INDEX

LIBRARY

Brief Overview Of the Project

The main objective of this project on library management is to manage the books and members.

This project is developed on Python and MYSQL.

The project is totally built at administrative end and only administrator is guaranteed the access.

The purpose of the project is to build an application program to reduce the manual work for managing the, stock, book issue details and members detail.

It tracks all the details about stocks, books , issues of books member details it also prints various reports as per input given by the user.

INPUT DATA AND VALIDATION OF PROJECT:

- All the input data values are validated and are not meant to take invalid values, if provided appropriate message will be displayed.
- Each form of input cannot accept the blank values.
- Minimizing errors in data.
- Controlling amount of input.

SOFTWARE AND HARDWARE REQUIREMENTS:

Data file handling has been effectively used in the program. The database is a collection of interrelated data to serve multiple applications. That is database programs create files of information. So we see that files are worked with most, inside the program.

DBMS: The software required for the management of data is called as DBMS. It has3 models:

- Relation model

- Hierarchical model

- Network model

RELATIONAL DATA MODEL: It's based on the concept on relation. Relation is the table that consists of rows and columns. The rows of the table are called tuple and the columns of the table are called attribute. Numbers of rows in the table is called as cardinality. Number of columns in the table is called as degree.

HIERARCHICAL MODEL: In this type of model, we have multiple records for each record. A particular record has one parent record. No chide record can exist without parent record. In this, the records are organized in tree.

NETWORK MODEL: In this, the data is represented by collection of records and relationship is represented by (ink or association.

CHARACTERISTICS OF DBMS:

- reduces the redundancy

- Reduction of data in inconsistency

- Data sharing

- Data standardization

DIFFERENT TYPES OF FILES: -BASED ON ACCESS:

- Sequential file

- Serial file

- Random (direct access) file BASED ON STORAGE:-

- Text file

- Binary File

Need Of Computation

The application of computer technology in library resources management marks the progress and development of an era. With advanced science and technology in place of part of human labour, the library resources management becomes more scientific, accurate, efficient and effective to reduce problems of service quality caused by human errors in the process of library resources management, which enhances the management level to a new step.

The computerisation has a strong function data information processing as well as storage. Moreover, thanks to the advancement of network technology, it is easier to spread and circulate books and materials.

With the computerisation more flexible management of library resources and simplified process ensure that all the library resources can be fully taken use of and well protected.

Advantages

- It generates the report on stocks, book rental details and member details.
- We can easily export PDF on sales, products and stocks.
- Applications can also provide excel export for stocks and books rental details.
- It deals with monitoring the information and transaction of books.
- It increases the efficiency of managing the book rental and stock system.
- It has higher efficiency of editing, adding and updating of records.
- Provides the searching facilities on various factors.

Limitations

- Excel export has not been developed for stocks and other fields.
- The transactions are executed in offline mode only.
- Online transactions for stock, rental due fine or other data modificationsare not possible.
- Offline reports of stocks cannot be generated due to batch mode execution.

Source code

DBMS: MySQL

Host: local host

User: root

Pass: root

Database: library

Table structure:

books:

```
mysql> use library;
Database changed
mysql> desc books;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| book_id   | varchar(10) | NO   | PRI | NULL    |       |
| book_name | varchar(30) | NO   |     | NULL    |       |
| writer    | varchar(20) | YES  |     | NULL    |       |
| price     | int         | NO   |     | NULL    |       |
| stock     | int         | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
5 rows in set (0.01 sec)
```

member:

```
mysql> desc member;
+----------------------+-------------+------+-----+---------+-------+
| Field                | Type        | Null | Key | Default | Extra |
+----------------------+-------------+------+-----+---------+-------+
| member_id            | int         | NO   | PRI | NULL    |       |
| member_name          | varchar(20) | YES  |     | NULL    |       |
| number_books_borrowed| int         | YES  |     | NULL    |       |
| member_expiry_date   | date        | YES  |     | NULL    |       |
+----------------------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

rental:

```
mysql> desc rental;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| rental_id   | varchar(20) | NO   | PRI | NULL    |       |
| book_id     | varchar(10) | NO   | MUL | NULL    |       |
| member_id   | int         | NO   | MUL | NULL    |       |
| date_borrow | date        | YES  |     | NULL    |       |
| date_return | date        | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

Python code:

```python
import mysql.connector
import datetime

mydb=mysql.connector.connect(host="localhost",\
                user="root",\
                password="swayamp123",\
                database="library")

mycursor=mydb.cursor()

def menu():
    choice="c"
    choice=choice.lower()
    while(choice=="c"):
        print("Enter 1:To veiw a table")
        print("Enter 2:To add a book")
        print("Enter 3:To edit a book detail")
        print("Enter 4:To delete a book form the table")
        print("Enter 5:To add a member")
        print("Enter 6:To edit a member detail")
        print("Enter 7:To delete a member from the list")
        print("Enter 8:To issue a book to a member")
        print("Enter 9:To remove a book issue detail")
        choice=input("Enter your choice:")
        if(choice=="1"):
            print("Which table do you want to view books or member or rental?")
            choice=input("Enter your choice")
            if(choice.lower() in ("books","member","rental")):
                view(choice.lower())
            else:
                print("Invalid choice")
        elif(choice=="2"):
            addbook()
        elif(choice=="3"):
            editbook()
        elif(choice=="4"):
            delbook()
        elif(choice=="5"):
            addmember()
        elif(choice=="6"):
            editmember()
```

```python
        elif(choice=="7"):
            delmember()
        elif(choice=="8"):
            addrental()
        elif(choice=="9"):
            delrental()
        else:
            print("Invaild choice")
        choice=input("To countinue enter 'c' or 'q' to quit.")
        choice=choice.lower()

def search(a,b):
    sql="select * from "+b
    mycursor.execute(sql)
    data=mycursor.fetchall()
    flag=False
    for x in data:
        if(x[0]==a):
            flag=True
    return flag

def datemod(a,b):
    d=int(a.day)
    m=int(a.month)
    y=int(a.year)
    if(m in (1,3,5,7,8,10)):
        if((d+b)>31):
            d=(d+b)%31
            m+=1
        else:
            d=(d+b)%31
    elif(m in (4,6,9,11)):
        if((d+b)>30):
            d=(d+b)%30
            m+=1
        else:
            d=(d+b)%30
    elif(m==12):
        if((d+b)>31):
            d=(d+b)%31
            m=1
            y+=1
        else:
```

```python
            d=(d+b)%31
    else:
        if(y%4==0):
            if((d+b)>31):
                d=(d+b)%29
                m+=1
            else:
                d=(d+b)%29
        else:
            if((d+b)>31):
                d=(d+b)%28
                m+=1
            else:
                d=(d+b)%28
    nd=datetime.datetime(y,m,d)
    newdate=nd.date()
    return newdate

def view(a):
    sql="select * from "+a
    mycursor.execute(sql)
    data=mycursor.fetchall()
    for x in data:
        print(x)

def addbook():
    L=[]
    bookid=input("Enter book_id:")
    bookname=input("Enter book name:")
    writer=input("Enter name of writer:")
    price=int(input("Enter price of the book:"))
    stock=int(input("Enter stock of the book:"))
    L.append(bookid)
    L.append(bookname)
    L.append(writer)
    L.append(price)
    L.append(stock)
    newbook=(L)
    sql="insert into
books(book_id,book_name,writer,price,stock)values(%s,%s,%s,%s,%s)"
    mycursor.execute(sql,newbook)
    mydb.commit()
    print("One Book added.")
```

```python
def editbook():
    bookid=input("Enter book_id:")
    flag=search(bookid,"books")
    if(flag==True):
        field=input("Enter 'price' to change price or 'stock' to change stock:")
        field=field.lower()
        if(field=="price" or field=="stock"):
            new=int(input("Enter the new value:"))
            sql="update books set "+field+" = %s where book_id = %s"
            ed=(new,bookid)
            mycursor.execute(sql,ed)
            mydb.commit()
            print("Edited")
            print("Edited Record:")
            sql="select * from books where book_id=%s"
            ed=([bookid])
            mycursor.execute(sql,ed)
            rec=mycursor.fetchall()
            for x in rec:
                print(x)
        else:
            print("Invalid choice")
    else:
        print("Invalid book_id")

def delbook():
    bookid=input("Enter the book_id to be deleted:")
    flag=search(bookid,"books")
    if(flag==True):
        sql="select member_id from rental where book_id=%s"
        d=([bookid])
        mycursor.execute(sql,d)
        rec=mycursor.fetchall()
        for x in rec:
            sql="select number_books_borrowed from member where member_id=%s"
            mycursor.execute(sql,[x[0]])
            r=mycursor.fetchall()
            for i in r:
                nbb=int(i[0])-1
                sql="update member set number_books_borrowed = %s where member_id = %s"
```

```python
            up=(nbb,x[0])
            mycursor.execute(sql,up)
            mydb.commit()
        sql="delete from books where book_id=%s"
        ide=([bookid])
        mycursor.execute(sql,ide)
        mydb.commit()
        sql="delete from rental where book_id=%s"
        mycursor.execute(sql,ide)
        mydb.commit()
        print("One book deletled")
    else:
        print("Invalid book_id")

def addmember():
    L=[]
    memid=input("Enter member_id:")
    memname=input("Enter member name:")
    year=int(input("Enter year(yyyy) of membership expiry date:"))
    month=int(input("Enter month(mm) of membership expiry date:"))
    d=int(input("Enter date(dd) of membership expiry date:"))
    da=datetime.datetime(year,month,d)
    dat=da.date()
    nbook=int(input("Enter number of books borrowed:"))
    L.append(memid)
    L.append(memname)
    L.append(nbook)
    L.append(dat)
    newmem=(L)
    sql="insert into
member(member_id,member_name,number_books_borrowed,member_expiry_
date)values(%s,%s,%s,%s)"
    mycursor.execute(sql,newmem)
    mydb.commit()
    print("One member added.")

def editmember():
    memid=int(input("Enter member_id:"))
    flag=search(memid,"member")
    if(flag==True):
        field=input("Enter 'exp' to change member_expiry_date or 'borrow' to
change number_books_boroowed")
        field=field.lower()
```

```python
            if(field=="exp"):
                year=int(input("Enter year(yyyy) of new membership expiry date:"))
                month=int(input("Enter month(mm) of new membership expiry date:"))
                d=int(input("Enter date(dd) of new membership expiry date:"))
                da=datetime.datetime(year,month,d)
                dat=da.date()
                sql="update member set member_expiry_date = %s where member_id = %s"
                ed=(dat,memid)
                mycursor.execute(sql,ed)
                mydb.commit()
                print("Edited")
                print("Edited Record:")
                sql="select * from member where member_id=%s"
                ed=([memid])
                mycursor.execute(sql,ed)
                rec=mycursor.fetchall()
                for x in rec:
                    print(x)
            elif(field=="borrow"):
                new=int(input("Enter the new value"))
                sql="update member set number_books_borrowed = %s where member_id = %s"
                ed=(new,memid)
                mycursor.execute(sql,ed)
                mydb.commit()
                print("Edited")
                print("Edited Record:")
                sql="select * from member where member_id=%s"
                ed=([memid])
                mycursor.execute(sql,ed)
                rec=mycursor.fetchall()
                for x in rec:
                    print(x)
            else:
                print("Invalid choice")
        else:
            print("Invalid member_id")

def delmember():
    memid=int(input("Enter the member_id to be deleted:"))
    flag=search(memid,"member")
    if(flag==True):
```

```python
        sql="select book_id from rental where member_id=%s"
        d=([memid])
        mycursor.execute(sql,d)
        rec=mycursor.fetchall()
        for x in rec:
            sql="select stock from books where book_id=%s"
            mycursor.execute(sql,[x[0]])
            r=mycursor.fetchall()
            for i in r:
                nstk=int(i[0])+1
                sql="update books set stock = %s where book_id = %s"
                up=(nstk,x[0])
                mycursor.execute(sql,up)
                mydb.commit()
        sql="delete from member where member_id=%s"
        ide=([memid])
        mycursor.execute(sql,ide)
        mydb.commit()
        sql="delete from rental where member_id=%s"
        mycursor.execute(sql,ide)
        mydb.commit()
        print("One member deletled")
    else:
        print("Invalid member_id")

def addrental():
    memid=int(input("Enter member_id:"))
    d=datetime.datetime.now()
    flag=search(memid,"member")
    if(flag==True):
        L=[]

rentalid="R."+str(d.year)+str(d.month)+str(d.day)+"."+str(d.hour)+str(d.minute)
+str(d.second)
        db=d.date()
        bookid=input("Enter book_id:")
        fl=search(bookid,"books")
        if(fl==True):
            ext=int(input("Enter the number of days of rental period:"))
            dr=datemod(db,ext)
            L.append(rentalid)
            L.append(bookid)
            L.append(memid)
```

```python
            L.append(db)
            L.append(dr)
            newrental=(L)
            sql="insert into
rental(rental_id,book_id,member_id,date_borrow,date_return)
values(%s,%s,%s,%s,%s)"
            mycursor.execute(sql,newrental)
            mydb.commit()
            sql="select stock from books where book_id=%s"
            bid=([bookid])
            mycursor.execute(sql,bid)
            stk=mycursor.fetchall()
            nstk=int(stk[0][0])-1
            sql="update books set stock=%s where book_id=%s"
            x=(nstk,bookid)
            mycursor.execute(sql,x)
            mydb.commit()
            sql="select number_books_borrowed from member where
member_id=%s"
            mid=([memid])
            mycursor.execute(sql,mid)
            num=mycursor.fetchall()
            numb=int(num[0][0])+1
            sql="update member set number_books_borrowed=%s where
member_id=%s"
            x=(numb,memid)
            mycursor.execute(sql,x)
            mydb.commit()
            print("One Rental Details added.")
        else:
            print("Invalid book_id")
    else:
        print("Invalid member_id")

def delrental():
    renid=input("Enter the rental_id to be deleted:")
    x=([renid])
    flag=search(renid,"rental")
    if(flag==True):
        sql="select book_id from rental where rental_id=%s"
        mycursor.execute(sql,x)
        bookid=mycursor.fetchall()
        sql="select stock from books where book_id=%s"
```

```
        mycursor.execute(sql,bookid[0])
        stk=mycursor.fetchall()
        nstk=int(stk[0][0])+1
        sql="update books set stock=%s where book_id=%s"
        up=(nstk,bookid[0][0])
        mycursor.execute(sql,up)
        mydb.commit()
        sql="select member_id from rental where rental_id=%s"
        mycursor.execute(sql,x)
        memid=mycursor.fetchall()
        sql="select number_books_borrowed from member where
member_id=%s"
        mycursor.execute(sql,memid[0])
        num=mycursor.fetchall()
        numb=int(num[0][0])-1
        sql="update member set number_books_borrowed=%s where
member_id=%s"
        up=(numb,memid[0][0])
        mycursor.execute(sql,up)
        mydb.commit()
        sql="delete from rental where rental_id=%s"
        mycursor.execute(sql,x)
        mydb.commit()
        print("One Rental Detail deletled")
    else:
        print("Invalid rental_id")

menu()
```

Outputs

Main menu:

```
============ RESTART: C:\Books\Computer\12th project\library_code.py ============
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:
```

_____

Viewing a Table:

```
============ RESTART: C:\Books\Computer\12th project\library_code.py ============
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:1
Which table do you want to view books or member or rental?
Enter your choicebooks
('FA8754', 'Fundamental Astronomy', 'Richard Feynman', 750, 10)
('FP4529', '5-Pointer', 'Chetan Bhagat', 200, 45)
('HP3801', 'Harry Potter', 'JK Rowling', 250, 30)
('PJ1783', 'Percy Jackson:Blood of Olympus', 'Rick Roirdan', 350, 20)
('WF0271', 'Wings of Fire', 'APJ Abdul Kalam', 100, 75)
To countinue enter 'c' or 'q' to quit.q
```

_____

Adding a Book:

Initial table-

```
mysql> select * from books;
+---------+------------------------------+-----------------+-------+-------+
| book_id | book_name                    | writer          | price | stock |
+---------+------------------------------+-----------------+-------+-------+
| FA8754  | Fundamental Astronomy        | Richard Feynman |   750 |    10 |
| FP4529  | 5-Pointer                    | Chetan Bhagat   |   200 |    45 |
| HP3801  | Harry Potter                 | JK Rowling      |   250 |    30 |
| PJ1783  | Percy Jackson:Blood of Olympus | Rick Roirdan  |   350 |    20 |
| WF0271  | Wings of Fire                | APJ Abdul Kalam |   100 |    75 |
+---------+------------------------------+-----------------+-------+-------+
5 rows in set (0.00 sec)
```

```
>>>
============ RESTART: C:\Books\Computer\12th project\library_code.py ============
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:2
Enter book_id:CS5629
Enter book name:Computer Systems
Enter name of writer:Preeti Arora
Enter price of the book:225
Enter stock of the book:30
One Book added.
To countinue enter 'c' or 'q' to quit.q
>>>
```

Final table-

```
mysql> use library;
Database changed
mysql> select * from books;
+---------+------------------------------+-----------------+-------+-------+
| book_id | book_name                    | writer          | price | stock |
+---------+------------------------------+-----------------+-------+-------+
| CS5629  | Computer Systems             | Preeti Arora    |   225 |    30 |
| FA8754  | Fundamental Astronomy        | Richard Feynman |   750 |    10 |
| FP4529  | 5-Pointer                    | Chetan Bhagat   |   200 |    45 |
| HP3801  | Harry Potter                 | JK Rowling      |   250 |    30 |
| PJ1783  | Percy Jackson:Blood of Olympus | Rick Roirdan  |   350 |    20 |
| WF0271  | Wings of Fire                | APJ Abdul Kalam |   100 |    75 |
+---------+------------------------------+-----------------+-------+-------+
6 rows in set (0.00 sec)
```

Editing Book:

Initial table-

```
mysql> use library;
Database changed
mysql> select * from books;
+---------+-------------------------------+------------------+-------+-------+
| book_id | book_name                     | writer           | price | stock |
+---------+-------------------------------+------------------+-------+-------+
| CS5629  | Computer Systems              | Preeti Arora     |   225 |    30 |
| FA8754  | Fundamental Astronomy         | Richard Feynman  |   750 |    10 |
| FP4529  | 5-Pointer                     | Chetan Bhagat    |   200 |    45 |
| HP3801  | Harry Potter                  | JK Rowling       |   250 |    30 |
| PJ1783  | Percy Jackson:Blood of Olympus| Rick Roirdan     |   350 |    20 |
| WF0271  | Wings of Fire                 | APJ Abdul Kalam  |   100 |    75 |
+---------+-------------------------------+------------------+-------+-------+
6 rows in set (0.00 sec)
```

```
>>>
============ RESTART: C:\Books\Computer\12th project\library_code.py ===========
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:3
Enter book_id:CS5629
Enter 'price' to change price or 'stock' to change stock:price
Enter the new value:200
Edited
Edited Record:
('CS5629', 'Computer Systems', 'Preeti Arora', 200, 30)
To countinue enter 'c' or 'q' to quit.c
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:3
Enter book_id:FA8754
Enter 'price' to change price or 'stock' to change stock:stock
Enter the new value:15
Edited
Edited Record:
('FA8754', 'Fundamental Astronomy', 'Richard Feynman', 750, 15)
To countinue enter 'c' or 'q' to quit.q
>>>
```

Final table-

```
mysql> select * from books;
+---------+------------------------------+------------------+-------+-------+
| book_id | book_name                    | writer           | price | stock |
+---------+------------------------------+------------------+-------+-------+
| CS5629  | Computer Systems             | Preeti Arora     |   200 |    30 |
| FA8754  | Fundamental Astronomy        | Richard Feynman  |   750 |    15 |
| FP4529  | 5-Pointer                    | Chetan Bhagat    |   200 |    45 |
| HP3801  | Harry Potter                 | JK Rowling       |   250 |    30 |
| PJ1783  | Percy Jackson:Blood of Olympus | Rick Roirdan   |   350 |    20 |
| WF0271  | Wings of Fire                | APJ Abdul Kalam  |   100 |    75 |
+---------+------------------------------+------------------+-------+-------+
6 rows in set (0.00 sec)
```

Deletion of a book:

Initial table-

```
mysql> select * from books;
+---------+------------------------------+------------------+-------+-------+
| book_id | book_name                    | writer           | price | stock |
+---------+------------------------------+------------------+-------+-------+
| CS5629  | Computer Systems             | Preeti Arora     |   200 |    30 |
| FA8754  | Fundamental Astronomy        | Richard Feynman  |   750 |    15 |
| FP4529  | 5-Pointer                    | Chetan Bhagat    |   200 |    45 |
| HP3801  | Harry Potter                 | JK Rowling       |   250 |    30 |
| PJ1783  | Percy Jackson:Blood of Olympus | Rick Roirdan   |   350 |    20 |
| WF0271  | Wings of Fire                | APJ Abdul Kalam  |   100 |    75 |
+---------+------------------------------+------------------+-------+-------+
6 rows in set (0.00 sec)
```

```
>>>
============ RESTART: C:\Books\Computer\12th project\library_code.py ===========
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:4
Enter the book_id to be deleted:CS5629
One book deletled
To countinue enter 'c' or 'q' to quit.q
>>>
```

Final table-

```
mysql> select * from books;
+---------+-------------------------------+------------------+-------+-------+
| book_id | book_name                     | writer           | price | stock |
+---------+-------------------------------+------------------+-------+-------+
| FA8754  | Fundamental Astronomy         | Richard Feynman  |   750 |    15 |
| FP4529  | 5-Pointer                     | Chetan Bhagat    |   200 |    45 |
| HP3801  | Harry Potter                  | JK Rowling       |   250 |    30 |
| PJ1783  | Percy Jackson:Blood of Olympus| Rick Roirdan     |   350 |    20 |
| WF0271  | Wings of Fire                 | APJ Abdul Kalam  |   100 |    75 |
+---------+-------------------------------+------------------+-------+-------+
5 rows in set (0.00 sec)
```

Adding a member:

Initial table-

```
mysql> select * from member;
+-----------+-------------+----------------------+--------------------+
| member_id | member_name | number_books_borrowed| member_expiry_date |
+-----------+-------------+----------------------+--------------------+
|     11940 | Aman Gupta  |                    2 | 2022-11-30         |
|     26482 | Shreyas Sen |                    1 | 2023-01-15         |
|     78392 | Swayam Patel|                    2 | 2022-12-15         |
|     89026 | Shaurya Rathi|                   1 | 2022-09-25         |
|     94775 | Ananya Sharma|                   1 | 2022-07-01         |
+-----------+-------------+----------------------+--------------------+
5 rows in set (0.00 sec)
```

```
>>>
============ RESTART: C:\Books\Computer\12th project\library_code.py ===========
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:5
Enter member_id:90825
Enter member name:Sam Patil
Enter year(yyyy) of membership expiry date:2023
Enter month(mm) of membership expiry date:08
Enter date(dd) of membership expiry date:01
Enter number of books borrowed:0
One member added.
To countinue enter 'c' or 'q' to quit.q
>>>
```

Final table-

```
mysql> select * from member;                    Page. 21
+-----------+---------------+----------------------+--------------------+
| member_id | member_name   | number_books_borrowed | member_expiry_date |
+-----------+---------------+----------------------+--------------------+
|     11940 | Aman Gupta    |                    2 | 2022-11-30         |
|     26482 | Shreyas Sen   |                    1 | 2023-01-15         |
|     78392 | Swayam Patel  |                    2 | 2022-12-15         |
|     89026 | Shaurya Rathi |                    1 | 2022-09-25         |
|     90825 | Sam Patil     |                    0 | 2023-08-01         |
|     94775 | Ananya Sharma |                    1 | 2022-07-01         |
+-----------+---------------+----------------------+--------------------+
6 rows in set (0.01 sec)
```

Edit member:

Initial table

```
mysql> select * from member;
+-----------+---------------+----------------------+--------------------+
| member_id | member_name   | number_books_borrowed | member_expiry_date |
+-----------+---------------+----------------------+--------------------+
|     11940 | Aman Gupta    |                    2 | 2022-11-30         |
|     26482 | Shreyas Sen   |                    1 | 2023-01-15         |
|     78392 | Swayam Patel  |                    2 | 2022-12-15         |
|     89026 | Shaurya Rathi |                    1 | 2022-09-25         |
|     90825 | Sam Patil     |                    0 | 2023-08-01         |
|     94775 | Ananya Sharma |                    1 | 2022-07-01         |
+-----------+---------------+----------------------+--------------------+
6 rows in set (0.01 sec)
```

```
============ RESTART: C:\Books\Computer\12th project\library_code.py ============
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:6
Enter member_id:90825
Enter 'exp' to change member_expiry_date or 'borrow' to change number_books_boro
owedborrow
Enter the new value3
Edited
Edited Record:
(90825, 'Sam Patil', 3, datetime.date(2023, 8, 1))
To countinue enter 'c' or 'q' to quit.c
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:6
Enter member_id:78392
Enter 'exp' to change member_expiry_date or 'borrow' to change number_books_boro
owedexp
Enter year(yyyy) of new membership expiry date:2023
Enter month(mm) of new membership expiry date:07
Enter date(dd) of new membership expiry date:01
Edited
Edited Record:
(78392, 'Swayam Patel', 2, datetime.date(2023, 7, 1))
To countinue enter 'c' or 'q' to quit.
```

Final table-

```
mysql> select * from member;
+-----------+----------------+----------------------+--------------------+
| member_id | member_name    | number_books_borrowed | member_expiry_date |
+-----------+----------------+----------------------+--------------------+
|     11940 | Aman Gupta     |                    2 | 2022-11-30         |
|     26482 | Shreyas Sen    |                    1 | 2023-01-15         |
|     78392 | Swayam Patel   |                    2 | 2023-07-01         |
|     89026 | Shaurya Rathi  |                    1 | 2022-09-25         |
|     90825 | Sam Patil      |                    3 | 2023-08-01         |
|     94775 | Ananya Sharma  |                    1 | 2022-07-01         |
+-----------+----------------+----------------------+--------------------+
6 rows in set (0.00 sec)
```

Delete member:

Initial table-

```
mysql> select * from member;
+-----------+---------------+----------------------+--------------------+
| member_id | member_name   | number_books_borrowed | member_expiry_date |
+-----------+---------------+----------------------+--------------------+
|     11940 | Aman Gupta    |                    2 | 2022-11-30         |
|     26482 | Shreyas Sen   |                    1 | 2023-01-15         |
|     78392 | Swayam Patel  |                    2 | 2023-07-01         |
|     89026 | Shaurya Rathi |                    1 | 2022-09-25         |
|     90825 | Sam Patil     |                    3 | 2023-08-01         |
|     94775 | Ananya Sharma |                    1 | 2022-07-01         |
+-----------+---------------+----------------------+--------------------+
6 rows in set (0.00 sec)
```

```
>>>
============ RESTART: C:\Books\Computer\12th project\library_code.py ===========
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:7
Enter the member_id to be deleted:90825
One member deletled
To countinue enter 'c' or 'q' to quit.q
>>>
```

Final table-

```
mysql> select * from member;
+-----------+---------------+----------------------+--------------------+
| member_id | member_name   | number_books_borrowed | member_expiry_date |
+-----------+---------------+----------------------+--------------------+
|     11940 | Aman Gupta    |                    2 | 2022-11-30         |
|     26482 | Shreyas Sen   |                    1 | 2023-01-15         |
|     78392 | Swayam Patel  |                    2 | 2023-07-01         |
|     89026 | Shaurya Rathi |                    1 | 2022-09-25         |
|     94775 | Ananya Sharma |                    1 | 2022-07-01         |
+-----------+---------------+----------------------+--------------------+
5 rows in set (0.00 sec)
```

Issuing a book:

Initial table-


```
mysql> select * from rental;
+----------------+---------+-----------+-------------+-------------+
| rental_id      | book_id | member_id | date_borrow | date_return |
+----------------+---------+-----------+-------------+-------------+
| R.202225.144843 | PJ1783 |     78392 | 2022-02-05  | 2022-02-12  |
| R.202225.144958 | FP4529 |     11940 | 2022-02-05  | 2022-02-15  |
| R.202225.145134 | FA8754 |     78392 | 2022-02-05  | 2022-03-07  |
| R.202225.145228 | HP3801 |     26482 | 2022-02-05  | 2022-02-10  |
| R.202225.1521   | WF0271 |     89026 | 2022-02-05  | 2022-02-12  |
| R.202228.02031  | FP4529 |     94775 | 2022-02-08  | 2022-02-15  |
| R.202228.02131  | WF0271 |     11940 | 2022-02-08  | 2022-02-23  |
+----------------+---------+-----------+-------------+-------------+
7 rows in set (0.00 sec)
```

```
mysql> select * from member;
+-----------+---------------+-----------------------+--------------------+
| member_id | member_name   | number_books_borrowed | member_expiry_date |
+-----------+---------------+-----------------------+--------------------+
|     11940 | Aman Gupta    |                     2 | 2022-11-30         |
|     26482 | Shreyas Sen   |                     1 | 2023-01-15         |
|     78392 | Swayam Patel  |                     2 | 2023-07-01         |
|     89026 | Shaurya Rathi |                     1 | 2022-09-25         |
|     94775 | Ananya Sharma |                     1 | 2022-07-01         |
+-----------+---------------+-----------------------+--------------------+
5 rows in set (0.00 sec)
```

```
mysql> select * from books;
+---------+-----------------------------+------------------+-------+-------+
| book_id | book_name                   | writer           | price | stock |
+---------+-----------------------------+------------------+-------+-------+
| FA8754  | Fundamental Astronomy       | Richard Feynman  |   750 |    15 |
| FP4529  | 5-Pointer                   | Chetan Bhagat    |   200 |    45 |
| HP3801  | Harry Potter                | JK Rowling       |   250 |    30 |
| PJ1783  | Percy Jackson:Blood of Olympus | Rick Roirdan  |   350 |    20 |
| WF0271  | Wings of Fire               | APJ Abdul Kalam  |   100 |    75 |
+---------+-----------------------------+------------------+-------+-------+
5 rows in set (0.00 sec)
```

```
>>>
============ RESTART: C:\Books\Computer\12th project\library_code.py ===========
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:8
Enter member_id:78392
Enter book_id:HP3801
Enter the number of days of rental period:15
One Rental Details added.
To countinue enter 'c' or 'q' to quit.q
>>>
                                                          Ln: 96  Col: 0
```

Final table-

```
mysql> select * from rental;
+----------------+---------+-----------+-------------+-------------+
| rental_id      | book_id | member_id | date_borrow | date_return |
+----------------+---------+-----------+-------------+-------------+
| R.2022226.10649 | HP3801  |     78392 | 2022-02-26  | 2022-03-13  |
| R.202225.144843 | PJ1783  |     78392 | 2022-02-05  | 2022-02-12  |
| R.202225.144958 | FP4529  |     11940 | 2022-02-05  | 2022-02-15  |
| R.202225.145134 | FA8754  |     78392 | 2022-02-05  | 2022-03-07  |
| R.202225.145228 | HP3801  |     26482 | 2022-02-05  | 2022-02-10  |
| R.202225.1521   | WF0271  |     89026 | 2022-02-05  | 2022-02-12  |
| R.202228.02031  | FP4529  |     94775 | 2022-02-08  | 2022-02-15  |
| R.202228.02131  | WF0271  |     11940 | 2022-02-08  | 2022-02-23  |
+----------------+---------+-----------+-------------+-------------+
8 rows in set (0.00 sec)
```

```
mysql> select * from member;
+-----------+---------------+-----------------------+--------------------+
| member_id | member_name   | number_books_borrowed | member_expiry_date |
+-----------+---------------+-----------------------+--------------------+
|     11940 | Aman Gupta    |                     2 | 2022-11-30         |
|     26482 | Shreyas Sen   |                     1 | 2023-01-15         |
|     78392 | Swayam Patel  |                     3 | 2023-07-01         |
|     89026 | Shaurya Rathi |                     1 | 2022-09-25         |
|     94775 | Ananya Sharma |                     1 | 2022-07-01         |
+-----------+---------------+-----------------------+--------------------+
5 rows in set (0.00 sec)
```

```
mysql> select * from books;
+---------+-----------------------------+-----------------+-------+-------+
| book_id | book_name                   | writer          | price | stock |
+---------+-----------------------------+-----------------+-------+-------+
| FA8754  | Fundamental Astronomy       | Richard Feynman |   750 |    15 |
| FP4529  | 5-Pointer                   | Chetan Bhagat   |   200 |    45 |
| HP3801  | Harry Potter                | JK Rowling      |   250 |    29 |
| PJ1783  | Percy Jackson:Blood of Olympus | Rick Roirdan |   350 |    20 |
| WF0271  | Wings of Fire               | APJ Abdul Kalam |   100 |    75 |
+---------+-----------------------------+-----------------+-------+-------+
5 rows in set (0.00 sec)
```

Deleting a rental detail:

Initial table-

```
mysql> select * from rental;
+----------------+---------+-----------+-------------+-------------+
| rental_id      | book_id | member_id | date_borrow | date_return |
+----------------+---------+-----------+-------------+-------------+
| R.2022226.10649 | HP3801 |     78392 | 2022-02-26  | 2022-03-13  |
| R.202225.144843 | PJ1783 |     78392 | 2022-02-05  | 2022-02-12  |
| R.202225.144958 | FP4529 |     11940 | 2022-02-05  | 2022-02-15  |
| R.202225.145134 | FA8754 |     78392 | 2022-02-05  | 2022-03-07  |
| R.202225.145228 | HP3801 |     26482 | 2022-02-05  | 2022-02-10  |
| R.202225.1521   | WF0271 |     89026 | 2022-02-05  | 2022-02-12  |
| R.202228.02031  | FP4529 |     94775 | 2022-02-08  | 2022-02-15  |
| R.202228.02131  | WF0271 |     11940 | 2022-02-08  | 2022-02-23  |
+----------------+---------+-----------+-------------+-------------+
8 rows in set (0.00 sec)
```

```
mysql> select * from member;
+-----------+---------------+-----------------------+--------------------+
| member_id | member_name   | number_books_borrowed | member_expiry_date |
+-----------+---------------+-----------------------+--------------------+
|     11940 | Aman Gupta    |                     2 | 2022-11-30         |
|     26482 | Shreyas Sen   |                     1 | 2023-01-15         |
|     78392 | Swayam Patel  |                     3 | 2023-07-01         |
|     89026 | Shaurya Rathi |                     1 | 2022-09-25         |
|     94775 | Ananya Sharma |                     1 | 2022-07-01         |
+-----------+---------------+-----------------------+--------------------+
5 rows in set (0.00 sec)
```

```
mysql> select * from books;
+---------+---------------------------+----------------+-------+-------+
| book_id | book_name                 | writer         | price | stock |
+---------+---------------------------+----------------+-------+-------+
| FA8754  | Fundamental Astronomy     | Richard Feynman |  750 |    15 |
| FP4529  | 5-Pointer                 | Chetan Bhagat   |  200 |    45 |
| HP3801  | Harry Potter              | JK Rowling      |  250 |    29 |
| PJ1783  | Percy Jackson:Blood of Olympus | Rick Roirdan |  350 |    20 |
| WF0271  | Wings of Fire             | APJ Abdul Kalam |  100 |    75 |
+---------+---------------------------+----------------+-------+-------+
5 rows in set (0.00 sec)
```

```
============ RESTART: C:\Books\Computer\12th project\library_code.py ===========
Enter 1:To veiw a table
Enter 2:To add a book
Enter 3:To edit a book detail
Enter 4:To delete a book form the table
Enter 5:To add a member
Enter 6:To edit a member detail
Enter 7:To delete a member from the list
Enter 8:To issue a book to a member
Enter 9:To remove a book issue detail
Enter your choice:9
Enter the rental_id to be deleted:R.202225.144958
One Rental Details deletled
To countinue enter 'c' or 'q' to quit.
```

Ln: 110 Col: 38

Final table-

```
mysql> select * from rental;
+----------------+----------+-----------+-------------+-------------+
| rental_id      | book_id  | member_id | date_borrow | date_return |
+----------------+----------+-----------+-------------+-------------+
| R.2022226.10649 | HP3801  |     78392 | 2022-02-26  | 2022-03-13  |
| R.202225.144843 | PJ1783  |     78392 | 2022-02-05  | 2022-02-12  |
| R.202225.145134 | FA8754  |     78392 | 2022-02-05  | 2022-03-07  |
| R.202225.145228 | HP3801  |     26482 | 2022-02-05  | 2022-02-10  |
| R.202225.1521   | WF0271  |     89026 | 2022-02-05  | 2022-02-12  |
| R.202228.02031  | FP4529  |     94775 | 2022-02-08  | 2022-02-15  |
| R.202228.02131  | WF0271  |     11940 | 2022-02-08  | 2022-02-23  |
+----------------+----------+-----------+-------------+-------------+
7 rows in set (0.00 sec)
```

```
mysql> select * from member;
+-----------+---------------+-----------------------+--------------------+
| member_id | member_name   | number_books_borrowed | member_expiry_date |
+-----------+---------------+-----------------------+--------------------+
|     11940 | Aman Gupta    |                     1 | 2022-11-30         |
|     26482 | Shreyas Sen   |                     1 | 2023-01-15         |
|     78392 | Swayam Patel  |                     3 | 2023-07-01         |
|     89026 | Shaurya Rathi |                     1 | 2022-09-25         |
|     94775 | Ananya Sharma |                     1 | 2022-07-01         |
+-----------+---------------+-----------------------+--------------------+
5 rows in set (0.00 sec)
```

```
mysql> select * from books;
+---------+----------------------------+-----------------+-------+-------+
| book_id | book_name                  | writer          | price | stock |
+---------+----------------------------+-----------------+-------+-------+
| FA8754  | Fundamental Astronomy      | Richard Feynman |   750 |    15 |
| FP4529  | 5-Pointer                  | Chetan Bhagat   |   200 |    46 |
| HP3801  | Harry Potter               | JK Rowling      |   250 |    29 |
| PJ1783  | Percy Jackson:Blood of Olympus | Rick Roirdan |   350 |    20 |
| WF0271  | Wings of Fire              | APJ Abdul Kalam |   100 |    75 |
+---------+----------------------------+-----------------+-------+-------+
5 rows in set (0.00 sec)
```

Future Enhancements:

- The process of gathering information, diagnosing the problems, then interpreting facts is known as System analysis. It includes recommending system improvements needed, based on the same data.

- 24x7 running with expiry date alert and return date exceeded can be added with a fine system

- Although tunings any system as a whole is a complex procedure, but tuning individual statements is not the best as something that is correct for one input may hurt another inputs performance.

- The solutions are given as a proposal. The suggestion is revised on user request and optimal changes are made. This loop terminates as soon as the user is gratified with the proposal.

- So on the whole, system analysis is done to improve the system performance by monitoring it and obtaining the best throughput possible from it.

Bibliography

Books:

      1. Computer SciencePython (class:xi),Preeti Arora

      2. Computer Science with python(class:xii) Preeti Arora

Sites Referred For Some Basic Informaton:

      1. https://en.wikipedia.org

      2. https://www.geeksforgeeks.org/

      3. https://www.w3schools.com/python/

*. Also under the guidance of our subject teacher

Thank you