## **Part 1: Identify Classes**

### **1. Book**

A class to represent individual books in the library collection. This class is needed to store and manage information about each book, such as its title, author, ISBN, and availability status.

### **2. Member**

A class to represent library members who can borrow books. This class is needed to track individual members' information and manage their borrowing activities, including enforcing the 3-book limit.

### **3. Library**

A class to represent the overall library system. This class is needed to maintain the collection of books and provide methods for searching and managing the collection.

### **4. Librarian**

A class to represent library staff with special privileges. This class is needed to handle administrative functions like adding/removing books and generating reports about book status and member activities.

## **Part 2: Define Responsibilities**

### **Book Class Responsibilities:**

* Store and provide access to book information (title, author, ISBN)
* Track and update the book's availability status

### **Member Class Responsibilities:**

* Store and provide access to member information
* Track books currently borrowed by the member
* Enforce the limit of 3 books per member

### **Library Class Responsibilities:**

* Maintain the collection of all books
* Provide methods to search for books by various criteria
* Track which books are available and which are checked out

### **Librarian Class Responsibilities:**

* Add new books to the library collection
* Remove outdated or lost books from the collection
* View reports about book availability and checkout status

## **Part 3: Identify Collaborators**

### **Book Class Collaborators:**

* **Library**: The Book class collaborates with the Library class because books are part of the library's collection. The Library needs to know about each Book's status.
* **Member**: The Book class collaborates with the Member class when a book is borrowed or returned, affecting its availability status.

### **Member Class Collaborators:**

* **Book**: The Member class collaborates with the Book class to borrow and return books, tracking which books a member currently has.
* **Library**: The Member class collaborates with the Library class to access the book collection and update records when books are borrowed or returned.

### **Library Class Collaborators:**

* **Book**: The Library class collaborates with the Book class to maintain the collection of books and track their status.
* **Member**: The Library class collaborates with the Member class to manage book borrowing and returning operations.
* **Librarian**: The Library class collaborates with the Librarian class to provide administrative functions and generate reports.

### **Librarian Class Collaborators:**

* **Library**: The Librarian class collaborates with the Library class to perform administrative functions on the book collection.
* **Book**: The Librarian class collaborates with the Book class when adding new books or removing existing ones.
* **Member**: The Librarian class collaborates with the Member class to view who has checked out which books.