Dr. D. Y. Patil Pratishthan's College of Engineering
Salokhenagar, Kolhapur

2023-2024

DEPARTMENT OF COMPURET SCIENCE & ENGINEERING (DATA SCIENCE)

A PROJECT REPORT ON

"LIBRARY MANAGEMENT"

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Dr. D. Y. Patil Pratishthan's College of Engineering, Salokhenagar, Kolhapur

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

(DATA SCIENCE)

CERTIFICATE

Certified that the Project topic entitled "LIBRARY MANAGEMENT" a bonafide work carried out by,

Bhumika Sandip Patil (48)

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in partial fulfilment for the award of Degree of Bachelor of Engineering in 4th semester of the **SHIVAJI UNIVERSITY, KOLHAPUR** during the year **2022-2023**. It is certified that all correction/suggestion indicated for Internal Assessment have been incorporated in the report deposited in the Department Library. The Project report has been approved as it satisfies the Academic requirement in respect of Project work prescribed for **BACHELOR OF ENGINEERING DEGREE**.

Mrs. BHAGYASHRI JADHAV	Dr.S.D. MANE
(Guide & HOD)	(Principal)

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ABSTRACT

The Library System Management Project aims to address the inefficiencies inherent in traditional library management systems by developing a modern, integrated solution. This project encompasses the design, development, and implementation of a comprehensive library management system that automates processes, enhances user experience, and provides valuable insights for efficient library operations. Key features include cataloging, resource tracking, patron management, circulation management, and reporting functionalities. By leveraging technology and adopting best practices in library management, this project seeks to streamline operations, improve access to resources, and enhance the overall effectiveness of library services.

INTRODUCTION

A Library Management System (LMS) implemented in Python serves as a comprehensive platform for managing various aspects of library operations. At its core, an LMS facilitates the organization, storage, retrieval, and dissemination of library resources, including books, journals, multimedia materials, and digital assets.

Python's versatility allows developers to leverage a wide array of libraries and frameworks to build an LMS tailored to specific requirements.

Additionally, Python's extensive support for database integration enables efficient data management, ensuring accurate cataloging and tracking of library materials.

Key features of a Python-based LMS may include:

1. User Management
2. Error Handling
3. Circulation Management
4. Integration with External Systems

By leveraging Python's simplicity and readability, developers can build scalable and maintainable LMS solutions that meet the evolving needs of modern libraries. Whether it's a small community library or a large academic institution, a Python-based LMS offers efficiency, flexibility, and accessibility, ultimately enhancing the overall library experience for both librarians and patrons alike.

1.2 Problem Statement:

Despite advancements in technology, many libraries still struggle with outdated systems and processes, leading to inefficiencies in managing resources, patron services, and administrative tasks. These challenges include manual cataloguing, difficulty in tracking borrowed materials, inadequate patron engagement tools, and lack of real-time data for decision-making. As a result, librarians spend excessive time on administrative tasks, patrons face difficulties in accessing and locating resources, and the library's overall effectiveness is hindered. Therefore, there is a pressing need for a modern, integrated library management system that automates processes, enhances user experience, and provides actionable insights for efficient library operations.

OBJECTIVE

The main objective of the Project on Library Management System is to manage the details of Student, Books, Issues, Librarian, Member. It manages all the information about Student, Address of Member as well as Student. The project is totally built at administrative end and thus only the administrator is guaranteed the access. The purpose of the project is to build a web-based application program to reduce the manual work for managing the Student, Books, Address, Issues. It tracks all the details about the Issues, Librarian, Member, etc.

1. The objectives of a library management system is to operate a library with efficiency and at reduced costs. The system being entirely automated streamlines all the tasks involved in operations of the library.
2. The activities of book purchasing, cataloging, indexing, circulation recording and stock checking are done by the software. Such software eliminates the need for repetitive manual work and minimizes the chances of errors.
3. The library management system software helps in reducing operational costs. Managing a library manually is labor intensive and an immense amount of paperwork is involved. An automated system reduces the need for manpower and stationery. This leads to lower operational costs.
4. The system saves time for both the user and the librarian. With just a click the user can search for the books available in the library. The librarian can answer queries with ease regarding the availability of books.

5. Adding, removing or editing the database is a simple process. Adding new members.
6. Stock checking and verification of books in the library can be done within a few hours. The automated system saves a considerable amount of time as opposed to the manual system.
7. The library management system soft cancelling existing memberships can be done with ease. 11ware makes the library a smart one by organizing the books systematically by author, title and subject. This enables users to search for books quickly and effortlessly.
8. Students need access to authentic information. An advanced organized library is an integral part of any educational institution.
9. In this digital age a web-based library management system would be ideal for students who can access the library's database on their smartphones.
10. The main objective of the Project of Library Management System is to manage the details of users as well as books.

PROPOSED SYSTEM

3.1 Proposed Work:

1. Existing system does not have any facility of teacher's login or student login whereas proposed system will have a facility of student login as well as teacher's login

2. Existing system does not have a facility of online reservation of books whereas proposed system has a
   a. facility of online reservation of books

3. Existing system does not have any facility of online notice board where description of workshops happening in our college as well as nearby colleges is being provided.

4. Existing system does not has any option of lectures notes uploaded by teachers whereas proposed system will have this facility.

5. Existing system does not have any facility to generate student reports as well book issue reports whereas proposed system provides librarian with a tool to generate reports

6. Existing system does not has any facility for book request and suggestions where as in proposed system after logging in to their accounts student can request books as well as provide suggestions to improve library.

3.2 Software tools used:

- **Project Category:**

The whole project is based on the **Python** language.

Python:

Python is a general-purpose programming language that is used in a wide variety of applications, including library management systems. Python is well-suited for this task because it is a powerful and versatile language that is relatively easy to learn. Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed.

The Python installers for the Windows platform usually include the entire standard library and often also include many additional components. For Unix-like operating systems Python is normally provided as a collection of packages, so it may be necessary to use the packaging tools provided with the operating system to obtain some or all of the optional components.

Here are some of the benefits of using Python for library management system:

1. Easy to learn: Python is a relatively easy language to learn, even for beginners. This makes it a good choice for libraries that do not have a lot of programming experience.

2. Powerful: Python is a powerful language that can be used to create complex and sophisticated library management systems.

3. Versatile: Python is a versatile language that can be used to create a wide variety of library management systems, from simple systems to complex systems with a lot of features.

4. Open source: Python is an open-source language, which means that it is free to use and distribute. This makes it a good choice for libraries that are on a budget.

Here are some of the features that a Python-based library management system might have:

1. Book catalog: The system can store information about books, such as the title, author, publisher, and ISBN.

2. Member database: The system can store information about library members, such as their name, address, and phone number.

3. Book checkout: The system can allow members to check out books.

4. Book return: The system can allow members to return books.

5. Book renewal: The system can allow members to renew books.

6. Fine calculation: The system can calculate fines for overdue books.

- **Modules:**

Our project contains four modules

1. Add books : This model is responsible for adding a book in the display model, a user can add books using number "1" as a command.
2. Display books : In this module the list of all the books available to the user is kept. A user can add books using "2" as a command.
3. Borrow book: This model is responsible in borrowing any book to the user based on the corresponding index of the book entered by the user. A user can add books using "3" as a command.
4. Return books: This model is used to return the book to the library. Using the number "4" the user can add a book to the display model of the library.
5. Exit: Exit the program.

- **Algorithm:**

Step 1: Begin

Step 2: Display the menu of choices user can opt for.

Step 2: Take user input for choices as a number.

Step 3: Take user input as a name of the book.

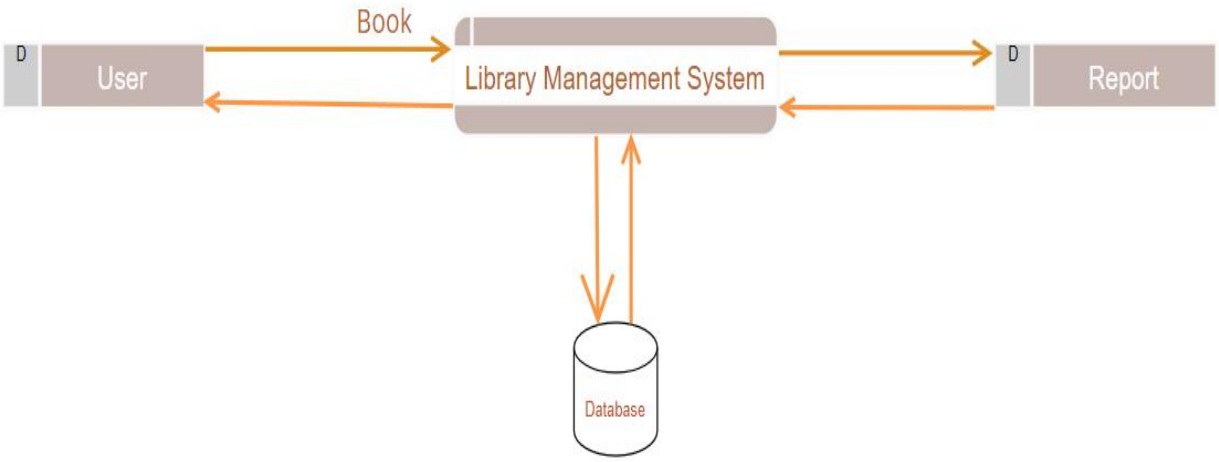
Step 4: Enter the number of books as user wants.

Step 5: Display the appropriate result of the user choices.

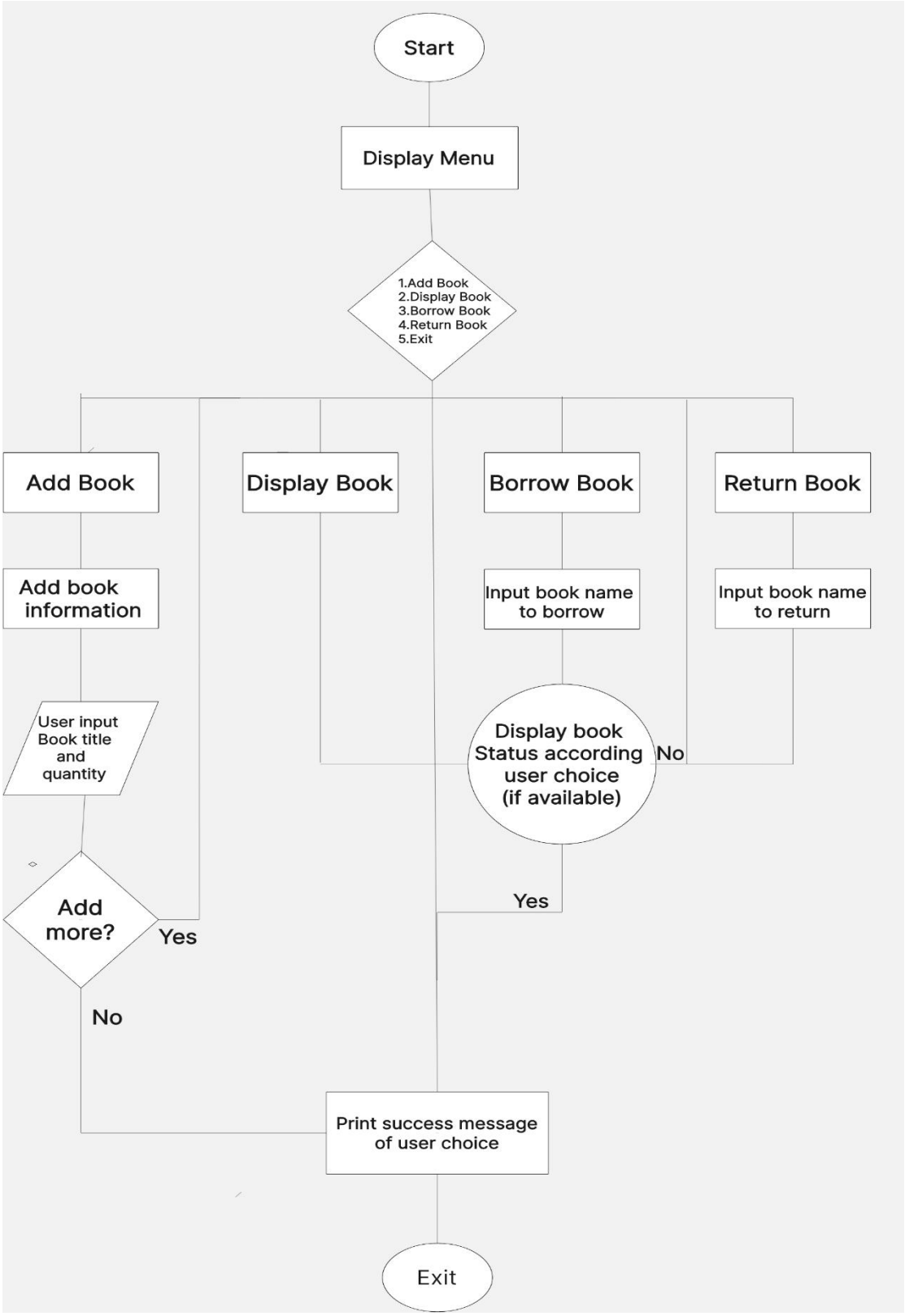
Step 6: If an invalid choice is entered, notify user to enter a valid option the go to Step 2. If it is valid the go to Step 7.

Step 7. Exit.

Architecture



FLOWCHART

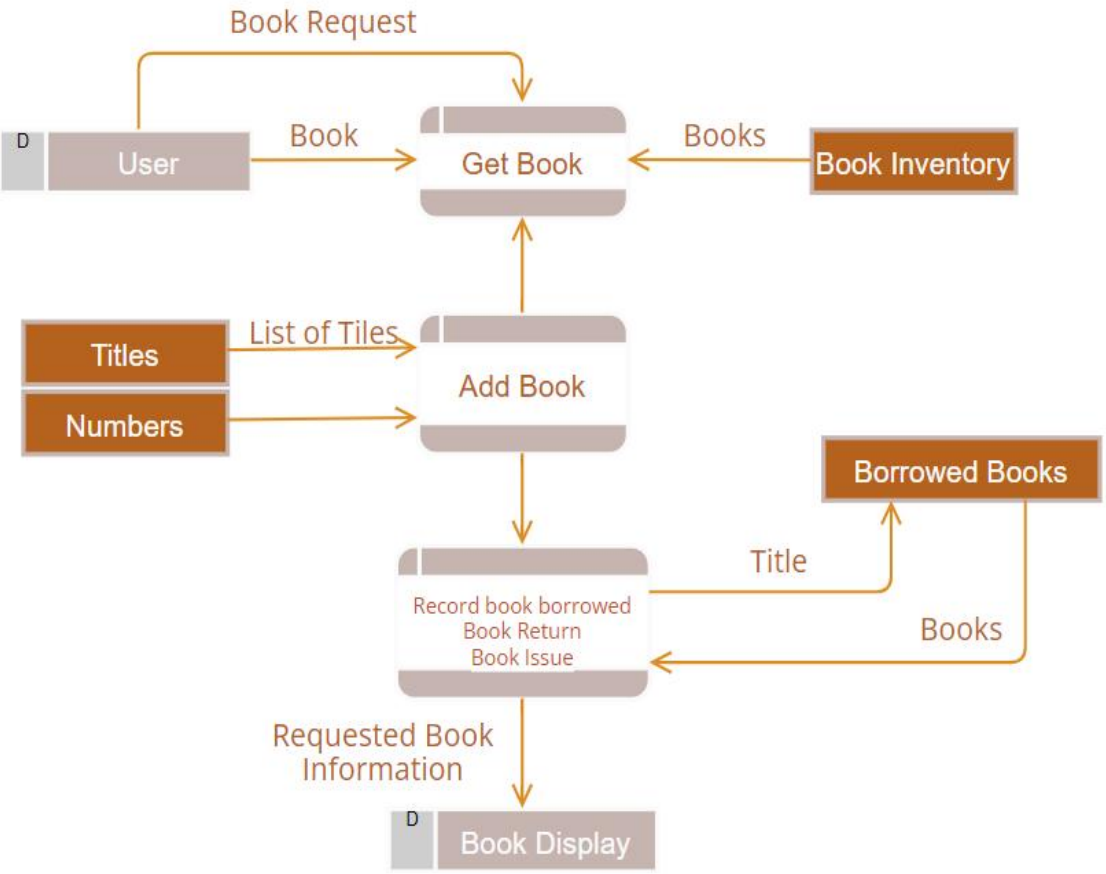

Start
Display Menu
1.Add Book
2.Display Book
3.Borrow Book
4.Return Book
5.Exit
Add Book
Display Book
Borrow Book
Return Book
Add book information
Input book name to borrow
Input book name to return
User input Book title and quantity
Display book Status according user choice (if available)
No
Add more?
Yes
Yes
No
Print success message of user choice
Exit

SYSTEM DESIGN

- **Data Flow Diagram (DFD):**

1.Level 0 DFD:

2.Level 1 DFD:



SYSTEM ANALYSIS

4.1 System Requirements:

1. Preliminary Investigation:

The first step in the System Development Life Cycle (SDLC) is the identification of the need. This is the user request to change, improve or enhance an existing system. Because there is likely to be a stream of such requests, standard procedures must be established to deal with them. The initial investigation is one way of this solutions. In this process, the development team visit the customer and studies their system. They investigate the need for possible software automation of the given system by the end of the preliminary investigation. Our project furnish the document that hold the different recommendation of the needs of the user.

2. Present System In Use:

Present system comprises all the information related to books such as book name, author and edition. Current system also contains information about the students and books. It contains registration option to users. Without registration nobody can use this system.

3. Flaws In Present System:

Present system has various limitations. Present System is difficult to use. User interface not shown properly. Fast report generations is not possible. Tracing a book is difficult. Security issues occurring sometimes. Information about issue or return of the book books are not properly maintained.

4.Need For New System:

A current system is not compatible because the current system is a bit complicated to use. The new system is designed to be easy for the user to use. Admin can get all the information about books and students according to the new system. The new system includes student's mobile number, issuing and borrowing date of the books, fine if the student does not return the book within the given period, etc. The aim of new system is to develop a system of improved facilities. The new system can overcome all the limitations of the existing system.

4.2 Hardware Requirements:

Hardware is a term that refers to all the physical parts that make up a computer. The internal hardware devices that make up the computer. Various devices which are essentials to form a hardware is called as components.

Following are the hardware specifications that is required to develop this project is as follows:

1. Computer components like Monitor, Keyboard, Mouse, CPU.
2. Minimum 8 GB RAM for smooth working of application.
3. 250 GB Hard Disk or More. CD ROM Drive.
4. The processor will up to 15 GB minimum.

4.3 Software Requirements:

Computer software, or simply software, is a collection of data or computer instructions that tell the computer how to work. This is in contrast to physical hardware, from which the system is build and actually performs the work.

Operating System:

Windows10: - Windows10 is used as the operating system as it is stable and supports more features and is more user friendly.

SYSTEM IMPLEMENTATION

- **Implementation:**

The design of a management information system may seem to management to be an expensive project, the cost of getting the MIS on line satisfactorily may often be comparable to that of its design, and the implementation has been accomplished when the outputs of the MIS are continuously utilized by decision makers. Once the design has been completed, there are four basic methods for implementing the MIS.

These are following:

1. Install the system in a new operation or organization.
2. Cut off the old system and install the new:

This produces a time gap during which no system is in operation. Practically, installation requires one or two days for small companies or small systems.

1. Cut over by segments:

This method is also referred as" phasing in" the new system. Small parts or subsystems are substituted for the old. In the case of upgrading old systems, this may be a very desirable method.

4. Operate in parallel and cut over:

The new system is installed and operated in parallel with the current system until it has been checked out, then only the current system is cut out. This method is expensive because of personal and related costs. Its big advantages are that the system is fairly well debugged when it becomes the essential information system.

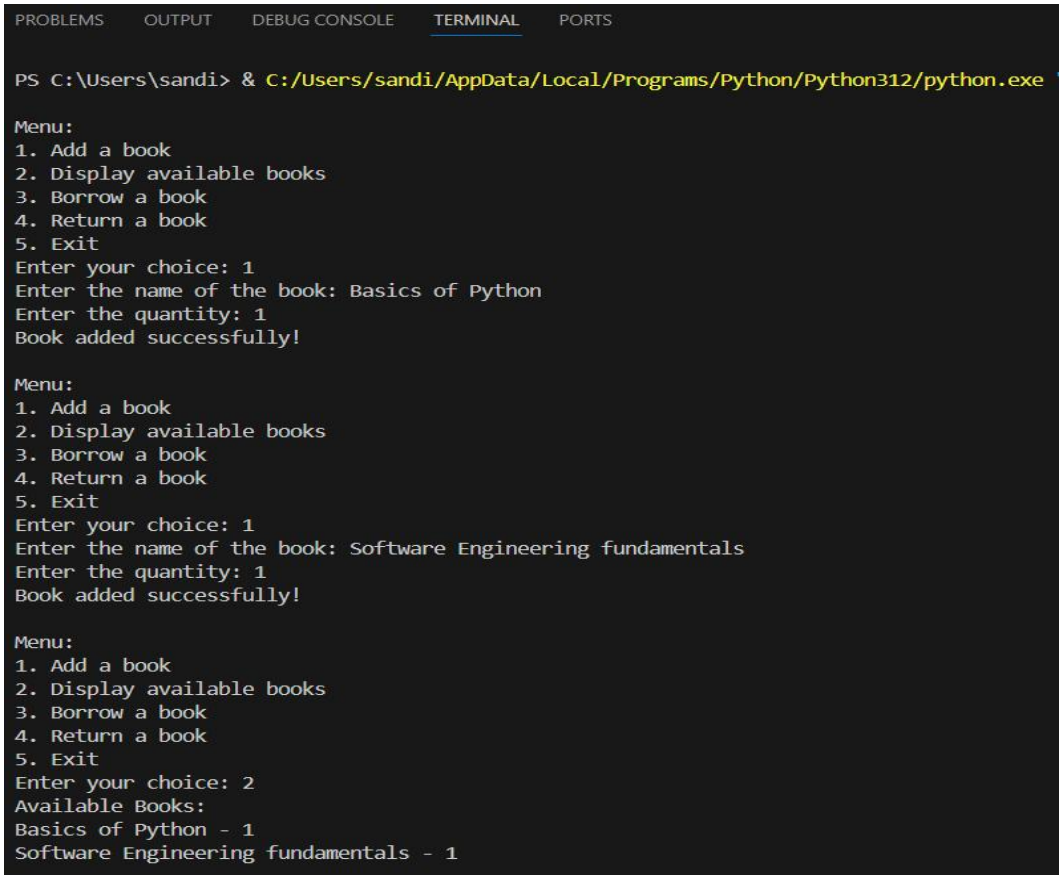
- **Evaluation:**

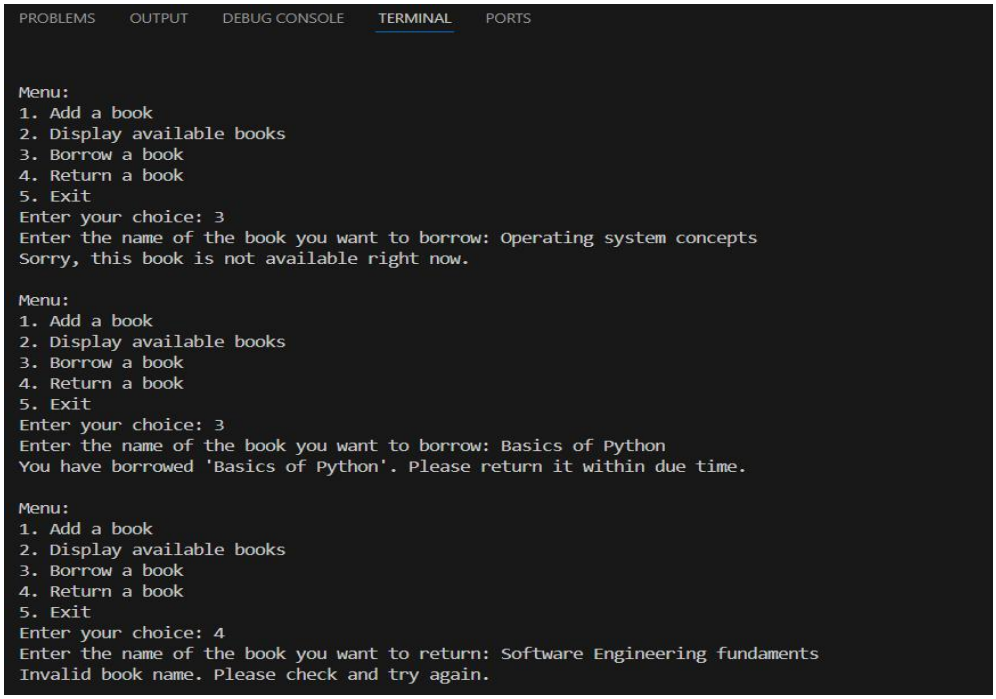
After the MIS has been operating smoothly for a short period of time, an evaluation of each step in the design and of the final system performance should be made. Evaluation should not be delayed beyond the time when the system's analysts have completed most of the debugging. The longer the delay, the more difficult it will be for designer to remember important details. The evaluation should be made by the customer as well as by the designers.

- **Maintenance:**

Control and maintenance of the system are the responsibilities of the line managers. Control of the systems means the operation of the system as it was designed to operate. Sometimes, well-intentioned people or operators may make unauthorized changes to improve the system, changes that are not approved or documented. Maintenance is closely related to control. Maintenance is that ongoing activity that keeps the MIS at the highest levels of effectiveness and efficiency within cost constraints. Maintenance is directed towards reducing errors due to design, reducing errors due to environmental changes and improving the system's scope and services.

- **SNAP SHOTS:**


PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\sandi> & C:/Users/sandi/AppData/Local/Programs/Python/Python312/python.exe
Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 1
Enter the name of the book: Basics of Python
Enter the quantity: 1
Book added successfully!
Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 1
Enter the name of the book: Software Engineering fundamentals
Enter the quantity: 1
Book added successfully!
Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 2
Available Books:
Basics of Python - 1
Software Engineering fundamentals - 1


PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 3
Enter the name of the book you want to borrow: Operating system concepts
Sorry, this book is not available right now.
Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 3
Enter the name of the book you want to borrow: Basics of Python
You have borrowed 'Basics of Python'. Please return it within due time.
Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 4
Enter the name of the book you want to return: Software Engineering fundaments
Invalid book name. Please check and try again.

```
Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 4
Enter the name of the book you want to return: Software Engineering fundamentals
Thank you for returning 'Software Engineering fundamentals'.

Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 5
Thank you for using the library management system. Goodbye!
PS C:\Users\sandi>
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

PS C:\Users\sandi\OneDrive\Desktop\Python> & C:/Users/sandi/AppData/Lo
ocuments/Library _management/library.py"

Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 4
Enter the name of the book you want to return: Software Engineering
Invalid book name. Please check and try again.

Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 1
Enter the name of the book: Python for Data Science
Enter the quantity: 2
Book added successfully!
```

```
Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 2
Available Books:
Python for Data Science - 2

Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 3
Enter the name of the book you want to borrow: Python for Data Science
You have borrowed 'Python for Data Science'. Please return it within due time.
```

```
Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 4
Enter the name of the book you want to return: Python for Data Science
Thank you for returning 'Python for Data Science'.

Menu:
1. Add a book
2. Display available books
3. Borrow a book
4. Return a book
5. Exit
Enter your choice: 5
Thank you for using the library management system. Goodbye!
PS C:\Users\sandi\OneDrive\Desktop\Python>
```

FUTURE SCOPE OF PROJECT

Our web-based application “Library Management System” which provides complete information about Users and books. We will add more content on them in future. In our web-based application right now, only Books and Users with their information available but in future we will add Online Lectures, Links, etc.

We will also provide more images in GUI related to our web-based application in future. We will try to find out more about this topic and add in future. We will try to make this application more attractive so that visitor cannot get bored while using it. We will provide login id to each and every user so that he can access our website from anywhere through log in id and password. In future we add some major facilities like Reservation of Book.

CONCLUSION

Library Management System allows the user to store the book details and the customer details. This software package allows storing the details of all the data related to library. The system is strong enough to withstand regressive yearly operations under conditions where the database is maintained and cleared over a certain time of span. The implementation of the system in the organization will considerably reduce data entry, time and also provide readily calculated reports.

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