LIBRARY MANAGEMENT SYSTEMS

PROGRAM:

```
import json

from datetime import datetime


FILE_NAME = 'library_data.json'


class Book:

    def __init__(self, title, author, year, isbn, borrower=None,
borrowed_time=None):

        self.title = title

        self.author = author

        self.year = year

        self.isbn = isbn

        self.borrower = borrower

        self.borrowed_time = borrowed_time


    def to_dict(self):

        return {

            "title": self.title,
```

```
            "author": self.author,
            "year": self.year,
            "isbn": self.isbn,
            "borrower": self.borrower,
            "borrowed_time": self.borrowed_time
        }

class Library:
    def __init__(self):
        self.books = self.load_data()

    def load_data(self):
        try:
            with open(FILE_NAME, 'r') as file:
                data = json.load(file)
                return [Book(**book) for book in data]
        except (FileNotFoundError, json.JSONDecodeError):
            return []

    def save_data(self):
```

```
        try:
            with open(FILE_NAME, 'w') as file:
                json.dump([book.to_dict() for book in self.books], file,
indent=4)
        except IOError as e:
            print(f"Error saving data: {e}")

    def add_book(self):
        title = input("Enter the book title: ")
        author = input("Enter the author: ")
        year = input("Enter the publication year: ")
        isbn = input("Enter the ISBN number: ")
        self.books.append(Book(title, author, year, isbn))
        print("Book added successfully!")

    def view_books(self):
        if not self.books:
            print("No books available.")
        else:
            for i, book in enumerate(self.books, 1):
```

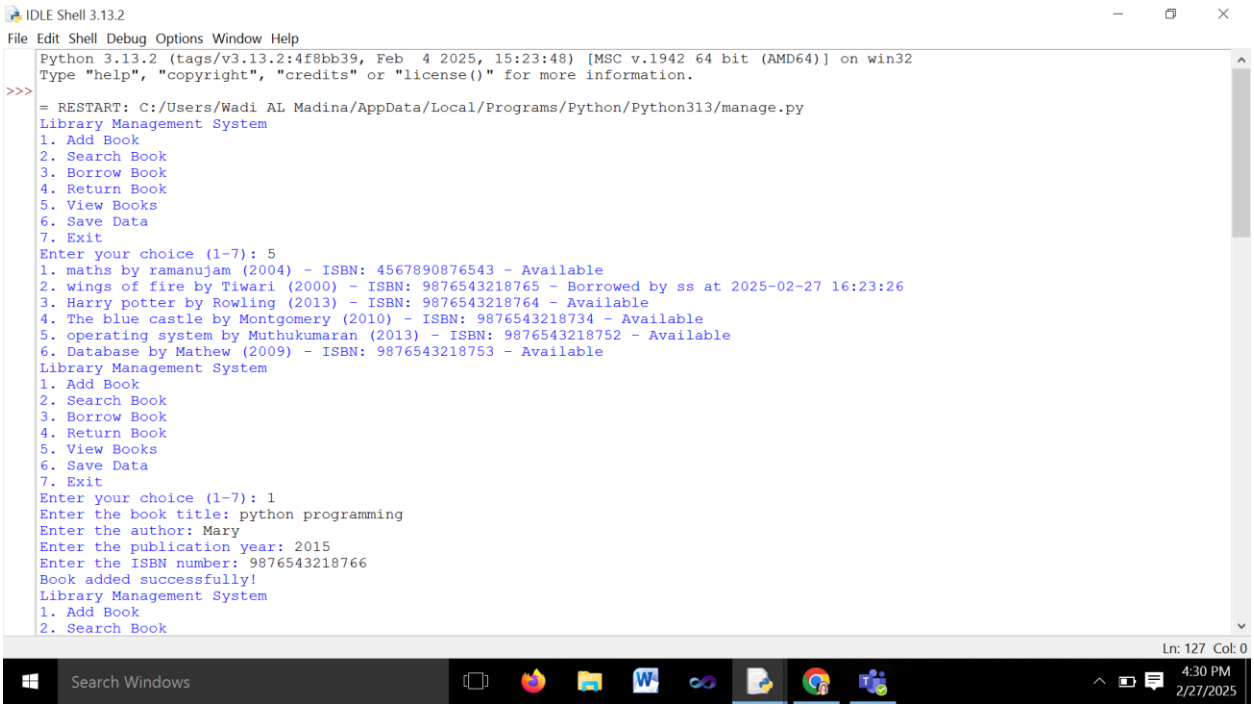
```
            status = f"Borrowed by {book.borrower} at
{book.borrowed_time}" if book.borrower else "Available"

            print(f"{i}. {book.title} by {book.author} ({book.year}) - ISBN:
{book.isbn} - {status}")


    def borrow_book(self):
        isbn = input("Enter the ISBN number of the book to borrow: ")
        for book in self.books:
            if book.isbn == isbn:
                if book.borrower:
                    print("Book is already borrowed.")
                else:
                    borrower_name = input("Enter your name: ")
                    book.borrower = borrower_name
                    book.borrowed_time = datetime.now().strftime('%Y-%m-%d
%H:%M:%S')
                    print("Book borrowed successfully!")
                break
        else:
            print("Book not found.")
```

```
    def return_book(self):
        isbn = input("Enter the ISBN number of the book to return: ")
        for book in self.books:
            if book.isbn == isbn:
                if book.borrower:
                    book.borrower = None
                    book.borrowed_time = None
                    print("Book returned successfully!")
                else:
                    print("Book is not borrowed.")
                break
        else:
            print("Book not found.")

    def search_book(self):
        search_type = input("Search by (title/author/isbn): ").lower()
        search_query = input("Enter the search query: ").lower()
        results = [book for book in self.books if search_query in
getattr(book, search_type).lower()]
```

```
        if results:
            for i, book in enumerate(results, 1):
                status = f"Borrowed by {book.borrower} at {book.borrowed_time}" if book.borrower else "Available"
                print(f"{i}. {book.title} by {book.author} ({book.year}) - ISBN: {book.isbn} - {status}")
        else:
            print("No matching books found.")

    def display_menu(self):
        print("Library Management System")
        print("1. Add Book")
        print("2. Search Book")
        print("3. Borrow Book")
        print("4. Return Book")
        print("5. View Books")
        print("6. Save Data")
        print("7. Exit")

def main():
```

```
library = Library()
while True:
    library.display_menu()
    choice = input("Enter your choice (1-7): ")
    if choice == '1':
        library.add_book()
    elif choice == '2':
        library.search_book()
    elif choice == '3':
        library.borrow_book()
    elif choice == '4':
        library.return_book()
    elif choice == '5':
        library.view_books()
    elif choice == '6':
        library.save_data()
        print("Data saved successfully!")
    elif choice == '7':
        library.save_data()
        print("Exiting the Library Management System. Goodbye!")
```

```
            break
        else:
            print("Invalid choice. Please enter a number from 1 to 7.")

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




IDLE Shell 3.13.2
File Edit Shell Debug Options Window Help
Book added successfully!
Library Management System
1. Add Book
2. Search Book
3. Borrow Book
4. Return Book
5. View Books
6. Save Data
7. Exit
Enter your choice (1-7): 5
1. maths by ramanujam (2004) - ISBN: 4567890876543 - Available
2. wings of fire by Tiwari (2000) - ISBN: 9876543218765 - Borrowed by ss at 2025-02-27 16:23:26
3. Harry potter by Rowling (2013) - ISBN: 9876543218764 - Available
4. The blue castle by Montgomery (2010) - ISBN: 9876543218734 - Available
5. operating system by Muthukumaran (2013) - ISBN: 9876543218752 - Available
6. Database by Mathew (2009) - ISBN: 9876543218753 - Available
7. python programming by Mary (2015) - ISBN: 9876543218766 - Available
Library Management System
1. Add Book
2. Search Book
3. Borrow Book
4. Return Book
5. View Books
6. Save Data
7. Exit
Enter your choice (1-7): 2
Search by (title/author/isbn): title
Enter the search query: wings of fire
1. wings of fire by Tiwari (2000) - ISBN: 9876543218765 - Borrowed by ss at 2025-02-27 16:23:26
Library Management System
1. Add Book
2. Search Book
3. Borrow Book
4. Return Book
5. View Books
6. Save Data
Ln: 127 Col: 0
Search Windows
4:31 PM
2/27/2025


IDLE Shell 3.13.2
File Edit Shell Debug Options Window Help
5. View Books
6. Save Data
7. Exit
Enter your choice (1-7): 3
Enter the ISBN number of the book to borrow: 9876543218766
Enter your name: Malini
Book borrowed successfully!
Library Management System
1. Add Book
2. Search Book
3. Borrow Book
4. Return Book
5. View Books
6. Save Data
7. Exit
Enter your choice (1-7): 5
1. maths by ramanujam (2004) - ISBN: 4567890876543 - Available
2. wings of fire by Tiwari (2000) - ISBN: 9876543218765 - Borrowed by ss at 2025-02-27 16:23:26
3. Harry potter by Rowling (2013) - ISBN: 9876543218764 - Available
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6. Database by Mathew (2009) - ISBN: 9876543218753 - Available
7. python programming by Mary (2015) - ISBN: 9876543218766 - Borrowed by Malini at 2025-02-27 16:29:27
Library Management System
1. Add Book
2. Search Book
3. Borrow Book
4. Return Book
5. View Books
6. Save Data
7. Exit
Enter your choice (1-7): 4
Enter the ISBN number of the book to return: 9876543218765
Book returned successfully!
Library Management System
1. Add Book
Ln: 127 Col: 0
Search Windows
4:31 PM
2/27/2025


IDLE Shell 3.13.2
File Edit Shell Debug Options Window Help
2. Search Book
3. Borrow Book
4. Return Book
5. View Books
6. Save Data
7. Exit
Enter your choice (1-7): 4
Enter the ISBN number of the book to return: 9876543218765
Book returned successfully!
Library Management System
1. Add Book
2. Search Book
3. Borrow Book
4. Return Book
5. View Books
6. Save Data
7. Exit
Enter your choice (1-7): 5
1. maths by ramanujam (2004) - ISBN: 4567890876543 - Available
2. wings of fire by Tiwari (2000) - ISBN: 9876543218765 - Available
3. Harry potter by Rowling (2013) - ISBN: 9876543218764 - Available
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Library Management System
1. Add Book
2. Search Book
3. Borrow Book
4. Return Book
5. View Books
6. Save Data
7. Exit
Enter your choice (1-7): 7
Exiting the Library Management System. Goodbye!
>>>
Ln: 127 Col: 0
Search Windows
4:31 PM
2/27/2025