

Integration Testing Plan: Library Management System

1. Test Environment:

- Test Data:

- Sample member profiles: Faculty (ID: F001), Student (ID: S001), Bronze Community Member (ID: B001), Silver Community Member (ID: S001), Gold Community Member (ID: G001)
- Sample books in the inventory: Book A (10 copies), Book B (5 copies), Book C (3 copies)
- Loan records: Book A loaned by Student (ID: S001), Book B loaned by Faculty (ID: F001)
- Payment accounts: Faculty (ID: F001) with \$50 balance, Bronze Community Member (ID: B001) with \$10 balance
- Recommended books: Book D recommended by Faculty (ID: F001), Book E recommended by Silver Community Member (ID: S001)
- Donated books: Book F donated by Gold Community Member (ID: G001), Book G donated by Bronze Community Member (ID: B001)

2. Integration Test Scenarios:

a) Loan Subsystem and Manage Book Inventory Subsystem:

- Test Scenario 1: Verify that loaning a book decreases its availability in the book inventory and updates the loan status.

- Test Input: Book A, Student (ID: S001), loan duration: 7 days

- Expected Result: Book A availability in the inventory reduced to 9 copies, loan status updated with Student (ID: S001) as the borrower.

- Test Scenario 2: Verify that returning a book increases its availability in the book inventory and updates the loan status.

- Test Input: Book B, Faculty (ID: F001)

- Expected Result: Book B availability in the inventory increased to 6 copies, loan status updated as returned.

b) Member Activity Subsystem and Manage Book Inventory Subsystem:

- Test Scenario 1: Verify that recommending a book adds it to the list of recommended books in the system.

- Test Input: Book D, Faculty (ID: F001)

- Expected Result: Book D added to the list of recommended books.

- Test Scenario 2: Verify that removing a recommended book updates the list of recommended books accordingly.

- Test Input: Book D, Faculty (ID: F001)

- Expected Result: Book D removed from the list of recommended books.

- Test Scenario 3: Verify that donating a book increases its quantity in the book inventory.

- Test Input: Book F, Gold Community Member (ID: G001)

- Expected Result: Book F quantity in the inventory increased to 1 copy.

- Test Scenario 4: Verify that removing a donated book updates the book inventory accordingly.

- Test Input: Book F, Gold Community Member (ID: G001)

- Expected Result: Book F removed from the book inventory.

c) Contacting Subsystem and Manage Book Inventory Subsystem:

- Test Scenario 1: Verify that exchanging books with other libraries updates the book inventory accordingly.

- Test Input: Book A, Book B exchanged with another library

- Expected Result: Book A, Book B removed from the book inventory.

- Test Scenario 2: Verify that donating books to charity organizations updates the book inventory with the

donated books.

- Test Input: Book G donated to charity organization

- Expected Result: Book G added to the book inventory.

- Test Scenario 3: Verify that buying books from vendors updates the book inventory with the purchased books.

- Test Input: Book H purchased from a vendor

- Expected Result: Book H added to the book inventory.

d) Additional Loan Subsystem and Manage Book Inventory Subsystem Scenarios:

- Test Scenario 1: Verify that a member cannot loan a book if all copies are already loaned out.

- Test Input: Book A, Bronze Community Member (ID: B001), loan duration: 3 days

- Expected Result: Loan request denied due to no available copies.

e) Printing Subsystem and Payment Subsystem:

- Test Scenario 1: Verify that printing a document deducts the appropriate printing fee from the member's payment account.
 - Test Input: Student (ID: S001) prints 5 papers
 - Expected Result: \$2.5 deducted from Student (ID: S001)'s payment account.
- Test Scenario 2: Verify that printing a document for faculty members does not deduct any fee.
 - Test Input: Faculty (ID: F001) prints 10 papers
 - Expected Result: No deduction from Faculty (ID: F001)'s payment account.

3. Test Execution Order:

- Execute the test scenarios in the following order:
 1. Loan Subsystem and Manage Book Inventory Subsystem
 2. Member Activity Subsystem and Manage Book Inventory Subsystem
 3. Contacting Subsystem and Manage Book Inventory Subsystem
 4. Additional Loan Subsystem and Manage Book Inventory Subsystem Scenarios
 5. Printing Subsystem and Payment Subsystem

4. Test Dependencies:

- Ensure that the necessary data and conditions are set up before executing each scenario. For example:
 - Loan subsystem integration tests depend on the availability of books in the inventory.
 - Member activity subsystem integration tests depend on the existence of recommended and donated books.
 - Contacting subsystem integration tests depend on the availability of other libraries or charity organizations.

1. Register Member:
 - Description: Allows a new member to register in the system.
 - Estimated Effort: 3 points
2. Loan Book:
 - Description: Enables a member to borrow a book from the library.
 - Estimated Effort: 5 points
3. Return Book:
 - Description: Allows a member to return a borrowed book to the library.
 - Estimated Effort: 4 points
4. Recommend Book:
 - Description: Enables a member to recommend a book to the library.
 - Estimated Effort: 2 points
5. Manage Book Inventory:
 - Description: Allows library staff to manage the book inventory, including adding, updating, and removing books.
 - Estimated Effort: 8 points
6. Print Document:
 - Description: Enables members to print their desired documents.
 - Estimated Effort: 4 points
7. Process Payment:
 - Description: Handles payment transactions, including annual subscription fees and printing fees.
 - Estimated Effort: 6 points
8. Exchange Books:
 - Description: Facilitates the exchange of books between libraries.
 - Estimated Effort: 5 points
9. Donate Books:
 - Description: Allows members to donate books to the library.
 - Estimated Effort: 3 points
10. View Shift Information:

- Description: Enables staff to view their shift information.
- Estimated Effort: 2 points