

LIBRARY MANAGEMENT SYSTEM



Submitted By :

Mehak Aftab

2021-CS-92

Mahnoor Ijaz

2021-CS-95

Amna Imran

2021-CS-96

Aqsa Mahmood

2021-CS-110

UNIVERSITY OF ENGINEERING AND TECHNOLOGY
COMPUTER SCIENCE DEPARTMENT

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16	View Books Use Case	8
17	Add Books Use Case	9
18	Edit Books Use Case	9
19	Delete Books Use Case	9
20	View Genre Use Case	10
21	Add Genre Use Case	10
22	Edit Genre Use Case	10
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1 CHAPTER

1.1 Introduction

1.1.1 Description

A requisite in library services nowadays is a library management system. This software application helps librarians perform vital tasks such as tracking books, borrowers, lending and returning, and transactions on a day-to-day basis. In order to execute successful library management, the system needs to consider multiple entities including students, issuance, return, transactions, book details such as author and genre classification.

Another important entity that aids in efficient library operations is employee attendance including rank. By storing comprehensive data on students including their full names, places of residence, contact information and other relevant particulars; the library management system can ensure efficient organization. This approach also necessitates tracking all book-related activity per student including issued copies and accruing fines or fees. Paralleling this feature is prompt identification of issuance dates matched simultaneously by an expectation date for every book taken out.

To ensure efficient management of library resources and to cater to the needs of users, it is imperative for a library system to be able to generate reports that provide information on currently issued books and their recipients. Additionally, the system should also keep users informed on whether any books are overdue. Considerably, an indispensable feature that entails proper book circulation is return, which is equally important as issuance.

Return is the opposite of issuance, and is equally important in a library management system. The system needs to keep track of all the books that are returned by students, including the date of return and any fines or fees that may have been incurred. The system should also be able to generate reports on which books have been returned, and which are still outstanding.

Transactions are the backbone of a library management system. The system needs to keep track of all the transactions that occur within the library, including the issuance and return of books, as well as any fines or fees that are collected. The system should be able to generate reports on all transactions, including those that are outstanding or overdue.

Books are, of course, the primary entity in a library management system. The system needs to keep track of all the books that are available in the library, including their title, author, publisher, publication date, and other relevant details. The system should also be able to generate reports on which books are currently available, as well as any that are out of stock or have been lost.

Authors and genres are also important entities in a library management system. The system needs to keep track of all the authors and their associated works that are available in the library, as well as the different genres that books can be classified under. This information can be used to help users find books that are relevant to their interests, as well as to help librarians keep track of which books are popular and which are not.

Employees are another important entity in a library management system. The system needs to keep track of all the employees who work in the library, including their name, position, and other relevant details. Additionally, the system needs to keep track of the attendance of employees, as well as any absences or tardiness.

Floor is another important entity in a library management system. The system needs to keep track of the different floors in the library, as well as the different sections and shelves where books are located. This information can be used to help users find books that are relevant to their interests, as well as to help librarians keep track of which books are popular and which are not.

Finally, employee rank is an important entity in a library management system. The system needs to keep track of the different ranks that employees can attain within the library, as well as any promotions or demotions that occur. This information can be used to help manage employee performance and ensure that the library is staffed with qualified and capable individuals.

In conclusion, a library management system is an essential tool for librarians who need to manage the day-to-day operations of a library.

Word Count: 802

1.2 Features and Functionalities

1. Student Management

=> Students Details

=> Issued Books, Returned Books, Transactions, Fine, Outstanding Books Details

2. Issuance and Return Management

=> Employees maintain data of issued books to students with book title, data of issuance and return, and any overdue fines

3. Transactions Management

=> Record of Student Transactions and salary of Employees

4. Book Management

=> Book Details

5. Author Management

=> Author Details

6. Genre Management

=> Genre Details

7. Employee Management

=> Employee Details with Ranks

=> Employee Attendance

8. Floor Management

=> Floor Details with library sections

1.3 System Requirements

Table 1: System Requirements

Language	C# (3.11.0)
IDEs	Microsoft Visual Studio Community 2019 (16.11.21)
	using System.Windows.Forms;
	using System;
	using System.Collections.Generic;
	using System.ComponentModel;
	using System.Data;
	using System.Drawing;
	using System.Linq;
	using System.Text;
	using System.Threading.Tasks;
	using System.Text.RegularExpressions;
	Guna.UI2
	Pencil Tool
	Latex

1.4 Project Actors and Stakeholders

1.4.1 Actors:

1. Employees
2. Student
3. Administrator

1.5 Use Cases:

1.5.1 Login Use Case

Table 2: Login Use Case

Use Case ID	U01
Name	Login Process
Actor	Employees/Students/Administrator
Description	Allows the Employees/Students/Administrator to login into the system.

1.5.2 Log In Screen

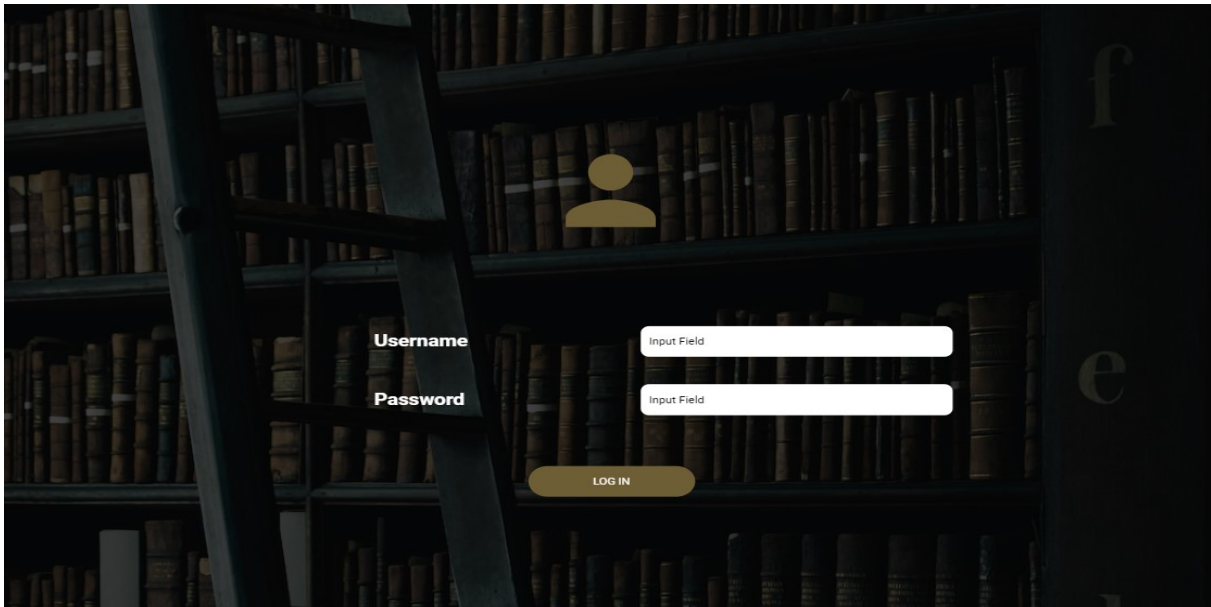


Figure 1: Log In Screen

1.5.3 View Employees Use Case

Table 3: View Employees Use Case

Use Case ID	U02
Name	View Employee
Actor	Administrator
Description	Viewing the registered employees of the library.

1.5.4 Add Employee Use Case

Table 4: Add Employee Use Case

Use Case ID	U03
Name	Add Employee
Actor	Administrator
Description	Adding employees to the library.

1.5.5 Edit Employee Use Case

Table 5: Edit Employee Use Case

Use Case ID	U04
Name	View Employee Details
Actor	Administrator
Description	Editing Employee details.

1.5.6 Delete Employee Use Case

Table 6: Delete Employee Use Case

Use Case ID	U05
Name	Delete Employee
Actor	Administrator
Description	Deleting of employees from the library system.

1.5.7 Employees Info Screen

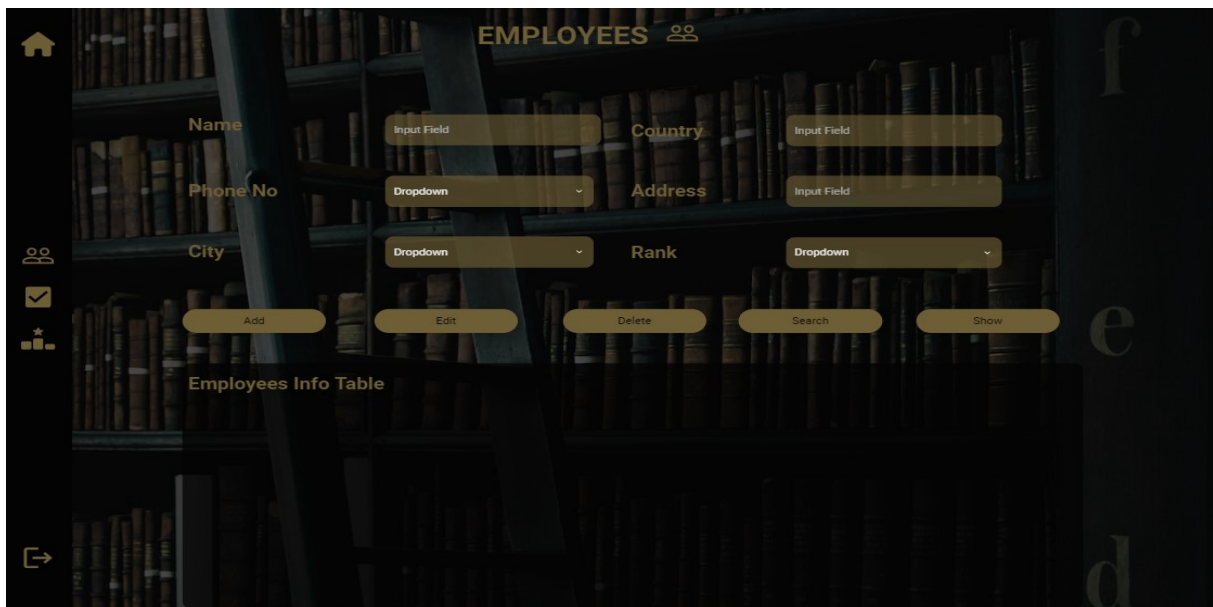


Figure 2: Employees Info Screen

1.5.8 View Ranks Use Case

Table 7: View Ranks Use Case

Use Case ID	U06
Name	View Ranks
Actor	Administrator
Description	Viewing the ranks of registered Employees.

1.5.9 Add Ranks Use Case

Table 8: Add Ranks Use Case

Use Case ID	U07
Name	Add Ranks
Actor	Administrator
Description	Adding ranks of Employees.

1.5.10 Edit Ranks Use Case

Table 9: Edit Ranks Use Case

Use Case ID	U08
Name	View Ranks
Actor	Administrator
Description	Editing ranks of Employees.

1.5.11 Delete Ranks Use Case

Table 10: Delete Ranks Use Case

Use Case ID	U09
Name	Delete Employee
Actor	Administrator
Description	Deleting ranks of Employees.

1.5.12 Employees Ranks Screen

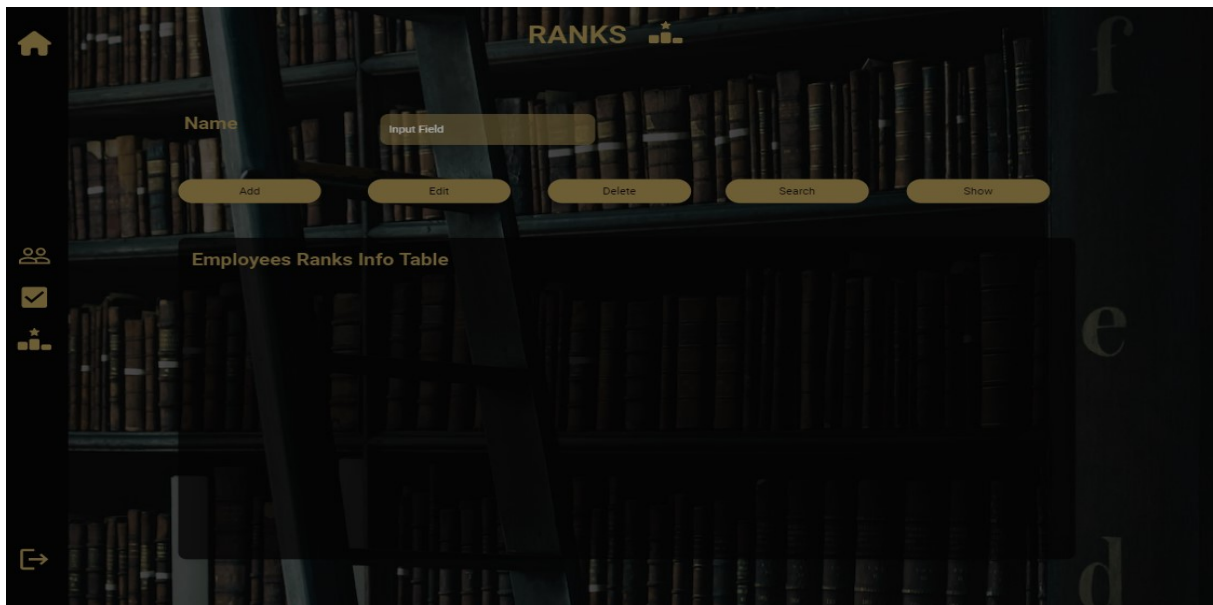


Figure 3: Employees Ranks Screen

1.5.13 Mark Attendance Use Case

Table 11: Mark Attendance Use Case

Use Case ID	U10
Name	Mark Attendance
Actor	Administrator
Description	Marking the attendance of registered Employees.

1.5.14 Employees Attendance Screen

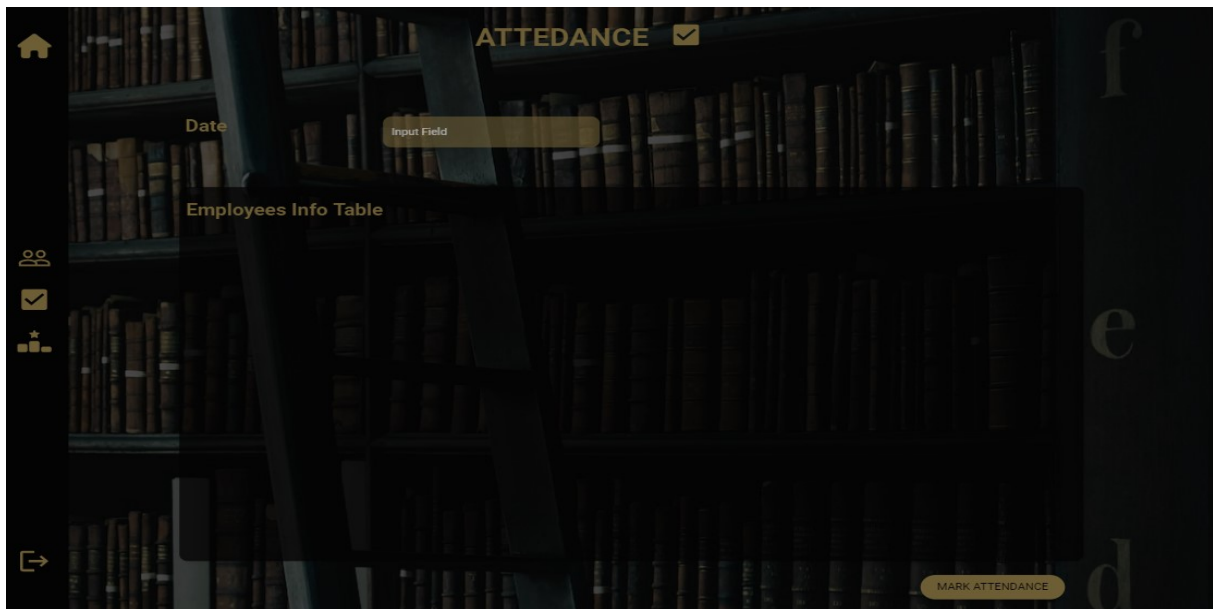


Figure 4: Employees Attendance Screen

1.5.15 View Authors Use Case

Table 12: View Authors Use Case

Use Case ID	U11
Name	View Authors
Actor	Employee
Description	Viewing the Authors of Books.

1.5.16 Add Authors Use Case

Table 13: Add Authors Use Case

Use Case ID	U12
Name	Add Authors
Actor	Employee
Description	Adding Authors of Books.

1.5.17 Edit Authors Use Case

Table 14: Edit Authors Use Case

Use Case ID	U13
Name	View Authors
Actor	Employee
Description	Editing Authors of Books.

1.5.18 Delete Authors Use Case

Table 15: Delete Authors Use Case

Use Case ID	U14
Name	Delete Authors
Actor	Employee
Description	Deleting Authors of Books.

1.5.19 Authors Screen

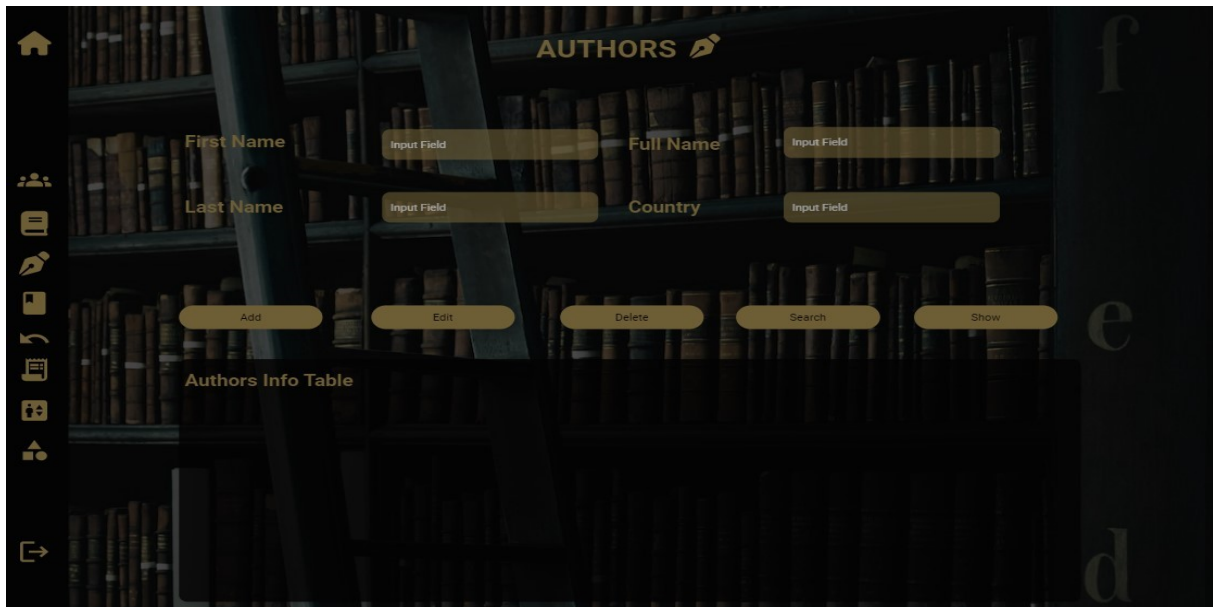


Figure 5: Authors Screen

1.5.20 View Books Use Case

Table 16: View Books Use Case

Use Case ID	U15
Name	View Books
Actor	Employee
Description	Viewing the Books of Library.

1.5.21 Add Books Use Case

Table 17: Add Books Use Case

Use Case ID	U16
Name	Add Books
Actor	Employee
Description	Adding Books in the Library.

1.5.22 Edit Books Use Case

Table 18: Edit Books Use Case

Use Case ID	U17
Name	View Books
Actor	Employee
Description	Editing Books of the Library.

1.5.23 Delete Books Use Case

Table 19: Delete Books Use Case

Use Case ID	U18
Name	Delete Books
Actor	Employee
Description	Deleting Books from the Library.

1.5.24 Books Screen

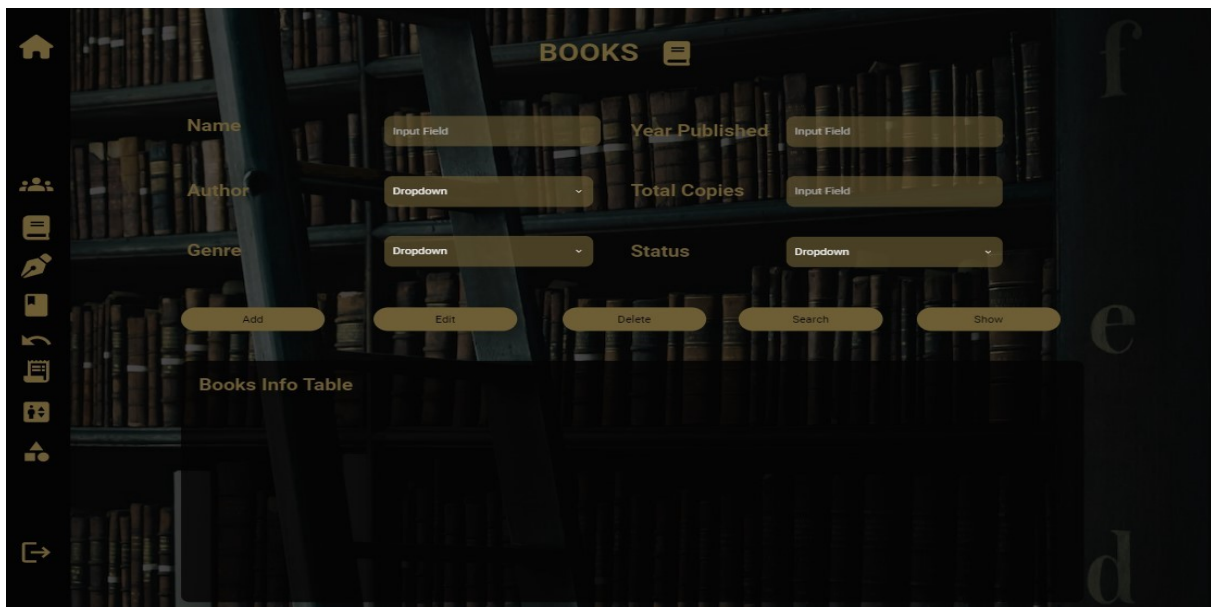


Figure 6: Books Screen

1.5.25 View Genre Use Case

Table 20: View Genre Use Case

Use Case ID	U19
Name	View Genre
Actor	Employee
Description	Viewing the Genre of Books.

1.5.26 Add Genre Use Case

Table 21: Add Genre Use Case

Use Case ID	U20
Name	Add Genre
Actor	Employee
Description	Adding Genre of Books.

1.5.27 Edit Genre Use Case

Table 22: Edit Genre Use Case

Use Case ID	U21
Name	Edit Genre
Actor	Employee
Description	Editing Genre of Books.

1.5.28 Delete Genre Use Case

Table 23: Delete Genre Use Case

Use Case ID	U22
Name	Delete Genre
Actor	Employee
Description	Deleting Genre of Books.

1.5.29 View Floor Use Case

Table 24: View Floor Use Case

Use Case ID	U23
Name	View Floor
Actor	Employee
Description	Viewing the Floor of Library.

1.5.30 Add Floor Use Case

Table 25: Add Floor Use Case

Use Case ID	U24
Name	Add Floor
Actor	Employee
Description	Adding Floor of Library.

1.5.31 Edit Floor Use Case

Table 26: Edit Floor Use Case

Use Case ID	U25
Name	Edit Floor
Actor	Employee
Description	Editing Floor of Library.

1.5.32 Delete Floor Use Case

Table 27: Delete Floor Use Case

Use Case ID	U26
Name	Delete Floor
Actor	Employee
Description	Deleting Floor of Library.

1.5.33 Genre Screen

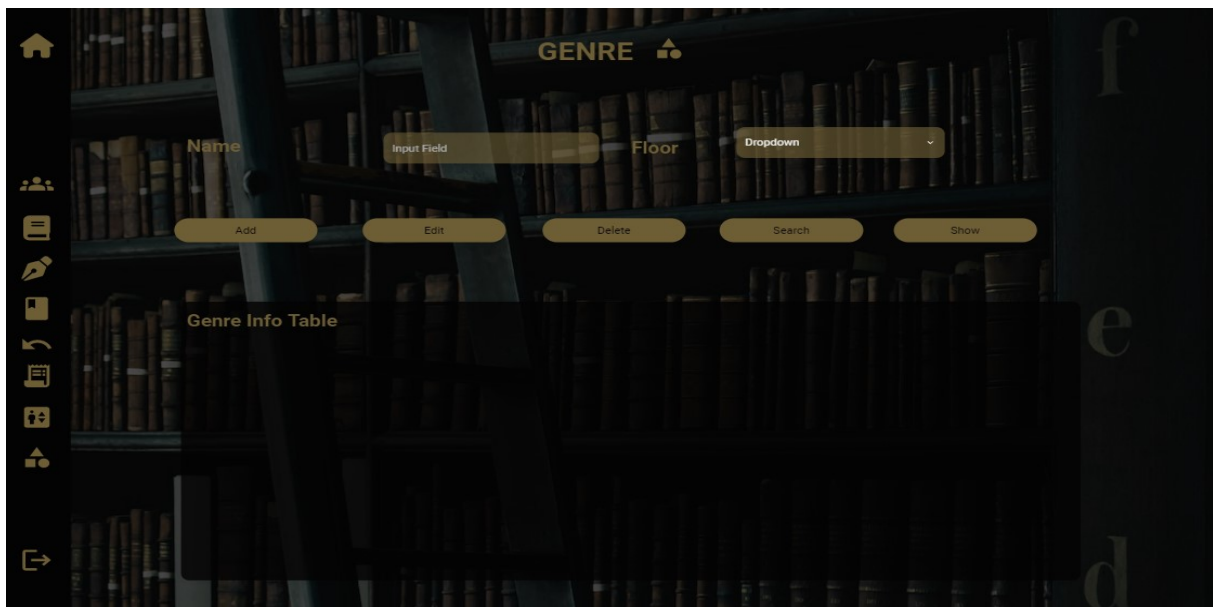


Figure 7: Genre Screen

1.5.34 Floor Screen

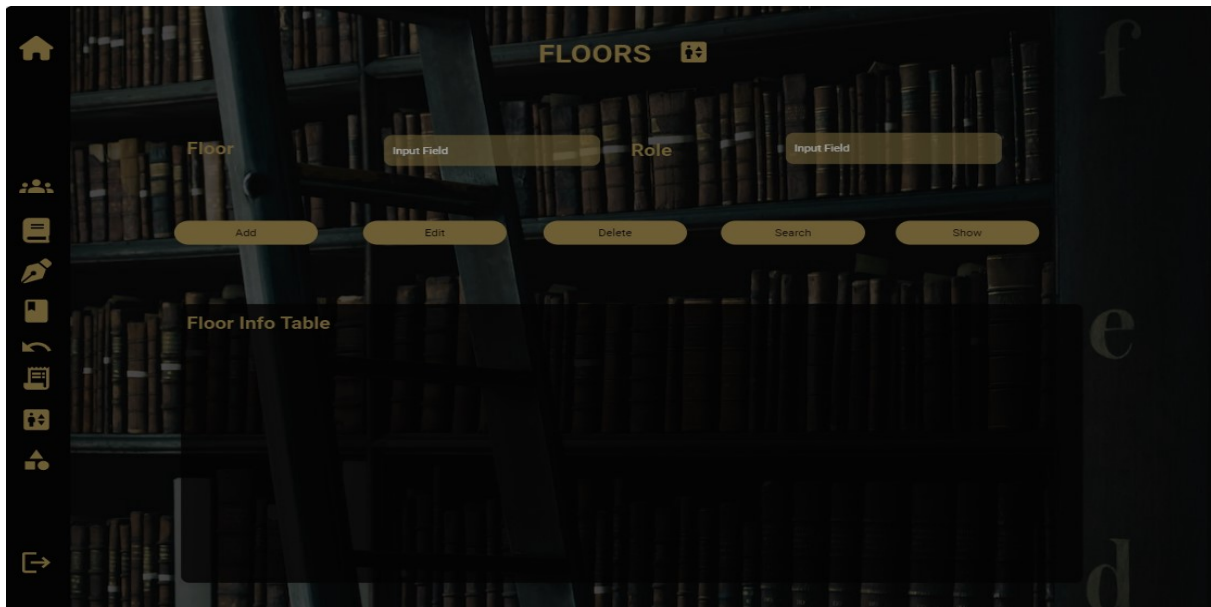


Figure 8: Floor Screen

1.5.35 View Students Use Case

Table 28: View Students Use Case

Use Case ID	U27
Name	View Students
Actor	Employee
Description	Viewing Students associated with Library.

1.5.36 Add Students Use Case

Table 29: Add Students Use Case

Use Case ID	U28
Name	Add Students
Actor	Employee
Description	Adding Students to the Library.

1.5.37 Edit Students Use Case

Table 30: Edit Students Use Case

Use Case ID	U29
Name	Edit Floor
Actor	Employee
Description	Editing Students of the Library.

1.5.38 Delete Students Use Case

Table 31: Delete Students Use Case

Use Case ID	U30
Name	Delete Students
Actor	Employee
Description	Deleting Students from the Library.

1.5.39 Students Screen

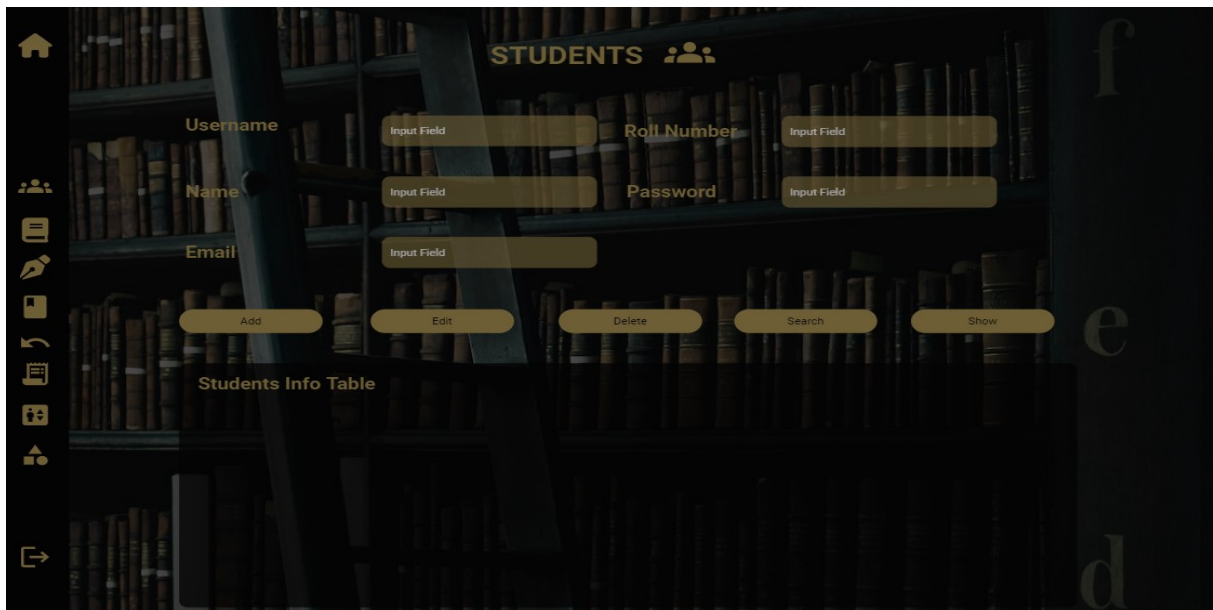


Figure 9: Students Screen

1.5.40 Issuance and Return Use Case

Table 32: Issuance and Return Use Case

Use Case ID	U31
Name	Issuance and Return
Actor	Employee
Description	Maintaining Issuance and Return of Books.

1.5.41 View Returned Books Use Case

Table 33: View Returned Books Use Case

Use Case ID	U32
Name	View Returned Books
Actor	Employee
Description	View Returned Books by Students.

1.5.42 Issuance Screen

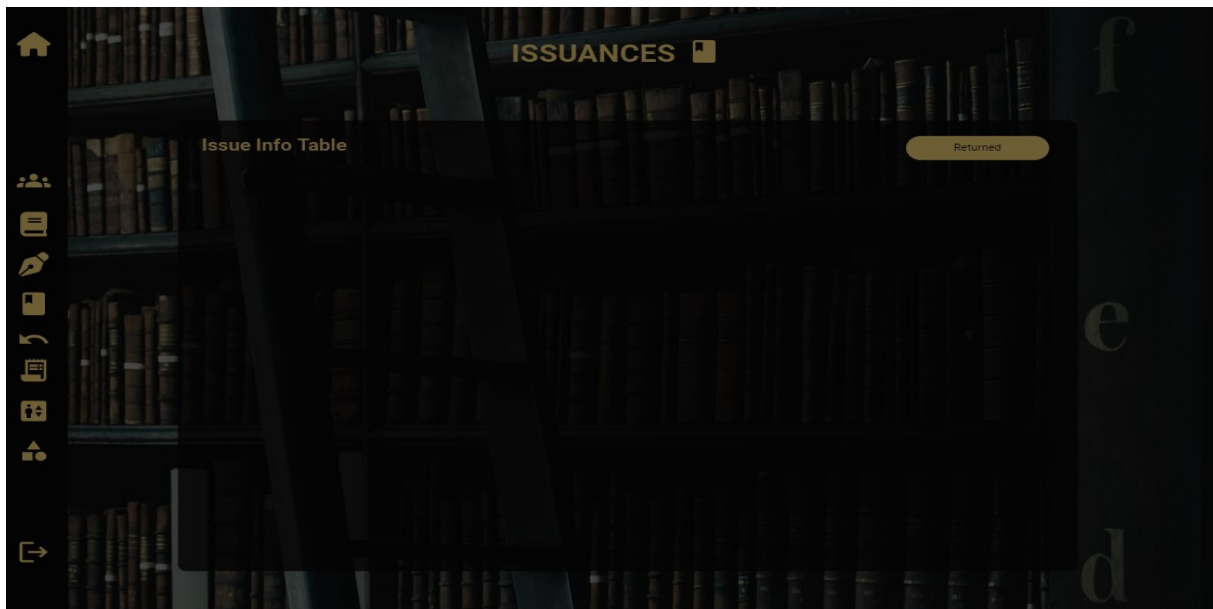


Figure 10: Issuance Screen

1.5.43 Returned Books Screen

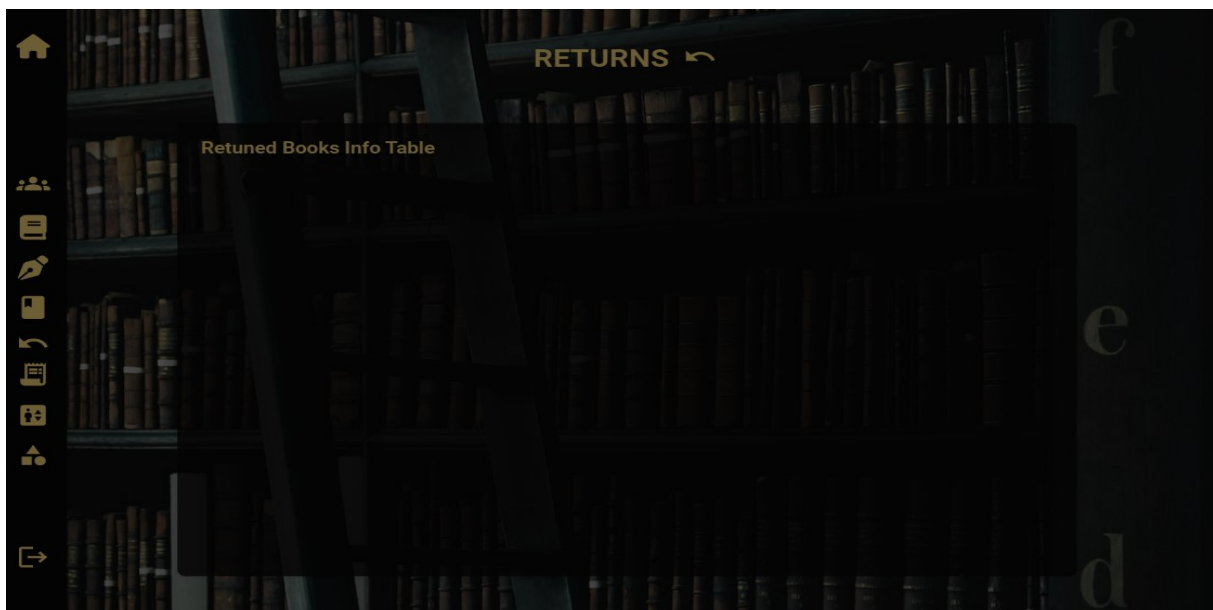


Figure 11: Returned Books Screen

1.5.44 View Transaction Use Case

Table 34: View Transaction Use Case

Use Case ID	U33
Name	View Transaction
Actor	Employee
Description	View Transactions made by Students.

1.5.45 Transactions Screen

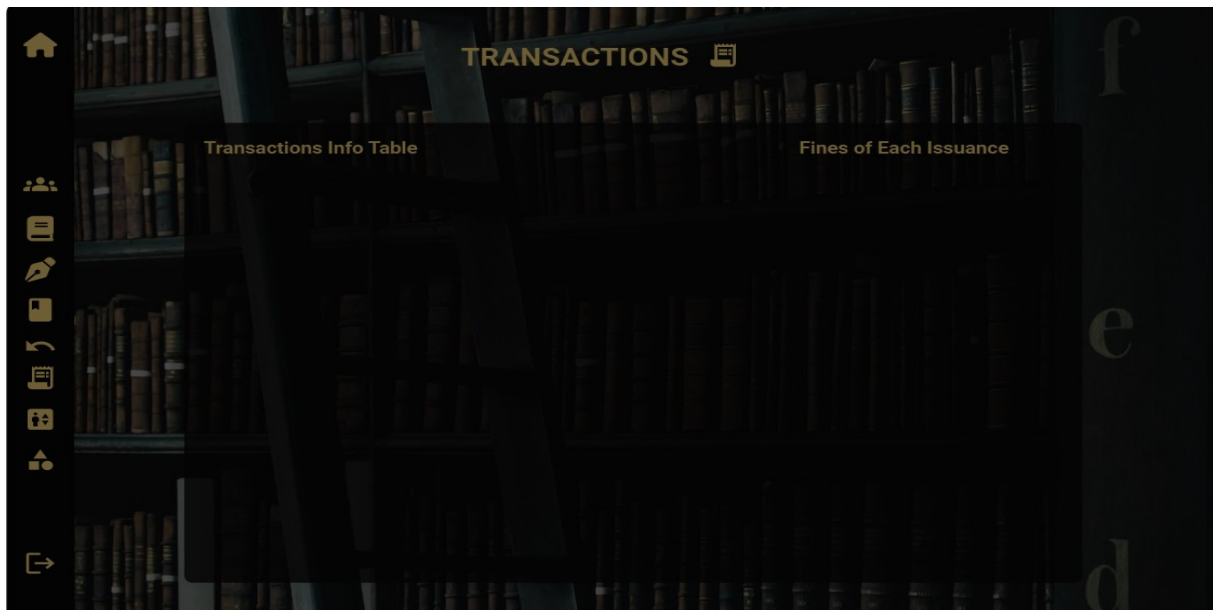


Figure 12: Transactions Screen

1.5.46 View Student's Books Use Case

Table 35: View Student's Books Use Case

Use Case ID	U34
Name	View Student's Books
Actor	Student
Description	View all Books borrowed by Students.

1.5.47 View Authors Use Case

Table 36: View Authors Use Case

Use Case ID	U35
Name	View Authors
Actor	Student
Description	View all Author's of Books in the Library.

1.5.48 Student's Books Screen

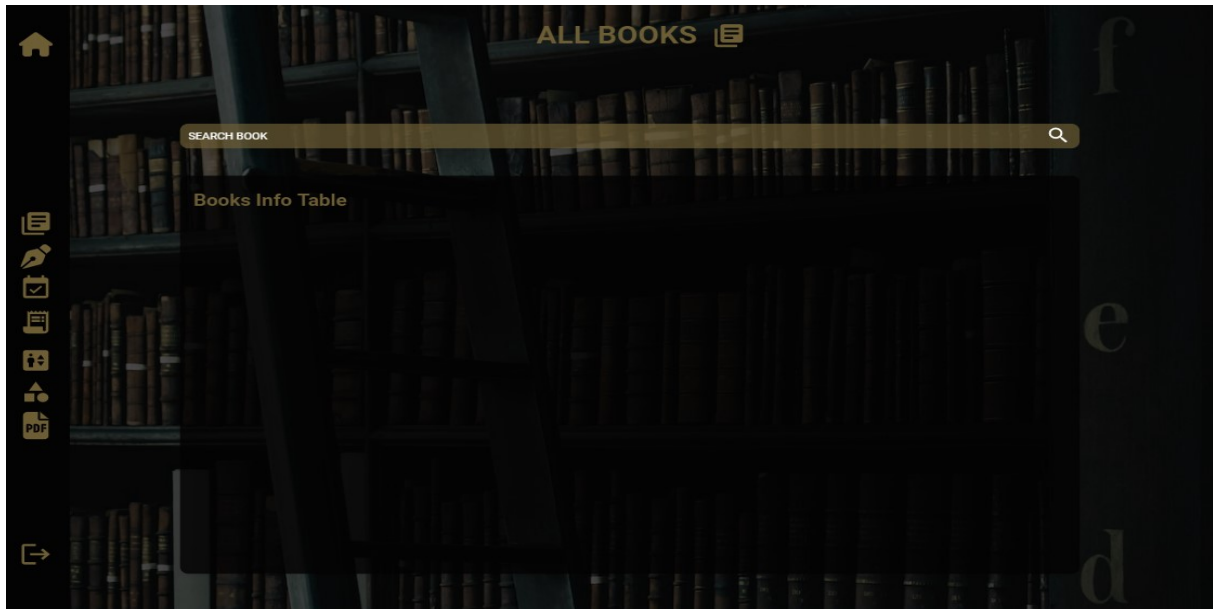


Figure 13: Student's Books Screen

1.5.49 Student's Author Screen

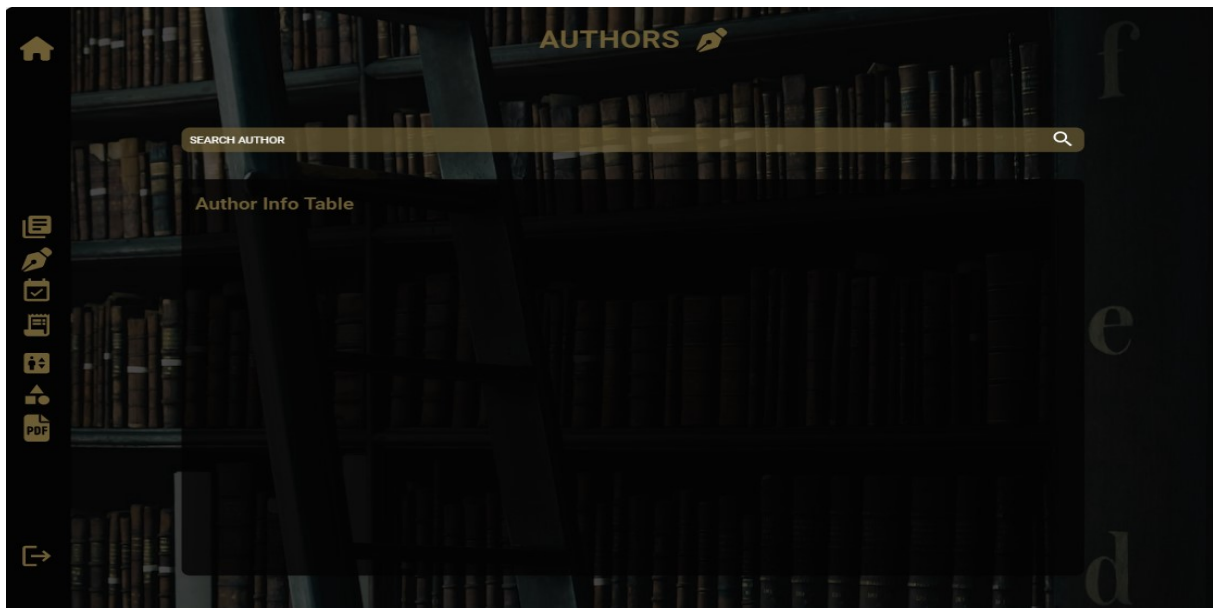


Figure 14: Student's Author Screen

1.6 ER Diagram

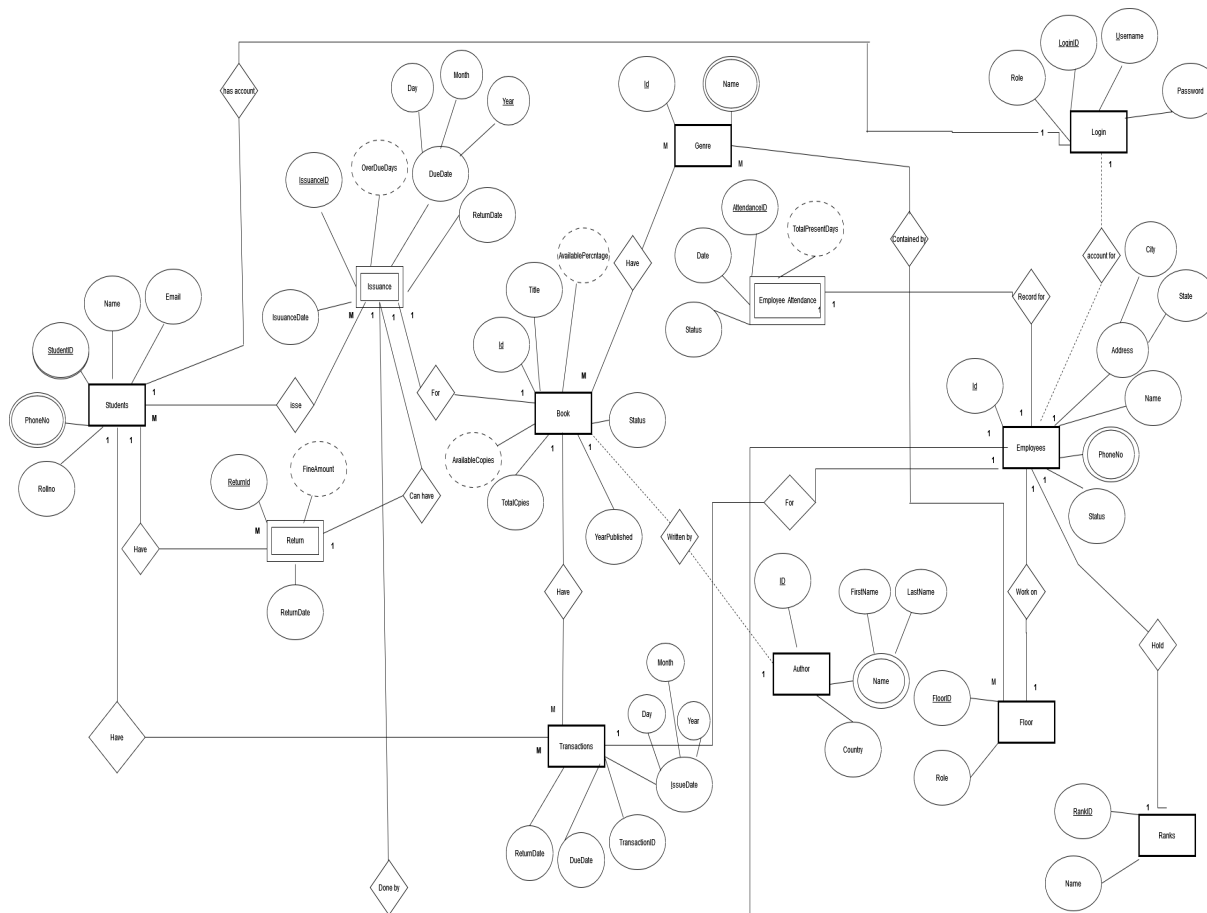


Figure 15: ER Diagram

1.6.1 One to One Relationship

1. Each book is written by only one author: Book table (1) —> (1) Author table
2. Each employee belongs to only one floor: Employees table (1) —> (1) Floors table

1.6.2 One to Many Relationship

1. One student can have many book issuance: Students table (1) —> (*) Issuance table
2. One book can be issued to many students: Books table (1) —> (*) Issuance table
3. One Genre can be assigned to many books: Genre table (1) —> (*) Books table
4. One book can have many Genre Books table (1) —> (*) Categories table
5. One book can have multiple transactions: Books table (1) —> (*) Transactions table
6. One author can have written many books: Authors table (1) —> (*) Books table
7. One employee can have many transactions: Employees table (1) —> (*) Transactions table
8. One floor can have many employees: Floors table (1) —> (*) Employees table
9. One employee can have many attendance records: Employees table (1) —> (*) Attendance table

10. One employee can issue multiple books: Employees table (1) —> (*) Issuance table

1.6.3 Many to Many Relationship

1. One student can issue many books and one book can be issued to many students: Students table () <—> () Issuance table
2. One book can have many Genre Books table and One Genre can be assigned to many books: Genre table () <—> () Books table

1.6.4 Weak Entities

1. "Issuance" table is a weak entity dependent on both "Book" and "Student" tables
2. "Returns" table is a weak entity dependent on "Issuance" table
3. "Employee Attendance" is a weak entity dependent on "Employee" table

1.6.5 Strong Relationship

1. Each book is written by one author: Books table (1) —> (1) Authors table
2. Each book is written by only one author: Book table (1) —> (1) Author Table

1.6.6 Multivalued Attributes

1. Phone no in "Employee" table
2. Name in "Genre" table
3. Name in "Author"
4. Phone no in "Students"

1.6.7 Complex Attributes

1. Due Date in Issuance Table
2. IssueDate in Transactions Table
3. Name in Author Table
4. Address in Employee Table

1.6.8 Computed Attributes

1. The "Books" table could have a computed attribute "Available Percentage," which would calculate the percentage of available copies out of total copies.
2. Books Table: Available copies (computed by subtracting the number of checked-out books from the total number of copies)
3. Issuance Table: Overdue days (computed by subtracting the due date from the return date, if available)
4. The "Returns" table could have a computed attribute "Fine Amount," which would calculate the amount of fine to be paid by the student for late return of the book.
5. The "Employee Attendance" table could have a computed attribute "Total Present Days," which would calculate the total number of days an employ

1.7 User Interface Details

Table 37: User Interface Details

Inter- face Id	Text Box	Drop Down	Picture Box	Table	Date Field	But- tons	Grid- view	Radio But- ton	Check Box	Menu	Text Area	Prog- ress Bar
I01	2	0	1	0	0	2	0	3	0	0	6	0
I02	0	0	1	0	0	4	0	0	0	0	1	0
I03	5	2	1	0	0	5	0	0	0	0	6	0
I04	0	0	1	1	0	5	0	0	0	0	16	0
I05	1	0	1	0	0	5	1	0	0	0	4	0
I06	0	0	1	0	0	8	1	0	0	0	1	0
I07	7	3	1	0	0	9	1	0	0	0	8	0
I08	0	0	1	0	0	9	1	0	0	0	16	0
I09	1	0	1	0	0	9	0	0	0	0	4	0
I10	0	0	1	0	0	9	1	0	0	0	3	0
I11	0	0	1	0	0	9	1	0	0	0	3	0
I12	0	0	1	0	0	8	1	0	0	0	3	0
I13	0	0	1	0	0	9	1	0	0	0	3	0
I14	0	0	1	0	0	6	0	0	0	0	1	0
I15	5	0	1	0	0	7	0	0	0	0	7	0
I16	0	0	1	1	0	7	0	0	0	0	15	0
I17	1	0	1	0	0	7	1	0	0	0	4	0
I18	1	1	1	0	0	7	0	0	0	0	3	0
I19	5	0	1	0	0	8	1	0	0	0	7	0
I20	0	0	1	0	0	2	0	0	0	0	1	0
I21	2	0	1	0	0	3	1	0	0	0	3	0
I22	0	0	1	0	0	2	0	0	0	0	3	0
I23	0	0	1	0	0	2	1	0	0	0	1	0
I24	0	0	1	0	0	3	1	0	0	0	3	0
I25	0	0	1	0	0	2	0	0	0	0	4	0