Python Assignment - 3
School of Engineering & Technology

Department: SOET	**Session:** 2025-26
Program: MCA (AI & ML)	**Semester:** Ist
Course Code: ETCCPP171	**Roll No.:** 2501940069
Course Name: Programming for Problem Solving Using Python	
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GitHub Link: https://github.com/bhatiatanya81-code/Library-Management-System.git
Assignment: Library Management System

Code:

```
# ------------------------------------------------------------
# Name: Tanya Bhatia
# Date: 25th November 25

 # Assignment: #
"""
 ------------------------------------------------------------------------
```

1) book.py

```
# ------------------------------------
#   Book CLASS
# ------------------------------------


class Book:
    def __init__(self, book_id, title, author, available=True):
        self.book_id = book_id
        self.title = title
        self.author = author
        self.available = available


    def to_dict(self):
        return {
            "book_id": self.book_id,
            "title": self.title,
            "author": self.author,
            "available": self.available
        }
```

2) member.py

```
# ------------------------------------
#   Member CLASS
# ------------------------------------

class Member:
    def __init__(self, member_id, name):
        self.member_id = member_id
        self.name = name
        self.borrowed_books = []

    def to_dict(self):
        return {
            "member_id": self.member_id,
            "name": self.name,
            "borrowed_books": self.borrowed_books
        }
```

3) library.py

```
import os
import json
from book import Book
from member import Member

# ------------------------------------
#   Library CLASS
# ------------------------------------

class Library:
    def __init__(self, books_file="books.json", members_file="members.json"):
        self.books_file = books_file
        self.members_file = members_file

        # Load existing data
```

```
    self.books = self._read_file(self.books_file)
    self.members = self._read_file(self.members_file)

# ------------ File Handling --------------
def _read_file(self, path):
    if not os.path.exists(path):
        return {}
    with open(path, "r") as f:
        return json.load(f)

def _save_file(self, path, data):
    with open(path, "w") as f:
        json.dump(data, f, indent=4)

# ------------ Library Operations --------------
def add_book(self, book: Book):
    self.books[book.book_id] = book.to_dict()
    self._save_file(self.books_file, self.books)
    print("\n✓ Book added successfully!")

def add_member(self, member: Member):
    self.members[member.member_id] = member.to_dict()
    self._save_file(self.members_file, self.members)
    print("\n✓ Member added successfully!")

def borrow_book(self, member_id, book_id):
    if member_id not in self.members:
        print("\n❌ Member ID not found.")
        return

    if book_id not in self.books:
        print("\n❌ Book ID not found.")
        return
```

```
        if not self.books[book_id]["available"]:
            print("\n❌ Book already borrowed.")
            return

        self.books[book_id]["available"] = False
        self.members[member_id]["borrowed_books"].append(book_id)

        self._save_file(self.books_file, self.books)
        self._save_file(self.members_file, self.members)
        print("\n📘 Book borrowed successfully!")

    def return_book(self, member_id, book_id):
        if member_id not in self.members:
            print("\n❌ Member ID invalid.")
            return

        if book_id not in self.members[member_id]["borrowed_books"]:
            print("\n❌ This member did not borrow this book.")
            return

        self.members[member_id]["borrowed_books"].remove(book_id)
        self.books[book_id]["available"] = True

        self._save_file(self.books_file, self.books)
        self._save_file(self.members_file, self.members)
        print("\n🔄 Book returned successfully!")

    def show_books(self):
        print("\n------ Library Books ------")
        if not self.books:
            print("No books available.")
            return
```

```
        for b in self.books.values():
            status = "Available" if b["available"] else "Borrowed"
            print(f'{b["book_id"]} | {b["title"]} | {b["author"]} | {status}')

    def show_members(self):
        print("\n------ Members List ------")
        if not self.members:
            print("No members registered.")
            return

        for m in self.members.values():
            print(f'{m["member_id"]} | {m["name"]} | Borrowed: {m["borrowed_books"]}')
```

4) main.py

```
from library import Library
from book import Book
from member import Member

# ------------------------------------
#       MAIN PROGRAM
# ------------------------------------

def main():
    lib = Library()

    while True:
        print("\n========== Library Menu ==========")
        print("1. Add a New Book")
        print("2. Register a Member")
        print("3. Borrow a Book")
        print("4. Return a Book")
        print("5. View All Books")
        print("6. View All Members")
        print("7. Exit")
```

```
choice = input("\nEnter your choice: ")

if choice == "1":
    book_id = input("Book ID: ")
    title = input("Book Title: ")
    author = input("Author Name: ")
    lib.add_book(Book(book_id, title, author))

elif choice == "2":
    member_id = input("Member ID: ")
    name = input("Member Name: ")
    lib.add_member(Member(member_id, name))

elif choice == "3":
    member_id = input("Enter Member ID: ")
    book_id = input("Enter Book ID: ")
    lib.borrow_book(member_id, book_id)

elif choice == "4":
    member_id = input("Enter Member ID: ")
    book_id = input("Enter Book ID: ")
    lib.return_book(member_id, book_id)

elif choice == "5":
    lib.show_books()

elif choice == "6":
    lib.show_members()

elif choice == "7":
    print("\nGoodbye! 👋")
    break

else:
```

```
            print("\n❌ Invalid option. Try again.")


if __name__ == "__main__":
    main()
```

Output 1:

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 1
Book ID: 001
Book Title: Dsa
Author Name: harsh

✓ Book added successfully!
```

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 1
Book ID: 002
Book Title: Full Stack Develpment
Author Name: S.p Acharya

✓ Book added successfully!
```

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 1
Book ID: 003
Book Title: python
Author Name: Neha Kaushik

✓ Book added successfully!
```

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 1
Book ID: 004
Book Title: Moon Walk
Author Name: Michael Jackson

✓ Book added successfully!
```

```
   ========== Library Menu ==========
   1. Add a New Book
   2. Register a Member
   3. Borrow a Book
   4. Return a Book
   5. View All Books
   6. View All Members
   7. Exit

   Enter your choice: 1
   Book ID: 005
   Book Title: Idols
   Author Name: Sunil Gavaskar

   ✓ Book added successfully!
```

Output 2:

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 2
Member ID: 01
Member Name: tanya

✓ Member added successfully!
```

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 2
Member ID: 02
Member Name: harsh

✓ Member added successfully!
```

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 2
Member ID: 03
Member Name: khushi

✓ Member added successfully!
```

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 2
Member ID: 04
Member Name: nitin

✓ Member added successfully!
```

Output 3:

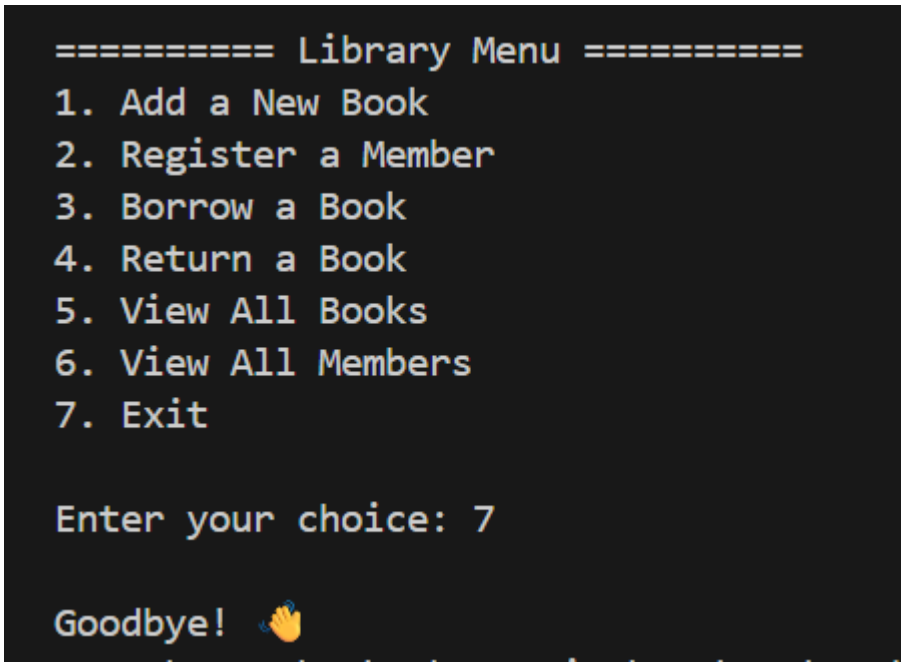
```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 3
Enter Member ID: 03
Enter Book ID: 001

📘 Book borrowed successfully!
```

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 4
Enter Member ID: 03
Enter Book ID: 001

🔄 Book returned successfully!
```

Output 5:

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 5

------ Library Books ------
001 | Dsa | harsh | Available
002 | Full Stack Develpment | S.p Acharya | Available
003 | python | Neha Kaushik | Available
004 | Moon Walk | Michael Jackson | Available
005 | Idols | Sunil Gavaskar | Available
```

```
========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit

Enter your choice: 6

------ Members List ------
01 | tanya | Borrowed: []
02 | harsh | Borrowed: []
03 | khushi | Borrowed: []
04 | nitin | Borrowed: []
```


========== Library Menu ==========
1. Add a New Book
2. Register a Member
3. Borrow a Book
4. Return a Book
5. View All Books
6. View All Members
7. Exit
Enter your choice: 7
Goodbye! 👋