TEST PLAN DOCUMENT

for

Library Information System

Prepared by:Gayathri Anant 22CS30026
Pracheta Saha 22CS30042
Ankita Mishra 22CS10010

Indian Institute of Technology

Kharagpur

April 8, 2024

Contents

1 Test Plan Identifier

RS-MTP01.1

2 References

None Identified.

3 Introduction

The Master Test Plan serves as a comprehensive roadmap, delineating the testing strategy for the Library Information System. This specialized software is engineered to streamline various operations within an institute's library. Its primary aim is to offer a centralized platform, simplifying processes such as book issuance, return, reservation, and penalty management, thereby enriching the library experience for both staff and members.

For an in-depth understanding of the Library Information System's functionalities, it's advisable to consult the Software Requirements Specification (SRS) document. This document elucidates the system's goals and objectives, serving as a foundation for crafting test cases and shaping the testing approach. Subsequently, the Master Test Plan outlines specific methodologies and procedures to ensure rigorous testing, aligning the software with end-user requirements and expectations.

4 Software Risk Issues

Risk: Fraudulent Book Transactions

Although the Library Information System implements measures to ensure the integrity of book transactions, there is a risk of fraudulent activities such as unauthorized book issuances, reservations, or returns. Despite user authentication mechanisms, there remains a possibility of users exploiting system vulnerabilities or sharing credentials to carry out fraudulent transactions, resulting in inaccurate inventory records and financial losses.

Mitigation Strategy:

- **Enhanced Authentication:** Strengthen user authentication mechanisms by implementing multi-factor authentication reducing the likelihood of unauthorized access.

- **Role-Based Access Control:** Restrict access to book transaction functionalities based on user roles and permissions, ensuring that only authorized personnel can perform certain actions such as issuing, reserving, or returning books.

- **Logging and Auditing:** Maintain comprehensive logs of all book transactions, including user IDs, and transaction details, to facilitate post-event analysis and audit trails. Regularly review transaction logs for any irregularities or unauthorized activities.

- **User Education:** Educate users about the importance of safeguarding their login credentials and adhering to the library's policies and procedures regarding book transactions. Encourage users to report any suspicious activities or discrepancies they encounter while using the system.

- **Penetration Testing:** Conduct regular penetration testing and security assessments to identify and address vulnerabilities in the system's architecture and implementation, including potential loopholes that could be exploited for fraudulent book transactions.

- **Continuous Monitoring and Improvement:** Implement a proactive approach to risk management by continuously monitoring system performance and user feedback, and iterating on security measures to adapt to evolving threats and mitigate new risks as they arise.

5 Features to be Tested

The following is a list of the areas to be focused on during testing of the Library Information System, along with their levels of risk, with H standing for High Risk, M standing for Medium Risk, and L standing for Low Risk:

- New User Registration (H)
- Existing User Login (M)
- User Profile Viewing (L)
- Status and Notifications Page Access (L)
- Book Procurement Request Submission (M)
- Report of Missing Book from Rack Position (L)
- Admin Login (H)
- User Login (UG, PG, RS Students, Faculty Members) (M)
- Add, Remove, and Edit User (H)
- Add, Remove, and Edit Book (H)
- Book Transaction: Issue Book for User (H)
- Book Transaction: Reserve Book for User (H)
- Book Transaction: Return Book by User (H)
- Notification to Users for Overdue Books (M)
- Notification to Users for Maximum Reserve Date Passed (M)
- Fine Generation while Sending Notifications (M)
- Fine Generation while Returning Books (M)

- Transaction Search by User ID (L)
- Transaction Search by Book ISBN (L)
- Auto-Suggestion based on Recent Issued Books (M)
- Auto-Suggestion based on Department (M)
- Display of Recently Added Books (L)

6 Approach

6.1 Testing Levels

The testing approach for the Library Information System will encompass Unit, System/Integration (combined), and Acceptance test levels. While acknowledging budget and time constraints, the primary responsibility for testing will rest with the test manager, with the development team's involvement.

- **UNIT:** Developers will execute unit tests, collectively approved by the development team. Comprehensive unit test details will be shared with the testing team for their reference.
- **SYSTEM/INTEGRATION:** The test manager will lead System/Integration testing in collaboration with the development team. No specialized test tools are required. System/Integration testing will commence once critical defects have been addressed. Programs may possess up to two Major defects, provided they don't impede testing and have available workarounds.
- **ACCEPTANCE:** Actual end users will conduct Acceptance testing under the guidance of the test manager and developers. Prior to testing, end users will be briefed on acceptance test cases. Acceptance testing will commence once all critical and major defects are resolved. Programs may have one major defect, provided it doesn't obstruct testing and has a workaround. Before finalizing acceptance testing, all open critical and major defects must be resolved.

6.2 Defect Reporting

During the Unit Testing phase of the Library Information System, the development team will assume responsibility for identifying and documenting any defects within the codebase. Defects will be meticulously documented, detailing their source, severity, proposed solutions, and estimated resolution time. This comprehensive information will be promptly shared with the testing team and project manager for further evaluation and resolution.

As testing progresses into subsequent phases, such as System/Integration and Acceptance testing, the focus will shift towards identifying defects that may have been overlooked during Unit Testing or arise from interactions between different modules or components of the system. Special attention will be paid to defects that should have

been captured during Unit Testing but were not, as these may pose greater risks or complexities to resolve at higher testing levels.

Ultimately, the overarching goal of the testing process is to ensure that the Library Information System adheres to the required quality standards and remains free from critical defects that could compromise user experience or the integrity of the library's data. Efforts will be directed towards achieving thorough defect identification, resolution, and continuous improvement throughout the testing lifecycle.

7 Item Pass/Fail Criteria

The test process for the Library Information System will be considered complete under the following conditions:

- The initial set of data for students, faculty members, and other stakeholders is collected and verified by the administration staff to ensure accuracy and completeness.
- The application successfully handles the administration staff's tasks of adding, removing, and editing user profiles and book records, with all changes reflecting accurately in the database.
- Users can log in to their respective accounts (UG student, PG student, RS student, Faculty Member) without encountering authentication issues.
- Users can view their profiles, access the status and notifications page, and perform actions such as requesting procurement of new books and reporting missing books from rack positions without errors.
- Admins can issue, reserve, and return books for users, with transactions accurately recorded in the system and reflected in the user's transaction history.
- Admins can send notifications to users regarding overdue books and maximum reserve date violations, with fines generated accurately according to the notification criteria.
- Admins can search transactions by user ID or book ISBN, with search results displaying relevant information.
- Features such as auto-suggestion based on recent issued books and department, and showing recently added books, function correctly and provide relevant suggestions and information to users.

- New data collected every semester is successfully integrated into the system, and any updates requested by users are accurately reflected in the database.

The test process will be considered successful if all of the above criteria are met without encountering critical errors or functionality issues. Any deviations from these criteria will be noted as test failures and addressed accordingly before the system is considered ready for live deployment.

8 Suspension Criteria and Resumption Requirements

8.1 Database Unavailability

If there is a failure in accessing or updating the database, testing will be suspended until the database issue is resolved. The development team will work to restore database functionality as soon as possible. Testing can resume once the database is accessible and all data integrity is verified.

8.2 Critical Functionality Failure

If critical features such as user login, book transactions, or admin functionalities are not functioning as expected, testing will be suspended until these issues are resolved. The development team will prioritize fixing critical functionality failures to ensure the system operates smoothly. Testing can resume once the critical functionalities are restored and validated.

8.3 Security Breach

If there is evidence of a security breach or vulnerability in the system, testing will be suspended immediately to prevent further risk to user data and system integrity. The development team will investigate and address the security issue promptly. Testing can resume once the security breach is resolved, and necessary security measures are implemented and verified.

9 Test Deliverables

- Acceptance test plan
- System/Integration test plan
- Unit test plans
- Test cases document

10 Environmental Needs

The successful execution of testing for the Library Information System requires access to the following elements:

- Access to the Library Information database containing information on books, users, transactions, and system configurations.
- Access to a testing dataset that includes a variety of scenarios and data configurations to thoroughly test the system's functionalities.

11 Staff and Training Needs

For the effective testing and operation of the Library Information System, the following staff and training needs should be addressed:

- **Testing Staff:** It is preferred to assign at least one full-time tester dedicated to the project, specifically for system/integration and acceptance testing phases. This individual will participate in reviews and testing activities. In the absence of a dedicated tester, the project manager or test manager will assume this role.
- **Developer and Tester Training:** Developers and testers involved in the project will require training on Object-Oriented Programming (OOP) principles and a solid understanding of the software stack used, such as React for frontend development, Django for backend development and PostgreSQL for database management. This training will ensure a common understanding of the technology stack and facilitate effective collaboration between development and testing teams.

- **Admin Training:** Administrative personnel tasked with managing user data and the application's administrative interface will require training on system functionalities related to user management, book management, and transaction processing. This training will empower administrators to efficiently handle user requests, maintain system integrity, and troubleshoot any issues that may arise.

12 Responsibilities

	Dev Team	Test Team	Client
Acceptance test Documentation & Execution		x	x
System/Integration test Documentation & Execution	x	x	
Unit test Documentation & Execution	x	x	
System Design Reviews	x	x	x
Test Procedures & Rules	x	x	

13 Schedule

The testing phase of the Library Information System will be divided into three main parts: Unit Testing, System/Integration Testing, and Acceptance Testing.

- **Unit Testing:** Unit testing will commence concurrently with the development phase, with the final unit testing scheduled to be completed by 2nd April 2024. During this phase, individual components or modules of the system will be tested independently to ensure their proper functionality.
- **System/Integration Testing:** Scheduled for 9th April, this phase involves testing the entire system once all individual components have been integrated. The objective is to verify that different parts of the system work seamlessly together.
- **Acceptance Testing:** Also scheduled for 9th April, this phase focuses on testing the system from the perspective of end-users to ensure it meets their requirements and expectations. Testing will be conducted by a group of individuals under the supervision of the development team, and results will be evaluated against predefined acceptance criteria.

Upon completion of each testing phase, the results will be analyzed, and necessary changes will be implemented in the system's codebase.

Please note that the provided dates are tentative and subject to adjustments based on the progress of development, resource availability, and any other factors influencing the testing schedule.

14 Planning Risks and Contingencies

14.1 Delay in Data Collection

If there is a delay in collecting or verifying data for the Library Information System, it may lead to a delay in updating the application with accurate information. During this period, manual data entry or management may be necessary to ensure the system remains functional.

Contingency Plan:

- If the delay is due to understaffing, existing staff members may need to work overtime to expedite the data collection process.
- Alternatively, outsourcing data collection tasks to temporary staff or third-party agencies could be considered if hiring and training new staff within the given timeframe is not feasible.