

Test Plan for Library Management System (LMS)

Submitted to:

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1. Functional requirements of the project

The Library Management System (LMS) includes the following core functionalities:

- User Registration: Allows users to sign up and create an account.
- User Login: Enables users to log in using their credentials.
- Book Search: Provides search capabilities for finding books in the catalog.
- **Book Borrowing**: Allows users to borrow books if they are available.
- **Book Returning**: Facilitates the return of borrowed books.
- **Admin Management**: Enables administrators to manage the system, including adding or removing books and managing user accounts.

2. Use case of the project

Use Case 1: User Registration

- Actors: New user
- **Description**: A new user registers for an account by providing required information like name, email, and password.
- **Preconditions**: User must not be already registered.
- **Postconditions**: User account is created, and the user is redirected to the login page.

Use Case 2: Book Borrowing

- **Actors**: Registered user
- **Description**: A user borrows a book from the library if it is available.
- **Preconditions**: User must be logged in and the book must be available.
- Postconditions: Book's status is updated to borrowed and is added to the user's borrowed list.

3. Item to be tested

- User Registration
- User Login
- Book Search
- Book Borrowing

- Book Returning
- Admin Management

4. Approach for testing

White Box Testing will be performed on the following modules:

- 1. User Registration
- 2. Book Borrowing

Black Box Testing will be conducted on:

- 1. User Login
- 2. Book Search
- 3. **Book Returning**
- 4. Admin Management

Test item pass and fail criteria

SL No	Test Item	Pass Criteria	Fail Criteria
1 U	User Registration	Valid data creates an account	Invalid data does not create an
1	Oser Registration	and stores it.	account.
2	User Login	Valid credentials log in the	Invalid credentials fail to log in the
	Oser Login	user.	user.
3	3 Book Search	Relevant results are returned	No or irrelevant results are
3 BOOK Sear	BOOK Search	for valid searches.	returned.
1	Pook Porrowing	Available books are marked as	Borrowing fails when a book is
4	4 Book Borrowing	borrowed.	already borrowed.
5	Book Returning	Borrowed books are marked as	Returning fails if the book was not
5	BOOK RELUITIING	returned.	borrowed.
6	Admin Management	Admin actions correctly update	Actions fail to update system
		the system state.	state.

5. Team responsibility

Member	Responsibilities
Anika Mobashera	Conducting test team and meetings, providing environmental needs, checking and resolving issues, identifying test case item and features.
Oli Ahmed	Designing Test plan, preparing test plan, executing test case, preparing test case specification, defining project scope.

6. Testing Scheduling

Testing milestone:

• Defining team responsibilities: 1 day

• Preparing test plan: 1 day

• Preparing test case: 2 days

• Executing test cases: 3 days

• Preparing report: 1 day

Time estimation to perform testing task:

Test Task	Estimated time (day)
User Registration	1
User Login	1
Book Search	1
Book Borrowing	1
Book Returning	1
Admin Management	2

7. Test case specification

Test Case Specification Identifier	T1
Purpose	To verify the registration process
Test Items Needed	Database access, Web form access
Special Environmental Requirements	Web server running, Database online
Special Procedural Requirements	-
Inter-case Dependencies	-
Input Specifications	Name, Email, Password
Test Procedure	Fill form and submit
Output Specifications	Account creation success message

Test Case: Book Borrowing

Test Case Specification Identifier	T2		
Purpose	To check the book borrowing functionality		
Test Items Needed	Database access, Book catalog access		
Special Environmental Requirements	Web server running, Database online		
Special Procedural Requirements	-		
Inter-case Dependencies	User must be logged in		
Input Specifications	Book ID, User ID		

Test Procedure	Select a book and borrow
Output Specifications	Borrowing success message

Test Case: User Login

Test Case Specification Identifier	тз
Purpose	To verify login functionality
Test Items Needed	User credentials
Special Environmental Requirements	Web server running, Database online
Special Procedural Requirements	-
Inter-case Dependencies	-
Input Specifications	Email, Password
Test Procedure	Enter credentials and submit
Output Specifications	Login success or failure message

Test Case: Book Search

Test Case Specification Identifier	T4	
Purpose	To test the search functionality	
Test Items Needed	Search query, Book database	
Special Environmental Requirements	Web server running, Database online	
Special Procedural Requirements	-	
Inter-case Dependencies	-	
Input Specifications	Search keywords	
Test Procedure	Enter search query and submit	
Output Specifications	Relevant search results	

Test Case: Book Returning

Test Case Specification Identifier	T5
Purpose	To check the book returning functionality
Test Items Needed	Book database access, User records

Special Environmental	Web server running, Database online	
Requirements	Web server running, Database online	
Special Procedural		
Requirements		
Inter-case Dependencies	Book must be borrowed by the user	
Input Specifications	Book ID, User ID	
Test Procedure	Select a book and return	
Output Specifications	Returning success message	

Test Case: Admin Management

Test Case Specification Identifier	Т6
Purpose	To test the admin functionalities
Test Items Needed	Admin credentials, System access
Special Environmental Requirements	Web server running, Database online
Special Procedural Requirements	-
Inter-case Dependencies	Admin must be logged in
Input Specifications	Admin actions (Add/Remove books, etc.)
Test Procedure	Perform admin actions
Output Specifications	Successful execution of admin actions

8. Test Result

White Box Testing:

• Test Item: User Registration -> Passed

o **Test Case:** T1

o Client: New user

o **Input:** Valid name, email, password

o **Expected Output:** Account created

o **Actual Output:** Account successfully created

Remarks: Pass

• Test Item: Book Borrowing -> Failed

Test Case: T2

o Client: Registered user

o **Input:** Book ID (available), User ID

Expected Output: Book borrowed successfully

o **Actual Output:** Error in borrowing book

Remarks: Fail due to unhandled edge case

Black Box Testing:

• Test Item: User Login -> Passed

o **Test Case:** T3

o **User ID:** Existing user

o **Password:** Correct password

Expected Output: Login successful

Actual Output: Login successful

Remarks: Pass

• Test Item: Book Search -> Passed

Test Case: T4

Search Query: "Data Structures"

o **Expected Output:** Relevant books displayed

o Actual Output: Correct books displayed

Remarks: Pass

Test Item: Book Returning -> Passed

Test Case: T5

o **Book ID:** Borrowed book

User ID: Borrowing user

Expected Output: Book returned successfully

Actual Output: Book returned successfully

Remarks: Pass

Test Item: Admin Management -> Passed

Test Case: T6

o Admin Actions: Adding new book

Expected Output: Book added to catalog

Actual Output: Book added to catalog

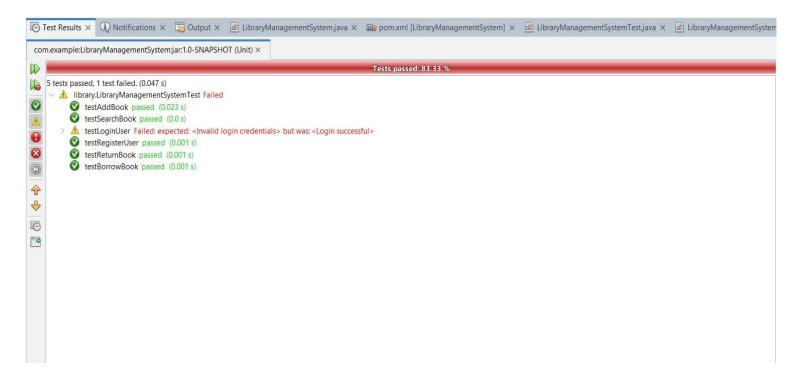
> **Remarks:** Pass

9. Conclusion

Overall, the Library Management System has successfully passed the majority of the test cases, meeting the acceptance criteria for moving to the next phase. The system requires minor corrections on the book borrowing module to handle all edge cases effectively. With 5 out of 6 test items passing, the system is 83.33% successful, thus meeting the 75% passing threshold for progression.

10. Project and Result Snippets

Result:



LibraryManagmentSystem.java:

```
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
                                                                                                                                                                            LibraryManagementSystem - Apache NetBeans IDE 20
                                                                                                                                                                                                                                                                                                                Q Search (Ctrl+I)
  ** | Company | C
                                                🕝 Test Results 🗴 🔃 Notifications x 🔁 Output x 😸 LibraryManagementSystemjava x 👜 LibraryManagementSystemjava x 🕸 pom.xml [LibraryManagementSystem] x 🎂 LibraryManagementSystemTestjava x
         LibraryManagementS
                                                Source History 🔯 🏹 - 🔍 🖓 🖓 🖫 🖟 🚱 😂 💇 🐞 🔲 😃 🚅

√ Image: ✓ Source Packages

                                                                      public LibraryManagementSystem() {
                  Ⅲ Test
                                                                              users = new HashMap<>();
books = new HashMap<>();
                  e com.mycompa
                                                 15
                 library
                                                                              borrowedBooks = new HashMap<>();
                      LibraryMar LibraryMar
                                                 18

√ Image: ✓ Test Packages

                                                                      public String registerUser(String userId, String name, String email, String password) {
                  com.mycompa
                                                                               if (users.containsKey(userId)) {
                      LibraryMar
                                                 21
                                                                                      return "User already registered";
             Dependencies
                                                                               users.put(userId, name);
                  iunit-jupiter-a
                                                 24
                                                                               return "User registered successfully";
                 apiguardian-a junit-platform
                                                 25
                  opentest4j-1.2
                                                 27 <del>-</del>
28 <del>-</del>
                                                                       public String loginUser(String userId, String password) {
            Test Dependencie
                                                                               if (!users.containsKey(userId)) {
                 junit-jupiter-e junit-platform
                                                                                      return "Invalid login credentials";
             Java Dependencie
                                                                               // For simplicity, we skip password checking in this example.
                 JDK 17 (Defau
                                                                               return "Login successful";
           Project Files
                                                  33
                  pom.xml
                                                 34
         LoginModule
                                                 35 📮
                                                                      public String addBook(String bookId, String title) {
         project
                                                  36
                                                                              if (books.containsKey(bookId))
         Project
                                                                                      return "Book already exists";
             Source Packages
                                                 38
             Test Packages
                                                  39
                                                                               books.put(bookId, title);
                  Iibrary
                                                 40
                                                                               return "Book added successfully";
             Dependencies
                                                  41
             Test Dependencie
             Java Dependencie
                                                  43
                                                                       public List<String> searchBook(String keyword) {
             Project Files
                                                                              List<String> result = new ArrayList<>();
                                                  44
                 Imx.mog em
                                                                               for (String title : books.values()) {
              Project430
                                                  46 E
                                                                                      if (title.toLowerCase().contains(keyword.toLowerCase())) {
         Testing_Sel
                                                  47
                                                                                               result.add(title);
            Source Packages
Test Packages
```

LibraryanagmentSystemTest.java:

```
🖸 Test Results 🗴 🛈 Notifications 🗴 🐻 Output 🗴 🏿 LibraryManagementSystemjava 🗴 🛍 pom.xml [LibraryManagementSystem] 🗴 🚳 LibraryManagementSystemTestjava 🗴
nagements
           Source History 🔯 🖟 📲 - 🎑 🞝 😓 👺 🚭 🗳 👲 👲 🗎 🚨
Packages
                 package library;
1.mvcompa
            3  import org.junit.jupiter.api.BeforeEach;
                 import org.junit.jupiter.api.Test;
LibraryMar
LibraryMar
                 import static org.junit.jupiter.api.Assertions.*;
ckages
ı.mycompa
                 public class LibraryManagementSystemTest {
                     private LibraryManagementSystem lms,
LibraryMar
dencies
                      @BeforeEach
t-jupiter-a
                     public void setUp() {
quardian-a
           13
                          lms = new LibraryManagementSystem();
t-platform
           14
ntest4j-1.2
ependencie
t-jupiter-e
           17
                      public void testRegisterUser() {
t-platform
                          String result = lms.registerUser("user01", "Alice", "alice@example.com", "password123");
ependencie
                          assertEquals("User registered successfully", result);
result = lms.registerUser("user01", "Alice", "alice@example.com", "password123");
17 (Defau
           20
Files
                          assertEquals("User already registered", result);
           21
n xml
ule
                      public void testLoginUser() {
Packages
                          lms.registerUser("user02", "Bob", "bob@example.com", "securepass");
String result = lms.loginUser("user02", "securepass");
           26
ckages
                          assertEquals("Login successful", result);
dencies
           29
                          result = lms.loginUser("user02", "wrongpass");
pendencie
                          assertEquals("Invalid login credentials", result);
ependencie
                          result = lms.loginUser("user03", "nopass
Files
           32
                          assertEquals("Invalid login credentials", result);
n.xml
           33
           34
           35
Packages
           36 =
                      public void testAddBook() {
                          String result = lms.addBook("book01", "Python Programming");
```

Pom.xml:

```
Test Results × 🗘 Notifications × 👼 Output × 🏿 LibraryManagementSystem.java × 🐿 LibraryManagementSystemTestjava.x 🔞 LibraryManagementSystemTestjava.x
raryManagement5
               Source Graph Effective History 🔯 🖟 🌄 - 🍳 🞝 🗗 📮 <equation-block> 😭 😫 💇 🐞 🔲 🤝 🤝 📦
Source Packages
                1 - project xmlns="http://maven.apache.org/POM/4.0.0"
Test
                              xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
e com.mycompa
                               xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
library
                          <modelVersion>4.0.0</modelVersion>
  <groupId>com.example</groupId>
 ₫ LibraryMar
                          <artifactId>LibraryManagementSystem</artifactId>
Test Packages
                          <version>1.0-SNAPSHOT</version>
com.mycompa
                          <dependencies>
library
                              <dependency>
₫ LibraryMar
                                  <groupId>org.junit.jupiter</groupId>
Dependencies
junit-jupiter-a
apiguardian-a
junit-platform
opentest4j-1.2
               11
                                 <artifactId>junit-jupiter-api</artifactId>
                                 <version>5.8.1
               12
               13
                                 <type>jar</type>
                              </dependency>
               15
                              <dependency>
Test Dependencie
               16
                                  <groupId>org.junit.jupiter</groupId>
junit-jupiter-e junit-platform
                                  <artifactId>junit-jupiter-engine</artifactId>
               17
                                  <version>5.8.1
               18
Java Dependencie
                                  <scope>test</scope>
JDK 17 (Defau
Project Files
               21
                          </dependencies>
lmx.moq
               22
                          <build>
inModule
               23 E
24 E
25 E
                              <pl><pluginManagement></pl>
ject
                                 <plugins>
ject
                                      <plugin>
Source Packages
               26
                                          <groupId>org.apache.maven.plugins
Test Packages
               27
                                          <artifactId>maven-surefire-plugin</artifactId>
library
                                          <version>2.22.2
               28
Dependencies
               29
                                      </plugin>
Test Dependencie
                                  </plugins>
Java Dependencie
               31
                              </pluginManagement>
Project Files
               32
                         </build>
pom.xml
               33
                     </project>
ject430
               34
ting_Sel
Source Packages
Test Packages
```