PURBANCHAL UNIVERSITY

HIMALAYAN WHITEHOUSE INTERNATIONAL COLLEGE

PUTALISADAK, KATHMANDU

Project-I Report

On

"LIBRARY MANAGEMENT SYSTEM"

Submitted by:

Umesh Raj Joshi [310753]

Prince Kumar Chaudary [310720]

Yubaraj Karki [310755]

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APPROVAL CERTIFICATE

The undersigned certify that they have read and recommended to the Department of Science and Technology for acceptance, a project report entitled "**Library Management System**" submitted by Umesh Raj Joshi, Yubaraj Karki & Prince Kumar Chaudary in partial fulfilment for the Degree of Bachelor in Information Technology.

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Er. Jaya Raj Joshi

Supervisor

Date:

……

External Examiner

Date:

……

Er. Bimal Sharma

Head of Department

Date:

ACKNOWLEDGEMENT

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Thanking you
Umesh Raj Joshi
Prince Kumar Chaudary
Yubraj Karki

ABSTRACT

A Library management system is a sophisticated digital platform designed to seamlessly manage and streamline the operation of library. Our project make a digital library management system which can help to manage a library in comfortable and efficient way in a C programming language. It aim to provide users with secure, efficient and comfortable way to manage library. A librarian can use this system with full security and efficient way. This system can solves the problem of librarian which are faces during a managing a library. Solve the data lost problem and book manage complexity in a management of library. The system is entirely implanted in the C programming language utilizing variable, strings, and other relevant concept of development. For a security of this system username and password is must be needed for enter in the system. This can insure the information about books are secure and protected.

LIST OF FIGURES

LIST OF ABBREVIATIONS

LMS	Library Management System
MINGW	Minimalist GNU For Windows
SDLC	Software Development Lifecycle
GUI	Graphical User Interface
IDE	Integrated Development Environment
HTML	Hypertext Markup Language
ID	Identity Document
CSS	Cascading Style Sheets
UAT	User Acceptance Testing
UML	Unified Modeling Language

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CHAPTER 1
INTRODUCTION

1.1 Background

At a present time technology is growing rapidly day by day in every sector. Every work are done through digitally for get success in a short period of time. Traditional manual method are to complex and not effective for managing a library in today world these method are complex for data storing, more time consuming but also prone and errors and inefficiencies. To address these problem we made a Library management system to storing and managing a library in effective way.

Traditionally library data are manage through the paper work and human record-keeping system which can faces many problem of data lost and security issues. For minimizing these problems organizations are started the digital methods for managing a data which can help to keep data secure. At a library management system there is option of addition, deletion, issue book, return book. There is almost all function which are normally needed in a library.

The need of LMS arises from the growing complexity of librarian tasks, especially in library with a large amount of book management problem. Manual process for tracking library data like see data of available book, issue book and etc. which can directly help to the librarian for managing the problem in library. This LMS system can save data, or delete data with a 100% accuracy. Moreover, with the advent of remote work and flexible schedules, the demand for digital solutions to manage library related tasks has become more pronounced.

The goal of our project was to plan and create a thorough Library management system that will increase the efficiency of library operations. By developing an LMS, organization can achieve several key objectives like efficiency, accuracy, transparency, compliance, confidential and many more. Overall, an LMS is a strategic investment for organizations seeking to optimize their librarian processes, enhance library operation smoothly and stay competitive in today's dynamic business landscape.

1.2 Problem Statement

In present time, many library can uses manual process of data storage system in library which is not effective and more complicated to store data in library by a librarian. Many

problem like file lost, file damaged, difficult to searches book in library, costly and space consuming, security problem are faced by the library and librarian. So we can address these problem and decided to make a systematic and digitalized software which can help to easily maintain the library data in a single computer knows as LMS. LMS can solve all the problem which are faced by librarian to keep data in digital form. After using this software a single person can easily maintain the library and not needed to use paper for keeping

1.3 Project objective

The main motto of our project was to develop an LMS & to be familiar with the features of C programming. The project is mainly based on the following objectives:

1.3.1 General Objective for Employee Management System:

- To develop a user-friendly system for efficient management of books data.
- To provide secure and safe environment to store and manage sensitive information in library.

1.3.2 Specific Objectives for Employee Management System:

- To store a library data for a long period of time in a file of a computer with accuracy and data are easily accessibility.
- To provide functionality for authorized administrators to securely add, delete, modify, search & view books records.

1.4 Project scope & limitations

Our system is designed to minimize the manual work in maintaining books data digitally. It aims to store book data digitally and permanently and provide the feature of add, delete, and search books using this system. Some of the scope and limitations of our system are listed below:

1.4.1 Scope

- This system can be primarily used in library for making comfortable environment for librarian to manage library in an effective way and save the details of library permanently and confidential.
- This system can help to librarian by easy to search book, add new book and deletion old book and minimize the paper work in a library and also help to save time of librarian and reduces the library cost.

1.4.2 Limitations

- The system may require some training for users to fully utilize its feature and functions.
- More complex to use this system due to the less use of library and complex to update the system for other developer.
- System is doesn’t use by the general public due to the unavailable of graphical user interface.

CHAPTER 2

LITERATURE REVIEW

2.1 Research based on similar project

Existing systems were manual where there was no way of properly storing information. Library records were stored manually which lead to errors. There was no proper way of tracking books records. It was very difficult and required a lot of paperwork which makes the application time consuming and not secured. There was no administrator which could handle the records. So there was the need to develop a system which could manage all these things and reduce the paperwork.

The project done by Abir Roy and Nandita on Library Management System based on web technology HTML, CSS, and Javascript. The features modules like library management, issue book, return book and adding and deletion of boos in library. They made a very secure system which is only login with a username and password. Librarian and user both can run the system with their username and this system can also support real time book transaction. [1]

A web based Library Management System proposed by Prabhakar kumar and Rahul considers management function like issue book, return book, register new student and add and deletion of book. They made a LMS system using HTML, CSS. The transaction of books are done through online. They proposed a web based Library Management System surpassing traditional manual methods and existing computerized systems. [2]

According to the researchgate, library management system is for monitoring and controlling the transaction of library. This project library management system is developed in HTML, CSS which mainly focuses on basic operation in a library like adding new books, and updating new information, searching books and members and returning books. This system is easy to operation and no paper work is needed. This is also an online management system many transaction are also done in online. The purpose of this system is systematic circulation of book and keeping record of transaction. [3]

According to the studocu, library management systems is a project which aim in developing a computerized system to maintain all the daily work of library. C programming language is used for make this library management system. The whole system is worked by offline every transaction of book are done by online in this system. This system has many feature

which are generally not available in normal library management like facility of user login and a facility of admin login. It can also facilities the admin to monitoring the whole system and student can see their list of book issued and login their account. [4]

After studying about previous project we can address these problem and we will trying to solve these problem. This project have many new feature which are generally not available in the normal library management system like user login and a facility of admin login. No paper work is needed in this system where all data are saved in digital form. We are making a cost effective, time effective, and feasible library management system.

2.2 Requirement analysis

Requirement analysis is a critical phase in system development that involves identifying, documenting, analyzing and prioritizing the needs and expectations. This process typically includes gathering both functional and non-functional requirements.

2.2.1 Functional requirement

The key functional requirements that must be performed by our system are described below:

- **User authentication:** The system allows users to securely log in using their username and password.
- **Registration:** The system allows new users to register, providing them with the authorization for manipulating LMS.
- **Library information management:** The system provides functionality for adding, updating, editing and deleting library data records.

2.2.2 Non-Functional Requirements

Non-functional requirements specify the quality attributes or constraints that the system must adhere to, such as performance, reliability, usability and security. These requirements define how the system should behave or perform rather that what it should do. The non-functional requirements of our system are described below:

- **Performance:** Performance refers to how well the system performs in terms of speed, responsiveness and efficiency. It includes factors like response time, throughput, and resource utilization.
- **Reliability:** The system should be available whenever needed, minimizing downtime. It should ensure the integrity and consistency of library data, preventing data loss or corruption.

- **Usability:** Usability focuses on the ease of use and user experience of the system. It includes factors like user interface design, navigation, accessibility, and user support features. A usable system provides intuitive interfaces, clear instructions, and efficient workflows to enhance user satisfaction and productivity.
- **Security:** Security encompasses measures to protect the system from unauthorized access, and data deletion. Our system includes user authentication to securely login into the system.

2.3 Feasibility study

A feasibility study is a systematic analysis to determine the practicality and potential success in competition of the project or venture.

A. Technical Feasibility: Technical feasibility is concerned with the availability of hardware and software required for the development of the system. The system is designed in a c programming language and store data in the text file. All necessary hardware and software are readily available in the market, making the system technically feasible.

B. Operational Feasibility: library management system is made on a low level programming language which general feature which are generally present in the library. LMS is an operational feasible. This system is made in a low-level programming language (C programming). This system is made for small intuition so for this system there is no needed to high database and high-level operating system. This system satisfies the requirement so we can say LMS is technical feasible After the study, it was determined that with proper training and maintenance plans we can further proceed for the development of the system

C. Cost Feasibility: The cost feasibility analysis for the Library management system involves evaluating expenses related to development, maintenance, and operational aspects. LMS system is highly cost feasible because of this project is made for a study purpose so there is no need of investment for developing this project.

D. Legal Feasibility: Legal feasibility entails ensuring compliance with relevant laws and regulations governing data privacy, intellectual property, and employment practices. Specifically, for the employee management system, it involves adherence to data protection laws ensuring proper handling and security of employee data. The system was found to be legally feasible since only the authorized admin is allowed to use the system which will further enhance data privacy.

E. Time Feasibility: Time feasibility refers to the assessment of whether a proposed project can be completed within a reasonable timeframe. After the study of the tasks involved in completing the project including requirement gathering, frontend development, backend development, coding, testing and others, we concluded that the project timeline appears feasible. The project timeline was structured over a 15-week period. By carefully analysing tasks, resource availability & potential risks or delays, we can assess the feasibility of meeting the projects deadlines and make adjustments to the schedule as needed to ensure timely completion.

CHAPTER 3

SYSTEM DESIGN & METHODOLOGY

3.1 SDLC model

The Software Development Life Cycle (SDLC) model is a structured approach used by software development teams to design, develop, test, deploy, and maintain software systems. It encompasses a series of phases or stages, each with specific activities and deliverables. Common SDLC models include Waterfall, prototype & spiral model with its own set of principles, methodologies, and best practices tailored to different project requirements and organizational needs.

The phases in the Software Development Life Cycle (SDLC) typically include:

1. **Planning**: This phase involves defining the project scope, objectives, timelines, and resources required. It may also include feasibility studies and risk assessments to ensure the project's viability.
2. **Requirement Analysis**: During this phase, the development team gathers and analyses requirements from stakeholders, such as users, customers, and business owners. The goal is to understand the needs and expectations of the software system to be developed.
3. **Design**: In this phase, the system architecture and design specifications are created based on the requirements gathered. This includes defining the software components, data structures, interfaces, and algorithms to be used in the system.
4. **Implementation**: Also known as coding or development, this phase involves translating the design specifications into actual code. Developers write, compile, and test the code to ensure it meets the requirements and design standards.
5. **Testing**: Once the code is developed, it undergoes rigorous testing to identify and fix defects or bugs. Testing includes various techniques such as unit testing, integration testing, system testing, and UAT.
6. **Deployment**: After successful testing, the software is deployed or released to the production environment. This phase involves installing the software on users machines or servers and configuring it for use.

7. **Maintenance**: The final phase involves maintaining and supporting the software post-deployment. This includes addressing any issues or bugs reported by users, making enhancements or updates as needed, and ensuring the software remains functional and efficient over time.

These phases may vary slightly depending on the specific SDLC model or methodology being used, but they generally encompass the key activities involved in software development projects.

3.1.1 Selected model

Our project is aimed to develop Library Management System using C programming language. After going through all the SDLC models we concluded on using Waterfall model. The Waterfall Model is particularly suitable for projects where requirements are well-defined and unlikely to change significantly throughout the development process.

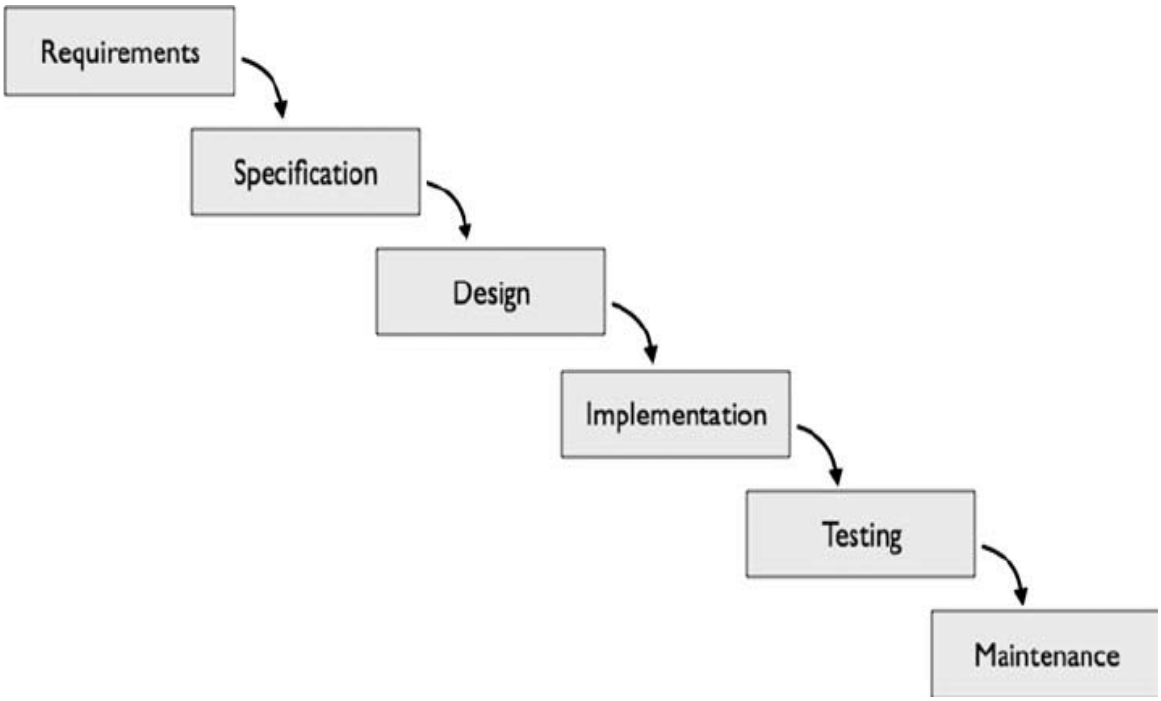


Figure 1: Waterfall Model

Here are the reason behind the selecting waterfall model are listed below:

i. Stability of Requirements:

The Waterfall Model assumes that requirements are stable and can be fully defined at the beginning of the project. This model is suitable for projects where there is a clear understanding of what needs to be developed, and changes to requirements are minimal.

ii. **Sequential Progression:**

The Waterfall Model follows a sequential progression of phases, with each phase building upon the deliverables of the previous one. This approach provides a clear structure and roadmap for the project, making it easier to plan and manage.

iii. **Well-Defined Deliverables:**

The Waterfall Model defines specific deliverables for each phase, making it easier to track progress and ensure that all requirements are met. This model emphasizes documentation, ensuring that requirements, designs, and test cases are well-documented throughout the development process.

3.2 Algorithm

Start the software

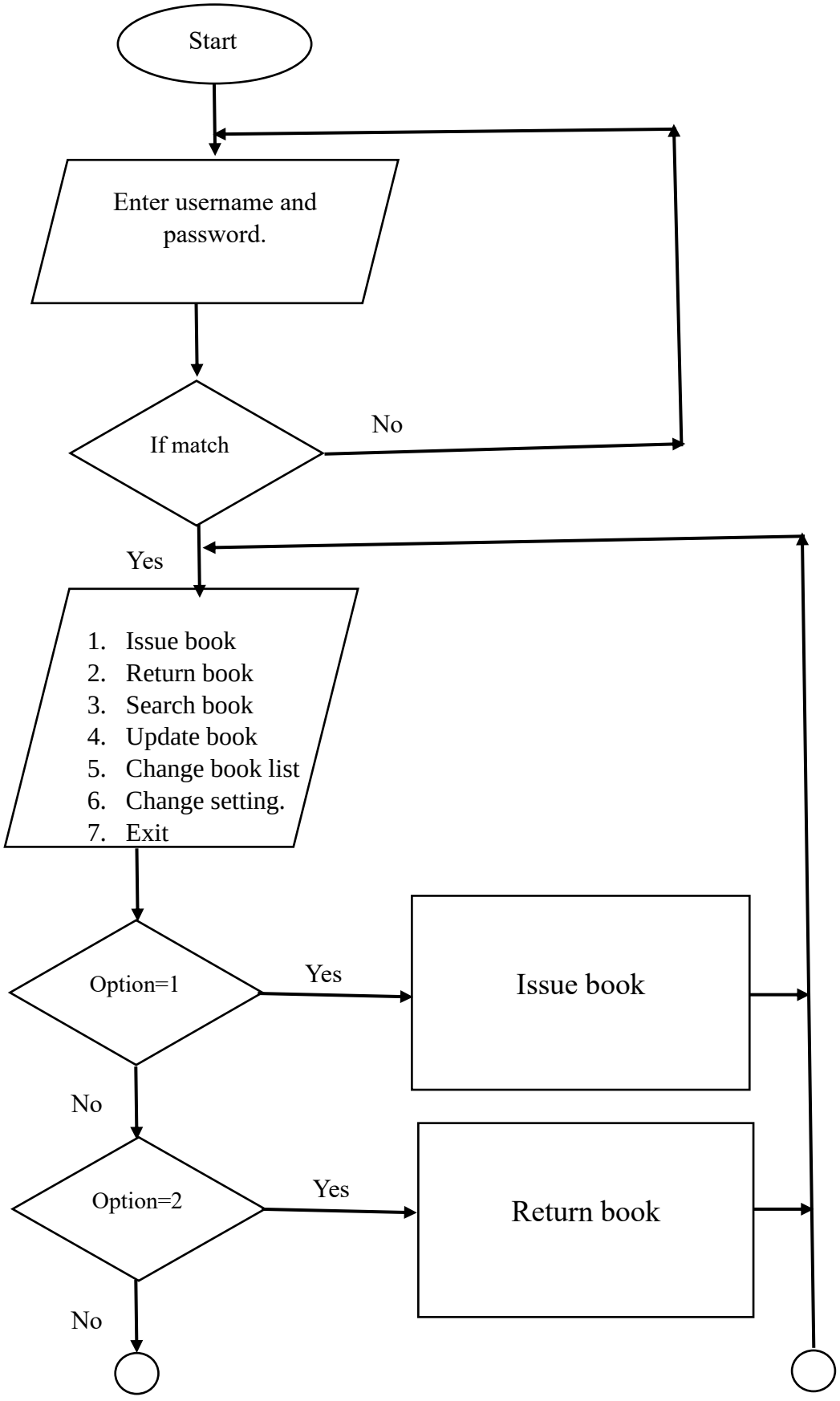
- Two login options are displaying i.e. login, exit.
- In login if username and password are correct then the user can enter the menu. If username and password are not matched the re-enter option is given.

(Display main menu)

- Enter 1 for issues book.
- Enter 2 for return book.
- Enter 3 for search book.
- Enter 4 for update books.
- Enter 5 for change book list.
- Enter 6 change setting.
- Enter 7 for exit.
    - If enter 1
        - Enter 1 for issue book.
        - Enter 2 for see issue list.
        - Enter 3 for exit.
            - If enter 1: Enter necessary detail for issue book.
            - If enter 2: See issue list of book.
            - If enter 3: Program terminated.
    - If enter 2

        - Enter required detail for return book.
- If enter 3
    - Enter book name for search book.
- If enter 4
    - Make change in book details.
- If enter 5
    - Enter 1 for add book.
    - Enter 2 for delete book.
    - Enter 3 for see book list.
    - Enter 4 for exit.
        - If enter 1: Enter required book detail to add book.
        - If enter 2: Enter book name for delete book.
        - If enter 3: See book list.
        - If enter 4: Program terminated.
- If enter 6
    - Enter new password and username for change.
- If enter 7
    - Program terminated.

3.3 Flowchart



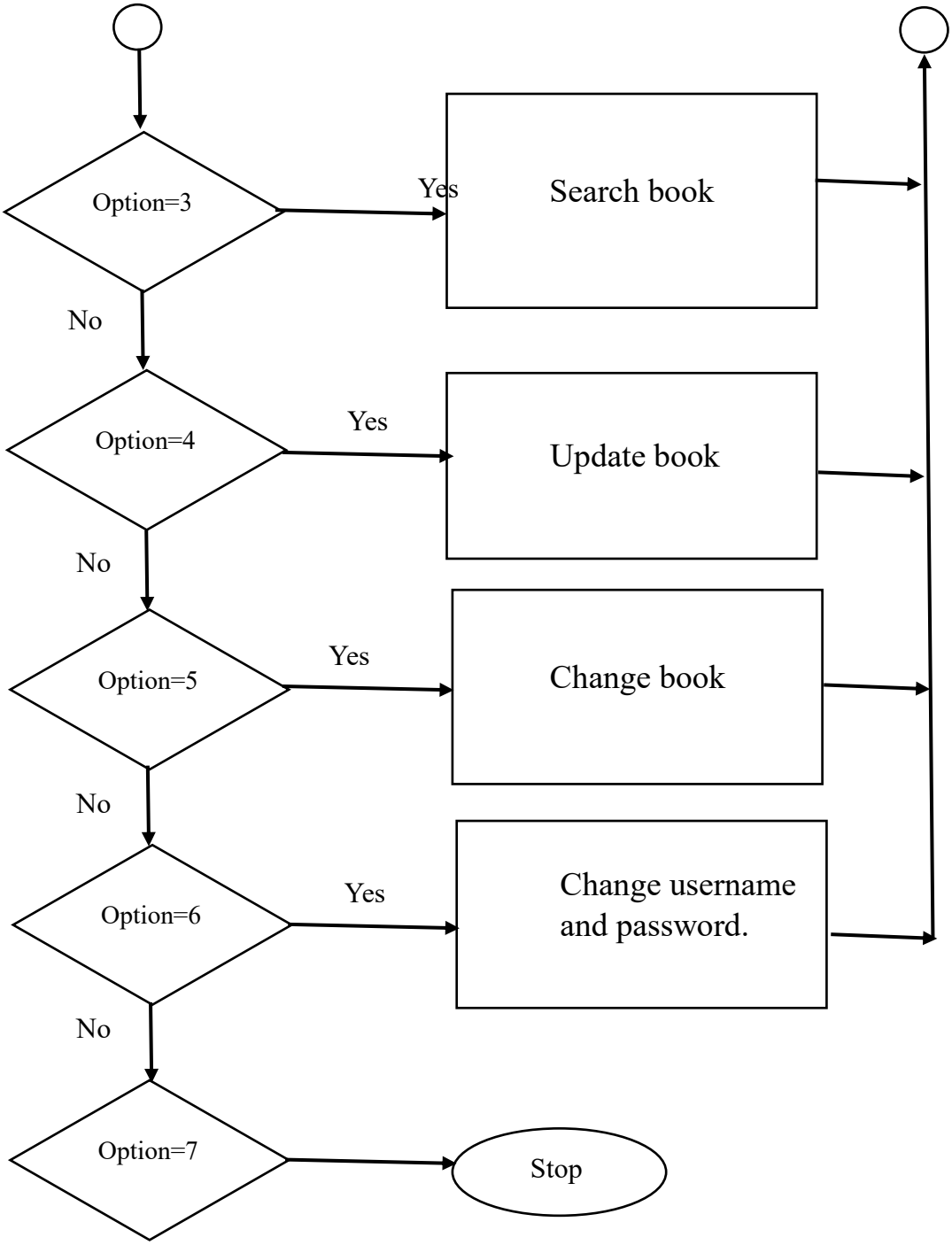


Figure 2: flowchart

3.5 Use Case Diagram

A use case diagram is a type of behavioral diagram in Unified Modeling Language (UML) that illustrates the interactions between actors (users or external systems) and a system to accomplish specific goals or tasks. It shows the functionality of a system from the perspective of its users and helps to understand how users interact with the system. The use case diagram of our system is as shown below:

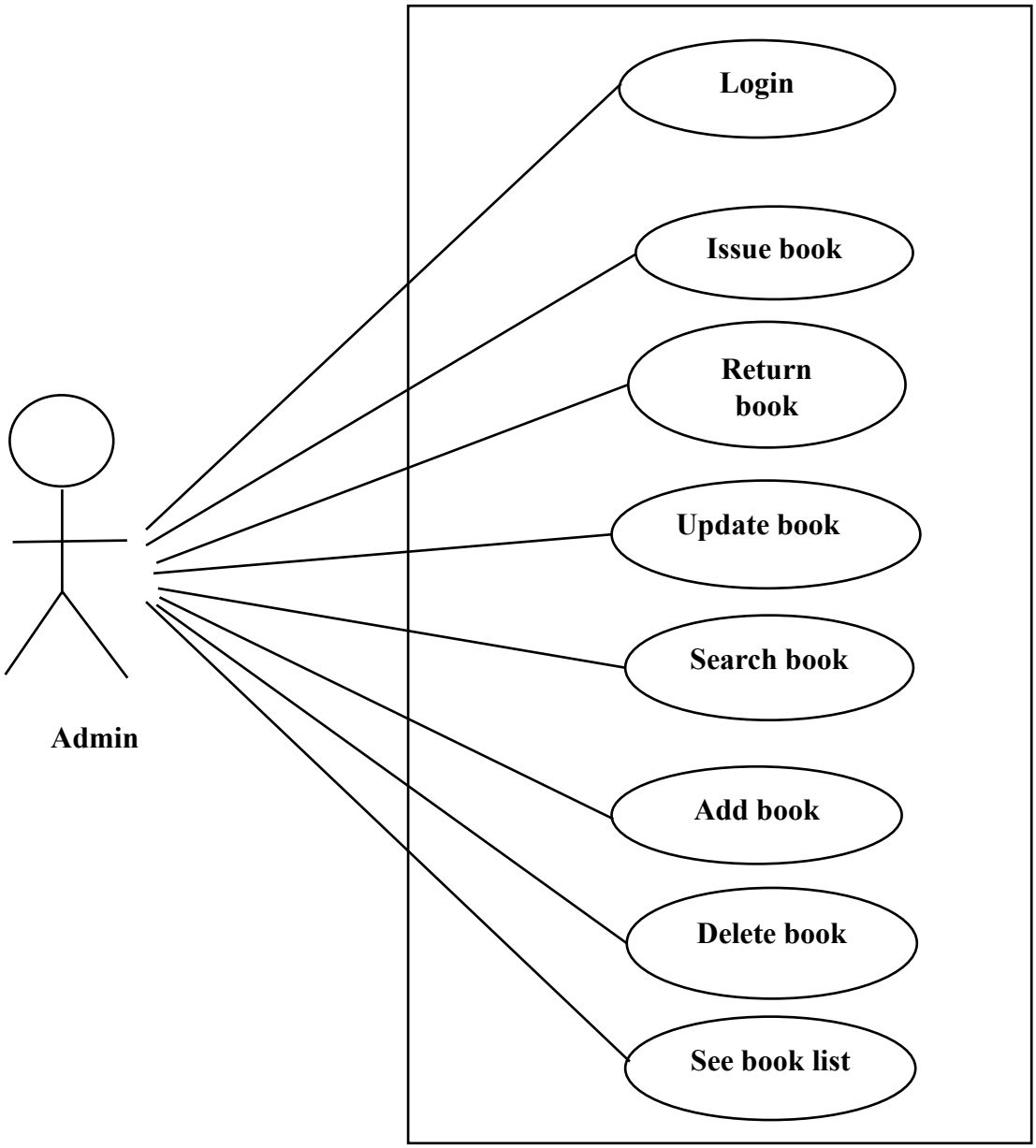


Figure 3: Use Case Diagram

CHAPTER 4

IMPLEMENTATION & TESTING

4.1 Software and hardware requirements

To successfully develop and run Library Management System using C programming language you need to meet specific software and hardware requirements. The software and hardware requirements for the completion of our project are listed below

A. Software requirements

- **a. Operating system** (windows 7/8/10/11 (32-bit or 64-bit))
- **b. Dev C++:** There are the many software where we can do code for a c program but we can use a Dev C++ for the coding of c programming language.
- **c. MINGW:** Mingw is the software with compile the c programming based program and give the output and finding the error in the program.
- **d. Notepad:** In a library management system we a store data in a file. Notepad is the software which can help to read data from text file.

B. Hardware requirements

a. **Processor:** Intel Core i3 or higher

b. **Memory:** 4 GB or more

c. **Storage:** 256 GB HDD or SDD

4.1.1 Language used

The language used for the development of our system is listed in the table below:

A. **C-program:** The C programming language is a procedural and general-purposed language that provides low-level access to system. A program written in C must be run through a C compiler to convert it into an executable that a computer can run.

4.2 Testing

Software testing is a process of analyzing an application's functionality as per the requirements. If we 5 of various types of software testing methods we used:

A. Functional Testing: In functional testing, all the components are tested by giving the value, defining the output, and validating the actual output with the expected value.

i. **Unit Testing:** Unit testing is the first level of functional testing. Using this test, we tested the module of our system independently, verifying that individual components of the LMS works correctly.

ii. **Integration Testing:** Once we successfully implemented the unit testing, we went for integration testing. It is the second level of functional testing, where we tested the data flow between dependent modules or interface ensuring that different modules or services used by LMS works together. The integration between user interfaces, file handling services were tested.

iii. **System Testing:** After successful integration, we moved further with the system testing. In system testing, the test environment is parallel to the production environment. The main objective of system testing was to validate the complete and integrated LMS system against the requirements. Here, we went through each attribute of the software and tested if the end feature works according to our projects requirements.

B. Non-Functional Testing: Non-functional testing is a type of software testing that focuses on the attributes of a system that do not relate to specific behaviour's or functions. Instead, it assesses qualities such as performance, reliability, scalability, usability, security, and compatibility. Non-functional test was also conducted to ensure it meets the quality standards. It involved evaluating the system's performance, security, usability and compatibility.

CHAPTER 5

ANALYSIS & EVALUATION

5.1 Analysis of output obtained

The general objective of this project was to develop a user-friendly platform for efficient management of library data while ensuring a secure environment for storing and managing sensitive information. The specific objective of this project is efficiently manage a library with adding book, delete book, view book record, search books, issue book, return book, login page and store data permanently.

By the end of this project we created a Library Management System (LMS) with features such as add, delete, modify, view and search implemented in C program of our proposed system objective. We achieved the objectives of the Library Management System through a series of strategic implementations and features. We implemented a text file to ensure data accuracy and accessibility. Authorized administrators can securely add, delete, and modify, search and view library records through streamlined operations with built-in validation and user permissions, achieving our projects objectives efficiently.

Furthermore, the project incorporates robust security measures to protect sensitive books data. Additionally, the user interface has been designed with simplicity, making it easy for administrators to navigate and perform tasks efficiently. Overall, the LMS not only meets but also exceeds the initial objectives by providing a secure, efficient, and user-friendly platform for comprehensive library data management, setting a solid foundation for future enhancement and scalability.

5.2 Schedule analysis

We have outlined the timeline for the implementation of the LMS below using a Gantt chart. This chart illustrates the major tasks, their dependencies and the duration for the completion of each task.

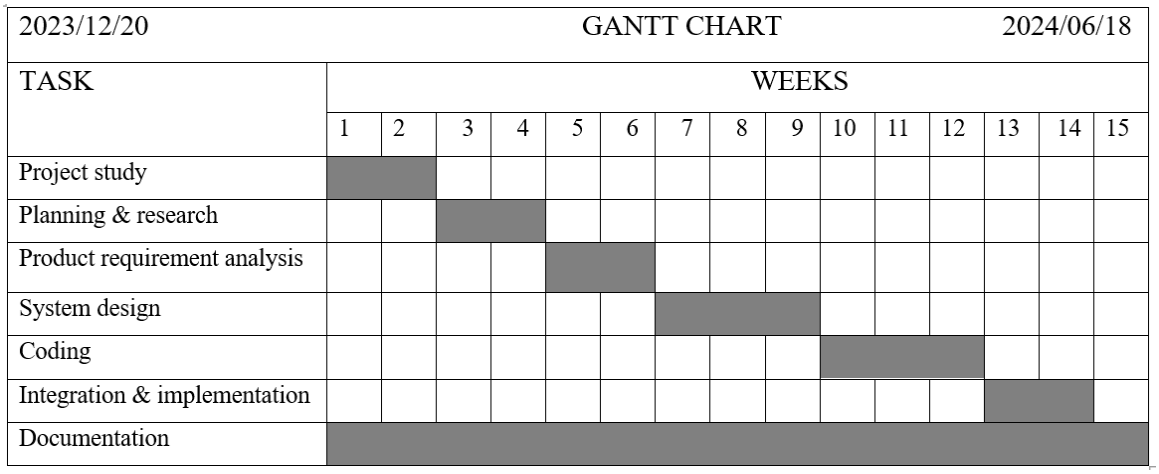


Figure 4: Gantt chart

CHAPTER 6

CONCLUSION & FUTURE RECOMMENDATION

6.1 Problem faced and their implementation

During the development and implementation of the Library Management System, several challenges were encountered. These issues were addressed systematically to ensure the project's successful completion. The problems and their respective implementations are briefly described below:

i. **File handling:**

   Problem: we face the problem during the file creating for save the library data permanently.

   Implementation: We can take a reference from the Google and other website to fix this problem and we are able to save available book in library and issues book from library.

ii. **User Authentication and Security:**

   Problem: Designing a robust authentication mechanism to secure sensitive data.

   Implementation: To address this issue, a login frame was implemented, requiring users to authenticate themselves using a username and password. This information was securely stored in the file.

6.2Conclusion

In conclusion, the Library Management System developed using C language efficiently addresses the essential needs of managing library data with functionalities such as adding, deleting, issue and return book, modifying, viewing, and searching available books. It ensures secure access through user authentication, safeguarding sensitive information. It also provides a register password and username before first time signing in into the system. The system's intuitive interface and platform independence make it a practical and versatile solution for streamlining administrative tasks, improving data accuracy, and enhancing productivity.

6.3 Future recommendation

Looking into the future, here are some forward-thinking recommendations and enhancements that can be made for Library management system:

1. **Biometric authentication:** Integrate biometric authentication methods, such as fingerprint scanning or facial recognition, to enhance the security of library access to sensitive data and systems with using other programming language.
2. **Real time book transaction:** In future we can update the Library management in real time book transaction through online by using other high level programming language. By this system we can solve almost 90% problem of library and library transaction.
3. **Graphical user interface:** In future we can add a high level graphic for making a library management system more attractive and make easy interface for the user by using other high level programming language.

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ANNEX

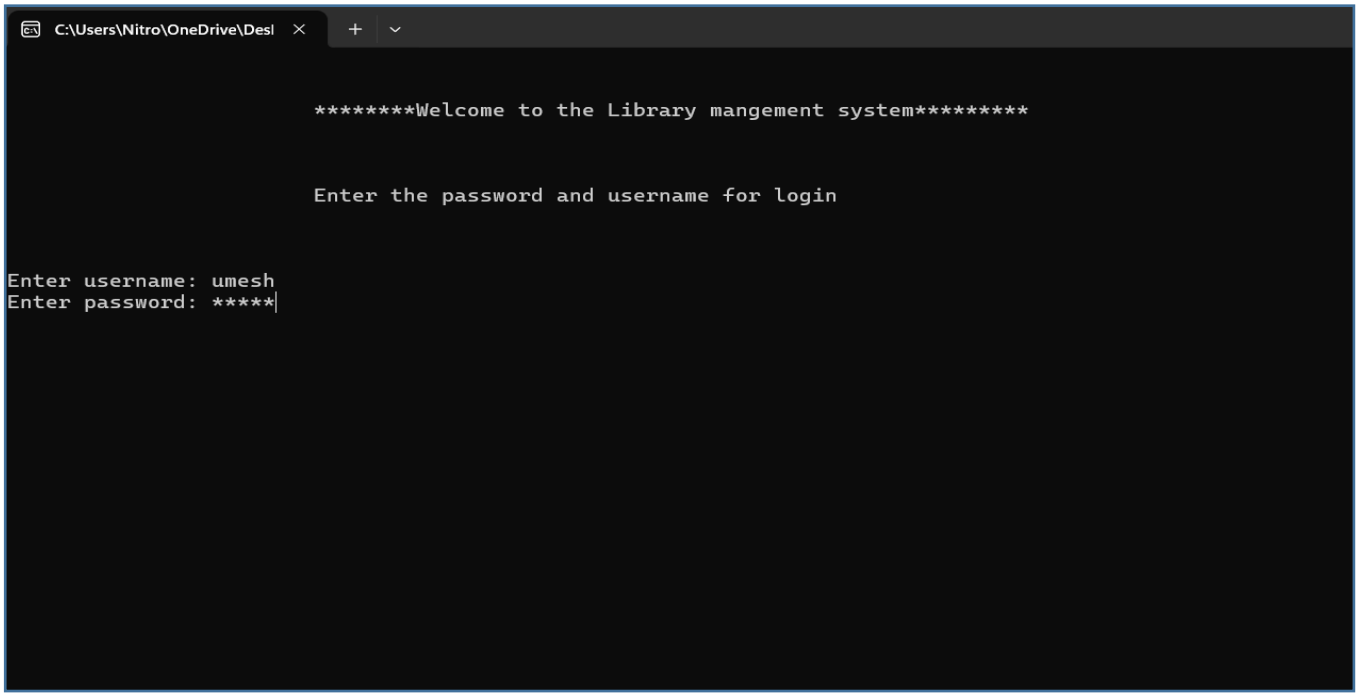

Figure 5: Login page

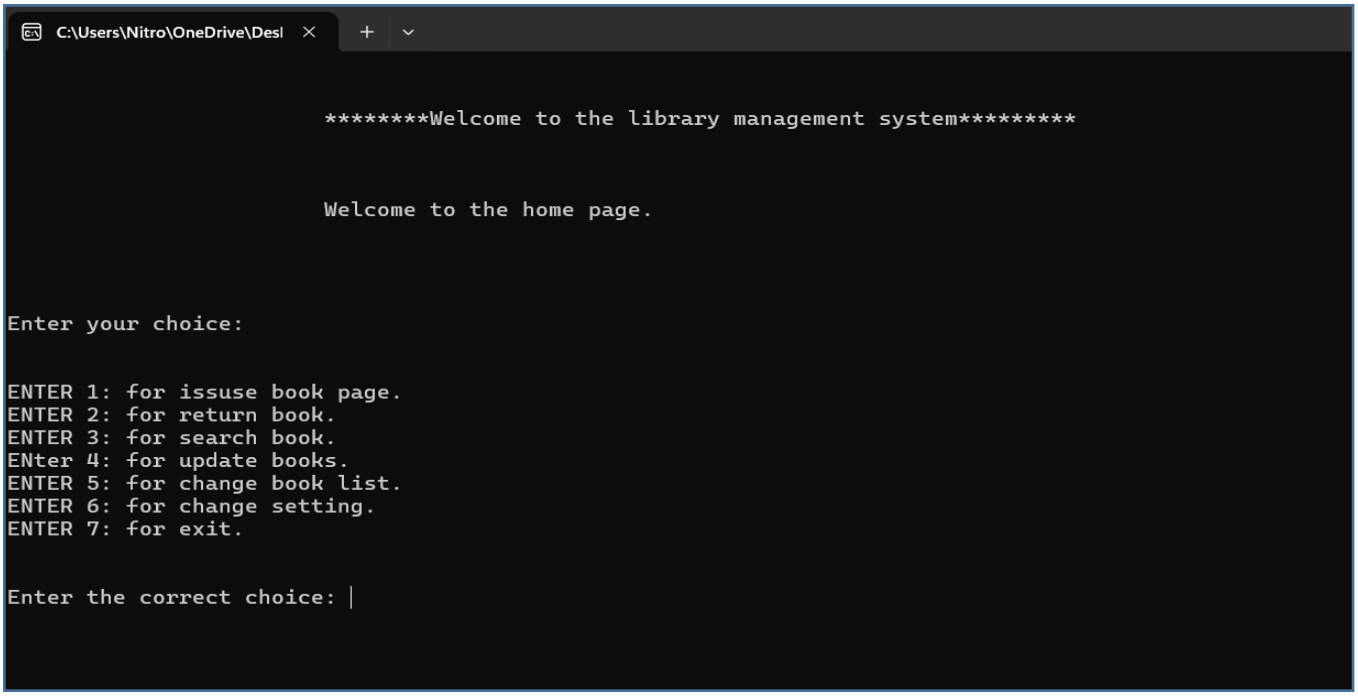

Figure 6: Home page

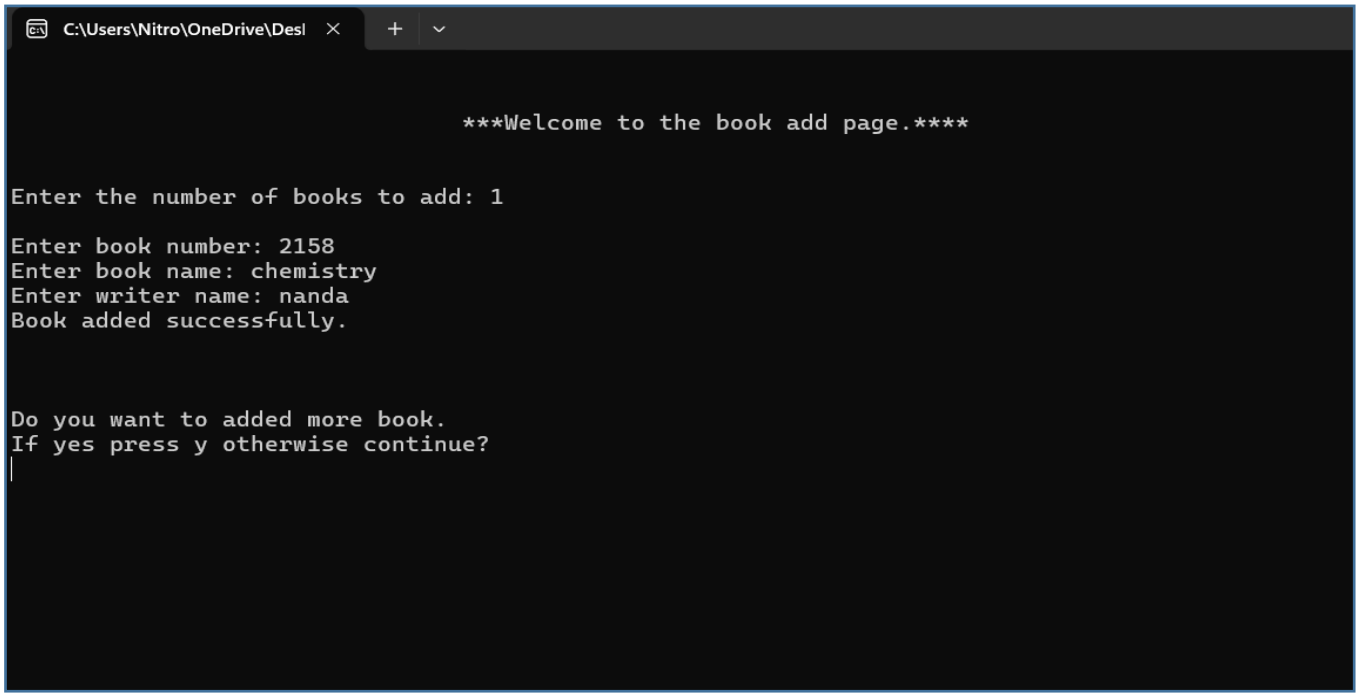

Figure 7: Add page

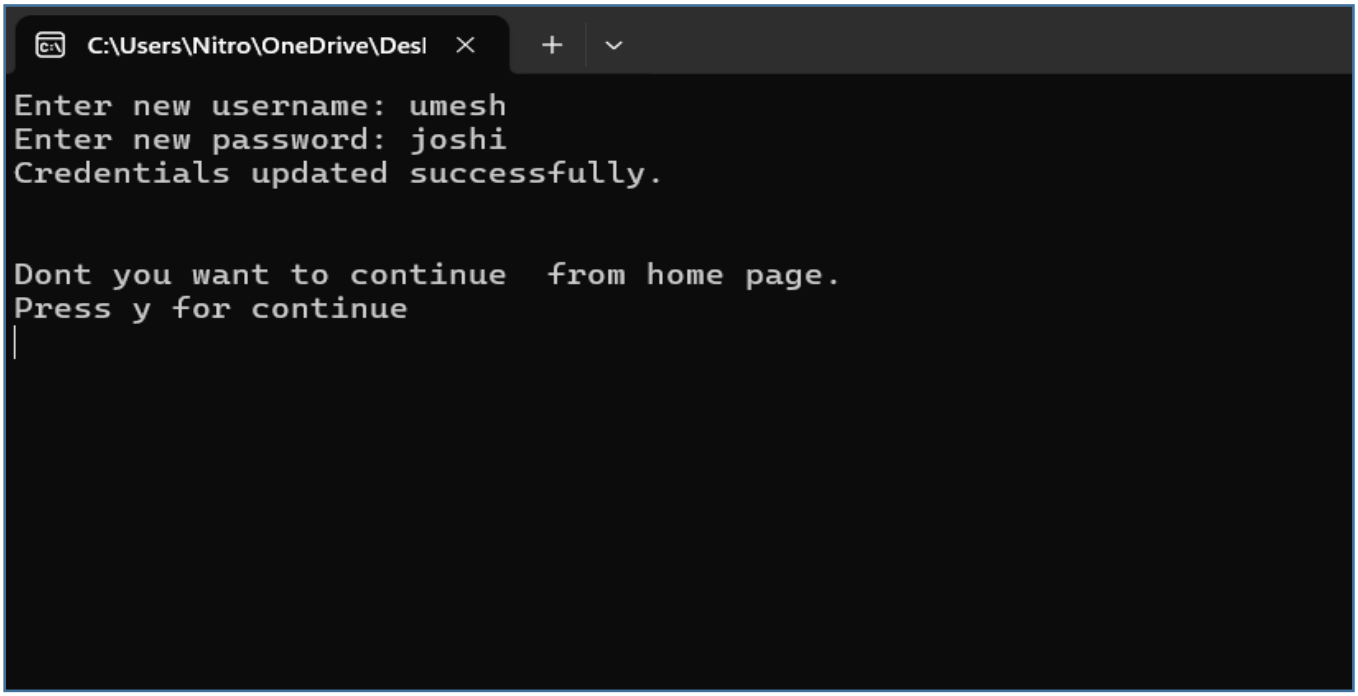

Figure 8: Change setting page

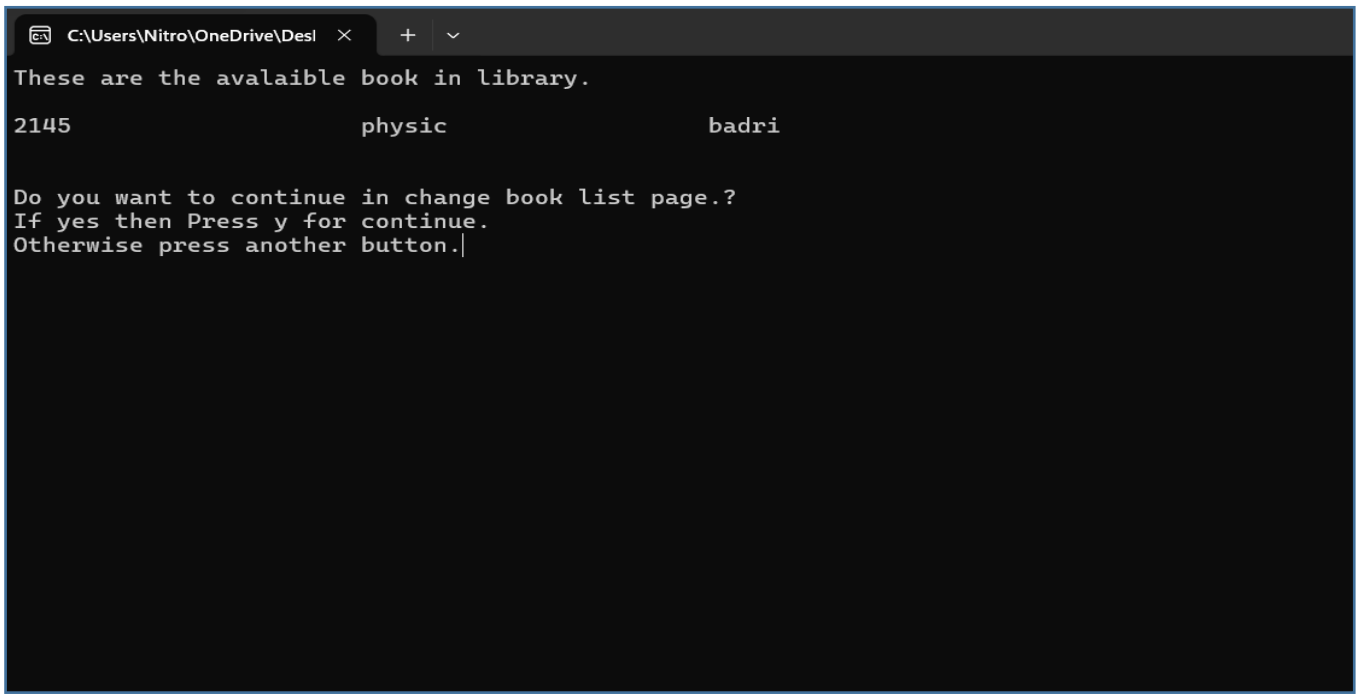

Figure 9: Book see page

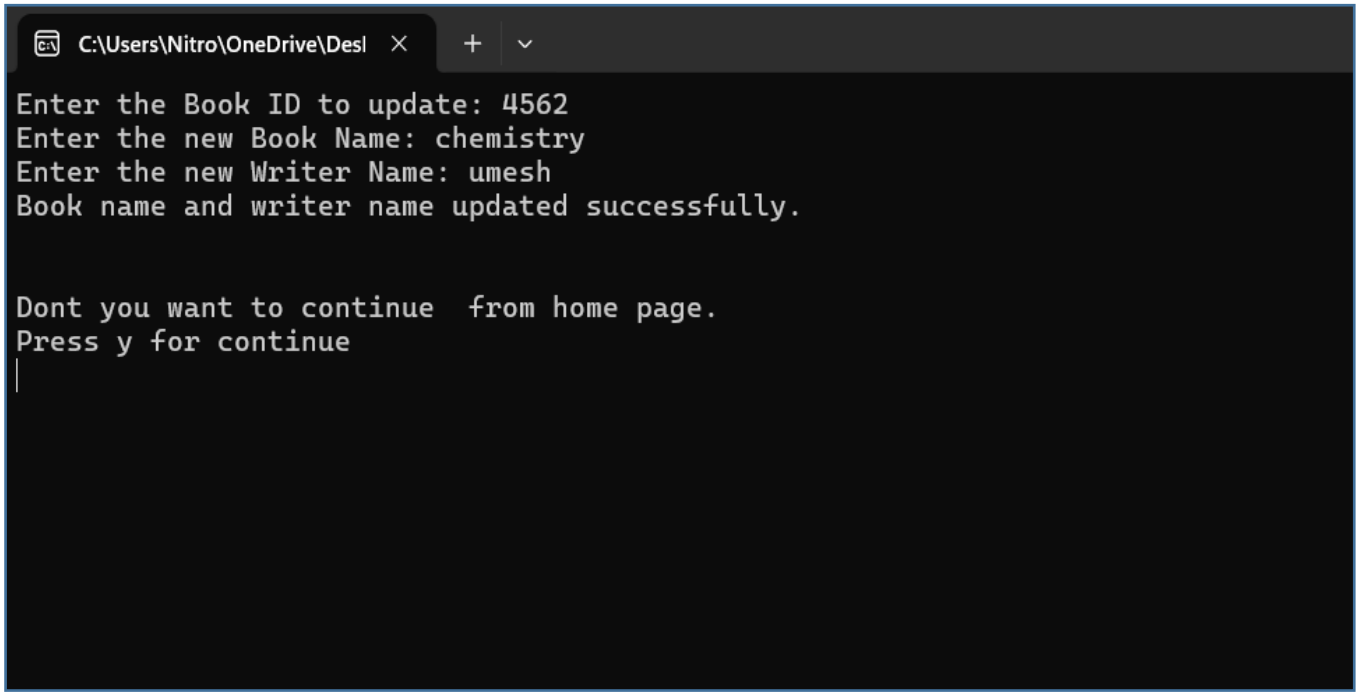

Figure 10: Update book page

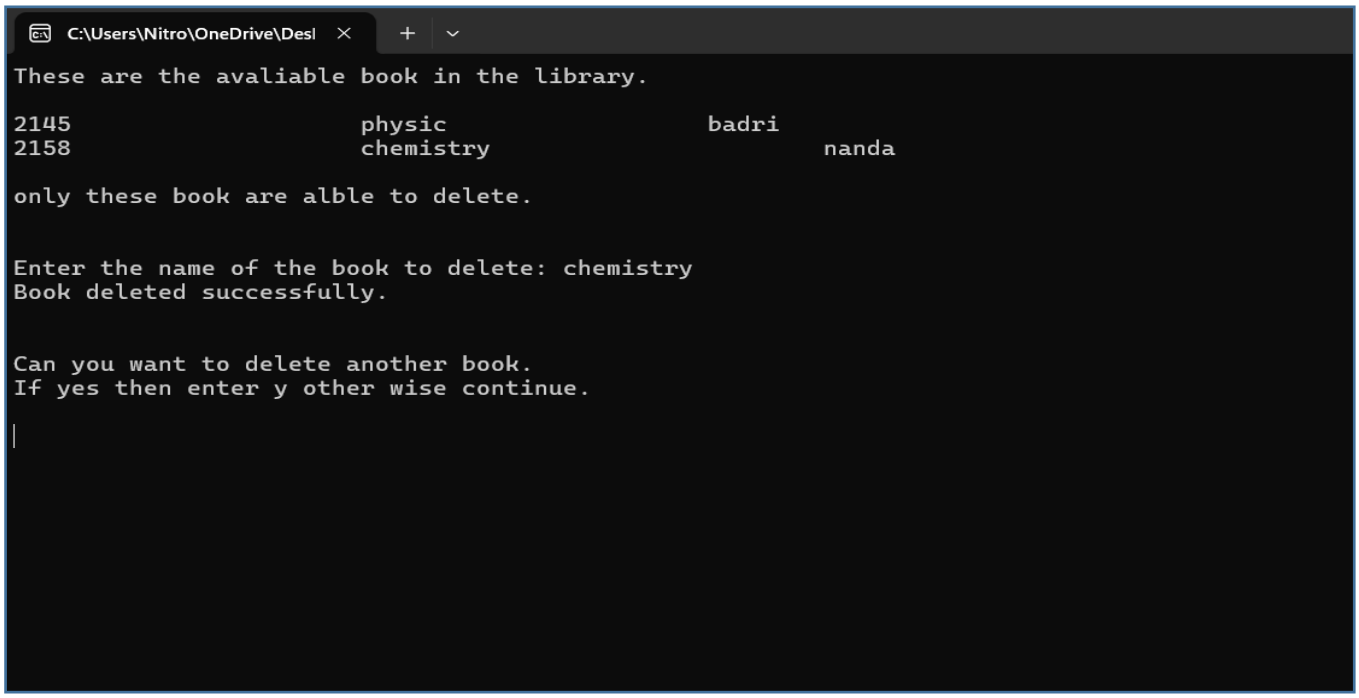

Figure 11: Delete book page

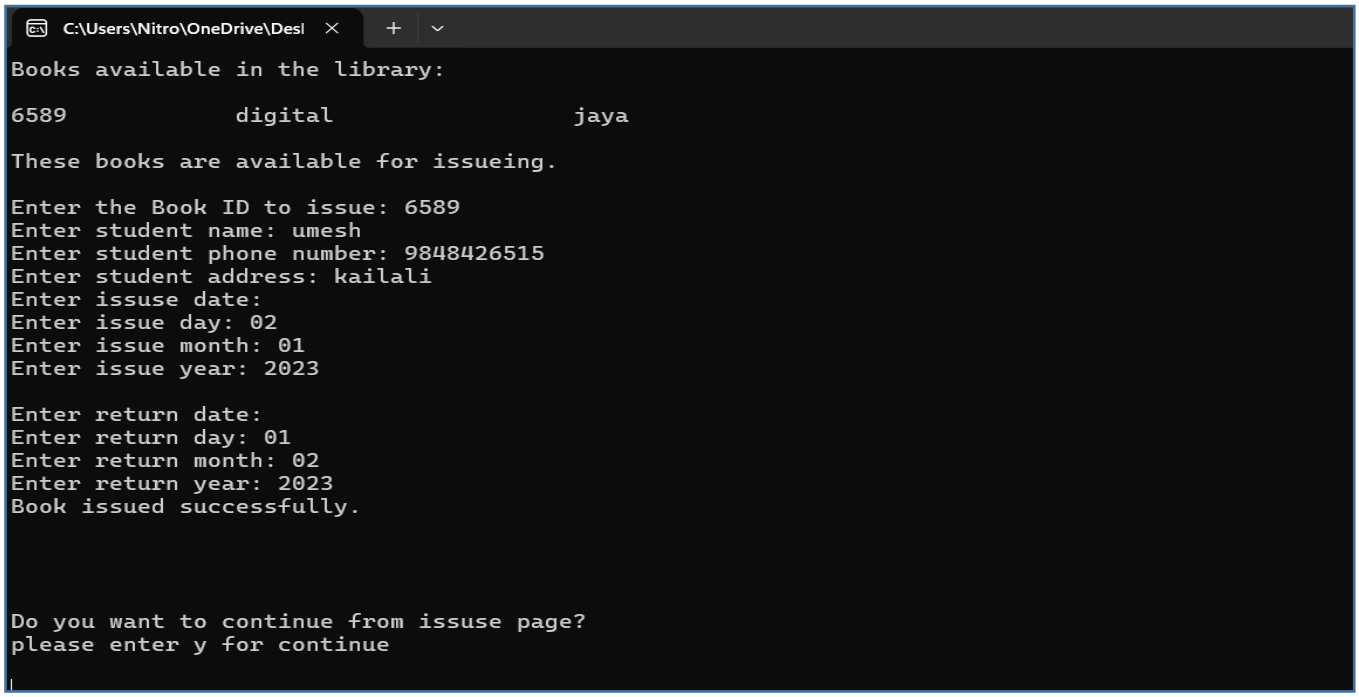

Figure 12: Issue book page

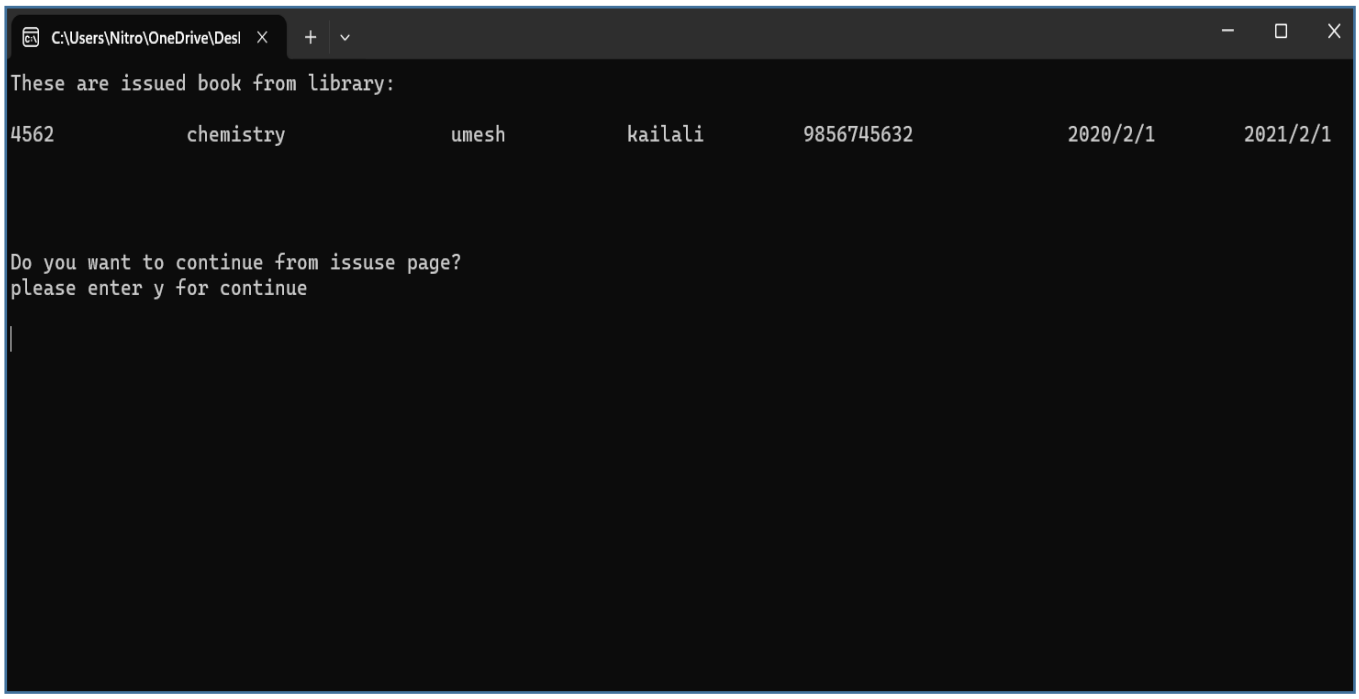

Figure 13: See issue book page

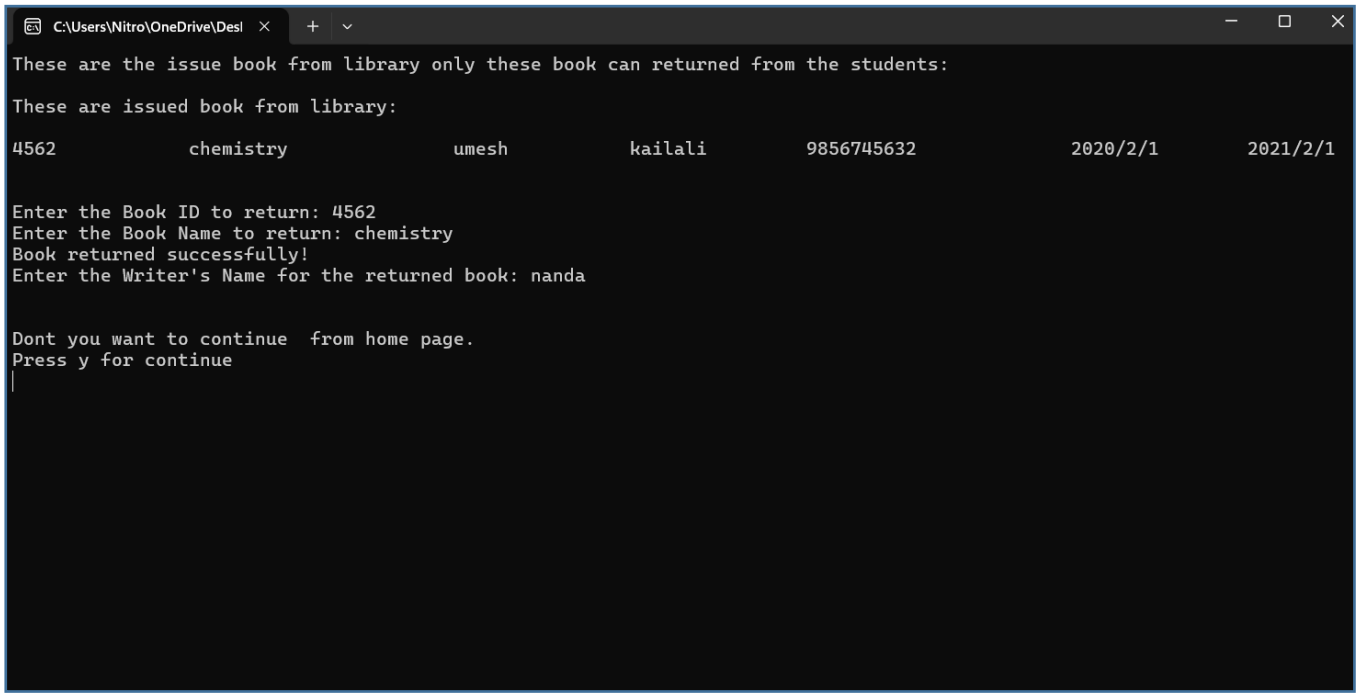

Figure 14: Return book page

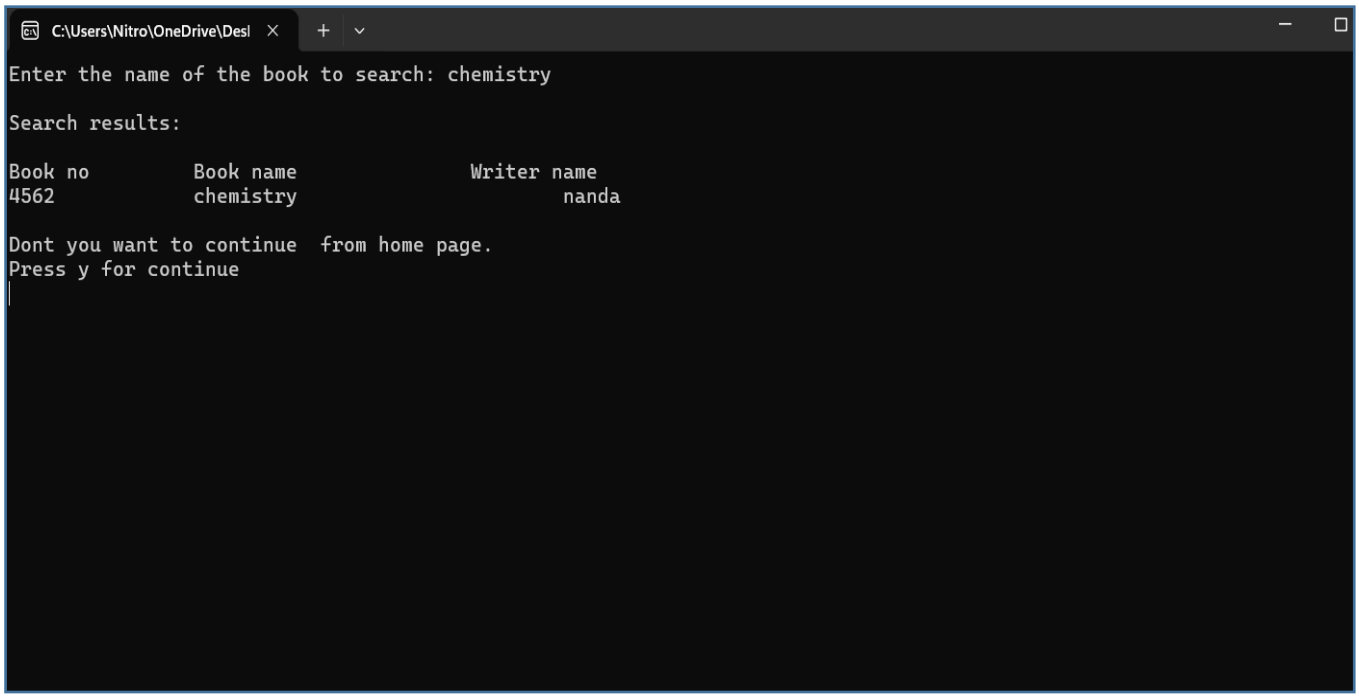

Figure 15: Search book page

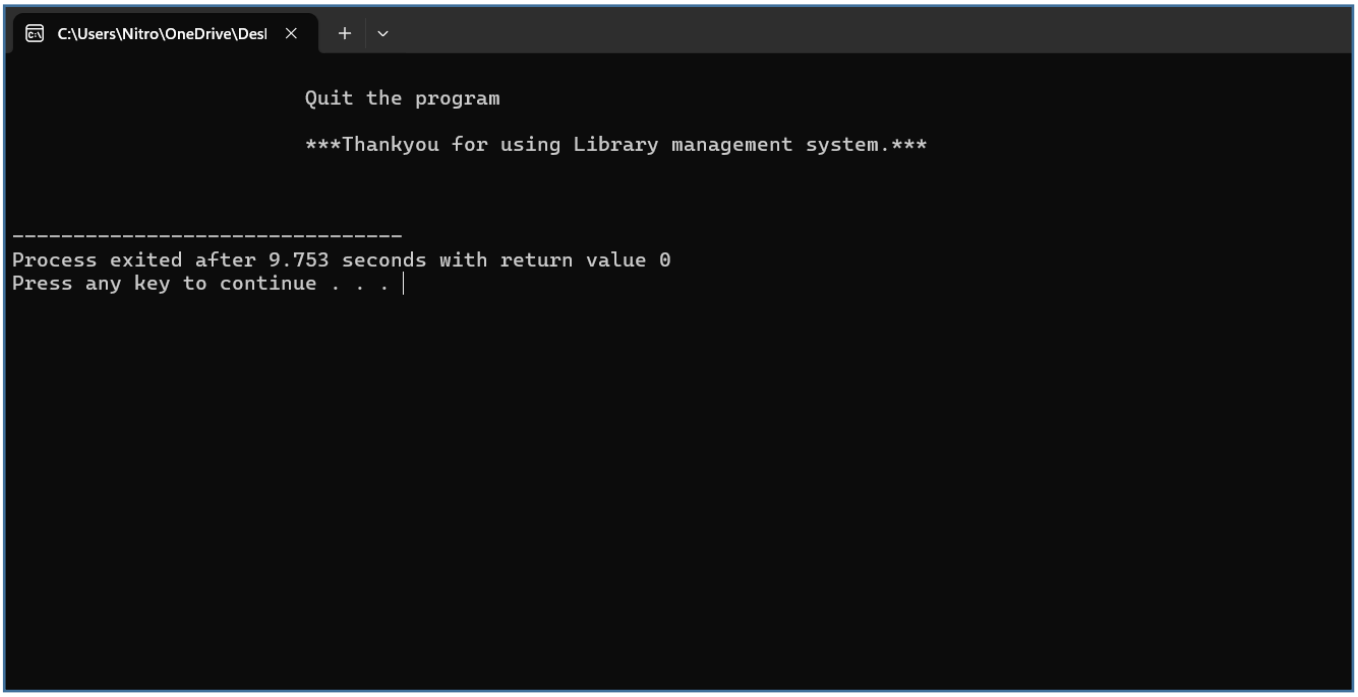

Figure 16: Exit page