Theoretical Background

3.1 Python (Front End)

Python is an interpreted, high-level and general-purpose programming language. Created by Guido van Rossum and first released in 1991, Python's design philosophy emphasizes code readability with its notable use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects.

Python is dynamically typed. It supports multiple programming paradigms, including structured (particularly, procedural), object-oriented, and functional programming. Python is often described as a "batteries included" language due to its comprehensive standard library.

Python was created in the late 1980s as a successor to the ABC language. Python 2.0, released in 2000, introduced features like list comprehensions and a garbage collection system with reference counting.

Python 3.0, released in 2008, was a major revision of the language that is not completely backward-compatible, and much Python 2 code does not run unmodified on Python 3. The latest version of Python as of October 2020 is Python 3.9.0.

The Python 2 language was officially discontinued in 2020 (first planned for 2015), and "Python 2.7.18 is the last Python 2.7 release and therefore the last Python 2 release." No more security patches or other improvements will be released for it. With Python 2's end-of-life, only Python 3.6.x and later are supported.

Features of Python Programming Language:

The main features of Python programming language are:

- Open Source and Free.
- Easy to Code
- Support for GUI.
- Object-Oriented Approach.
- High-Level Language.
- Integrated by Nature.
- Highly Portable.
- Highly Dynamic.

3.2 Database (Back End)

A database is a collection of information related to a particular subject or purpose, such as tracking customer orders or maintaining a music collection. Using any RDBMS application software like MS SQL Server, MySQL, Oracle, Sybase etc, you can manage all your information from a single database file. Within the file, divide your data into separate storage containers called tables. You may and retrieve the data using queries.

A table is a collection of data about a specific topic, such as products or suppliers. Using a separate table for each topic means you can store that data only once, which makes your database more efficient and reduces data-entry errors. Table organises data into columns (called fields) and rows (called records).

A Primary key is one or more fields whose value or values uniquely identify each record in a table. In a relationship, a primary key is used to refer to specific record in one table from another table. A primary key is called foreign key when it is referred to from another table.

To find and retrieve just the data that meets conditions you specify, including data from multiple tables, create a query. A query can also update or delete multiple records at the same time and perform built-in or custom calculations on your data.

Most of the database management systems have the following capabilities:

- Creating of a table, addition, deletion, modification of records.
- Retrieving data collectively or selectively.
- The data stored can be sorted or indexed at the user's discretion and direction.
- Various reports can be produced from the system. These may be either standardized report or that may be specifically generated according to specific user definition.
- Mathematical functions can be performed, and the data stored in the database can be manipulated with these functions to perform the desired calculations.
- To maintain data integrity and database use.

Database Design

Table Design:

The database of hotel contains 4 tables. The tables and their structure are given below.

Table: book

Column name	Type	Size	Constraint
bno	int		PRIMARY KEY
bname	varchar	30	
author	varchar	30	UNIQUE
publ	varchar	30	
qty	int		
cateogry	varchar	20	

Table: customer

Column name	Type	Size	Constraint
c_id	int		PRIMARY KEY
cname	varchar	35	
phoneno	int		
address	varchar	100	

Table: member

Column name	Type	Size	Constraint
mno	int		PRIMARY KEY
mname	varchar	30	
phoneno	int		

Table: issue

Column name	Type	Size	Constraint
bno	int		FOREIGN KEY
mno	int		FOREIGN KEY
idate	date		
rdate	date		

Package/Module used:

1.mysql.connector

2.sys

3.datetime

6.3 Functions Defined

1. addbook()- This function is used to add details abut books.

2. displayB()- This function displays the details of books.

3. searchB(): - This function is used to search a specific book on the basis of book number or book name.

4. delB(): - This function is used to remove books record from database.

5. addM(): - This function is used to add member to the library.

6. displayM(): - This function is used to display the details of member.

7. searchM(): - This function is used to search for a specific member.

8. delM(): - This function is used to remove the record of a library member.

9. updateM(): - This function is used to update the record of member

10. issueB(): - This function is used to add details for issuing a book.

11. return(): - This function is used to add details when a book is returned.

12. displayI(): - This function is used to display issued books.

13. issue(): - This function is used to display the menu for issuing a book.

14. member(): - This function is used to display the menu for operations performed on the library members

15. book(): - This function is used to display the menu for operations performed on books

16. menu(): - This function displays main menu for the library management software.

Coding

```
import mysql.connector as sql
import datetime
import sys

def addbook():
    conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
    mycursor=conn.cursor()
    bno=int(input("Enter Book no"))
    bname= input("Enter the Book name")
    Auth= input("Enter the Author name")
    pub=input("Enter the publisher")
    qty=int(input("Enter the quantity"))
    cat=input("Enter the cateogry")
    try:
        query="insert into book values(%s,%s,%s,%s,%s,%s)"
        mycursor.execute(query,(bno,bname,Auth,pub,qty,cat))
        print("Data inserted successfully")
        conn.commit()
        conn.close()
    except sql.IntegrityError:
        print("Book No exists")
        print("Enter new book no")



def displayB():
    conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
    mycursor=conn.cursor()
    query="select * from book"
    mycursor.execute(query)
    data = mycursor.fetchall()
    for row in data:
        print("Bookcode :", row[0])
        print("Book Name :", row[1])
        print("Author :", row[2])
        print("Publisher :", row[3])
        print("Quantuty:", row[4])
        print("Cateogry :", row[5])
        print("************************************")
    conn.close()



def searchB():
    conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
    mycursor=conn.cursor()
    ch=input("Enter Book No or Book Name")
    if ch.isdigit():
        x=int(ch)
        y="bno"
    else:
        x=ch
```

```
        y="bname"
    query= "select * from book where " + y + " =%s"
    mycursor.execute(query,(x,))
    data=mycursor.fetchall()
    count=mycursor.rowcount
    if count==0:
        print("No record found")
    else:
        for row in data:
            print()
            print("Bookcode :", row[0])
            print("Book Name :", row[1])
            print("Author :", row[2])
            print("Publisher :", row[3])
            print("Quantuty:", row[4])
            print("Cateogry :", row[5])
            print("**********************************")

    conn.close()



def delB():
    conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
    mycursor=conn.cursor()
    ch=input("Enter Book No or Book Name")
    if ch.isdigit():
        x=int(ch)
        y="bno"
    else:
        x=ch
        y="bname"
    query= "select * from book where " + y + " =%s"
    mycursor.execute(query,(x,))
    count=mycursor.rowcount
    conn.close()
    if count==0:
        print("No record to delete")
    elif count>1:
        print("Multiple books are found. Enter the book no of the book
you want to delete")
        searchB()
        delb()
    else:
        conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
        mycursor=conn.cursor()
        query="delete from book where "+y+" =%s"
        mycursor.execute(query,(x,))
        conn.commit()
        conn.close()
        print("Data deleted successfully")
```

```
def addM():
    conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
    mycursor=conn.cursor()
    mno=int(input("Enter Member no."))
    name= input("Enter the Member name")
    phno=int(input("Enter the Phone no"))
    #date=input("Enter the Date of joining in YYYYMMDD format")
    try:
        query="insert into member values(%s,%s,%s)"
        mycursor.execute(query,(mno,name,phno))
        print("Data inserted successfully")
        conn.commit()
        conn.close()
    except sql.IntegrityError:
        print("Member No. exists")
        print("Enter new Member no.")



def displayM():
    conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
    mycursor=conn.cursor()
    query="select * from member"
    mycursor.execute(query)
    data = mycursor.fetchall()
    for row in data:
        print("Membership code :", row[0])
        print("Name :", row[1])
        print("Phone No :", row[2])
        print("************************************")
    conn.close()



def searchM():
    conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
    mycursor=conn.cursor()
    ch=input("Enter Membership No")
    query= "select m.mno,m.mname,m.phoneno,b.bno,b.bname, i.idate,
i.rdate from book b, issue i, member m where b.bno=i.bno and
m.mno=i.mno and m.mno=%s"
    mycursor.execute(query,(ch,))
    data=mycursor.fetchall()
    count=mycursor.rowcount
    if count==0:
        print("No record found")
    else:
        print("Membership code :", data[0][0])
        print("Name :", data[0][1])
        print("Phone No :", data[0][2])
        print("Details of Book Issued")
        for row in data:
```

```
            print()
            print("Book no issued: ",row[3])
            print("Book name issued: ",row[4])
            print("Date of Issue:",row[5])
            print("Return Date: ", row[6])
            print("************************************")

    conn.close()



def delM():
    try:
        conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
        mycursor=conn.cursor()
        ch=int(input("Enter Member No"))
        query= "select * from member where mno =%s"
        mycursor.execute(query,(ch,))
        count=mycursor.rowcount
        conn.close()
        if count==0:
            print("No record to delete")
        else:
            conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
            mycursor=conn.cursor()
            query="delete from member where mno =%s"
            mycursor.execute(query,(ch,))
            conn.commit()
            conn.close()
            print("Data deleted successfully")
    except sql.errors.IntegrityError:
        print("Cannot delete member as books are issued to the
members")



def updateM():
    conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
    mycursor=conn.cursor()
    ch=int(input("Enter Member No"))
    query= "select * from member where mno =%s"
    mycursor.execute(query,(ch,))
    count=mycursor.rowcount
    conn.close()
    if count==0:
        print("No record to update")
    else:
        x=int(input("Enter 1. to update name and 2. to update phoneno
"))
        if x==1:
            y=input("Enter the new name")
            query="update member set mname=%s where mno = %s"
```

```
        elif ch==2:
            y=int(input("Enter number"))
            query="update member set phoneno=%s where mno = %s"


        conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
        mycursor=conn.cursor()
        mycursor.execute(query,(y,ch))
        conn.commit()
        conn.close()
        print("Data Updated Successfully")



def issueB():
    try:
        conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
        mycursor=conn.cursor()
        bno=int(input("Enter Book no"))
        mno=int(input("Enter Membership no."))
        idate=datetime.date.today()
        conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
        mycursor=conn.cursor()
        query="insert into issue(bno,mno,idate) values(%s,%s,%s)"
        mycursor.execute(query,(bno,mno,idate))
        conn.commit()
        conn.close()
        print("Book issued")
    except sql.errors.IntegrityError:
        print("Check book no or membership  no.")



def returnB():
    try:
        conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
        mycursor=conn.cursor()
        mno=int(input("Enter Membership no."))
        bno=int(input("Enter Book no"))
        rdate=datetime.date.today()
        query="update issue set rdate = %s where mno=%s and bno=%s"
        mycursor.execute(query,(rdate,mno,bno))
        conn.commit()
        conn.close()
        print("Book returned. Database updated")
    except sql.errors.IntegrityError:
        print("Check book no or membership  no.")



def displayI():
    conn=sql.connect(host="localhost", user="root",
password="root1234", database="library")
    mycursor=conn.cursor()
```

```
    query= "select m.mno,m.mname,m.phoneno,b.bno,b.bname, i.idate,
i.rdate from book b, issue i, member m where b.bno=i.bno and
m.mno=i.mno"
    mycursor.execute(query)
    data=mycursor.fetchall()
    count=mycursor.rowcount
    if count==0:
        print("No record found")
    else:
        for row in data:
            print("Membership code :", row[0])
            print("Name :", row[1])
            print("Phone No :", row[2])
            print("Details of Book Issued")
            print()
            print("Book no issued: ",row[3])
            print("Book name issued: ",row[4])
            print("Date of Issue:",row[5])
            print("Return Date: ", row[6])
            print("************************************")

    conn.close()

def issue():
    while  True:
        print("1. Issue Book")
        print("2. Return Book")
        print("3. Display Issued Books")
        print("4. Back to Main Menu")
        ch=int(input("Enter your choice"))
        if ch==1:
            issueB()
        elif ch==2:
            returnB()
        elif ch==3:
            displayI()
        elif ch==4:
            menu()
        else:
            print("Wrong Choice. Enter your choice again")



def member():
    while True:
        print("1. Add Member")
        print("2. Display Member")
        print("3. Search a Member")
        print("4. Delete a Member")
        print("5. Update details")
        print("6. Back to Main Menu")
        ch = int(input("Enter your choice"))
        if ch==1:
            addM()
        elif ch==2:
            displayM()
        elif ch==3:
            searchM()
```

```
        elif ch==4:
            delM()
        elif ch==5:
            updateM()
        elif ch==6:
            menu()
        else:
            print("Wrong Choice. Enter your choice again")




def book():
    while True:
        print("1. Add Book")
        print("2. Display Book")
        print("3. Search a Book")
        print("4. Delete a Book")
        print("5. Back to Main Menu")
        ch = int(input("Enter your choice"))
        if ch==1:
            addbook()
        elif ch==2:
            displayB()
        elif ch==3:
            searchB()
        elif ch==4:
            delB()
        elif ch==5:
            menu()
        else:
            print("Wrong Choice. Enter your choice again")



def menu():
    while True:
        print("*****LIBRARY MANAGEMENT SYSTEM*****")
        print("1. Book")
        print("2. Member")
        print("3. Issue/Return")
        print("4. Exit")
        ch=int(input("Enter your choice"))
        if ch==1:
            book()
        elif ch==2:
            member()
        elif ch==3:
            issue()
        elif ch==4:
            sys.exit()
        else:
            print("Wrong choice. Enter your choice again")



menu()
```

Output Screen

A. Display Menu

```
*****LIBRARY MANAGEMENT SYSTEM*****
1. Book
2. Member
3. Issue/Return
4. Exit
Enter your choice
```

B. Book

```
Enter your choice1
1. Add Book
2. Display Book
3. Search a Book
4. Delete a Book
5. Back to Main Menu
Enter your choice1
Enter Book no1003
Enter the Book nameNCERT English
Enter the Author nameNCERT
Enter the publisherNCERT
Enter the quantity10
Enter the cateogryEnglish
Data inserted successfully
1. Add Book
2. Display Book
3. Search a Book
4. Delete a Book
5. Back to Main Menu
Enter your choice2
Bookcode : 1001
Book Name : CS NCERT
Author : XYZ
Publisher : NCERT
Quantuty: 10
Cateogry : CS
****************************************
Bookcode : 1002
Book Name : CS with Python
Author : Sumita Arora
Publisher : Schand
Quantuty: 10
Cateogry : CS
****************************************
```

```
****************************************
Bookcode : 1003
Book Name : NCERT English
Author : NCERT
Publisher : NCERT
Quantuty: 10
Cateogry : English
****************************************
1. Add Book
2. Display Book
3. Search a Book
4. Delete a Book
5. Back to Main Menu
Enter your choice3
Enter Book No or Book Name1003

Bookcode : 1003
Book Name : NCERT English
Author : NCERT
Publisher : NCERT
Quantuty: 10
Cateogry : English
****************************************


1. Add Book
2. Display Book
3. Search a Book
4. Delete a Book
5. Back to Main Menu
Enter your choice4
Enter Book No or Book Name1003
Data deleted successfully
1. Add Book
2. Display Book
3. Search a Book
4. Delete a Book
5. Back to Main Menu
Enter your choice
```

C. Member

```
*****LIBRARY MANAGEMENT SYSTEM*****
1. Book
2. Member
3. Issue/Return
4. Exit
Enter your choice2
1. Add Member
2. Display Member
3. Search a Member
4. Delete a Member
5. Update details
6. Back to Main Menu
Enter your choice1
Enter Member no.1004
Enter the Member nameDiksha
Enter the Phone no832830
Data inserted successfully
1. Add Member
2. Display Member
3. Search a Member
4. Delete a Member
5. Update details
6. Back to Main Menu
Enter your choice2
Membership code : 1004
Name : Diksha
Phone No : 832830
****************************************
Membership code : 9001
Name : Ankita
Phone No : 9984302
****************************************
Membership code : 9002
Name : Apoorva
Phone No : 8392892
****************************************
```

```
**************************************
1. Add Member
2. Display Member
3. Search a Member
4. Delete a Member
5. Update details
6. Back to Main Menu
Enter your choice3
Enter Membership No9001
Membership code : 9001
Name : Ankita
Phone No : 9984302
Details of Book Issued

Book no issued:  1001
Book name issued:  CS NCERT
Date of Issue: 2019-01-20
Return Date:  2021-02-20
**************************************

Book no issued:  1001
Book name issued:  CS NCERT
Date of Issue: 2019-01-20
Return Date:  2021-02-20
**************************************

Book no issued:  1002
Book name issued:  CS with Python
Date of Issue: 2021-02-20
Return Date:  None
**************************************
1. Add Member
2. Display Member
3. Search a Member
4. Delete a Member
5. Update details
6. Back to Main Menu
Enter your choice4
Enter Member No9002
Cannot delete member as books are issued to the members
```

```
1. Add Member
2. Display Member
3. Search a Member
4. Delete a Member
5. Update details
6. Back to Main Menu
Enter your choice1004
Wrong Choice. Enter your choice again
1. Add Member
2. Display Member
3. Search a Member
4. Delete a Member
5. Update details
6. Back to Main Menu
Enter your choice4
Enter Member No1004
Data deleted successfully
1. Add Member
2. Display Member
3. Search a Member
4. Delete a Member
5. Update details
6. Back to Main Menu
Enter your choice5
Enter Member No9001
Enter 1. to update name and 2. to update phoneno 1
Enter the new nameAvinash
Data Updated Successfully
1. Add Member
2. Display Member
3. Search a Member
4. Delete a Member
5. Update details
6. Back to Main Menu
Enter your choice
```

D. ISSUE/RETURN

```
*****LIBRARY MANAGEMENT SYSTEM*****
1. Book
2. Member
3. Issue/Return
4. Exit
Enter your choice3
1. Issue Book
2. Return Book
3. Display Issued Books
4. Back to Main Menu
Enter your choice1
Enter Book no1001
Enter Membership no.9001
Book issued
1. Issue Book
2. Return Book
3. Display Issued Books
4. Back to Main Menu
Enter your choice2
Enter Membership no.9001
Enter Book no1002
Book returned. Database updated
```

```
=======================================
*****LIBRARY MANAGEMENT SYSTEM*****
1. Book
2. Member
3. Issue/Return
4. Exit
Enter your choice3
1. Issue Book
2. Return Book
3. Display Issued Books
4. Back to Main Menu
Enter your choice3
Membership code : 9002
Name : Apoorva
Phone No : 8392892
Details of Book Issued

Book no issued:  1001
Book name issued:  CS NCERT
Date of Issue: 2019-03-12
Return Date:  None
**************************************
Membership code : 9001
Name : Avinash
Phone No : 9984302
Details of Book Issued

Book no issued:  1001
Book name issued:  CS NCERT
Date of Issue: 2021-02-22
Return Date:  None
**************************************
```