Library Management System - Project Attributes, Methods, and Workflow

Current Date and Time (UTC - YYYY-MM-DD HH:MM:SS formatted): 2025-03-12 02:34:22

Current User's Login: CenJi03

1. Project Attributes

User Authentication Module

* username: String - The user's login identifier
* password: String - The user's password (stored in CSV)
* ip\_address: String - User's local IP address
* hostname: String - Computer's hostname
* login\_timestamp: DateTime - When the user logged in

Library Module

Class: Library

* get\_book\_Title: String - Title of the book
* get\_book\_Author: String - Author of the book
* get\_book\_Isbn: String - ISBN unique identifier
* set\_Transactions: List - History of quantity changes
* get\_Removed: Boolean - If book was completely removed

Transaction Dictionary

* quantity: Integer - Number of books added/removed
* date: String - Date and time of transaction

2. Methods

Login System Methods

* get\_local\_ip(): Retrieves the local IP address
* login(username, password): Authenticates credentials against CSV
* log\_login\_success(username): Logs successful login attempts
* log\_login\_failure(username): Logs failed login attempts
* authenticate\_user(): Manages the authentication process

Library System Methods

Library Class Methods

* set\_Transaction(get\_bookQuantity): Records book quantity changes
* mark\_as\_Removed(): Flags book as removed
* get\_total\_quantity(): Calculates current book quantity
* get\_book\_details(): Returns book information dictionary

Library Management Methods

* addBook(): Adds new book or updates existing quantity
* checkLibrary(): Displays all books in the library
* searchBook(): Searches for a book by ISBN
* updateBook(): Updates book information
* removeBook(): Removes books partially or completely
* export\_to\_excel(): Exports library data to Excel
* manageLibrary(): Main interface for library functions

Helper Methods

* get\_input(prompt, cast\_type, choices): Validates user input
* get\_yes\_no\_input(prompt): Gets yes/no confirmation
* find\_book\_by\_isbn(get\_book\_Isbn): Finds book by ISBN
* display\_bookInfo(book): Displays book details

3. Work Flow

1. Application Startup

1. main.py is executed
2. System checks for required directories (UserInfo/, logs/)
3. System checks for user accounts file, creates if missing
4. Displays welcome header with date/time and user information

2. Authentication Flow

1. User is prompted for username and password
2. System validates credentials against UserAccounts.csv
3. If successful:
   * Success is logged with timestamp and IP
   * User proceeds to library management
4. If unsuccessful:
   * Failure is logged with timestamp and IP
   * User gets 2 more attempts
   * After 3 failures, access is denied

3. Library Management Flow

1. Main menu displays 7 options
2. User selects an option (1-7)
3. Based on selection:
   * Option 1: Add Book
     + Enter number of books to add
     + For each book: Enter ISBN, check if exists
     + If exists: Update quantity
     + If new: Enter title, author, quantity
   * Option 2: Check Library
     + Display all books with details
   * Option 3: Search Book
     + Enter ISBN to search
     + Display book details or "not found"
     + Loop until user chooses to exit search
   * Option 4: Update Book
     + Enter ISBN to update
     + Input new ISBN, title, author
     + Loop until user chooses to exit update
   * Option 5: Remove Book
     + Enter ISBN to remove
     + Choose "All" or specific quantity
     + Confirm removal
     + Loop until user chooses to exit removal
   * Option 6: Export Books
     + Create Excel file with transaction history
     + Headers: No, Date, ISBN, Title, Author, Quantity, Transaction Type
   * Option 7: Exit
     + Return to main.py (or exit)

4. Data Persistence

1. User accounts stored in UserInfo/UserAccounts.csv
2. Login attempts logged to logs/login.log
3. Book data stored in memory (list of Library objects)
4. Export option saves book data to LibraryBooks.xlsx

Data Flow Diagram

Code

[User] → [Authentication] → [Library Management]

↓ ↓ ↓

[Input] [UserAccounts.csv] [Library Objects]

↓ ↓

[login.log] [LibraryBooks.xlsx]

Example Transaction Flow

1. User logs in as "CenJi03"
2. Adds book: "Python Programming" by "John Smith", ISBN "123456789", Quantity 5
3. The system:
   * Creates Library object
   * Adds transaction: {quantity: 5, date: "2025-03-12 02:34:22"}
   * Stores object in addBooks list
4. User exports to Excel
   * Row added: [1, "2025-03-12 02:34:22", "123456789", "Python Programming", "John Smith", 5, "Purchase In"]