

LIBRARY MANAGEMENT SYSTEM

A MINI-PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this project “**LIBRARY MANAGEMENT SYSTEM**” is the bonafide work of “**PONSURABHI V**” who carried out the project work under my supervision.

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INTERNAL EXAMINER

EXTERNAL EXAMINER

ABSTRACT

The Library Management System is a database-driven application designed to streamline and automate library operations. This system enables users to view, issue, return, and search books efficiently while maintaining accurate records of members and transactions. Built using Python (CustomTkinter for GUI) and MySQL as the backend, this project demonstrates how databases can be integrated with real-world applications to ensure data consistency, accessibility, and reliability. The system includes functionalities such as viewing available books, issuing and returning books, searching for books, managing members, and tracking overdue items.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The Library Management System automates daily tasks like managing books, members, and transactions. Built with Python (CustomTkinter) and MySQL, it replaces manual records with a secure, efficient, and user-friendly interface for issuing, returning, and searching books..

1.2 SCOPE OF THE WORK

This project offers a complete solution for small to medium-sized libraries by digitalizing all records. It automates the management of books and members, enables quick searches, tracks issued and returned books, and minimizes manual errors. The system is scalable and can be upgraded with additional features like online access and fine calculation.

1.3 PROBLEM STATEMENT

Traditional library systems depend on manual recordkeeping, which often results in mismanagement, human errors, and time-consuming operations. A computerized system is necessary to store, update, and retrieve records efficiently and provide real-time data access.

1.4 AIM AND OBJECTIVES OF THE PROJECT

The main aim of this project is to design a user-friendly system that automates and simplifies the management of library operations. It securely stores and manages book and member information, automates the issuing, returning, and searching of books, maintains accurate transaction records, and improves overall efficiency while minimizing human errors.

CHAPTER 2

SYSTEM SPECIFICATIONS

2.1 HARDWARE SPECIFICATIONS

Processor	:	Intel i5
Memory Size	:	8GB (Minimum)
HDD	:	1 TB (Minimum)

2.2 SOFTWARE SPECIFICATIONS

Operating System	:	WINDOWS 10 or higher
Front – End	:	Python(CustomTkinter)
Back - End	:	MySQL database
Language	:	Python 3
Libraries	:	Python libraries (mysql-connector, tkinter)
Tools used	:	MySQL Workbench, VS Code

CHAPTER 3

MODULE DESCRIPTION

This application is designed with two main modules that define how different types of users interact with the system. Instead of using a login window, the system operates through two access modes: **Administrator Mode** and **User Mode**. Each mode has its own set of responsibilities and functionalities, ensuring smooth operation and proper data handling.

1. Administrator Mode

This mode is designed for the project maintainer. The administrator can update, modify, or manage the data stored in the system. All database-related operations such as adding, deleting, and editing records are handled in this module.

2. User Mode

In this mode, the user interacts with the application by entering the number of symptoms. Based on the input, the system processes the data and displays the result in a structured table format.

CHAPTER 4

SAMPLE CODING

FRONTEND CODE

```
import customtkinter as ctk

from tkinter import messagebox

from backend import (

    get_available_books, get_issued_books, search_books,

    issue_book, return_book, get_members

)


def clear_frame(main_frame):    for widget in

main_frame.winfo_children():

    widget.destroy()


def display_table(parent, headers, rows):
```

```
table_frame = ctk.CTkScrollableFrame(parent, fg_color="white")
table_frame.pack(pady=10, padx=20, fill="both", expand=True)
```

```
for i, header in enumerate(headers):
```

```
    label = ctk.CTkLabel(table_frame, text=header, font=("Helvetica",
15, "bold"), text_color="#005f73")
```

```
    label.grid(row=0, column=i, padx=15, pady=10)
```

```
for r_index, row in enumerate(rows, start=1):
```

```
for c_index, value in enumerate(row):
```

```
    label = ctk.CTkLabel(table_frame, text=value,
font=("Helvetica", 13))
```

```
    label.grid(row=r_index, column=c_index, padx=15, pady=6)
```

```
def create_card(parent, title, desc, button_text, command):
```

```
    frame = ctk.CTkFrame(parent, corner_radius=15, fg_color="white")
```

```
    frame.pack_propagate(False)
```

```
    frame.configure(width=280, height=180)
```

```

title_label = ctk.CTkLabel(frame, text=title, font=("Helvetica", 17,
"bold"), text_color="#005f73")

title_label.pack(pady=(15, 5))


desc_label = ctk.CTkLabel(frame, text=desc, font=("Helvetica", 13),
text_color="black", wraplength=220)

desc_label.pack(pady=(0, 10))


btn = ctk.CTkButton(frame, text=button_text, width=100, height=30,
fg_color="#0a9396",

                    hover_color="#007f7b", command=command)

btn.pack(pady=(5, 10))

return frame

```

```

def available_books_page(main_frame, back_to_home):

    clear_frame(main_frame)

    ctk.CTkLabel(main_frame, text=" Available Books",

```

```
font=("Helvetica", 22, "bold")).pack(pady=15)
```

```
rows = get_available_books()
```

```
display_table(main_frame, ["Book ID", "Title", "Author", "Genre",  
"Year"], rows)
```

```
ctk.CTkButton(main_frame, text="← Back to Home",  
fg_color="#0a9396", command=back_to_home).pack(pady=20)
```

```
def issued_books_page(main_frame, back_to_home):
```

```
    clear_frame(main_frame)
```

```
    ctk.CTkLabel(main_frame, text=" Issued Books", font=("Helvetica",  
22, "bold")).pack(pady=15)
```

```
    rows = get_issued_books()
```

```
    display_table(main_frame, ["Issue ID", "Book Title", "Member  
Name", "Issue Date", "Due Date"], rows)
```

```
    ctk.CTkButton(main_frame, text="← Back to Home",  
fg_color="#0a9396", command=back_to_home).pack(pady=20)
```

```
def search_books_page(main_frame, back_to_home):  
    clear_frame(main_frame)
```

```

    ctk.CTkLabel(main_frame, text=" Search Books", font=("Helvetica",
22, "bold")).pack(pady=10)

```

```

search_frame = ctk.CTkFrame(main_frame)

```

```

search_frame.pack(pady=10)

```

```

    search_entry = ctk.CTkEntry(search_frame, width=300,
placeholder_text="Enter title or author...")

```

```

search_entry.grid(row=0, column=0, padx=10)

```

```

result_frame = ctk.CTkFrame(main_frame)

```

```

result_frame.pack(fill="both", expand=True, pady=10)

```

```

def search_action():      for widget in

```

```

result_frame.winfo_children():

```

```

    widget.destroy()

```

```

    term = search_entry.get().strip()

```

```

    if not term:

```

```

        messagebox.showwarning("Empty", "Please enter a search
term.")

    return

    rows = search_books(term)

    display_table(result_frame, ["Book ID", "Title", "Author",
"Genre", "Year"], rows)


    ctk.CTkButton(search_frame, text="Search", fg_color="#0a9396",
command=search_action).grid(row=0, column=1, padx=10)

    ctk.CTkButton(main_frame, text="← Back to Home",
fg_color="#0a9396", command=back_to_home).pack(side="bottom",
pady=20)


def issue_book_page(main_frame, back_to_home):

    clear_frame(main_frame)

    ctk.CTkLabel(main_frame, text=" Issue Book", font=("Helvetica",
22, "bold")).pack(pady=15)


    frame = ctk.CTkFrame(main_frame)

    frame.pack(pady=20)

```

```

    book_entry = ctk.CTkEntry(frame, width=200,
placeholder_text="Book ID")

    book_entry.grid(row=0, column=0, padx=10)

    member_entry = ctk.CTkEntry(frame, width=200,
placeholder_text="Member ID")

    member_entry.grid(row=0, column=1, padx=10)

    def issue_action():

        success, msg = issue_book(book_entry.get(), member_entry.get())

        if success:

            messagebox.showinfo("Success", msg)

        else:

            messagebox.showwarning("Error", msg)

    ctk.CTkButton(frame, text="Issue", fg_color="#0a9396",
command=issue_action).grid(row=1, column=0, columnspan=2,
pady=10)

    ctk.CTkButton(main_frame, text="← Back to Home",
fg_color="#0a9396", command=back_to_home).pack(side="bottom",
pady=20)

```

```
def return_book_page(main_frame, back_to_home):

    clear_frame(main_frame)

    ctk.CTkLabel(main_frame, text="🔄 Return Book",
font=("Helvetica", 22, "bold")).pack(pady=15)

    frame = ctk.CTkFrame(main_frame)

    frame.pack(pady=20)

    entry = ctk.CTkEntry(frame, width=300, placeholder_text="Enter
Issue ID")

    entry.grid(row=0, column=0, padx=10)


def return_action():

    success, msg = return_book(entry.get())

    if success:

        messagebox.showinfo("Success", msg)

    else:

        messagebox.showwarning("Error", msg)
```

```

    ctk.CTkButton(frame, text="Return", fg_color="#0a9396",
command=return_action).grid(row=0, column=1, padx=10)

```

```

    ctk.CTkButton(main_frame, text="← Back to Home",
fg_color="#0a9396", command=back_to_home).pack(side="bottom",
pady=20)

```

```

def view_members_page(main_frame, back_to_home):

```

```

    clear_frame(main_frame)

```

```

    ctk.CTkLabel(main_frame, text="View Members", font=("Helvetica",
22, "bold")).pack(pady=20)

```

```

    rows = get_members()

```

```

    if rows:

```

```

        display_table(main_frame, ["Member ID", "Name", "Email",
"Phone"], rows)

```

```

    else:

```

```

        ctk.CTkLabel(main_frame, text="No members found.",
font=("Helvetica", 14)).pack(pady=20)

```

```

    ctk.CTkButton(main_frame, text="← Back to Home",
fg_color="#0a9396", command=back_to_home).pack(side="bottom",
pady=20)

```

BACKEND CODE

```

import mysql.connector

```

```

def connect_db():

```

```

    return mysql.connector.connect(

```

```

        host="localhost",

```

```

        user="root",

```

```

        password="Angelin@2006",

```

```

        database="library_db"

```

```

    )

```

```

def get_available_books():

```

```

    conn = connect_db()

```

```

    cur = conn.cursor()

```

```

    cur.execute("""

```

```
SELECT book_id, title, author, genre, year

FROM books

WHERE book_id NOT IN (SELECT book_id FROM issued_books
WHERE return_date IS NULL)

""")

rows = cur.fetchall()

conn.close()

return rows


def get_issued_books():

conn = connect_db()

cur = conn.cursor()

cur.execute("""

SELECT i.issue_id, b.title, m.name, i.issue_date, i.due_date

FROM issued_books i

JOIN books b ON i.book_id = b.book_id

JOIN members m ON i.member_id = m.member_id
```

```
WHERE i.return_date IS NULL

""")

rows = cur.fetchall()

conn.close()

return rows


def search_books(term):

    conn = connect_db()

    cur = conn.cursor()

    cur.execute("""

        SELECT book_id, title, author, genre, year

        FROM books

        WHERE title LIKE %s OR author LIKE %s

        """, (f"%{term}%", f"%{term}%"))

    rows = cur.fetchall()

    conn.close()

    return rows
```

```

def issue_book(book_id, member_id):

    conn = connect_db()

    cur = conn.cursor()

    cur.execute("SELECT * FROM issued_books WHERE book_id=%s
AND return_date IS NULL", (book_id,))

    if cur.fetchone():

conn.close()

        return False, "Book already issued."

    cur.execute("""

        INSERT INTO issued_books (book_id, member_id, issue_date,
due_date)

        VALUES (%s, %s, CURDATE(), DATE_ADD(CURDATE(),
INTERVAL 14 DAY))

        """, (book_id, member_id))

    conn.commit()

    conn.close()

```

```
return True, "Book issued successfully."
```

```
def return_book(issue_id):
```

```
    conn = connect_db()
```

```
    cur = conn.cursor()
```

```
    cur.execute("UPDATE issued_books SET return_date =  
CURDATE() WHERE issue_id = %s AND return_date IS NULL",  
(issue_id,))
```

```
    conn.commit()
```

```
    updated = cur.rowcount
```

```
    conn.close()
```

```
    if updated == 0:
```

```
        return False, "Invalid or already returned Issue ID."
```

```
    return True, "Book returned successfully."
```

```
def get_members():
```

```
    conn = connect_db()
```

```
    cur = conn.cursor()
```

```
cur.execute("SELECT member_id, name, email, phone FROM  
members")
```

```
rows = cur.fetchall()
```

```
conn.close()
```

```
return rows
```

CHAPTER 5

SCREEN SHOTS

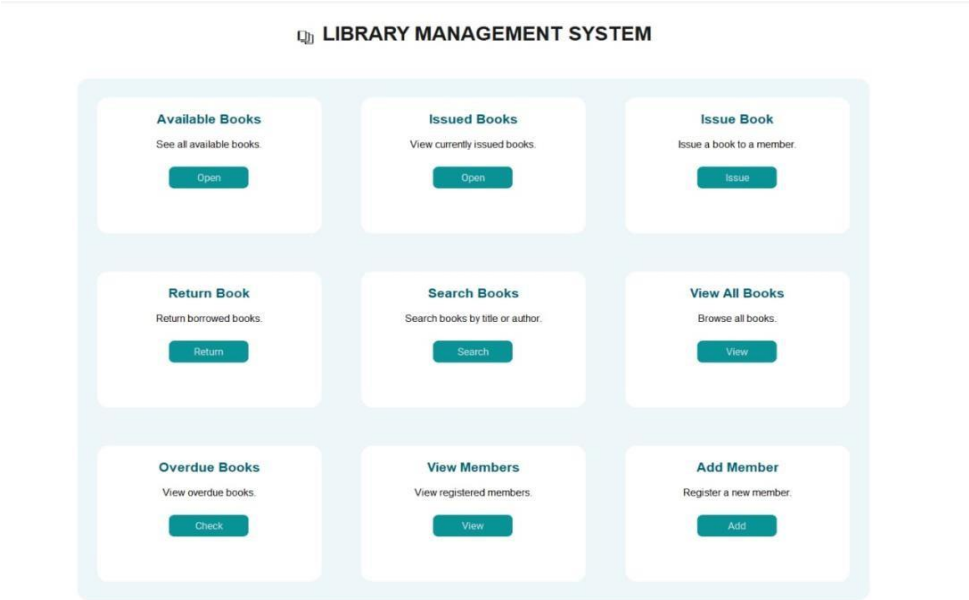


Fig 5.1 Introduction page

■ Available Books

Book ID	Title	Author	Genre	Year
1	Harry Potter and the Sorcerer's Stone	J.K. Rowling		
2	Atomic Habits	James Clear		
3	The Alchemist	Paulo Coelho		
4	Harry Potter and the Sorcerer's Stone	J.K. Rowling	Fantasy	1997
5	Atomic Habits	James Clear	Self-help	2018
6	The Alchemist	Paulo Coelho	Fiction	1988
7	To Kill a Mockingbird	Harper Lee	Classic	1960
8	1984	George Orwell	Dystopian	1949
9	Pride and Prejudice	Jane Austen	Romance	1813
10	The Great Gatsby	F. Scott Fitzgerald	Classic	1925
11	The Hobbit	J.R.R. Tolkien	Fantasy	1937
12	The Catcher in the Rye	J.D. Salinger	Classic	1951
13	Becoming	Michelle Obama	Biography	2018
14	The Power of Habit	Charles Duhigg	Self-help	2012
15	The Da Vinci Code	Dan Brown	Thriller	2003
16	Think and Grow Rich	Napoleon Hill	Motivation	1937
17	Rich Dad Poor Dad	Robert Kiyosaki	Finance	1997

Back to Home

Fig 5.2 Available Books

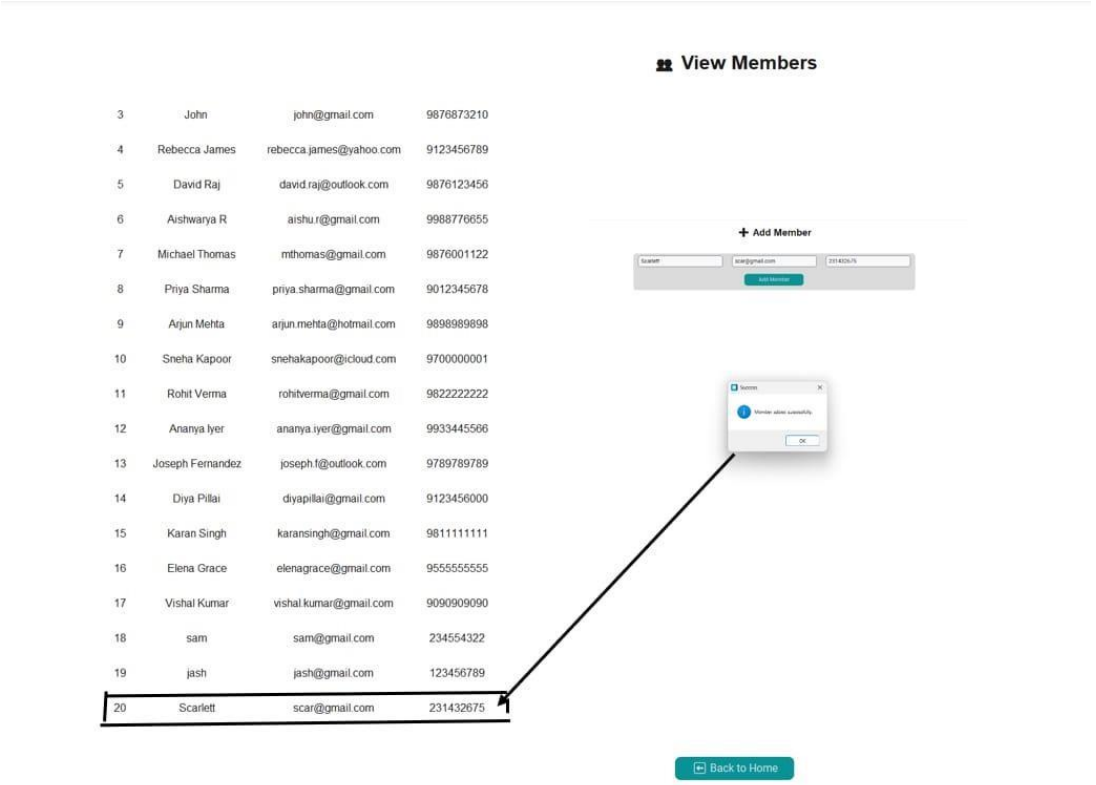


Fig 5.3 View Members



Fig 5.4 Search Books

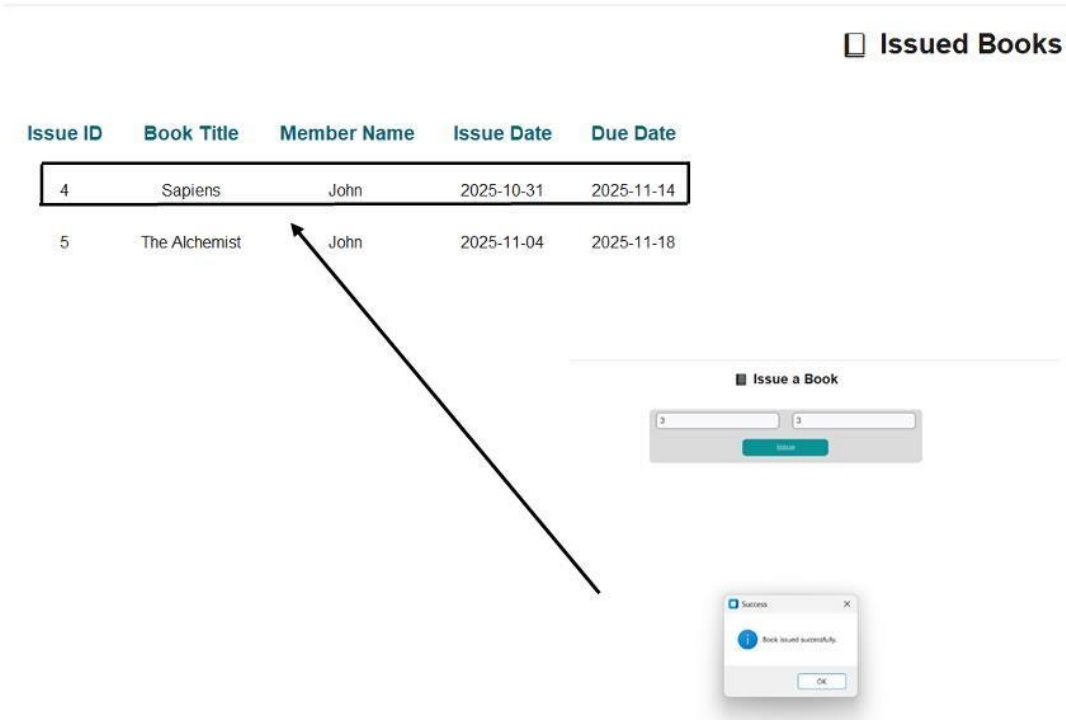


Fig 5.5 Issue Book

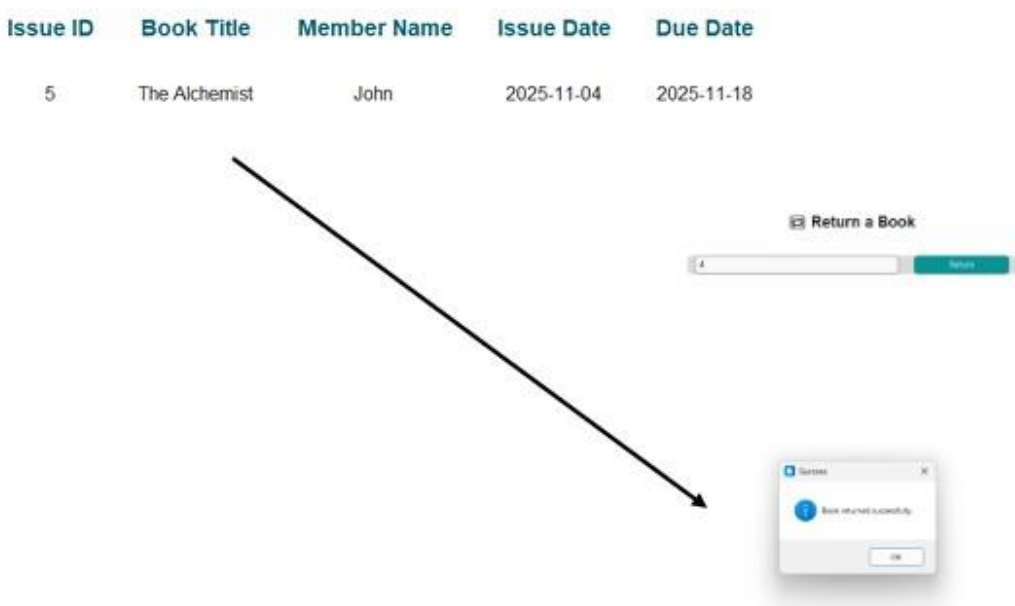
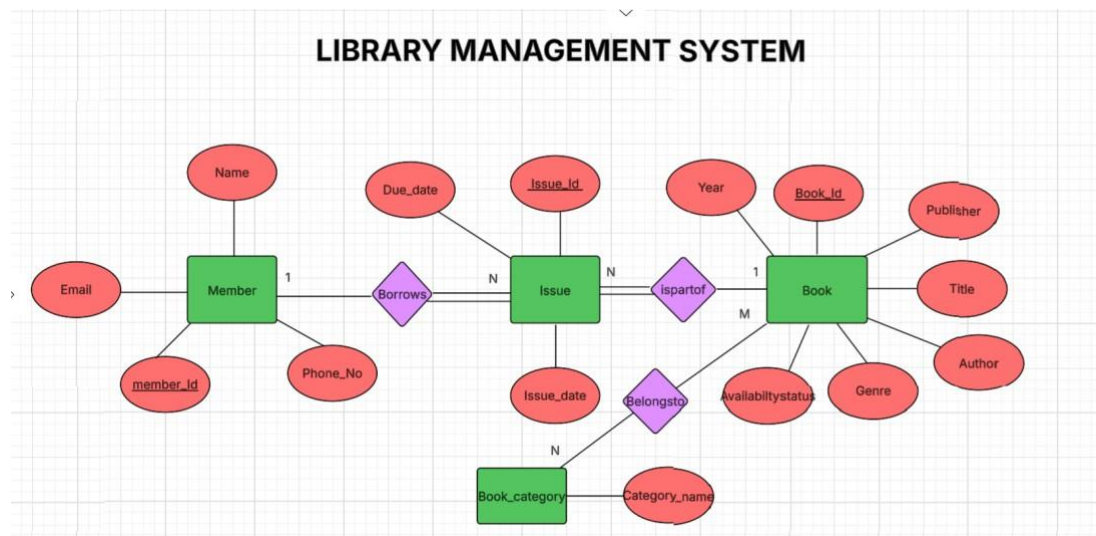


Fig 5.6 Return Book

Entity Relationship Diagram:

CHAPTER 6

CONCLUSION AND FUTURE ENHANCEMENT

The Library Management System successfully demonstrates the use of database management principles in real-world applications. It helps the librarian to automate the data easily into computer. The main aim of this Database system is to reduce human efforts. The Books and the Students are given a particular unique Id no, so that they can be accessed correctly without any errors. The problems which existed earlier have been removed to a large extent with the help of this MYSQL database software. The computerization of the library management will not only improve the efficiency but will also reduce human stress thereby indirectly improving human resources. It simplifies library operations by automating manual tasks, reducing human errors, and improving efficiency. Future enhancements could include user authentication, fine calculation for overdue books, and integration with online library systems.

REFERENCES

1. https://www.researchgate.net/publication/378435639_Library_management_database_design_and_application
2. https://www.researchgate.net/publication/266650310_The_Design_and_Implementation_of_Database_on_Library_Management_Information_System
3. https://www.clausiuspress.com/assets/default/article/2023/05/15/article_1684158036.pdf
4. <https://www.geeksforgeeks.org/system-design/system-design-forlibrary-management/>
5. <https://www.scribd.com/document/639582554/PROJECTREPORT-ON-LIBRARY-DATABASE-MANAGEMENT-SYSTEM>