also consists of information about how and when interns will accomplish objectives of each task.

Table 2: InterTable 1nternship Duration

Office Hour	9:00 am – 5:00 pm
Working Hour	8 Hours per day
Working Days	6 days a week
Position	Junior/Trainee Python Developer
Total Duration	3 months
Mentor	Er. Nishar Ali

1.2 Statement of Problem

The problem occurred before having Ebooks and Library Managent Systems includes:

When this system was not implemented files would have been lost because of human environment. Sometimes due to some human error there may be a loss of records. When a computerized system was not implemented file would have been lost due to some accident like spilling of water by some member on file accidentally. Besides some natural disaster like floods or fires may would also have damaged the files. When there was no such system there was always a difficulty in searching of records if the records was large in number. After the number of records become large the space for physical storage of file and records also increases if no computerized system is implemented. As there is no computerized system then to add each record paper was be needed which will increase the cost for the management of library.

1.3 Objective

The internship program was done to fulfill the academic requirement of B. Sc. CSIT 8th Semester. An internship provides a variety of benefits for the young workers who want to broaden their chances for landing in a job and jump-starting their careers. The main objectives of the internship project were to understand how the application works in real time.

The following are the internship objectives that were to be achieved:

1.3.1 Objectives of Internship

The objectives of internship are as follows:

- To assist students in focusing their interests, thus aiding in their professional career.
- To give students the opportunity to re-examine their career objectives and explore the variety of opportunities in the field of computer networking.
- To be technically and organizationally eligible to work in the future after the completion of academic degree.
- To be able to work in team, maintain good public relation and develop strategic problemsolving skills.

1.3.2 Objectives of Project

The objectives of project are as follows:

- To develop the web application that helps the daily activities performed within library of an educational institution.
- To provide a student an online resources such as online books to read.
- To develop the provide a user-friendly UI to a user.
- To provide a role-based dynamic content to a user

- A search column to search availability of books
- Librarian is able to search record by using few clicks of mouse and few search keywords thus saving his valuable time
- Have a facility to upload lectures notes in a pdf file having size not more than 10mb

1.4 Roles and Responsibility

The 3 month internship at Softtechpark Pvt. Ltd. involved various activities and tasks as per the requirement of both the organization and the project. Various responsibilities had been assigned such as CRUD operations in Librarian and Student dashboard, applying clients requirement in application and small bug fixing. All these tasks were done using Python with Django framework. The responsibilities of individual were not specified only to complete project, along with phases of software development life cycle, the responsibilities were varied. I worked as a Python Developer and was assigned to create the backend of project and also integrate with a frontend generated by frontend developer.

Table 3: Task schedule during internship

Week 1	Understanding about the company's environment and researching about usage of Django for the development				
Week 2	Planning and research about the project.				
Week 3	Database Development for a project according to the user requirement and collaborating with mentor.				
Week 4	Create CRUD operation to add some required features in our web applications.				
Week 5	Developing features for Elibrary rendering ebooks in application and preventing to render in browser				

Week 6	Integration with the front-end developed by front end developer
Week 7	USB barcode integration.
Week 8	Dashboard and dynamic data-vizualization for users according to their interest
Week 9	Apply additional feature of client after testing
Week 10	Fixing bug of a project
Week 11	Testing and validation of final project
Week 12	Making documentation ready and presentation.

1.5 Motivation

1.5.1 Motivation for choosing Softtechpark Pvt. Ltd.

Softtechpark Pvt. Ltd. is a group of young, motivated, and skilled people whose main goal is to provide their clients with an innovative solution regarding web development and software development. Whether it's a mobile application, a content-rich responsive website, its work is built for scale, performance and longevity.

As per the requirement of the Tribhuvan University (TU), the final year students of B.Sc. CSIT are required to complete a six credit (minimum ten weeks/180 hours long) internship as a part of the course requirement. Internship is one of medium that helps to break down the bars between the professional and the student life. Since, an internship is the course curriculum of TU, every student perusing BSc.CSIT need to do the internship in any area of their interest. So, the first motivation for choosing Softtechpark Pvt. Ltd. was to fulfill my academic requirements. Besides this, working as an intern in the organization I also got the opportunity to work in real-time projects which motivated me to work more towards my area of interest.

1.5.2 Motivation for choosing Python

Python is a object oriented programming language with lots of package that can help in analyze and visualize of the data and perform various scientific operations some of the package of python that are widely used are tensorflow, numpy, pandas etc.Python can be used for various purpose such as AI, machine-learning, deep-learning, NLP(Natural Language Processing), data science ,web development and desktop app development. Many IT company in current world are switching towards an AI so it can be useful for various aspect so I got motivated to choose python.

1.6 Report Organization

Chapter 1: Introduction puts emphasis on Overview, Problem Statement, Objectives, Scope and Limitation of the project.

Chapter 2: Requirement and Feasibility Analysis the important sections such as, Requirement Analysis and Feasibility Analysis. Requirement Analysis explains Functional and Non-functional requirements of the project, and Feasibility Analysis explains why/how the project is practical to be implemented.

Chapter 3: System Design gives the design of the system developed so that it can be used during the project implementation.

Chapter 4: Implementation provides an indication of how the system is implemented, what tools / platforms have been used.

Testing clarifies the system workflow.

Chapter 5: Conclusion marks an end to the document by summing up the entire project and also opening the door further for research in improving the developed system. The lesson learnt is also included in this chapter.

CHAPTER 2

SYSTEM ANALYSIS AND FEASIBILITY STUDY

2.1 System Analysis

Generally, System development comprises of two major phases: System Analysis and System Design. In System Analysis, the details of the existing system or proposed one is understood and decided whether proposed system is desirable or not and decided whether the existing system needs improvements. System analysis helps to understand the proposed system architecture, working and goals. Thus, System Analysis can be summarized as the process of investigating a system, identifying problems and using the gathered information to improve existing system or develop the proposed one.

By interacting with client of Slibrary, studying the documents provided by the client, discussing with the senior developers and studying the existing system we analyze the requirements of the system to be developed for the clear view of how the system should be and how it should be working so as to fulfill user requirements.

2.2 Literature Review

Manual Library Management systems, operating systems are vulnerable to human error. For instance, a librarian who misfiles a borrower's records or indexes a book incorrectly slows down the process and wastes students' time. Manual systems are unable to store large amounts of data efficiently. In a traditional sense, a Library is a large collection of books, and can refer to the place in which the collection is housed. Today, the term can refer to any collection, including digital sources, resources, and services. The collections can be of print, audio, and visual materials in numerous formats, including maps, prints, and documents, microform, CDs, cassettes, videotapes, DVDs, video games, e-books, audio books and many other electronic resources. They add that, a library is organized for use and maintained by a public body, an institution, a corporation, or a private individual. Public and institutional collections and services may be intended for use by people who choose not to or cannot afford to purchase an extensive collection themselves, who need material.

According Robertson (2007), libraries often provide a place of silence for studying, and they also often offer common areas to accommodate for group study and collaboration. Libraries often provide public facilities to access to their electronic resources and the Internet. Modern libraries are increasingly being redefined as places to get unrestricted access to information in many formats and from many sources. They are extending services beyond the physical walls of a building, by providing material accessible by electronic means, and by providing the assistance of librarians in navigating and analyzing tremendous amounts of information with a variety of digital tools.

The goal of this research is to design and implement an intelligent platform that will perform library based activities with ease and provide a learning an additional study resource such as online notes, books and provide ease in searching student records just by scanning student's card by an USB barcode scanner.

So "SLibrary" is not an invented concept but with lot more innovation to existing ones but with support and suggestions taken from them.

2.3 Requirement Analysis

This section presents complete set of functional and nonfunctional requirements. Functional requirements are listed first according to their relationship to the overall system. The nonfunctional requirements are listed after functional requirements. The functional requirements have been specified using natural language description using UML analysis model.

2.3.1 Functional Requirements

Functional Requirements defines what the system must do. It defines the behaviors or functions of a system, flows, business rules and other requirements of a system along with its output. The functional requirements are discussed below:

- Add/Remove/Edit book: To add, remove or modify a book or book item.
- **Search catalog:** To search books by title, author, subject or publication date.
- **Register new account/cancel membership:** To add a new member or cancel the membership of an existing member.

- **Check-out book:** To borrow a book from the library.
- **Reserve book:** To reserve a book which is not currently available.
- **Renew a book:** To reborrow an already checked-out book.
- **Return a book:** To return a book to the library which was issued to a member.
- **Notification:** Email and SMS based notification when reserved book is available
- **Invoice:** Provide billing system of a fine amount
- **Ebooks:** Different ebooks are allowed to read a members
- Hardware integrated: Books can be issued or returned using a barcode on a library card

2.3.1.1 Use Case Diagram

Use case diagram is representation of user's actions or interaction with system which can perform in collaboration with one users of the system. In this application, there are 3 types of student, librarian and admin/superuser, librarian can perform issue books, return books and allow ebook request only after registration and login whereas the student can user their functionality only after registration and login whereas admin can access the dashboard which consist of list of data and modification functionality according to client's requirement.

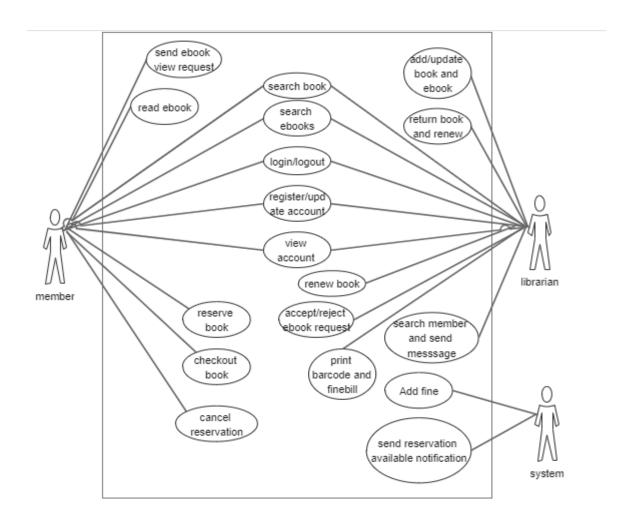


Figure 1: Use Case Diagram of the Project

2.3.2 Non-Functional Requirements

Non-functional requirements define how the system should be. It covers all the remaining requirements which are not covered by functional requirements. Slibrary system is easy to use and trust worthy to place orders. It follows some of the properties like secure, reliability, user-friendly, maintainability and usability.

2.4 Feasibility Analysis

Feasibility Study is used to determine the viability of an idea. It is often used before the actual implementation of the project. The objective of such a study is to ensure a project is legally and technically feasible and economically justifiable. It tells us whether a project is worth the investment.

2.4.1 Technical Feasibility

Technical feasibility involves evaluation of the hardware and the software requirements of the proposed system. This application was developed using Django framework, Postgress for database and the hardware required was USB barcode scanner. Google Chrome and Firefox were used to run the application for facilitating user interface. So, this system was technically feasible. All the necessary hardware and software required for developing and installing the system were available.

2.4.2 Operational Feasibility

Operational feasibility is dependent on human resources available for the project and involves projecting whether the system will be used if it is developed and implemented. Our system makes the maximum use of available resources including people, time and flow of forms. Our system provides reliable services to the client and the user should be familiar about the product they are using. This will enhance reduction in cost and increase in benefits for the business.

2.4.3 Schedule Feasibility

A system is said to be scheduled feasible if it is implemented within the planned scheduled. We carried out the study on how much it will take to complete the task after studying the requirements and proposed plan.



Figure 2: Grantt Chart for project Scheduling

2.4.4 Economic Feasibility

Economic feasibility is the cost and logistical outlook for a business project or endeavor. We considered various factors affecting the systems economic value and performance and implemented the best one. The application is a digital library based system and so it is economically feasible which means we can make the use of it at feasible cost and get much more benefit from it. It requires not many resources except what we already have along with our knowledge.

2.4.5 Legal Feasibility

Legal Feasibility analyzes and deals with various legal issues, contracts, policies, laws and violations that staffs are usually unknown about. It ensures if the application is legal to operate or not. Some systems may require license to operate. In such cases legal feasibility needs to be checked. This was done by going through all the legal requirements of the government of Nepal.

2.5 Dataflow Diagram

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated.

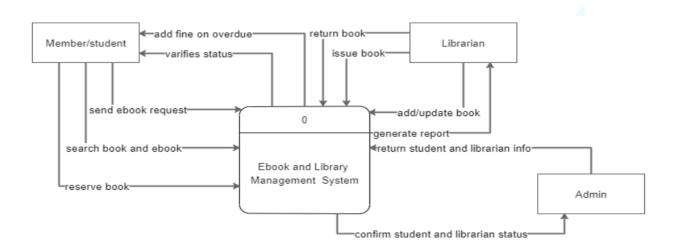


Figure 3: Context Diagram of System

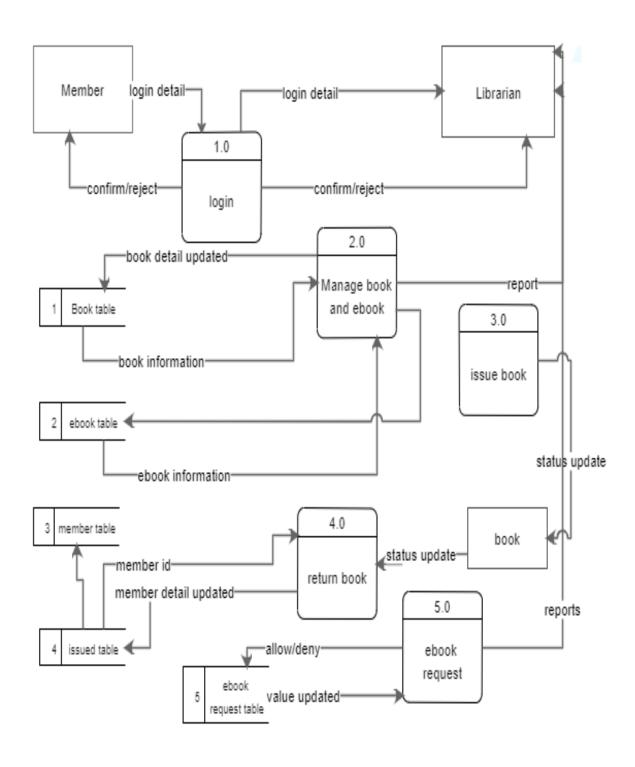


Figure 4: Level-1 DFD of System

2.6 ER Diagram

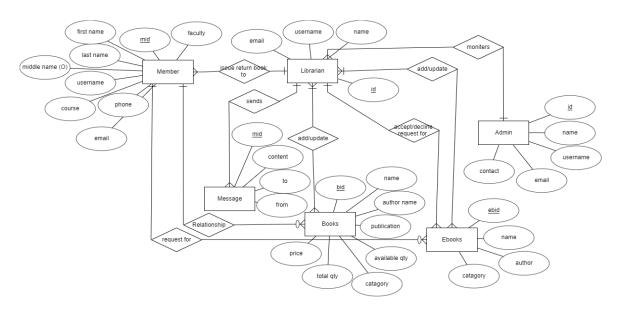


Figure 5: ER Diagram of the Project

2.7 Technical Requirements

2.7.1 Hardware Requirements

The standard input devices like keyboard and mouse and USB barcode scanner were used to get input. The outputs are generated and displayed on the screen.

2.7.2 Software Requirements

• Platform: Windows

• Programming Language: Python, JS

• Front End: HTML, CSS, AJAX and JS/Jquery

• Back End: Python with Django framework

•Database: Postgress

CHAPTER 3

SYSTEM DESIGN

3.1 System Design

Systems design is the process of defining elements of a system like modules, architecture, components and their interfaces and data for a system based on the specified requirements. The system follows a 3-tier architecture which is composed of presentation tier, logical tier and data tier and for this, we have used MVT(model view and template) pattern.

3.1.1 Database Design

Database design is the part of system development. Since the data is stored in Postgress database, the database takes the data from multiple forms. The table is multiple so there is relationship among other table.

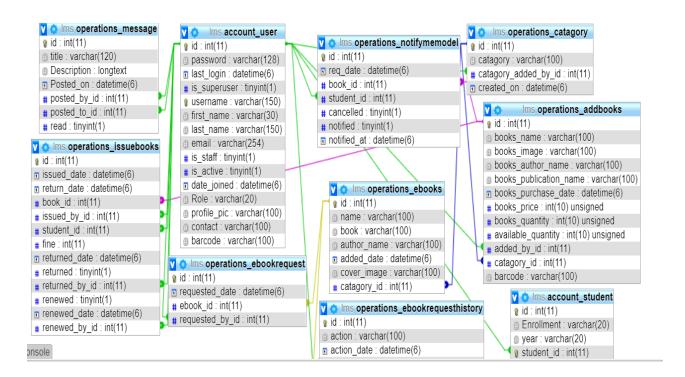


Figure 6: Table Format of the system

3.2 Interface Design

This is the way of representing how the system looks and how the data flow in the system along with the reference of the screen being displayed. There are three parts in the design. Top part represents the current screen number, the middle one represents the screen title or description and the bottom one represents the location of screen, which references the current screen. Here, after opening the system, the tasks that are done in the system are represented below:

3.2.1 Student Interface Design

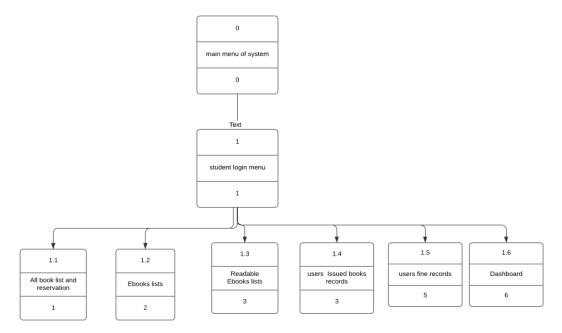


Figure 6:Student Interface Design

3.2.2 Librarian Interface Design

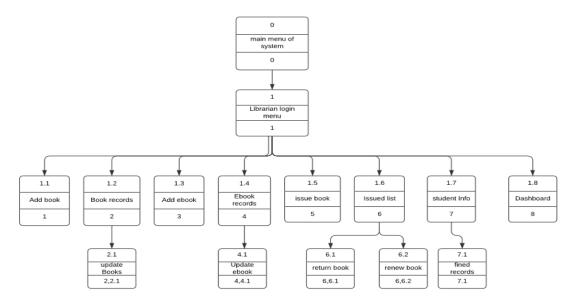


Figure 7:Librarian Interface Design

3.2.3 Admin Panel Design

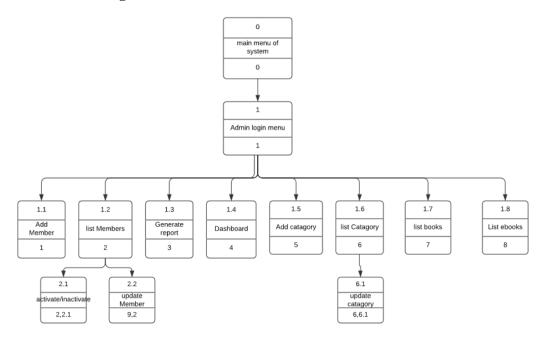


Figure 8:Admin Panel Design

3.3 Flow Chart

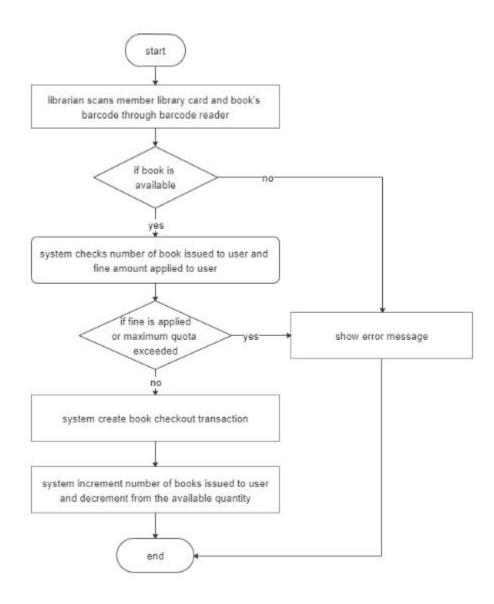


Figure 9: Flowchart to issue book in project

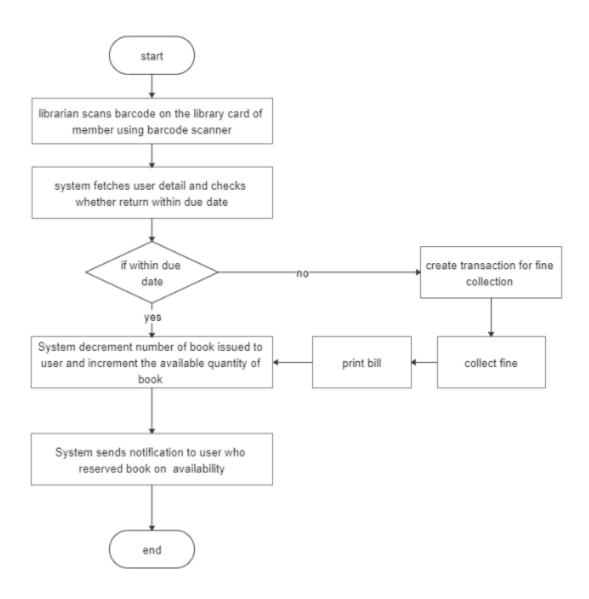


Figure 10: Flowchart to return book in project

CHAPTER 4

IMPLEMENTATION AND TESTING

4.1 Implementation

Implementation phase is one of the important phases of project development. In this phase we implement our conceptual design into the working program by using various tools. The successful implementation of project was nearer steps towards the project completion. Project implementation was not an easy step to us as we encountered various issues related to the programming logic as challenges.

4.1.2 Tools Used

Front end

- Html CSS and Javascript/Jquery was used to build website design.
- Django was used to make interactive and connect with database.

Back end:

- Postgress was used for creating and managing the database.
- Django for the development of the design and users dashboard.

Documentation Tools:

- Edraw max was used for designing of:
 - Data flow diagram
 - Use Case diagram
 - Interface design diagram
 - ER diagram
 - Flow Chart
- MS Word was used as a text editor for documentation process.
- Sublime Text 3 was used as IDE for coding.

4.1.3 Development Methodology

Waterfall model was followed for developing the system. The different phases that are required in this development methodology are requirement analysis, system design, implementation, testing, development and maintenance. The Project Manager and QA analyze all the functional and non-functional requirement of the system that needs to be developed. Knowing the requirements for the system we get a clear understanding and view about what the system is supposed to be.

After knowing the requirements for the system, now we define the overall architecture of the system through designs like, ER diagram, DFD, Database schemas, etc. Python language was used for the implementation of the system. For the data storage Postgress was used. while Python Anywhere a cloud based server is decided for deployment.

4.2 Testing

The testing phase can be carried out manually or by using automated testing tools to ensure each component works fine. After the project is ready, we tested its various components in terms of quality, performance to make it error free and remove any sort of technical jargons. The testing phase can be carried out manually or by using automated testing tools to ensure each component works fine.

4.2.1 Unit Testing

Unit testing emphasizes the verification effort on the smallest unit of software design i.e.; a software component or module. Unit testing is a dynamic method for verification, where program is actually compiled and executed. Unit testing is performed in parallel with the coding phase. Unit testing tests units or modules not the whole software.

Author has tested each view/module of the application individually. As the modules were built up testing was carried out simultaneously, tracking out each and every kind of input and checking the corresponding output until module is working correctly.

4.2.2 Integration Testing

In this type of testing we test various integration of the project module by providing the input .The primary objective is to test the module interfaces in order to ensure that no errors are occurring when one module invokes the other module.

4.2.3 System Testing

System testing has done after integrating testing in order to ensure that the whole systems functions properly. After the integration testing the whole system working process was checked. The output was as per the system specifications and hence the system was found to work properly.

4.2.4 Test Case

Table 4:Test Cases

SN	Test Case Name	Test Procedure	Precondition	Expected Result	Outcome
1	Registration form test1	Create Account	Registration page	Empty fields must generate error	Success
2	Registration form tesr2	Email confirmation sent	Registration page	Activation link received through email	Success
3	Login form test	Login with unregistered account	Login Page	Must show error message	Success
4	Database Connection	Connect to database	Database connected	Connection successful	Success

5	Add book and	Add book and	Add book	Data should be	Success
	ebook	ebook to	and ebook	added to database	
		database			
6	Hadata baak	Hadata baak	I Indote mass	Hadata na sanda	Cusass
6	Update book	Update book	Update page	Update records	Success
	and ebook	and ebook in			
		database			
7	Delete book and	Delete from	Delete page	Data should be	Success
	ebook	database		deleted from	
				database	

CHAPTER 5

CONCLUSION

5.1 Conclusion

In current context, the increasing information Technology has built up the software development trend. To follow the trend internship provides a bridge for the industrial environment for the undergraduate to learn and experience the real world. Internship has helped in adapting well to working under pressure. Working with multiple features in a single week-long sprint and handling immediate and urgent bugs have assisted in enhancing professionalism to meet deadlines. The technical tasks that were undertaken during the internship period have helped the intern in improving software development and debugging skills. It has helped in gaining knowledge about various technical tools and frameworks used in software development and the process that should be followed for proper development completion. Working as an intern in one of the popular IT companies of Nepal, has boosted the confidence and has polished the professional as well as soft skills of the intern in the IT sector. As whole, this report includes project and the internship experiences, findings, knowledge and the technical skills.

5.2 Future Scope

There is a future scope of this facility that many more features such as online lectures video tutorials can be added by teachers as well as online assignments submission facility, a feature Of group chat where students can discuss various issues of engineering can be added to this project thus making it more interactive more user friendly and project which fulfills each users need in the best way possible.

5.3 Lessons Learnt

Through the internship from Softtechpark pvt. ltd., the lessons learnt were:

- Importance of time management and working with multiple features under pressure to meet deadlines.
- Immediate handling of urgent bugs and fixing them.

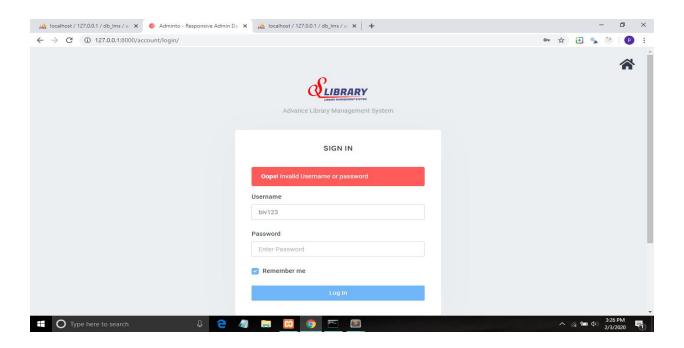
- Understanding the differences between theoretical and practical knowledge.
- Working in team with coordination and cooperation to make quality decisions.
- Working as Python\Django Developer can be considered as a potential career.

REFRENCES

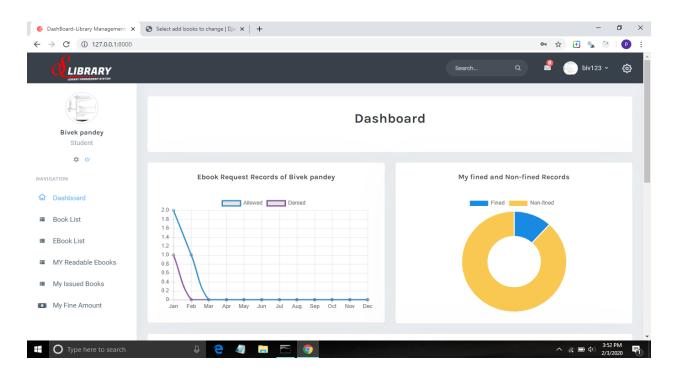
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Appendix-I:Screenshots

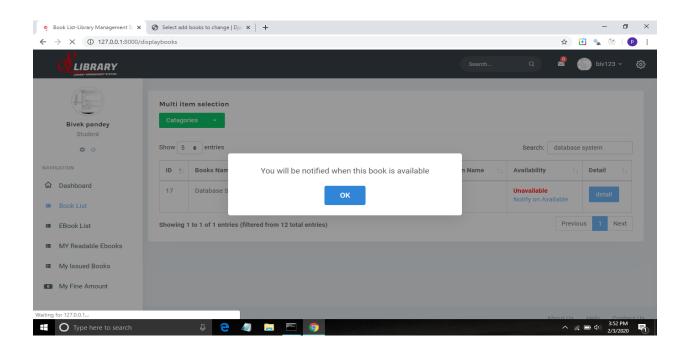
1 Login Page



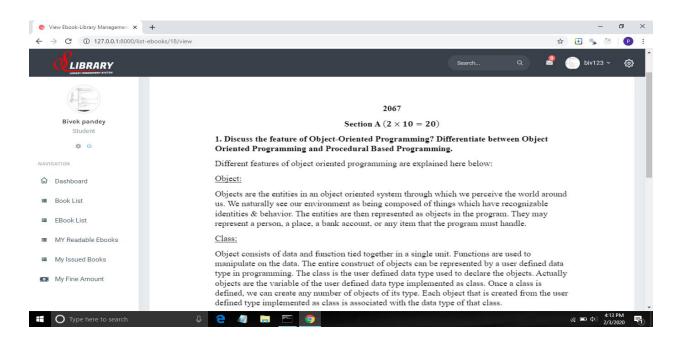
2 Student Dashboard



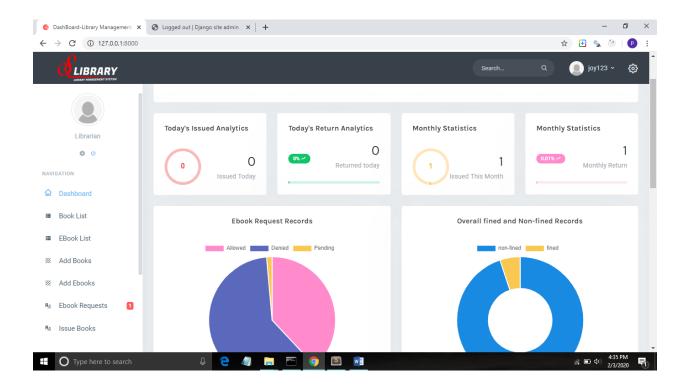
3 Book Reserving



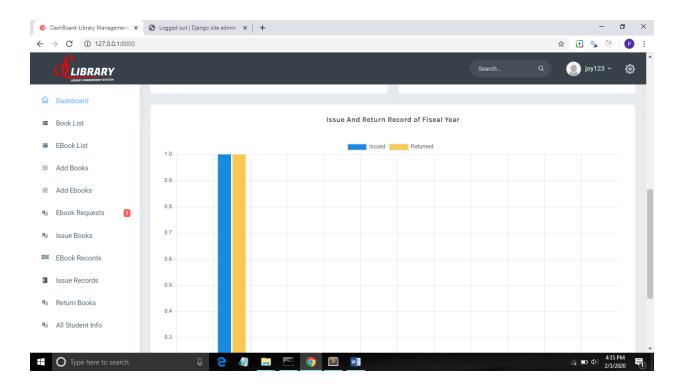
4 Rendering Ebooks



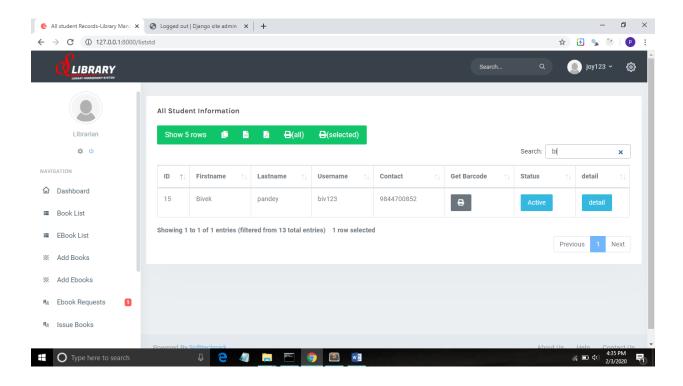
5 Librarian Dashboard



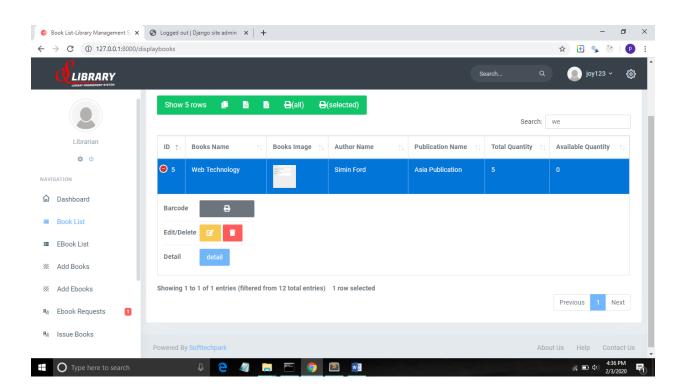
6 Librarian HomePage



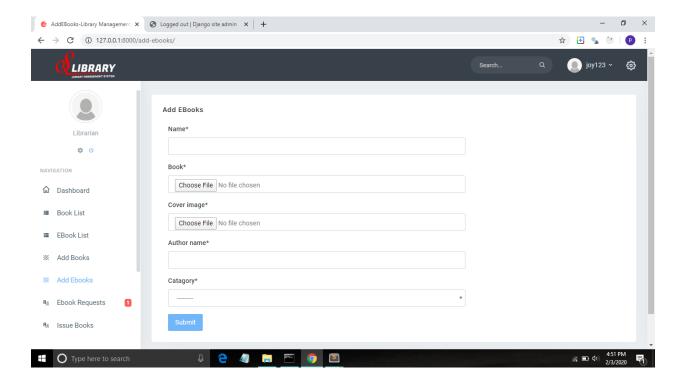
7 Student List



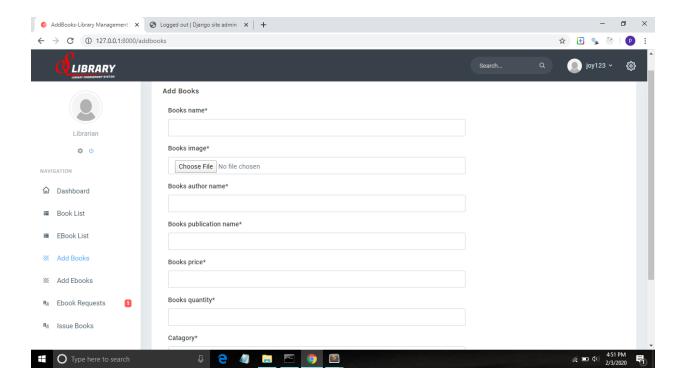
8 Book List



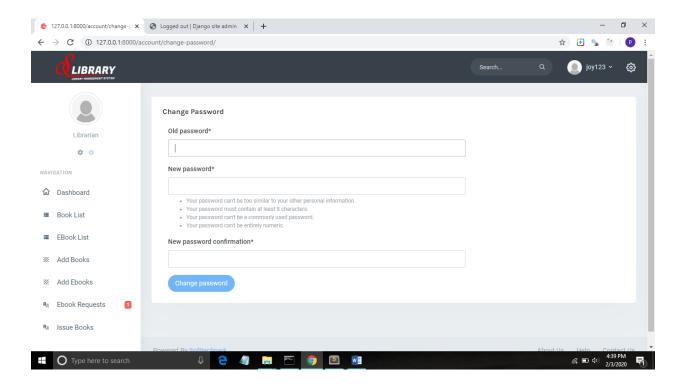
9 Add Ebooks Page



10 Add Books Page



11 Change user password page



12 Admin Dashboard

