Database Management Systems Lab
Project

Team members:
Amal Thomas
Mishel Mary Netto
Nihal S
Bhavesh Suresh Kumar
Ann Rinto
Alwin Joseph
Durga Ramaseshan
Aoron Seby
Bride Benson
Aquiline Rose Fernandez

Problem Statement

Implement a library management system

Theory

Python is a popular programming language that is used for a wide range of applications, including data analysis and web development. MySQL, on the other hand, is a popular open-source relational database management system that is used to store and manage data.

Connecting Python to MySQL allows developers to interact with and manipulate data in a MySQL database using Python code. This can be useful for tasks such as data analysis, data processing, and building web applications.

To establish a connection between Python and MySQL, developers typically use a Python library called "mysql-connector-python" or "pymysql". These libraries provide an interface between Python and MySQL, allowing developers to execute SQL queries, retrieve data from a

MySQL database, and insert or update data in a MySQL database.

To connect to a MySQL database from Python, developers need to provide the connection details such as the database hostname, port number, username, password, and database name. Once the connection is established, developers can create a cursor object to execute SQL queries and retrieve data from the MySQL database.

In summary, connecting Python to MySQL allows developers to interact with and manipulate data in a MySQL database using Python code, which can be useful for a wide range of applications.

PROGRAM CODE

MySql

```
CREATE DATABASE library;

USE library;

CREATE TABLE books (
    id INT PRIMARY KEY AUTO_INCREMENT,
    title VARCHAR(255) NOT NULL,
    author VARCHAR(255) NOT NULL,
    published_year INT NOT NULL,
    available BOOLEAN NOT NULL DEFAULT
TRUE
);

CREATE TABLE members (
    id INT PRIMARY KEY AUTO_INCREMENT,
    name VARCHAR(255) NOT NULL,
    email VARCHAR(255) NOT NULL UNIQUE,
    phone VARCHAR(255) NOT NULL UNIQUE
);

CREATE TABLE loans (
    id INT PRIMARY KEY AUTO_INCREMENT,
```

```
    book_id INT NOT NULL,
    member_id INT NOT NULL,
    start_date DATE NOT NULL,
    due_date DATE NOT NULL,
    returned BOOLEAN NOT NULL DEFAULT
FALSE,
    FOREIGN KEY (book_id) REFERENCES
books(id),
    FOREIGN KEY (member_id) REFERENCES
members(id)
);



USE library;

INSERT INTO books (title, author,
published_year, available) VALUES
("The Hobbit", "J.R.R. Tolkien", 1937, 4),
("To the Lighthouse", "Virginia Woolf", 1927, 2),
("A Passage to India", "E.M. Forster", 1924, 8),
("The Sun Also Rises", "Ernest Hemingway",
1926, 3),
```

```
("Slaughterhouse-Five", "Kurt Vonnegut", 1969,
1),
("The Hitchhiker's Guide to the Galaxy", "Douglas
Adams", 1979, 1),
("One Hundred Years of Solitude", "Gabriel Garcia
Marquez", 1967, 1),
("Beloved", "Toni Morrison", 1987, 6),
("The Color Purple", "Alice Walker", 1982, 11),
("The Bluest Eye", "Toni Morrison", 1970, 5),
("Their Eyes Were Watching God", "Zora Neale
Hurston", 1937, 9),
("The Joy Luck Club", "Amy Tan", 1989, 10);
```

Python

```
import mysql.connector
mydb = mysql.connector.connect(
    host="localhost",
    user="root",
    password="amalthomas",
    database="library"
)
```

```
cursor = mydb.cursor()
def add_book():
    title=input("Enter the Title of the book: ")
    author=input("Enter the name of the author: ")
    published_year=input("Enter the year of
publication: ")
    sql = "INSERT INTO books (title, author,
published_year) VALUES (%s, %s, %s)"
    val = (title, author, published_year)
    cursor.execute(sql, val)
    mydb.commit()
    print(cursor.rowcount, "book inserted")

def delete_book():
    book_id=int(input("Enter the id of the book to
delete:"))
    sql = "DELETE FROM books WHERE id = %s"
    val = (book_id,)
    cursor.execute(sql, val)
    mydb.commit()
    print(cursor.rowcount, "book deleted")

def add_member():
```

```
    name=input("Enter the name of the member : ")
    email=input("Enter the mail id of the member: ")
    phone=input("Enter phone number: ")
    sql = "INSERT INTO members (name, email,
phone) VALUES (%s, %s, %s)"
    val = (name, email, phone)
    cursor.execute(sql, val)
    mydb.commit()
    print(cursor.rowcount, "member inserted")

def delete_member():
    member_id=input("Enter the id of the member:
")
    sql = "DELETE FROM members WHERE id =
%s"
    val = (member_id,)
    cursor.execute(sql, val)
    mydb.commit()
    print(cursor.rowcount, "member deleted")

def loan_book():
    book_id=input("Enter the id of the book to
borrow: ")
```

```
    member_id=input("Enter the id of the member
:")
    start_date=input("Enter the start date: ")
    due_date=input("Enter the due date: ")
    sql = "INSERT INTO loans (book_id,
member_id, start_date, due_date) VALUES (%s,
%s, %s, %s)"
    val = (book_id, member_id, start_date,
due_date)
    cursor.execute(sql, val)
    mydb.commit()
    sql="UPDATE books SET available=available-1
WHERE id=%s"
    val=(book_id,)
    cursor.execute(sql,val)
    mydb.commit()
    print(cursor.rowcount, "book loaned")

def return_book():
    book_id=input("Enter the book ID")
    sql = "UPDATE loans SET returned = TRUE
WHERE id = %s AND returned = FALSE"
    val = (book_id,)
```

```
    cursor.execute(sql, val)
    mydb.commit()
    sql="UPDATE books SET
available=available+1 WHERE id=%s"
    val=(book_id,)
    cursor.execute(sql,val)
    mydb.commit()
    print(cursor.rowcount, "book returned")

def list_books():
    sql = "SELECT * FROM books"
    cursor.execute(sql)
    result = cursor.fetchall()
    for row in result:
        print(row)

def list_members():
    sql = "SELECT * FROM members"
    cursor.execute(sql)
    result = cursor.fetchall()
    for row in result:
        print(row)
```

```
def list_loans():
    sql = "SELECT loans.id, books.title,
members.name, loans.start_date,
loans.due_date, loans.returned FROM loans JOIN
books ON loans.book_id = books.id JOIN
members ON loans.member_id = members.id"
    cursor.execute(sql)
    result = cursor.fetchall()
    for row in result:
        print(row)


while True:

    print("Menu:")
    print("1. Add Book")
    print("2. Delete Book")
    print("3. Add Member")
    print("4. Delete Member")
    print("5. Borrow Book")
    print("6. Retrun Book")
    print("7. List Members")
    print("8. List Borrow")
```

```
print("9. List Books")
print("10. Exit")


choice = input("Enter your choice: ")


if choice == "1":
    print("You selected Add Book ")
    add_book()

elif choice == "2":
    print("You selected Delete Book")
    delete_book()

elif choice == "3":
    print("You selected Add Member")
    add_member()

elif choice == "4":
    print("You selected Delete Member")
    delete_member()
```

```
elif choice == "5":
    print("You selected Borrow Book")
    loan_book()

elif choice == "6":
    print("You selected Return Book")
    return_book()

elif choice == "7":
    print("You selected List Members")
    list_members()

elif choice == "8":
    print("You Selected List Borrow")
    list_loans()

elif choice == "9":
    print("You selected List Books")
    list_books()

else:
    print("Exit")
    break
```

OUTPUT

1.

```
File  Edit  Shell  Debug  Options  Window  Help
Python 3.11.2 (tags/v3.11.2:878ead1, Feb  7 2023, 16:38:35) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
== RESTART: C:\Users\amalt\AppData\Local\Programs\Python\Python311\library.py ==
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice: 1
You selected Add Book
Enter the Title of the book: No Exit
Enter the name of the author: Taylor Adams
Enter the year of publication: 2017
1 book inserted
```

```
mysql> select * from books;
+----+-----------------------------------+-----------------------+----------------+-----------+
| id | title                             | author                | published_year | available |
+----+-----------------------------------+-----------------------+----------------+-----------+
|  1 | The Hobbit                        | J.R.R. Tolkien        |           1937 |         4 |
|  2 | To the Lighthouse                 | Virginia Woolf        |           1927 |         2 |
|  3 | A Passage to India                | E.M. Forster          |           1924 |         8 |
|  4 | The Sun Also Rises                | Ernest Hemingway      |           1926 |         3 |
|  5 | Slaughterhouse-Five               | Kurt Vonnegut         |           1969 |         1 |
|  6 | The Hitchhiker's Guide to the Galaxy | Douglas Adams      |           1979 |         1 |
|  7 | One Hundred Years of Solitude     | Gabriel Garcia Marquez |           1967 |         1 |
|  8 | Beloved                           | Toni Morrison         |           1987 |         6 |
|  9 | The Color Purple                  | Alice Walker          |           1982 |        11 |
| 10 | The Bluest Eye                    | Toni Morrison         |           1970 |         5 |
| 11 | Their Eyes Were Watching God      | Zora Neale Hurston    |           1937 |         9 |
| 12 | The Joy Luck Club                 | Amy Tan               |           1989 |        10 |
| 13 | No Exit                           | Taylor Adams          |           2017 |         1 |
+----+-----------------------------------+-----------------------+----------------+-----------+
13 rows in set (0.00 sec)
```

2.

```
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice: 9
You selected List Books
(1, 'The Hobbit', 'J.R.R. Tolkien', 1937, 4)
(2, 'To the Lighthouse', 'Virginia Woolf', 1927, 2)
(3, 'A Passage to India', 'E.M. Forster', 1924, 8)
(4, 'The Sun Also Rises', 'Ernest Hemingway', 1926, 3)
(5, 'Slaughterhouse-Five', 'Kurt Vonnegut', 1969, 1)
(6, "The Hitchhiker's Guide to the Galaxy", 'Douglas Adams', 1979, 1)
(7, 'One Hundred Years of Solitude', 'Gabriel Garcia Marquez', 1967, 1)
(8, 'Beloved', 'Toni Morrison', 1987, 6)
(9, 'The Color Purple', 'Alice Walker', 1982, 11)
(10, 'The Bluest Eye', 'Toni Morrison', 1970, 5)
(11, 'Their Eyes Were Watching God', 'Zora Neale Hurston', 1937, 9)
(12, 'The Joy Luck Club', 'Amy Tan', 1989, 10)
(13, 'No Exit', 'Taylor Adams', 2017, 1)
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice: 2
You selected Delete Book
Enter the id of the book to delete:3
1 book deleted
```

```
mysql> select * from books;
+----+-------------------------------------+-----------------------+----------------+-----------+
| id | title                               | author                | published_year | available |
+----+-------------------------------------+-----------------------+----------------+-----------+
|  1 | The Hobbit                          | J.R.R. Tolkien        |           1937 |         4 |
|  2 | To the Lighthouse                   | Virginia Woolf        |           1927 |         2 |
|  4 | The Sun Also Rises                  | Ernest Hemingway      |           1926 |         3 |
|  5 | Slaughterhouse-Five                 | Kurt Vonnegut         |           1969 |         1 |
|  6 | The Hitchhiker's Guide to the Galaxy | Douglas Adams         |           1979 |         1 |
|  7 | One Hundred Years of Solitude       | Gabriel Garcia Marquez |           1967 |         1 |
|  8 | Beloved                             | Toni Morrison         |           1987 |         6 |
|  9 | The Color Purple                    | Alice Walker          |           1982 |        11 |
| 10 | The Bluest Eye                      | Toni Morrison         |           1970 |         5 |
| 11 | Their Eyes Were Watching God        | Zora Neale Hurston    |           1937 |         9 |
| 12 | The Joy Luck Club                   | Amy Tan               |           1989 |        10 |
| 13 | No Exit                             | Taylor Adams          |           2017 |         1 |
+----+-------------------------------------+-----------------------+----------------+-----------+
12 rows in set (0.00 sec)
```

3.

```
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice: 3
You selected Add Member
Enter the name of the member : Hathik
Enter the mail id of the member: hathik@mail.com
Enter phone number: 9837673636
1 member inserted
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice: 4
You selected Delete Member
Enter the id of the member: 2
1 member deleted
```

```
mysql> select * from members;
+----+---------------+--------------------+-------------+
| id | name          | email              | phone       |
+----+---------------+--------------------+-------------+
|  1 | Amal Thomas   | amalthomas@mail.com | 98976646434 |
|  2 | Jayasankar C M | jay@mail.com       | 374374343   |
|  3 | Bharath S     | bharath@mail.com   | 9383663736  |
|  4 | Vishnu        | vish@mail.com      | 39386373883 |
|  5 | Hathik        | hathik@mail.com    | 9837673636  |
+----+---------------+--------------------+-------------+
5 rows in set (0.00 sec)
```

4.(id number 2 deleted)

```
mysql> select * from members;
+----+-------------+---------------------+-------------+
| id | name        | email               | phone       |
+----+-------------+---------------------+-------------+
|  1 | Amal Thomas | amalthomas@mail.com | 98976646434 |
|  3 | Bharath S   | bharath@mail.com    | 9383663736  |
|  4 | Vishnu      | vish@mail.com       | 39386373883 |
|  5 | Hathik      | hathik@mail.com     | 9837673636  |
+----+-------------+---------------------+-------------+
4 rows in set (0.00 sec)
```

5.(The availability of book 1 reduced)

```
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice: 5
You selected Borrow Book
Enter the id of the book to borrow: 1
Enter the id of the member :1
Enter the start date: 2023-02-20
Enter the due date: 2023-03-20
1 book loaned
```

```
mysql> select * from books;
+----+-------------------------------------+----------------------+----------------+-----------+
| id | title                               | author               | published_year | available |
+----+-------------------------------------+----------------------+----------------+-----------+
|  1 | The Hobbit                          | J.R.R. Tolkien       |           1937 |         3 |
|  2 | To the Lighthouse                   | Virginia Woolf       |           1927 |         2 |
|  4 | The Sun Also Rises                  | Ernest Hemingway     |           1926 |         3 |
|  5 | Slaughterhouse-Five                 | Kurt Vonnegut        |           1969 |         1 |
|  6 | The Hitchhiker's Guide to the Galaxy | Douglas Adams        |           1979 |         1 |
|  7 | One Hundred Years of Solitude       | Gabriel Garcia Marquez |           1967 |         1 |
|  8 | Beloved                             | Toni Morrison        |           1987 |         6 |
|  9 | The Color Purple                    | Alice Walker         |           1982 |        11 |
| 10 | The Bluest Eye                      | Toni Morrison        |           1970 |         5 |
| 11 | Their Eyes Were Watching God        | Zora Neale Hurston   |           1937 |         9 |
| 12 | The Joy Luck Club                   | Amy Tan              |           1989 |        10 |
| 13 | No Exit                             | Taylor Adams         |           2017 |         1 |
+----+-------------------------------------+----------------------+----------------+-----------+
12 rows in set (0.00 sec)
```

6,7.

```
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice: 6
You selected Return Book
Enter the book ID1
1 book returned
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice: 7
You selected List Members
(1, 'Amal Thomas', 'amalthomas@mail.com', '98976646434')
(3, 'Bharath S', 'bharath@mail.com', '9383663736')
(4, 'Vishnu ', 'vish@mail.com', '39386373883')
(5, 'Hathik ', 'hathik@mail.com', '9837673636')
```

```
mysql> select * from loans;
+----+---------+-----------+------------+------------+----------+
| id | book_id | member_id | start_date | due_date   | returned |
+----+---------+-----------+------------+------------+----------+
|  1 |       4 |         1 | 2023-02-20 | 2023-03-20 |        1 |
|  2 |       1 |         1 | 2023-02-20 | 2023-03-20 |        1 |
+----+---------+-----------+------------+------------+----------+
2 rows in set (0.00 sec)
```

8,9.

```
Enter your choice: 8
You Selected List Borrow
(1, 'The Sun Also Rises', 'Amal Thomas', datetime.date(2023, 2, 20), datetime.date(2023, 3, 20), 1)
(2, 'The Hobbit', 'Amal Thomas', datetime.date(2023, 2, 20), datetime.date(2023, 3, 20), 1)
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice: 9
You selected List Books
(1, 'The Hobbit', 'J.R.R. Tolkien', 1937, 4)
(2, 'To the Lighthouse', 'Virginia Woolf', 1927, 2)
(4, 'The Sun Also Rises', 'Ernest Hemingway', 1926, 3)
(5, 'Slaughterhouse-Five', 'Kurt Vonnegut', 1969, 1)
(6, "The Hitchhiker's Guide to the Galaxy", 'Douglas Adams', 1979, 1)
(7, 'One Hundred Years of Solitude', 'Gabriel Garcia Marquez', 1967, 1)
(8, 'Beloved', 'Toni Morrison', 1987, 6)
(9, 'The Color Purple', 'Alice Walker', 1982, 11)
(10, 'The Bluest Eye', 'Toni Morrison', 1970, 5)
(11, 'Their Eyes Were Watching God', 'Zora Neale Hurston', 1937, 9)
(12, 'The Joy Luck Club', 'Amy Tan', 1989, 10)
(13, 'No Exit', 'Taylor Adams', 2017, 1)
Menu:
1. Add Book
2. Delete Book
3. Add Member
4. Delete Member
5. Borrow Book
6. Retrun Book
7. List Members
8. List Borrow
9. List Books
10. Exit
Enter your choice:
```

Conclusion

The code contains most functionalities of a library management system including

-ADD BOOK
-DELETE BOOK
-ADD MEMBER
-DELETE MEMBER
-BORROW BOOK
-RETURN BOOK
-LIST MEMBERS
-LIST BOOK
-LIST BORROW

The MySql database used here is called Library.
It consist of 3 tables:-
-Books
-Members
-Loans

Books table stores all the details of books that are available in the library.
Members table stores the information of all the members.

Loan table stores the details of the book borrowed.

Result

Library Management system is successfully executed using Python and MySql.

~~~~~Thank You~~~~~