**Project Brief – Library Management API**

1. **Overview**

You will develop an API for a library management system as well as devise a persistence mechanism. You will not develop a GUI. The API should use only native Java 8 code and should be developed entirely by your team. Best practices for OO software design should be utilized.

1. **Background**

A library management system allows anyone to search for books; however, to checkout a book a person must be a member. A person can become a member of the library by supplying their name, address, phone number, and username to a library associate. The associate enters the information into the system and if the username is unique the system responds with a password and a unique four-digit code (instead of a library card). The username and password are used by the member to access the system to do certain tasks as detailed below. The four-digit code is used to checkout books.

Note: In the description that follows we refer to *scanning a library book*. Since we won’t use an actual scanner, for this project, *scanning a library book* means that a library associate will type the ISBN into the system. Similarly, when we refer to *scanning a library member’s card*, this means that an associate will type in the member’s four-digit code.

When checking out books, a member approaches the circulation desk where an associate scans the books and library card. The system will record the date and time of the loan. A member can have no more than 10 books checked out at any time. A member returns books by placing them in a drop-box in the library. At various points in the day an associate will scan the books in the drop-box and the system will release the member from the loan and mark the books as available to be checked out (unless a book is on hold, which we discuss later).

Books are checked out for a period of 2 weeks and can be renewed 2 times. A book can be renewed by a member by logging into the system or by phone (or in person) by supplying the ISBN to an associate. The renewal is successful if no hold has been placed on the book. Certain new release books cannot be renewed.

After 2 weeks, a book that has not been returned accrues an overdue fine of $0.10 per day until the book is returned. A member can pay a fine (or portion of the fine) at any time, in person. When a member’s fines exceed $25, then their account is suspended due to overdue fines which means the member cannot checkout, renew, or place holds on any books. When an account is suspended due to overdue fines, the account can be restored to good standing when a payment of at least $5 is received and the balance falls to $25 or less.

If a member loses a book, then they can report this by logging into the system or by reaching an associate by phone (or in person). In this case their account is suspended due to a lost book(s) which means the member cannot checkout, renew, or place holds on any books. Also, the system immediately stops accruing overdue fees, if applicable, for a lost book(s) and the member’s account is charged for the replacement cost of the book (which is added to the overdue fees). The entire replacement cost(s) of the book(s) must be received before the release of the suspension due to a lost book(s).

Any book (checked out or available) can be placed on hold by a member by logging into the system or by reaching an associate by phone (or in person). When an available book is placed on hold an associate finds the book and notifies the user through the system. A member who logs in can see if the hold is available and has 4 days to check the book out, otherwise the hold is released and the book is marked as available. A similar situation results when a member places a hold on a book that is currently checked out. When the book is returned, the member is notified through the system and has 4 days to pick it up. Multiple users can places holds on the same book and the holds should be processed in the order they were received. If a member has a book checked out and another member places a hold on it, then it cannot be renewed.

A member can log into the system and use it to search for books in various ways. The system should show whether the book(s) are currently checked out and allow the member to place a hold on the book(s). A member can also display the books they have checked out, their due dates, and fines they have accrued, as well as any holds they have requested. The display of fines should be broken down to show the books, due dates, return dates, and amounts of the fines for each book.

We will only consider printed books. A book has the following information associated with it: title, author(s), ISBN, publication year, and keywords. The ISBN is unique and is composed of 10 digits if the book was published before 2007 and 13 digits if published in 2007 or after. There can be multiple copies of a book (each copy has the same ISBN).

A library has two types of employees: associates and managers. In addition to the items mentioned above, an associate can display the books a member has checked out and display fine information for a member. In addition to these tasks, a manager can add, edit, and delete book listings as well as assess overdue fines. Once a day, usually in the morning, the manager runs a program that assesses overdue charges for books that were due the previous day. A Manager can suspend a member’s account for any reason, and reactivate it as well. A manager can create accounts for employees (associate or manager), as well as edit and delete them.