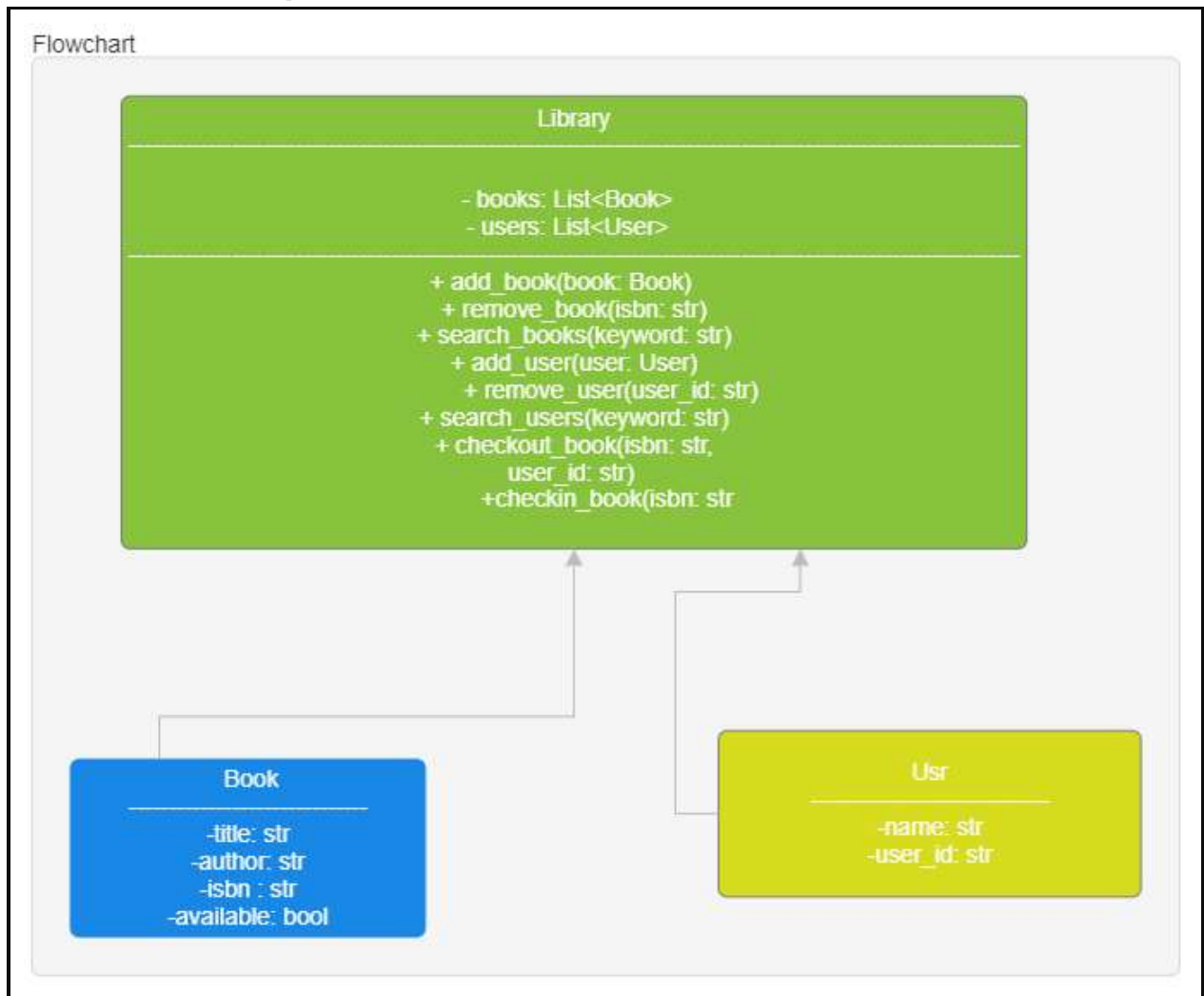


Low Level System Design and Documentation : Library Management System

Architecture diagram



Class: Book

Description:

Represents a book in the library system.

Attributes:

- `title`: The title of the book.
- `author`: The author of the book.
- `isbn`: The ISBN (International Standard Book Number) of the book.
- `available`: Indicates whether the book is available for checkout or not.

Methods:

`__init__(self, title, author, isbn)`: Constructor method to initialize a Book object with given title, author, and ISBN.

`__repr__(self)`: Returns a string representation of the Book object.

Class: User

Description:

Represents a user in the library system.

Attributes:

- `name`: The name of the user.
- `user_id`: The unique identifier for the user.

Methods:

`__init__(self, name, user_id)`: Constructor method to initialize a User object with given name and user ID.

`__repr__(self)`: Returns a string representation of the User object.

Class: Library

Description:

Represents the library and manages its books and users.

Attributes:

- `books`: A list of Book objects representing the books in the library.
- `users`: A list of User objects representing the users of the library.
- `book_storage`: An instance of Storage class for managing book data.
- `user_storage`: An instance of Storage class for managing user data.

Methods:

`__init__(self, book_storage, user_storage)`: Constructor method to initialize a Library object with book and user storages.

`load_books_from_file(self)`: Loads book data from file and populates the books list.

`load_users_from_file(self)`: Loads user data from file and populates the users list.

`save_books_to_file(self)`: Saves book data to file.

`save_users_to_file(self)`: Saves user data to file.

`add_book(self, title, author, isbn)`: Adds a new book to the library.

`remove_book(self, isbn)`: Removes a book from the library based on its ISBN.

`search_books(self, keyword)`: Searches for books in the library based on a keyword.

`add_user(self, name, user_id)`: Adds a new user to the library.

`remove_user(self, user_id)`: Removes a user from the library based on their user ID.

`search_users(self, keyword)`: Searches for users in the library based on a keyword.

`list_books(self)`: Lists all available books in the library.

Class: Storage

Description:

Handles the loading and saving of data to/from JSON files.

Attributes:

- `filename`: The name of the JSON file.

Methods:

`save_data(self, data)`: Saves data to the JSON file.

`load_data(self)`: Loads data from the JSON file.

Function Descriptions:

`main()`: The main function of the library management system.

`manage_books(library, book_storage):` Manages operations related to books (adding, removing, searching).

`manage_users(library, user_storage):` Manages operations related to users (adding, removing, searching).

`checkout_book(library):` Allows a user to checkout a book.

`checkin_book(library):` Allows a user to check in a book.

`main_menu():` Displays the main menu options.

`list_books():` Lists all books available in the library.