Name : Adhikesh R S

Project 1

Library Management System

Problem Statement:

This project is simple Library Management System in Python that includes functionalities for adding, viewing, borrowing, and returning books. This system will utilize lists, dictionaries, functions, file handling, and exception handling.

Requirements:

1. Programming Language: Python 3.x
2. Operating System: Windows, macOS, or Linux
3. Hardware Requirements: A computer with a minimum of 2GB RAM and 10GB free disk space

Proposed solution

In this problem is to develop a Library Management System that allows librarians and users to manage books, members, and transactions effectively. The system should provide functionalities to add, view, borrow, and return books, as well as manage member information.

Features:

1. Function to load library data from a file
2. Function to save library data to a file
3. Function to add a book to the library
4. Function to view all books in the library
5. Function to borrow a book from the library
6. Function to return a borrowed book to the library

Future scope:

1. Implement a self-checkout feature to allow members to borrow books without assistance.
2. Create a digital library to provide access to e-books, audiobooks, and other digital resources.
3. Develop an event management feature to allow librarians to schedule and manage events, workshops, and programs.

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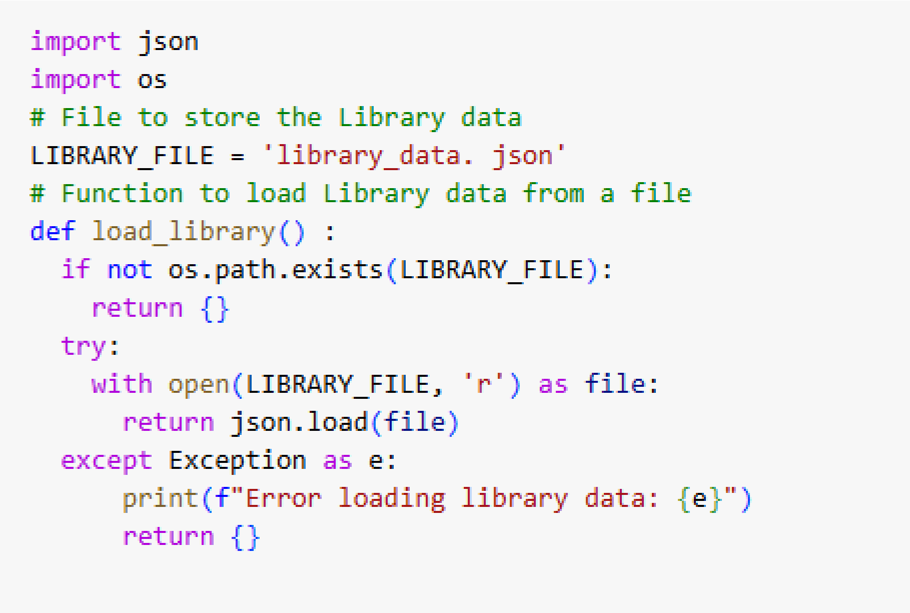
Conclusion:

Made a Library Management System in Python successfully which includes functionalities for adding, viewing, borrowing, and returning books. This system will utilize lists, dictionaries, functions, file handling, and exception handling.

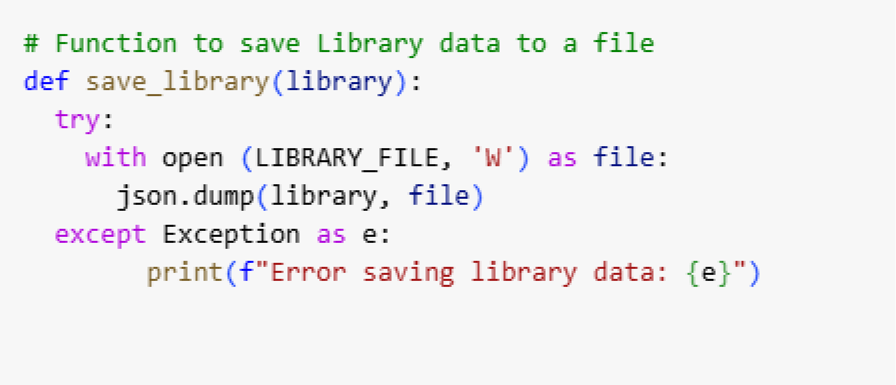
Code:

Task 1: Function to load library data from a file



```
import json
import os
# File to store the Library data
LIBRARY_FILE = 'library_data. json'
# Function to load Library data from a file
def load_library() :
  if not os.path.exists(LIBRARY_FILE):
    return {}
  try:
    with open(LIBRARY_FILE, 'r') as file:
      return json.load(file)
  except Exception as e:
      print(f"Error loading library data: {e}")
      return {}
```

Task 2: Function to save library data to a file



```
# Function to save Library data to a file
def save_library(library):
  try:
    with open (LIBRARY_FILE, 'W') as file:
      json.dump(library, file)
  except Exception as e:
        print(f"Error saving library data: {e}")
```

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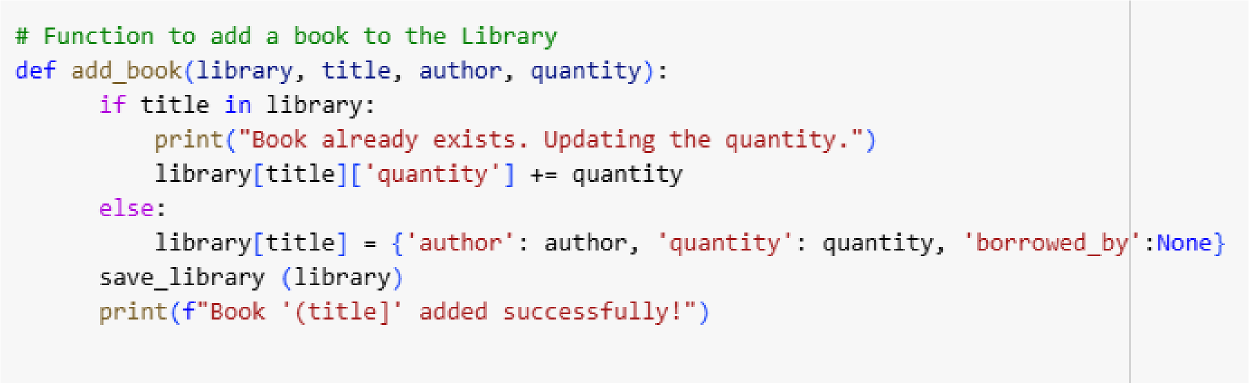
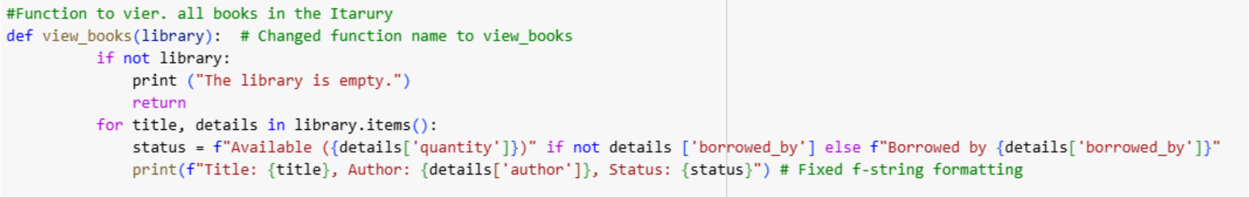
Task 3: Function to add a book to the library



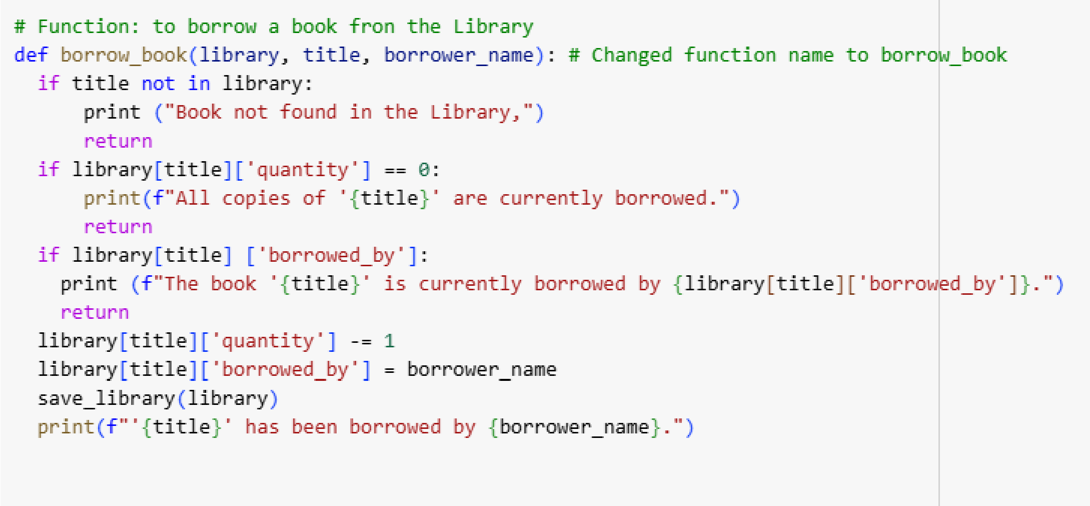
```
# Function to add a book to the Library
def add_book(library, title, author, quantity):
      if title in library:
          print("Book already exists. Updating the quantity.")
          library[title]['quantity'] += quantity
      else:
          library[title] = {'author': author, 'quantity': quantity, 'borrowed_by':None}
      save_library (library)
      print(f"Book '(title]' added successfully!")
```

Task 4: Function to view all books in the library



```
#Function to vier. all books in the Itarury
def view_books(library):  # Changed function name to view_books
          if not library:
              print ("The library is empty.")
              return
          for title, details in library.items():
              status = f"Available ({details['quantity']})" if not details ['borrowed_by'] else f"Borrowed by {details['borrowed_by']}"
              print(f"Title: {title}, Author: {details['author']}, Status: {status}") # Fixed f-string formatting
```

Task 5: Function to borrow a book from the library



```
# Function: to borrow a book fron the Library
def borrow_book(library, title, borrower_name): # Changed function name to borrow_book
  if title not in library:
      print ("Book not found in the Library,")
      return
  if library[title]['quantity'] == 0:
      print(f"All copies of '{title}' are currently borrowed.")
      return
  if library[title] ['borrowed_by']:
    print (f"The book '{title}' is currently borrowed by {library[title]['borrowed_by']}.")
    return
  library[title]['quantity'] -= 1
  library[title]['borrowed_by'] = borrower_name
  save_library(library)
  print(f"'{title}' has been borrowed by {borrower_name}.")
```

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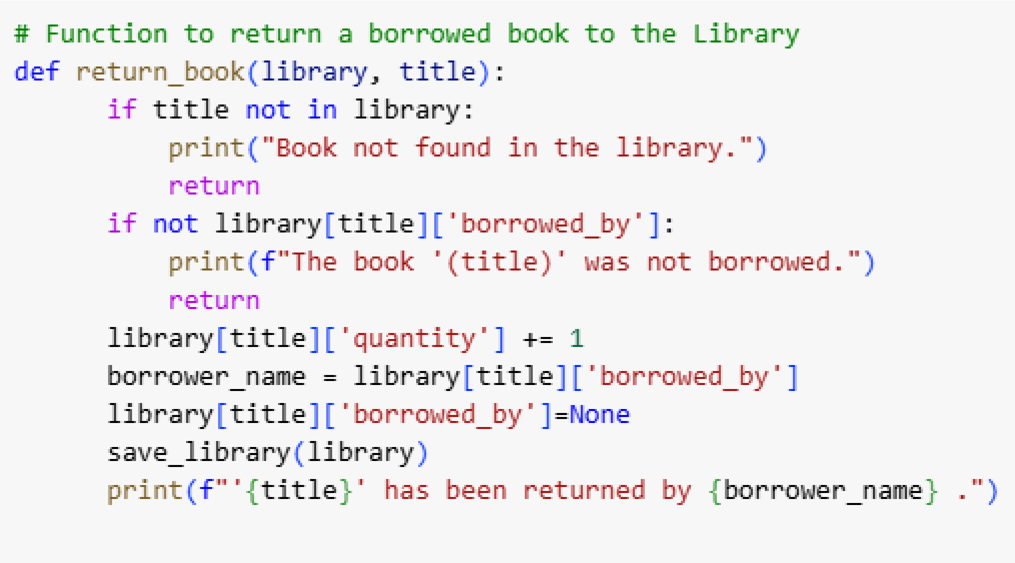
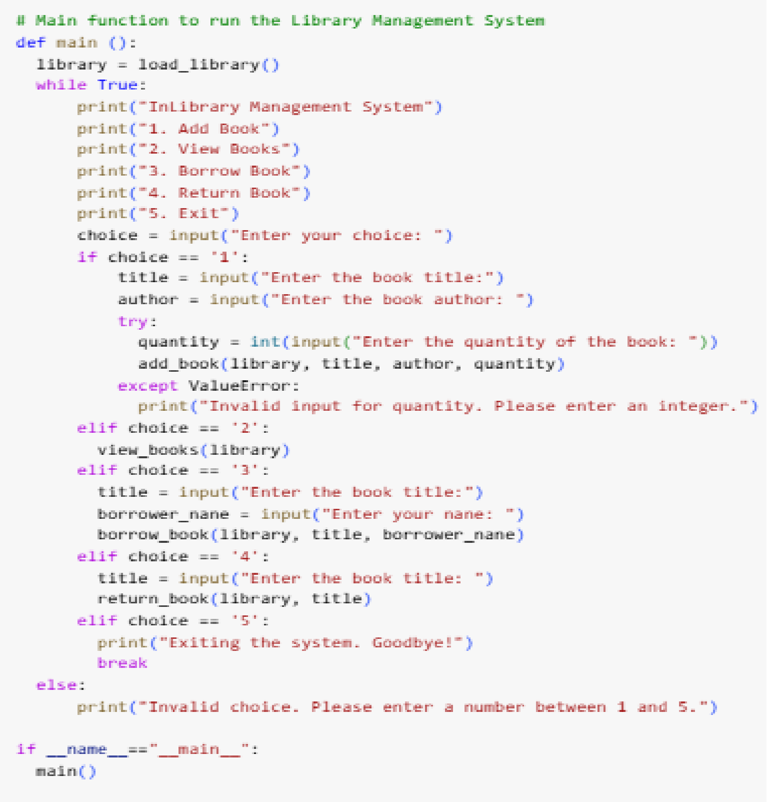
Task 6: Function to return a borrowed book to the library



```
# Function to return a borrowed book to the Library
def return_book(library, title):
      if title not in library:
          print("Book not found in the library.")
          return
      if not library[title]['borrowed_by']:
          print(f"The book '(title)' was not borrowed.")
          return
      library[title]['quantity'] += 1
      borrower_name = library[title]['borrowed_by']
      library[title]['borrowed_by']=None
      save_library(library)
      print(f"'{title}' has been returned by {borrower_name} .")
```

Task 7: Main function to run the Library Management System



```
# Main function to run the Library Management System
def main ():
  library = load_library()
  while True:
      print("InLibrary Management System")
      print("1. Add Book")
      print("2. View Books")
      print("3. Borrow Book")
      print("4. Return Book")
      print("5. Exit")
      choice = input("Enter your choice: ")
      if choice == '1':
          title = input("Enter the book title:")
          author = input("Enter the book author: ")
          try:
            quantity = int(input("Enter the quantity of the book: "))
            add_book(library, title, author, quantity)
          except ValueError:
            print("Invalid input for quantity. Please enter an integer.")
      elif choice == '2':
        view_books(library)
      elif choice == '3':
        title = input("Enter the book title:")
        borrower_nane = input("Enter your nane: ")
        borrow_book(library, title, borrower_nane)
      elif choice == '4':
        title = input("Enter the book title: ")
        return_book(library, title)
      elif choice == '5':
        print("Exiting the system. Goodbye!")
        break
  else:
      print("Invalid choice. Please enter a number between 1 and 5.")

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

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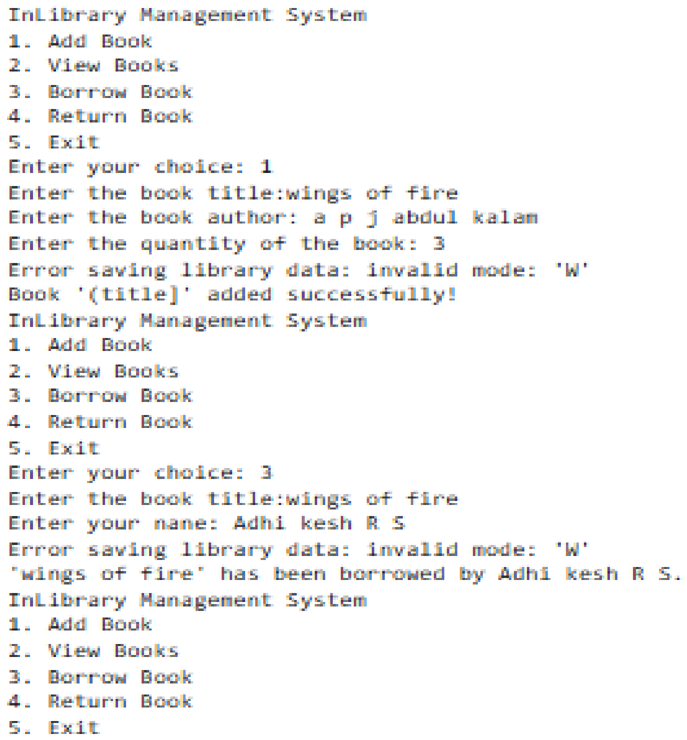
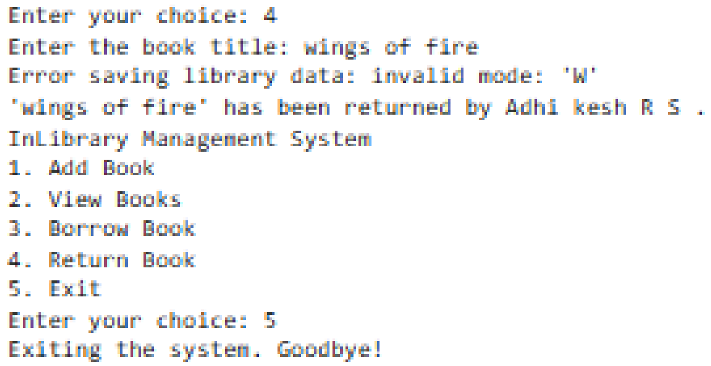
Output:



```
InLibrary Management System
1. Add Book
2. View Books
3. Borrow Book
4. Return Book
5. Exit
Enter your choice: 1
Enter the book title:wings of fire
Enter the book author: a p j abdul kalam
Enter the quantity of the book: 3
Error saving library data: invalid mode: 'W'
Book '(title]' added successfully!
InLibrary Management System
1. Add Book
2. View Books
3. Borrow Book
4. Return Book
5. Exit
Enter your choice: 3
Enter the book title:wings of fire
Enter your name: Adhi kesh R S
Error saving library data: invalid mode: 'W'
'wings of fire' has been borrowed by Adhi kesh R S.
InLibrary Management System
1. Add Book
2. View Books
3. Borrow Book
4. Return Book
5. Exit
```



```
Enter your choice: 4
Enter the book title: wings of fire
Error saving library data: invalid mode: 'W'
'wings of fire' has been returned by Adhi kesh R S .
InLibrary Management System
1. Add Book
2. View Books
3. Borrow Book
4. Return Book
5. Exit
Enter your choice: 5
Exiting the system. Goodbye!
```