



CCE104 – Fundamentals of Database

## **Library Borrowing and Returning Management System**

First Term, First Semester SY 2025-2026

Submitted by:

Lourde Vincent M. Pablo

Submitted to:

Jenny Espadero

## Chapter 1

### A. Introduction

The business entity in this study is the Learning and Information Center (Library) of University of Mindanao. The library provides services such as borrowing and returning of books, assisting students in research, and maintaining records of available learning materials. Disclaimer: The university has no prior knowledge that the researcher utilized the LIC as a reference for this project. The information presented is solely derived from the researcher's personal experiences in conducting transactions within the university's LIC.

Currently, transactions involve students borrowing books, staff processing checkout/return, and tracking due dates. A book that is currently borrowed (not yet returned) cannot be checked out again by another member until it is returned. Each process includes important details such as the student ID, book barcode/code, transaction date, and due date. However, the problematic area lies in the manual recording of transactions. At times, it is difficult to monitor which books are borrowed, who borrowed them, and whether they are returned on time. Delays, misplaced records, and lack of automated reminders for overdue books are common issues. (Marlindawati ., Misinem ., & Adhiatma, 2024)

Hence, the solution proposed in this study is intended to address the issues faced by a non-sectarian college—St. John Paul II College of Davao—that still processes book borrowing and returning manually. The researcher personally experienced this situation, having been a former student at the said college. In contrast, the University of Mindanao Library and Information Center (UM LIC) have already implemented an automated system. With the increase of book collections and the expansion of readers' scale in college libraries, how to improve the efficiency of borrowing and returning books has become an important topic in the operation and management of college libraries (Mengping, 2023).

The problem to be solved is the inefficient tracking of book borrowing and returning, which can lead to loss of books, delayed returns, and inaccurate inventory. The proposed database solution is a Library Management Database System that will:

- ✓ Store student and staff information.
- ✓ Record book details using barcode numbers.
- ✓ Manage checkout and return transactions.
- ✓ Track due dates and generate reports.

This system will improve accuracy, reduce errors, and make retrieval of information faster and more reliable (Song, 2018).

The scope of this system is limited to the physical borrowing and returning of books in the library. Based on an interview with one of the staff members at UM LIC, the book category in the borrowing process is not considered essential.

The primary objective of the borrowing process is to record which book a member wishes to borrow, along with the corresponding due date and any possible penalties that may arise from late returns (Andri, Sopiah, & Oktaviani, 2025).

## B. Business Rule

- A **member** must be registered in the library before performing any borrow transaction.
- A **member** may borrow **zero, one, or many books** over time, but each **borrow transaction** must be linked to exactly **one member**.
- A **borrow transaction** must be processed by a **staff** (librarian). A **staff** may process many transactions, but a transaction is linked to only one **staff**.
- A **book** may be borrowed multiple times, but at any given transaction, it may only be linked once. Some **books** may never be borrowed, but if a **borrow detail** exists, it must be linked to one book.
- A **borrow transaction** may include **one or many books**, but it cannot exist without at least one book.
- Each **borrow details** must be linked to exactly **one borrow transaction** and exactly **one book**.
- A **borrow transaction** must record the following information:
  - Transaction ID
  - Member ID
  - Staff ID
  - Date Borrowed
  - Due Date
  - Date Returned

## Chapter 2

### Entity Relationship Diagram

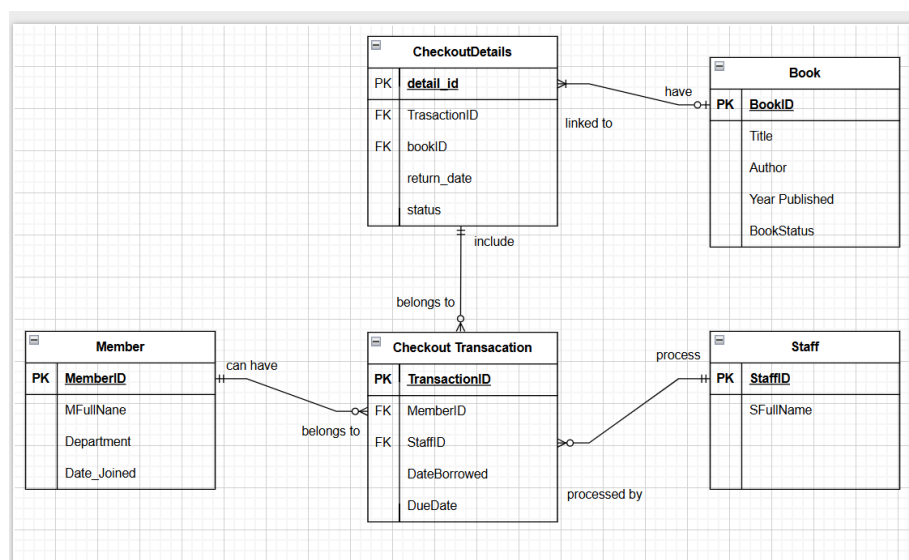


Figure 1: Library borrowing and returning System ERD

## Logic Design

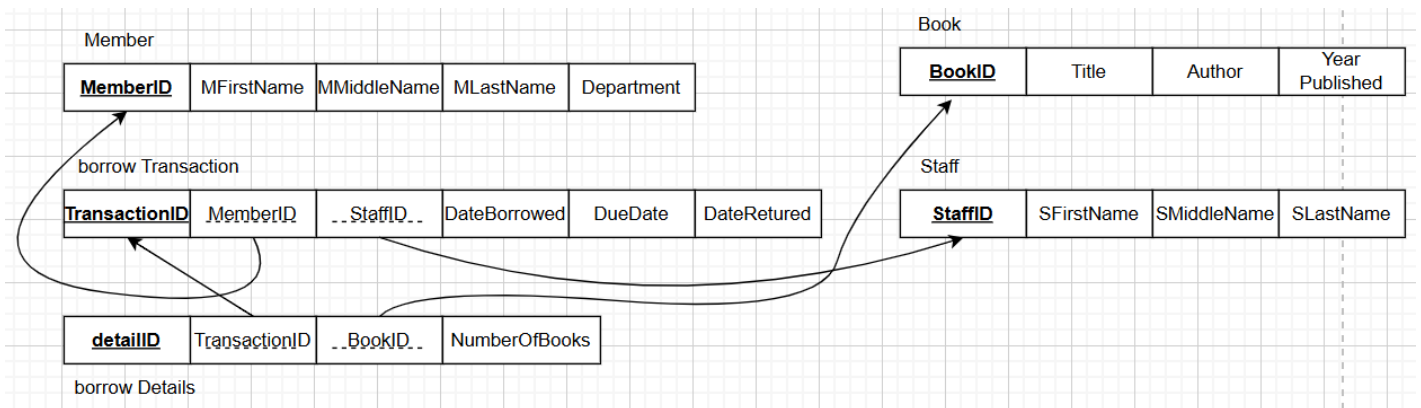


Figure 2: Library borrowing and returning System Mapping Relations

## Normalization

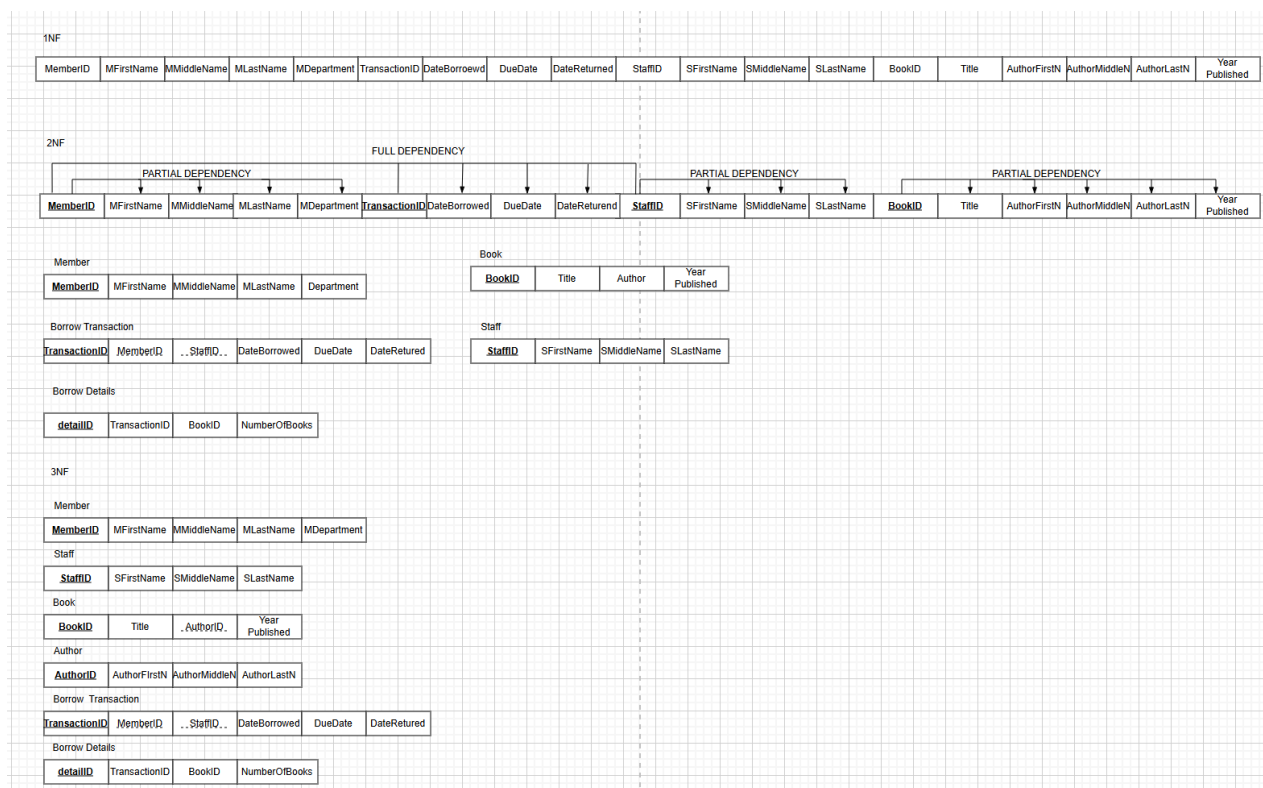


Figure 3: Library borrowing and returning System Normalization

## Chapter 3

### Physical Designs

Server: 127.0.0.1 » Database: pablolibsystem

Structure SQL Search Query Export Import Operations

Show query box

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are disabled.

Your SQL query has been executed successfully.

`DESCRIBE member;`

[ Edit inline ] [ Edit ] [ Create PHP code ]

Extra options

Field	Type	Null	Key	Default	Extra
memberID	varchar(7)	NO	PRI	NULL	
department	varchar(20)	NO		NULL	
FirstName	varchar(50)	NO		NULL	
MiddleName	varchar(50)	NO		NULL	
LastName	varchar(50)	NO		NULL	
Date_Joined	date	NO		NULL	

Query results operations

Figure 4: Member Table

Server: 127.0.0.1 » Database: pablolibsystem » Table: member

Browse Structure SQL Search Insert Export

Show query box

Your SQL query has been executed successfully.

`DESC staff;`

[ Edit inline ] [ Edit ] [ Create PHP code ]

Extra options

Field	Type	Null	Key	Default	Extra
staffID	varchar(7)	NO	PRI	NULL	
StaffFirstName	varchar(50)	NO		NULL	
StaffMiddleName	varchar(50)	NO		NULL	
StaffLastName	varchar(50)	NO		NULL	

Query results operations

Server: 127.0.0.1 » Database: pablolibsystem » Table: member

Browse Structure SQL Search Insert E

Show query box

Your SQL query has been executed successfully.

```
DESC books;
```

[ Edit inline ] [ Edit ] [ Create PHP code ]

Extra options

Field	Type	Null	Key	Default	Extra
bookID	varchar(20)	NO	PRI	NULL	
Title	varchar(100)	NO		NULL	
AuthorFirstName	varchar(50)	NO		NULL	
AuthorMiddleName	varchar(50)	YES		NULL	
AuthorLastName	varchar(50)	NO		NULL	
YearPublished	int(5)	NO		NULL	
BookStatus	varchar(20)	NO		NULL	

Query results operations

Figure 6: books Table

Server: 127.0.0.1 » Database: pablolibsystem

Structure SQL Search Query Export Import Opera

Show query box

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete fea

Your SQL query has been executed successfully.

```
DESC borrow_details;
```

[ Edit inline ] [ Edit ] [ Create PHP code ]

Extra options

Field	Type	Null	Key	Default	Extra
detail_id	int(11)	NO	PRI	NULL	auto_increment
TransactionId	int(11)	NO	MUL	NULL	
bookID	varchar(11)	NO	MUL	NULL	
return_date	date	YES		NULL	
status	enum('BORROWED','RETURNED')	YES		BORROWED	

Query results operations

Figure 7: borrow\_details Table

Server: 127.0.0.1 » Database: pablolibsystem

Structure SQL Search Query Export Im

Show query box

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit, (

Your SQL query has been executed successfully.

```
DESC borrow_transactions;
```

[ Edit inline ] [ Edit ] [ Create PHP code ]

Extra options

Field	Type	Null	Key	Default	Extra
TransactionID	int(11)	NO	PRI	NULL	auto_increment
memberID	varchar(7)	NO	MUL	NULL	
staffID	varchar(7)	NO	MUL	NULL	
Date_Borrowed	date	NO		NULL	
Due_Date	date	NO		NULL	

Query results operations

Figure 8: borrow\_transactions Table

Server: 127.0.0.1 » Database: pablolibsystem » Table: member

Browse Structure SQL Search Insert Export Import Privileges Operations

✓ Showing rows 0 - 9 (10 total, Query took 0.0004 seconds.)

```
SELECT * FROM `member`
```

☐ Profiling [ Edit inline ] [ Edit ] [ Explain SQL ] [ Create PHP code ] [ Refresh ]

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Extra options

			memberID	department	FirstName	MiddleName	LastName	Date_Joined
<input type="checkbox"/>	Edit	Copy	Delete	M001	STUDENT	Lourde Vincent M.	Pablo	2025-09-20
<input type="checkbox"/>	Edit	Copy	Delete	M002	FACULTY	Jenny	Espadero	2025-09-20
<input type="checkbox"/>	Edit	Copy	Delete	M003	STUDENT	Teressa H.	Corpuz	2025-09-20
<input type="checkbox"/>	Edit	Copy	Delete	M004	STUDENT	Maria H.	Gomez	2025-09-20
<input type="checkbox"/>	Edit	Copy	Delete	M005	STUDENT	Renz	Arriola	2025-09-20
<input type="checkbox"/>	Edit	Copy	Delete	M006	STUDENT	Andria	Mendoza	2025-09-24
<input type="checkbox"/>	Edit	Copy	Delete	M007	FACULTY	James	Cruz	2025-09-24
<input type="checkbox"/>	Edit	Copy	Delete	M008	FACULTY	Andy	Co	2025-09-24
<input type="checkbox"/>	Edit	Copy	Delete	M009	STUDENT	Maysie	Pajarillaga	2025-09-24
<input type="checkbox"/>	Edit	Copy	Delete	M010	STUDENT	Rochel	Tunilla	2025-09-24

↑ ☐ Check all | With selected: Edit Copy Delete Export

Figure 9: Member Records

Server: 127.0.0.1 » Database: pabloblibsystem » Table: staff

Showing rows 0 - 4 (5 total, Query took 0.0004 seconds.)

`SELECT * FROM `staff``

☐ Profiling [\[ Edit inline \]](#) [\[ Edit \]](#) [\[ Explain SQL \]](#) [\[ Create PHP code \]](#) [\[ Refresh \]](#)

☐ Show all | Number of rows: 25 | Filter rows:  Sort by key:

Extra options

				staffID	StaffFirstName	StaffMiddleName	StaffLastName
<input type="checkbox"/>				S001	Pedro	Reyes	Garcia
<input type="checkbox"/>				S002	Ana		Lopez
<input type="checkbox"/>				S003	Carlos	M.	Fernandez
<input type="checkbox"/>				S004	Jessa	Magsanay	Perez
<input type="checkbox"/>				S005	Marie	J.	Mendez

☐ Check all | With selected: Edit Copy Delete Export

Figure 10: Staff Records

Server: 127.0.0.1 » Database: pabloblibsystem » Table: books

Showing rows 0 - 9 (10 total, Query took 0.0004 seconds.)

`SELECT * FROM `books``

☐ Profiling [\[ Edit inline \]](#) [\[ Edit \]](#) [\[ Explain SQL \]](#) [\[ Create PHP code \]](#) [\[ Refresh \]](#)

☐ Show all | Number of rows: 25 | Filter rows:  Sort by key: None

Extra options

				bookID	Title	AuthorFirstName	AuthorMiddleName	AuthorLastName	YearPublished	BookStatus
<input type="checkbox"/>				000001	Introduction to Python	Jenny		Espadero	2024	AVAILABLE
<input type="checkbox"/>				000002	Introduction of C++	Jenny		Espadero	2023	AVAILABLE
<input type="checkbox"/>				B001	Introduction to Algorithms	Thomas	H.	Cormen	2020	AVAILABLE
<input type="checkbox"/>				B002	Clean Code	Robert	P.	Martin	2019	AVAILABLE
<input type="checkbox"/>				B003	Python	Erich		Matteh	2018	AVAILABLE
<input type="checkbox"/>				B004	Harry Potter and the Philosopher's Stone	J.K		Rowling	1997	AVAILABLE
<input type="checkbox"/>				B005	The Da Vinci Code	Dan		Brown	2003	AVAILABLE
<input type="checkbox"/>				B006	The Art of Computer Programming	Donald	E.	Knuth	1968	BORROWED
<input type="checkbox"/>				B007	The C Programming Language	Brian W. Kernighan		& Dennis M. Ritchie	1978	BORROWED
<input type="checkbox"/>				B008	Clean Code: A Handbook of Agile Software Craftsmen...	Robert	C.	Martin	2008	BORROWED

☐ Check all | With selected: Edit Copy Delete Export

Figure 11: books Records



Server: 127.0.0.1 » Database: pablolibsystem » Table: borrow\_transactions

[Browse](#) [Structure](#) [SQL](#) [Search](#) [Insert](#) [Export](#) [Import](#) [Privileges](#)

`SELECT * FROM `borrow_transactions``

☐ Profiling [\[ Edit inline \]](#) [\[ Edit \]](#) [\[ Explain SQL \]](#) [\[ Create PHP code \]](#) [\[ Refresh \]](#)

☐ Show all | Number of rows: 25 ▼ Filter rows:  Sort by key: None

Extra options

	TransactionID	memberID	staffID	Date_Borrowed	Due_Date
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	1	M001	S001	2025-09-20	2025-09-27
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	2	M002	S001	2025-09-20	2025-09-27
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	3	M001	S001	2025-09-20	2025-09-27
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	4	M001	S001	2025-09-20	2025-09-27
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	5	M001	S003	2025-09-20	2025-09-27
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	6	M001	S001	2025-09-20	2025-09-27
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	7	M001	S001	2025-09-20	2025-09-27
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	8	M001	S001	2025-09-20	2025-09-27
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	9	M003	S003	2025-09-20	2025-09-27
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	10	M001	S002	2025-09-23	2025-09-25
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	11	M001	S001	2025-09-23	2025-09-30
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	12	M001	S001	2025-09-24	2025-10-01
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	13	M001	S001	2025-09-24	2025-10-01
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	14	M009	S001	2025-09-24	2025-10-01
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	15	M009	S001	2025-09-24	2025-10-01
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	16	M009	S001	2025-09-24	2025-10-01
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	17	M009	S005	2025-09-24	2025-10-01
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	18	M010	S004	2025-09-24	2025-10-01
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	19	M007	S001	2025-09-24	2025-10-01
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	20	M005	S002	2025-09-24	2025-10-01
<input type="checkbox"/> <a href="#">Edit</a> <a href="#">Copy</a> <a href="#">Delete</a>	21	M001	S005	2025-09-24	2025-10-01

☐ Check all With selected: [Edit](#) [Copy](#) [Delete](#) [Export](#)

Figure 13: borrow\_transactions Records

## Utilizing Functions

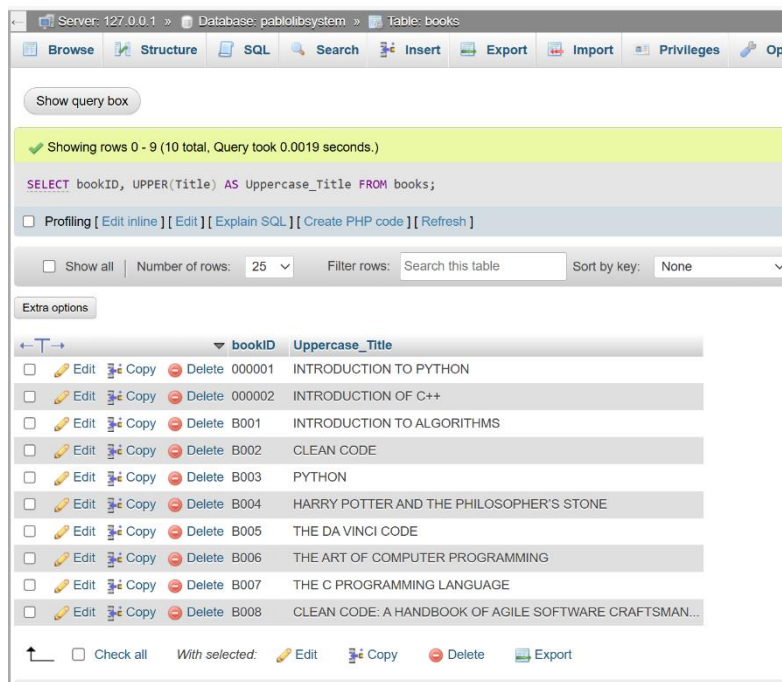


Figure 14: Function UPPER()

The UPPER() function converts text to uppercase. In the library system, it is used to standardize book titles for easier searching and reporting.

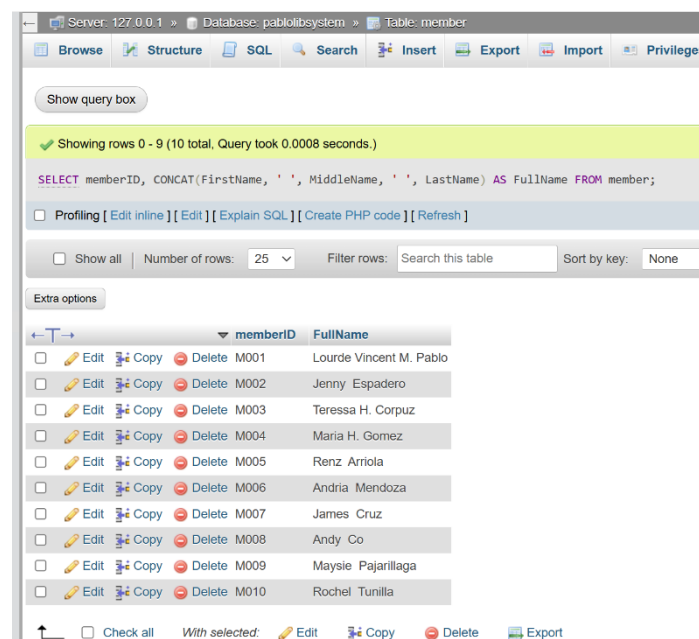
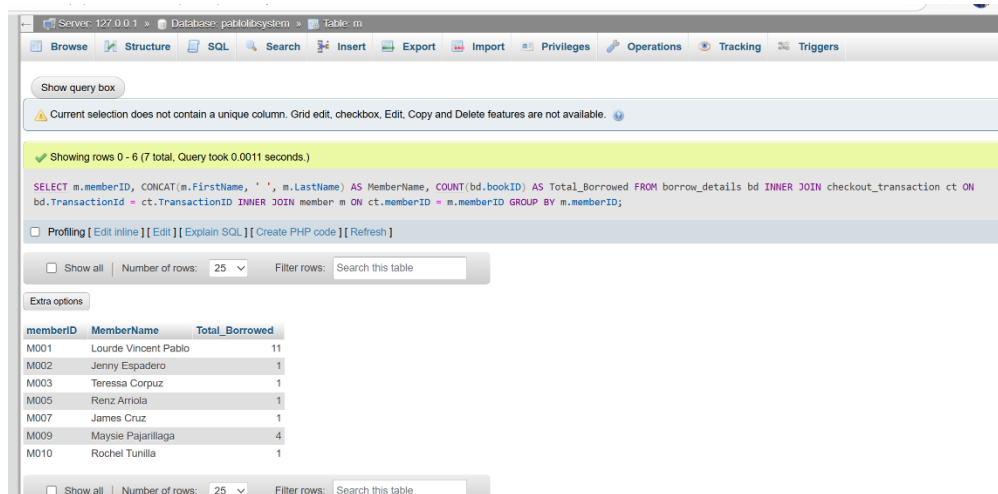


Figure 15: Function CONCAT()

The CONCAT() function combines multiple fields into one string. It is applied to display a member's full name by merging first, middle, and last names.



Server: 127.0.0.1 > Database: publiclibrarysystem > Table: m

Show query box

Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

Showing rows 0 - 6 (7 total, Query took 0.0011 seconds.)

```
SELECT m.memberID, CONCAT(m.FirstName, ' ', m.LastName) AS MemberName, COUNT(bd.bookID) AS Total_Borrowed FROM borrow_details bd INNER JOIN checkout_transaction ct ON bd.TransactionID = ct.TransactionID INNER JOIN member m ON ct.memberID = m.memberID GROUP BY m.memberID;
```

Profiling [ Edit inline ] [ Edit ] [ Explain SQL ] [ Create PHP code ] [ Refresh ]

Show all | Number of rows: 25 | Filter rows: Search this table

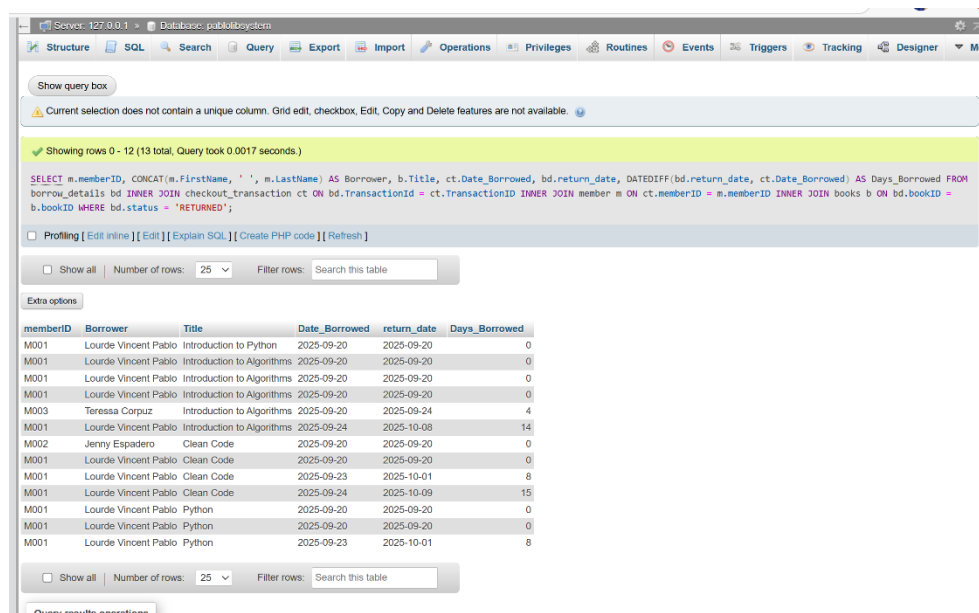
Extra options

memberID	MemberName	Total_Borrowed
M001	Lourde Vincent Pablo	11
M002	Jenny Espadero	1
M003	Teresa Corpuz	1
M005	Renz Arriola	1
M007	James Cruz	1
M009	Maysie Pajarillaga	4
M010	Rochel Tunilla	1

Show all | Number of rows: 25 | Filter rows: Search this table

Figure 16: Function COUNT()

The COUNT() function returns the number of records that meet a condition. In the library system, it shows how many books each member has borrowed.



Server: 127.0.0.1 > Database: publiclibrarysystem

Show query box

Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

Showing rows 0 - 12 (13 total, Query took 0.0017 seconds.)

```
SELECT m.memberID, CONCAT(m.FirstName, ' ', m.LastName) AS Borrower, b.Title, ct.Date_Borrowed, bd.return_date, DATEDIFF(bd.return_date, ct.Date_Borrowed) AS Days_Borrowed FROM borrow_details bd INNER JOIN checkout_transaction ct ON bd.TransactionID = ct.TransactionID INNER JOIN member m ON ct.memberID = m.memberID INNER JOIN books b ON bd.bookID = b.bookID WHERE bd.status = 'RETURNED';
```

Profiling [ Edit inline ] [ Edit ] [ Explain SQL ] [ Create PHP code ] [ Refresh ]

Show all | Number of rows: 25 | Filter rows: Search this table

Extra options

memberID	Borrower	Title	Date_Borrowed	return_date	Days_Borrowed
M001	Lourde Vincent Pablo	Introduction to Python	2025-09-20	2025-09-20	0
M001	Lourde Vincent Pablo	Introduction to Algorithms	2025-09-20	2025-09-20	0
M001	Lourde Vincent Pablo	Introduction to Algorithms	2025-09-20	2025-09-20	0
M001	Lourde Vincent Pablo	Introduction to Algorithms	2025-09-20	2025-09-20	0
M003	Teresa Corpuz	Introduction to Algorithms	2025-09-20	2025-09-24	4
M001	Lourde Vincent Pablo	Introduction to Algorithms	2025-09-24	2025-10-08	14
M002	Jenny Espadero	Clean Code	2025-09-20	2025-09-20	0
M001	Lourde Vincent Pablo	Clean Code	2025-09-20	2025-09-20	0
M001	Lourde Vincent Pablo	Clean Code	2025-09-23	2025-10-01	8
M001	Lourde Vincent Pablo	Clean Code	2025-09-24	2025-10-09	15
M001	Lourde Vincent Pablo	Python	2025-09-20	2025-09-20	0
M001	Lourde Vincent Pablo	Python	2025-09-20	2025-09-20	0
M001	Lourde Vincent Pablo	Python	2025-09-23	2025-10-01	8

Show all | Number of rows: 25 | Filter rows: Search this table

Query results operations

Figure 17: Function DATEDIFF()

The DATEDIFF() function calculates the number of days between two dates. It is useful for tracking borrowing duration and identifying overdue books.

The screenshot shows a database management interface with the following components:

- Header:** Server: 127.0.0.1 » Database: pablolibsystem » Table: books
- Navigation Bar:** Browse, Structure, SQL, Search, Insert, Export, Import, Privileges, Operations
- Query Execution:** A green status bar indicates "Showing rows 0 - 9 (10 total, Query took 0.0007 seconds.)". Below it, the SQL query is displayed: `SELECT Title, LENGTH(Title) AS TitleLength FROM books;`
- Query Options:** Includes checkboxes for "Show all", "Number of rows" (set to 25), "Filter rows" (Search this table), and "Sort by key" (set to None).
- Table Results:** A table with two columns: "Title" and "TitleLength". It contains 10 rows of book data.
- Extra Options:** A section below the table with checkboxes for "Check all" and "With selected:", followed by icons for Edit, Copy, Delete, and Export.

	Title	TitleLength
<input type="checkbox"/>	Introduction to Python	22
<input type="checkbox"/>	Introduction of C++	19
<input type="checkbox"/>	Introduction to Algorithms	26
<input type="checkbox"/>	Clean Code	10
<input type="checkbox"/>	Python	6
<input type="checkbox"/>	Harry Potter and the Philosopher's Stone	42
<input type="checkbox"/>	The Da Vinci Code	17
<input type="checkbox"/>	The Art of Computer Programming	31
<input type="checkbox"/>	The C Programming Language	26
<input type="checkbox"/>	Clean Code: A Handbook of Agile Software Craftsman...	54

Figure 18: Function LENGTH()

The LENGTH() function returns the number of characters in a string. In the library system, it can be used to measure the length of book titles or member names, helping with data validation and formatting.

## Chapter 4

### Prototype

**OwlReg**

Discover

- Add Book
- Add Member

Library

- Borrow
- Return book
- Books
- Members

**LIBRARY BOOK MANAGEMENT SYSTEM**

Add Book

**Book Information**

Book ID:

Book Title:

Author First Name:

Author Middle Name(if available):

Author Last Name:

Year Published:

Back Add

Figure 19: Add book navigation

```

1 INSERT INTO books (
2     bookID, Title, AuthorFirstName, AuthorMiddleName,
3     AuthorLastName, YearPublished, BookStatus
4 )
5 VALUES ('B001', 'Introduction to Python', 'Guido', '', 'Rossum', 1991, 'AVAILABLE');

```

**OwlReg**

Discover

- Add Book
- Membership

Library

- Borrow
- Return book
- Books
- Members

**LIBRARY BOOK MANAGEMENT SYSTEM**

Membership

**Member Registration**

Member ID:

Department:

First Name:

Middle Name(if available):

Last Name:

Back Add

Figure 20: Add member navigation

```

1 INSERT INTO member (
2     memberID, department, FirstName, MiddleName, LastName, Date_Joined
3 )
4 VALUES ('M001', 'STUDENT', 'Juan', 'Dela', 'Cruz', CURDATE());

```

Figure 21: Borrow navigation

```

1 INSERT INTO borrow_transactions (memberID, staffID, Date_Borrowed, Due_Date)
2 VALUES ('M001', 'S001', '2025-09-30', '2025-10-07');
3
4 INSERT INTO borrow_details (TransactionID, bookID, status)
5 VALUES (LAST_INSERT_ID(), 'B001', 'BORROWED');
6
7 UPDATE books SET BookStatus='BORROWED' WHERE bookID='B001';

```

Figure 22: Borrow receipt

```

1 SELECT
2     bt.TransactionID,
3     m.FirstName || ' ' || m.LastName AS MemberName,
4     s.FirstName || ' ' || s.LastName AS StaffName,
5     b.Title,
6     bt.DateBorrowed,
7     bt.DueDate,
8     bd.DateReturned
9 FROM borrowtransaction bt
10 JOIN member m ON bt.MemberID = m.MemberID
11 JOIN staff s ON bt.StaffID = s.StaffID
12 JOIN borrowdetails bd ON bt.TransactionID = bd.TransactionID
13 JOIN books b ON bd.BookID = b.BookID
14 WHERE bt.TransactionID = 1;

```

OwlReg

Discover

- Add Book
- Membership

Library

- Borrow
- Return book**
- Books
- Members

LIBRARY BOOK MANAGEMENT SYSTEM

Book Return

Book ID:

BookID...

Date returned:

YYYY-MM-DD

Staff ID(Assigned):

ID...

Back

Next

Figure 23: Book Return navigation

```

1 UPDATE borrow_details
2 SET return_date='2025-10-05', status='RETURNED'
3 WHERE detail_id=123;
4
5 UPDATE books SET BookStatus='AVAILABLE' WHERE bookID='B001';

```

OwlReg

Discover

- Add Book
- Membership

Library

- Borrow
- Return book**
- Books
- Members

LIBRARY BOOK MANAGEMENT SYSTEM

Book Return

Book ID:

BookID...

Date returned:

YYYY-MM-DD

Staff ID(Assigned):

ID...

Success


Book returned successfully and on time!

OK

Back

Next

Figure 24: Book Return confirmation



Discover

- Add Book
- Add Member

Library

- Borrow
- Return book
- Books**
- Members

## LIBRARY BOOK MANAGEMENT SYSTEM

Books Available

### Book Information


BookID	Title	Entry Status
BK-101	Introduction to CSS	Available <a href="#">Edit</a> <a href="#">Delete</a>
BK-102	Introduction to C++	Borrowed <a href="#">Edit</a> <a href="#">Delete</a>
BK-104	Introduction to Java	Available <a href="#">Edit</a> <a href="#">Delete</a>
BK-105	Introduction to Python	Available <a href="#">Edit</a> <a href="#">Delete</a>
BK-106	Introduction to C#	Available <a href="#">Edit</a> <a href="#">Delete</a>
BK-107	Introduction to MySQL	Available <a href="#">Edit</a> <a href="#">Delete</a>
BK-108	Introduction to HTML	Borrowed <a href="#">Edit</a> <a href="#">Delete</a>
BK-109	How to become a Professional IT	Borrowed <a href="#">Edit</a> <a href="#">Delete</a>
BK-110	Harry Potter the goblet of fire	Borrowed <a href="#">Edit</a> <a href="#">Delete</a>

Figure 25: Books list table

```

1 SELECT
2     bookID, Title, AuthorFirstName, AuthorMiddleName,
3     AuthorLastName, YearPublished, BookStatus
4 FROM books
5 ORDER BY bookID;

```



Discover

- Add Book
- Add Member

Library

- Borrow
- Return book
- Books
- Members**

## LIBRARY BOOK MANAGEMENT SYSTEM

Books Available

### Member Information

ID	Member Name	Department
ST-101	Juan Cruz	Student <a href="#">Edit</a> <a href="#">Delete</a>
ST-102	Vince Diay	Student <a href="#">Edit</a> <a href="#">Delete</a>
FC-104	Sarah Discaya	Faculty <a href="#">Edit</a> <a href="#">Delete</a>
ST-105	Sandro Marcos	Student <a href="#">Edit</a> <a href="#">Delete</a>
ST-106	Inday Gomez	Student <a href="#">Edit</a> <a href="#">Delete</a>
FC-107	Maria Lourdez	Faculty <a href="#">Edit</a> <a href="#">Delete</a>
ST-108	John Lloyd	Student <a href="#">Edit</a> <a href="#">Delete</a>
FC-109	Maria Leonora Teresa	Faculty <a href="#">Edit</a> <a href="#">Delete</a>
FC-110	Maria Defensor Santiago	Faculty <a href="#">Edit</a> <a href="#">Delete</a>

Figure 26: Members list table

```

1 SELECT
2     memberID, department, FirstName, MiddleName, LastName
3 FROM member
4 ORDER BY memberID;

```



## Transaction/Processes Design

The screenshot shows the 'OwIReg' library management system interface. On the left is a sidebar with navigation options: Discover (Add Book, Membership), Library (Borrow, Return book, Books, Members), and a 'Borrow' button. The main content area is titled 'LIBRARY BOOK MANAGEMENT SYSTEM' and contains a 'Book Checkout' form. The form has the following fields: Member ID, Book ID, Department, Date borrowed (YYYY-MM-DD), Due date (YYYY-MM-DD), and Staff ID (Assigned) (ID...). At the bottom of the form are 'Back' and 'Next' buttons.

Figure 27: Borrow Transaction

```

1  -- Insert into borrow_transactions
2  INSERT INTO borrow_transactions (memberID, staffID, Date_Borrowed, Due_Date)
3  VALUES ('M001', 'S002', '2025-09-30', '2025-10-07');
4
5  -- Link the book into borrow_details
6  INSERT INTO borrow_details (TransactionId, bookID, status)
7  VALUES (LAST_INSERT_ID(), 'B011', 'BORROWED');
8
9  -- Update book status to BORROWED
10 UPDATE books
11 SET BookStatus = 'BORROWED'
12 WHERE bookID = 'B011';

```

The screenshot shows the 'OwIReg' library management system interface. On the left is a sidebar with navigation options: Discover (Add Book, Membership), Library (Borrow, Return book, Books, Members), and a 'Book Return' button. The main content area is titled 'LIBRARY BOOK MANAGEMENT SYSTEM' and contains a 'Book Return' form. The form has the following fields: Book ID, Date returned (YYYY-MM-DD), and Staff ID (Assigned) (ID...). At the bottom of the form are 'Back' and 'Next' buttons.

Figure 28: Return Transaction

```

1  -- Update borrow_details with return date
2  UPDATE borrow_details
3  SET return_date = '2025-10-05', status = 'RETURNED'
4  WHERE TransactionId = 21 AND bookID = 'B011';
5
6  -- Update book status back to AVAILABLE
7  UPDATE books
8  SET BookStatus = 'AVAILABLE'
9  WHERE bookID = 'B011';

```

## Reports

### List of All Borrowed Books

```

1 SELECT b.bookID, b.Title, m.FirstName, m.LastName, bt.Date_Borrowed, bt.Due_Date
2 FROM borrow_details bd
3 JOIN books b ON bd.bookID = b.bookID
4 JOIN borrow_transactions bt ON bd.TransactionID = bt.TransactionID
5 JOIN member m ON bt.memberID = m.memberID
6 WHERE bd.status = 'BORROWED';

```

### Borrowing History of a Member

```

1 SELECT m.memberID, m.FirstName, m.LastName, b.Title, bt.Date_Borrowed, bd.return_date, bd.status
2 FROM borrow_transactions bt
3 JOIN member m ON bt.memberID = m.memberID
4 JOIN borrow_details bd ON bt.TransactionID = bd.TransactionID
5 JOIN books b ON bd.bookID = b.bookID
6 WHERE m.memberID = 'M001';

```

### Most Borrowed Books

```

1 SELECT b.Title, COUNT(bd.bookID) AS TimesBorrowed
2 FROM borrow_details bd
3 JOIN books b ON bd.bookID = b.bookID
4 GROUP BY bd.bookID
5 ORDER BY TimesBorrowed DESC
5 LIMIT 5;

```

### Transactions Processed by Staff

```

1 SELECT s.StaffFirstName, s.StaffLastName, COUNT(bt.TransactionID) AS TransactionsHandled
2 FROM borrow_transactions bt
3 JOIN staff s ON bt.staffID = s.staffID
4 GROUP BY bt.staffID
5 ORDER BY TransactionsHandled DESC;

```

### Daily Transaction summary

---

```

1 SELECT Date_Borrowed, COUNT(TransactionID) AS TotalTransactions
2 FROM borrow_transactions
3 GROUP BY Date_Borrowed
4 ORDER BY Date_Borrowed DESC;

```

## Appendix A

### LIC Receipt

LEARNING AND INFORMATION  
CENTER  
Bolton Campus  
Matina Campus  
Davao City, 8000


09/09/2025 7:35 pm

Library Checkout Receipt

PABLO, LOURDE VINCENT  
MAGKIDONG  
S553470

Today's Checkouts

-----  
Child sexual abuse : moral panic or  
state of denial? /  
Barcode: 7 159038  
Due Date: 11/09/2025

SERVE BY: 

## References

- Andri, A., Sopiah, N., & Oktaviani, N. (2025). Development of a book borrowing & returning system using the extreme programming method. *Journal of Information Systems and Application Innovation*, 6(2). Retrieved from <https://doi.org/10.26486/jisai.v6i2.239>
- Marlindawati ., Misinem ., & Adhiatma, P. (2024). Analyzing and Enhancing Data Management for the E-Library Transaction System. *Journal of Data Science*, 2024. Retrieved from <https://iuojs.intimal.edu.my/index.php/jods/article/view/558>
- Mengping, C. (2023). Strategies and practices to enhance the efficiency of borrowing and returning books in college libraries. *Academic Journal of Humanities & Social Sciences*, 6(22), 53–58. . Retrieved from <https://doi.org/10.25236/AJHSS.2023.062209>
- Song, W. (2018). Analysis of new library borrowing and returning mode based on book transfer system. In *Proceedings of the 2018 International Workshop on Advances in Social Sciences (IWASS 2018)*. Retrieved from [https://www.webofproceedings.org/proceedings\\_series/ESSP/IWASS%202018/IWASS1231018.pdf](https://www.webofproceedings.org/proceedings_series/ESSP/IWASS%202018/IWASS1231018.pdf)