Appendix

FORM 1

FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

Diploma in Software Engineering
Programme: DSF Y1 S1(Group: 3)

Assignment

AMSE1003 SOFTWARE ENGINEERING

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Date of Submission: 29/09/2024

FORM 2

TUNKU ABDUL RAHMAN UNIVERSITY OF MANAGEMENT AND TECHNOLOGY

FACULTY OF COMPUTING AND INFORMATION TECHNOLOGY

Plagiarism Statement and Guideline for Late Submission of Coursework

Read, complete, and sign this statement to be submitted with the written report.

We confirm that the submitted works are all our own work and are in our own words.

Name (Block Letters)	Registration No.	Signature	Date
1.Alisha Hiew Xue Yu	24SMD09984	*Alisha*	29/09/2024
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1.Inefficient Book Registration

using old system might not be accurate because everything is handwritten and it is very inefficient for example when there's a lot of people that want to borrow books but the library only have one book that record everything.Using a computer and also a barcode scanner could increase the efficiency and also the accuracy of the data

2.inconvenient

The library is not convenient enough.We can make a website dedicated to the library so that people can reserve the book that they want to borrow before even going to the library or just be able to borrow Ebook pdf file.The website should be able to show the borrow history of the user as well.

3.Late return of books

There is a lot of people that are unclear of when the due date is, create software that manages this and alerts borrowers of due date while also letting librarian know which books are due and which books are not

4.Bad finance system

Library may suffer loss due to poor finance system such as only using a book and manpower to count all the money related stuff such as library electricity,water bill, maintenance fee and books payment.this can be fix by using more advanced and also convenient method such as including the borrow cost when scanning a book and auto key in to a computer software that manages money

2.

- **Software quality attributes of the project.** Suggest and explain **FOUR (4)** software quality attributes for the new proposed system. You may make any relevant assumptions to support your answer. **[10 marks]**

(1)Acceptability

-borrowers: borrow books without the need to write down names in books, not easily forgetting their borrowed books
-librarians: more convenient at work

(2)Dependability and Security

The system will become more dependable and more secure compared to the system before. For example one of the major issues of the library is late return of books due to unclear instructions from the library staff. But, with a more refined system we can tell the user when they should return the books using methods such as sending messages through whatsapp or email. It does not also cause economic problems because a new financial system is introduced.Any money related stuff such as book cost and also maintenance fee will be more consistent and accurate.

(3)Efficiency

The system will be more efficient and it will be more responsive. For example, the system should be fast enough to respond when there are people that want to borrow books from the library and it will not cause long queuing. If the system in the library is inefficient and unresponsive, it will make the processing time longer and it will be wasting so much time that makes people unhappy.

(4)Maintainability

The software has been written in a way that it can evolve and meet the changing needs of the

customers such as new book borrowing systems and finance systems. We understand that maintainability is a critical attribute because software change is an inevitable requirement of a changing business environment. The maintainability should not be a big issue because it will not cost a lot and it does not require lots of service and update

-easier, registering new books

- **Software Process Model.** Recommend and explain an appropriate software process model for the proposed system. Justify your suggestion. You may make relevant assumptions to support your suggestion. **[10 marks]**

The purpose of this report is to recommend a Prototyping model for developing a library management system to address significant issues in an old library, such as the late return of books, theft, inefficiency in book registration, and a deficient finance system. After evaluating the other Model ,the Prototyping Model is identified as the most appropriate approach.

The Prototyping Model involves creating an initial version of the system to gather requirements and refine them through user feedback, allowing for continuous improvement until the final system meets all requirements. This model is particularly suitable for the library management system due to the complexity of the requirements and the need for user feedback. For instance, the system to manage late book returns must understand user behavior and preferences, which can be refined through prototypes. Implementing security measures like CCTV and fingerprint machines requires iterative testing to ensure effectiveness and usability, while transitioning from a manual to a computerized registration system needs careful design to match the workflow of library staff. Additionally, for financial management, precise handling of data and user input is crucial, and prototyping allows for testing different financial tracking methods and refining them based on user feedback.

The flexibility and iteration inherent in the Prototyping Model support changes and enhancements at any stage, crucial for developing a system that must adapt to various requirements and feedback from multiple stakeholders. Continuous user involvement through prototypes ensures that the final system aligns closely with user needs and expectations, essential for a library system used by different types of users with varying levels of technical proficiency. The implementation steps for the Prototyping Model include initial requirement gathering through interviews and surveys, developing an initial prototype focusing on core functionalities, conducting user testing and feedback sessions, refining and

enhancing the system in several iterations, developing the final version, and providing ongoing support and maintenance.

In conclusion, the Prototyping Model is highly suitable for developing a library management system that needs to address complex, multifaceted issues through continuous user feedback and iterative improvement. This approach ensures that the final system is user-friendly, effective, and meets the evolving needs of the library and its users, providing the necessary flexibility to accommodate changes and enhancements, making it the best choice for this project.

Software Requirements Specification

Functional requirement :

User Management

1.1 The system must allow users to create accounts.

1.2 The system must allow users to log in securely.

1.3 The system shall allow users to view their borrowing history.

1.4 The system shall allow librarians to view user's information (eg.phone number).

1.5 The system must allow users to provide at least 1 contact information.

1.6 The system must support different user roles (e.g., librarian, member, admin) with appropriate permissions.

1.7 The system must allow users to renew their borrowing period online.

1.8 Users must be able to leave feedback or suggest new books.

1.9 The system must allow users to update their personal information, including contact details and preferences.

Inventory Management

2.1 The system must enable librarians to add book records.

2.2 The system must enable librarians to update their book records.

2.3 The system must enable librarians to delete their book records.

2.4 The system must be able to search for every book by title, author, genre, ISBN, or keyword.

2.5 The system shall show the current status of each book (eg. borrowed, unborrowed, due).

2.6 The system must allow multiple librarians to manage book records, circulation, and inventory simultaneously without conflicts.

2.7 The system must keep a detailed history of all transactions for each user, including borrowed books, returns, fines paid, and any reservations made.

Financial Management

3.1 The system shall automatically calculate the overdue fine of a user.

3.2 The system shall allow users to pay the fine via e-wallet or card.

3.3 The system shall allow librarians to view the payment overdue of every user.

3.4 The system shall allow users & librarians to view past transactions.

3.5 The system must maintain a detailed transaction history for each user, including all payments made, fines incurred, and any financial adjustments, allowing users and librarians to view and manage past financial activities.

Book Reservation Management

4.1 The system must display the current availability status of books and allow user to reserve only if the book is not already checked out or reserved .

4.2 The system should enforce a limit on the number of books a user can reserve at any given time , configurable by the library.

4.3 The system should inform the user if a user fail to pick up a reserved book within a specified period , the reservation should automatically expire ,and the books becomes available for others.

4.4 The system should sent email or SMS notifications to the users when their reserved books becomes available for pickup.

4.5 The system must manage a queue for popular books ,allowing users to be placed in line and notified of their position and estimated wait time .

User Engagement Report Management

5.1 The system must record detailed user activity ,including the number of books borrowed , genres borrowed ,and frequency of visit to the library for inclusion in report.

5.2 The system should allow the librarian to generate reports based on custom date range to analyze engagement over different periods.

5.3 The system should track and report user who frequently return books late , helping identify pattern of delayed returns and assess the impact on overall book availability.

5.4 The system should track and report how often users physically visit the library, providing data on user interaction with the library space itself.

5.5 The system should allow users to submit feedback or reviews on borrowed books and include this data in engagement reports, helping assess user satisfaction and reading preferences.

Non-Functional requirement :

1.1 The system should make sure user data, including personal information and login credentials, must be securely encrypted and stored to protect against unauthorized access or data breaches.

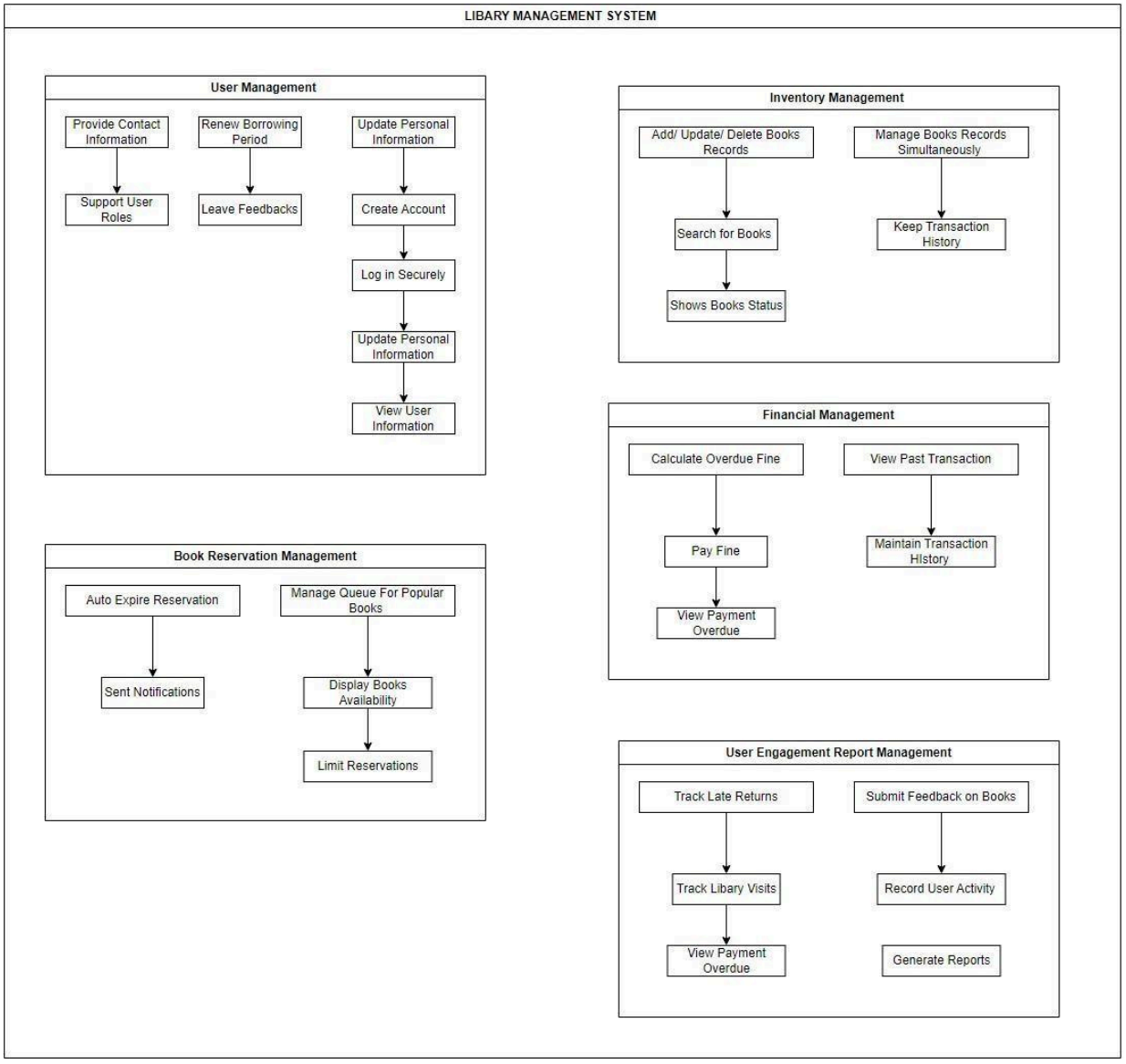
1.2 The system must handle large amounts of book records without a significant decrease in performance, allowing for future growth in the library's collection.

1.3 The system must make sure all financial calculations are accurate to two decimal places, ensuring precise financial reporting and management.

1.4 The system should make sure the reservation system to be available 24/7 ,ensuring that user can reserve books without interruption or downtime.

1.5 The system should make sure the report generation process must complete within 5 seconds for up to 10,000 records, ensuring timely access to insights and analytics.

System Organization



Test Case

1.0User Management Module

Test Case Name	**1.1.1 Create accounts with valid data**	**Test Case Description**	**To check the create accounts function by using valid email and password.**
Pre-conditions:		**Test Data:**	
1	**The email used to create accounts must be an existing, valid email address.**	**1**	**email= alishahxy-sm24@tarc.edu.my**
2	**The system must have the capability to send verifications to the email address.**	**2**	**password= AbCd1234**
3	**The user must not already have an account with the same email address.**	**3**	**username= Alisha_14**

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not executed / Suspended)**

1	**Open the system and navigate to the create account page**	**The registration page will be displayed showing fields for email address, username, password and confirm password.**	**The registration page is displayed showing fields for email address, username, password and confirm password.**	
2	**Create an account using details such as an existing email address, a valid password and a valid username**	**The system will accept the input and validates the details meeting the necessary criterias**	**The system accepted the input and validates the details meeting the necessary criterias**	
3	**Confirm user has successfully created an account**	**The system will display user's information in the page**	**The system displayed the user's information on the page**	
4	**Log off the system to end session**	**The system should log out the user from the system and return to**	**The system logged out the user from the system and returned them to the login screen**	

		the login screen		

Test Case Name	**1.2.1 Log in the system with data.**	**Test Case Description**	**To check the log in function by using valid email and password.**
Pre-conditions:		**Test Data:**	
1	**The email used to log in must be an existing, valid email address.**	**1**	**email= alishahxy-sm24@tarc.edu.my**
2	**The email address used must be registered in the system and already has an account.**	**2**	**password= AbCd1234**
3	**The user should have a stable network connection to avoid connectivity related log in failures.**	**3**	**username= Alisha_14**

Step	**Step Details**	**Expected**	**Actual Results**	**Remarks (Pass /**

#		Results		Fail / Not executed / Suspended)
1	Open the system and navigate to the “Login” page	The Login page will be displayed with fields for emails and passwords	The Login page is displayed with fields for emails and passwords	
2	Input login details using a valid email address with an existing account, or an existing username and a valid password	The system will authenticate the user’s credentials then redirect the user to their dashboard	The system authenticate the user’s credentials then redirected the user to their dashboard	
3	Confirm user has been successfully logged into the system	The user’s dashboard is visible. The user will be recognised by account details.	The user’s dashboard is visible and user was recognised by account details	
4	Click “Logout” to end the session	The system should log out the user from the system	The system logged out the user from the system and returned them to	

		and return to the login screen	**the login screen**	

Test Case Name	**1.6.1 view user's borrowing history**	**Test Case Description**	**To check if view borrowing history function is functioning properly**
Pre-conditions:		**Test Data:**	
1	**The user must be logged into the system.**	**1**	**Item ID: ABC-1234**
2	**The user must have existing borrowing records in the system.**	**2**	**Book Title: "Learning ABC"**
3	**The borrowing history functionality must be accessible**	**3**	**Status: Returned**

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not executed / Suspended)**

1	**Log into the system**	**The system will authenticate the user and redirect them to their account homepage**	**The system authenticated the user and redirect them to their account homepage**	
2	**From the user dashboard, click on the "Borrowing History" tab**	**The system should display a list of all borrowed items with details such as item ID, book title, borrowed date, due date and its borrowing status**	**The system displayed a list of all borrowed items and details of each items**	
3	**Verify that the borrowing history shows correct details for each borrowed items**	**The system should sort and filter borrowing history correctly based on user's selection**	**The system sorted and and filtered user's borrowing history correctly based on user's selection**	

4	**Click “Logout” to end the session**	**The system should log out the user from the system and return to the login screen**	**The system logged out the user from the system and returned them to the login screen**	

2.0 Inventory Management

Test Case Name	2.2.1The system must be able to search for every book title	Test Case Description	To let librarians search book
Pre-conditions:		**Test Data:**	
1	the librarians needs to be able to type	1	book title= “7 habits of highly effective people”
2	The book needs to be inside the database of the libary	2	book code “ 32675”
3		3	

Step #	Step Details	Expected Results	Actual Results	Remarks (Pass / Fail / Not executed / Suspended)
1	Type the name of the book	the book will appear under the search bar	The book appears under the search bar	
2	Click the book	The information of the book will	The information of the book will be	

		be displayed	display	
.				
.				
n				

Test Case Name	2.1.1 register valid book data	Test Case Description	To let librarians to register book records
Pre-conditions:		**Test Data:**	
1	the librarians need to have permission to edit the system records	1	book title= “rich dad poor dad”
2		2	book code “ 32456”
3		3	

Step #	Step Details	Expected Results	Actual Results	Remarks (Pass / Fail / Not

				executed / Suspended)
1	**scan the book code of the book**	**the book data will come out**	**Book data will be shown**	
2	**go into the system record page**	**system record page will be displayed**	**System record page Is displayed**	
.	**enter the book name and the book code**	**the book title and bookcode were entered**	**Book Title and bookcode are entered**	
.	**click the key in button**	**the data will be recorded**	**Data got recorded**	
n				

Test Case Name	**2.3 The system shall show the current status of each book**	**Test Case Description**	**To let librarians check status of the book**
Pre-conditions:		**Test Data:**	

1	**the system should have function to show the book status**	**1**	**book title= “48 powers of law”**
2	**Book have to be in database of the library system**	**2**	**book code “ 32749”**
3		**3**	

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not executed / Suspended)**
1	**Search the book**	**the book will appear under the search bar**	**The boon appears under search bar**	
2	**Click the book**	**The status of the book will be displayed**	**Status of the book got displayed**	
.				
.				
n				

3.0 Financial Management

Test Case Name	3.2The systems shall allow users to pay the fine via e-wallets or card	**Test Case Description**	To allow users to pay the fine via e-wallets or card
Pre-conditions:		**Test Data:**	
1	Users must have e-wallets	1	e-wallet: Touch n go
2	Users must have card	2	card: debit card
3	Users must already registered to the system	3	email: hwh2005@gmail.com

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not**

				executed / Suspended)
1	Log in to the system	The library system page shall be displayed	The library system page is displayed	Pass
2	Locate “outstanding fines” and choose fines to pay	The system will displayed outstanding fines owe by users	The system displayed outstanding fines owe by users	Pass
.	Select “payment method” and enter payment details	The system will displayed “Select Payment Method” page to let users enter their payment details	The system displayed “Select Payment Method” page and users entered their payment details	Pass
.	Payment confirmation	The system will display payment confirmation for the users	The system displayed payment confirmation for the users	Pass
n	View payment status in account	The system will display payment status in account	The system displayed payment status in account	Pass

Test Case Name	3.1 The system shall automatically calculate the overdue fine of a user.	**Test Case Description**	To save librarian’s time by calculating the overdue fine of a user automatically

Pre-conditions:		**Test Data:**	
1	The users must already registered to the system	1	email: hwh2005@gmail.com
2	The books must already registered to the system	2	book name: “Atomic Habits”
3	The record of the book borrowed must be recorded in the system	3	borrow book: “Atomic Habits”

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not executed / Suspended)**
1	Log in to the system	The library system page shall be displayed	The library system page is displayed	Pass
2	Navigate to “My Account” section	The system will display users account	The system displayed users account	Pass
.	Select “View Overdue Fines” section	The system will display overdue fines owe by users	The system displayed overdue fines owe by users	Pass
.	Select “Fine Payment Options” section	The system will display fine payment options for users	The system displayed fine payment options for users	Pass
n	Select “Fines exemptions” section	The system will display fines exemptions for users	The system displayed fines exemptions for users	Pass

Test Case Name	3.4The system shall allow users & librarians to view past transaction	**Test Case Description**	To allow users & librarians to view past transaction
Pre-conditions:		**Test Data:**	
1	Users must already registered to the system	1	email: hwh2005@gmailcom
2	Transaction must be recorded in the system	2	transaction: Hiew
3	Amount of transaction must be recorded in the system	3	amount of transaction: RM1

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not executed / Suspended)**
1	Login to the library system as existing users or as a librarian credentials	Users and librarians should be logged in to the system	Users and librarians is logged in to the system	Pass
2	Navigate to “Transaction History” for users or “Transaction Management Section” for librarians	The system shall display a list of transaction history	The system displayed a list of transaction history	Pass
.	Select “View Past	System shall display	System displayed	Pass

	Transactions” section	past transaction	past transaction	
.	Select “View Specific Transactions Detail” for users or “View or edit Specific Transactions Detail” for librarians	System shall display specific transaction detail for the users and for the librarians it is editable	System displayed specific transaction detail for the users and for the librarians it is editable	Pass
n	Select “Export Transaction History” for users or “Generate Report” for librarians	System shall display transaction history for the users and it will generate report for the librarians	System displayed transaction history for the users and it generates report for the librarians	Pass

4.0Book Reservation Management

Test Case Name	4.1.1 Find availability status of books	**Test Case Description**	To check the book availability status
Pre-conditions:		**Test Data:**	
1	The book must already be registered in the system.	1	Book Title = “Atomic Habits”
2	The book’s data is updated.	2	
3		3	

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not executed / Suspended)**
1	Open the system.	The library system page shall be displayed.	The library system page is displayed.	Pass
2	Click on the ‘Books’ tab.	The list of books page shall be displayed.	The list of books page is displayed.	Pass
3	Enter the book title .	The book title shall be entered.	The book title was entered.	Pass
4	Click the ‘Check Availability’ button.	The book’s availability shall be displayed.	The book’s availability is displayed as “available” or “currently not available”.	Pass
n				

Test Case Name	4.2.1 Limit number of books user borrow	**Test Case Description**	To limit the number of books borrowed
Pre-conditions:		**Test Data:**	
1	User is registered into the library	1	

	system.		
2	The maximum number of books allowed for borrowing is defined.	2	
3	User attempts to borrow a book exceeding the limit of borrowed books.	3	Borrow book : “Atomic Habits”

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not executed / Suspended)**
1	Login to library system as existing user.	User shall be logged into the system as an existing user.	User is logged into the system as an existing user.	Pass
2	User clicks on ‘borrow book’ button.	System shall send out an error message “sorry you have reached the limit of books borrowed”.	System sends out an error message “sorry you have reached the limit of books borrowed”.	Pass
.	Select an borrow the maximum number of books allowed.	The books shall be registered as borrowed books.	The books are registered as borrowed books.	Pass

.	Attempt to borrow an additional book.	An error message : “you have reached the maximum amount of borrowed books allowed” shall be displayed.	An error message : “you have reached the maximum amount of borrowed books allowed” is displayed.	Pass
n				

Test Case Name	4.4.1 Notify user for reserved book.	**Test Case Description**	Sends a notification to user when reserved book is ready for pickup.
Pre-conditions:		**Test Data:**	
1	User is already registered as existing user.	1	
2	User has reserved a book thats currently unavailable.	2	Book name : “Atomic Habits”
3	The reserved book has been returned to library.	3	

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not executed / Suspended)**

1	Login to the library system as existing user.	User is should be logged in as existing user and is allowed to borrow books.	User is logged in as existing user and is allowed to borrow books.	Pass
2	Navigate to “Search Books” selection.	The system shall display a list of books without regard of availability.	The system displayed a list of books without regard of availability.	Pass
3	Select a book that's currently unavailable.	System shall place user in the list of reservation for the book.	System places user in the list of reservation for the book.	Pass
4	An automated system marks the reserved book as returned when returned.	The system shall process the book’s availability as available.	The system processes the book’s availability as available.	Pass
5	The system sends a notification regarding the availability to the user’s SMS.	The notification should contain relevant details like pickup	The notification contained relevant details like pickup location, branch and time.	Pass

		location and time.		

5.0 User engagement report management module

Test Case Name	**5.5Submit Feedback on Borrowed Books**	**Test Case Description**	**Verify if the system allows users to submit feedback or reviews on borrowed books and includes the data in engagement reports.**
Pre-conditions:		**Test Data:**	
1	**The user is logged into the system.**	**1**	**Book title: "The Great Gatsby"**
2	**The user has borrowed at least one book.**	**2**	**Feedback: "Excellent book with deep characters."**
3		**3**	

Step #	Step Details	Expected Results	Actual Results	Remarks (Pass / Fail / Not executed / Suspended)
1	**User navigates to the "My Borrowed Books" section**	**The system successfully stores the feedback.**		
2	**Select the book "The Great Gatsby."**	**The feedback is included in the engagement report with**		

		user satisfaction and reading preferences.		
.	**Click on "Submit Feedback."**			
.	**Enter the feedback: "Excellent book with deep characters."**			
n	**Submit the feedback.**			

Test Case Name	**5.3 Track Late Returns**	**Test Case Description**	**Verify if the system tracks users who frequently return books late and generates reports for identifying patterns of delayed returns.**
Pre-conditions:		**Test Data:**	
1	**The user has returned at least two books late.**	**1**	**User ID: 12345**
2		**2**	**Book A - Return date: 5 days late**
3		**3**	**Book B - Return date: 3 days late**

Step #	**Step Details**	**Expected Results**	**Actual Results**	**Remarks (Pass / Fail / Not executed / Suspended)**
1	**System detects late return of Book A (5 days late).**	**The system tracks the late returns.**		
2	**System detects late return of Book B (3 days late).**	**The user is flagged in the report for frequent late returns with the pattern of delayed returns.**		
.	**Admin accesses the "Late Return Reports."**			
.				
n				

Test Case Name	5.1 Record User Activity	Test Case Description	Verify if the system records detailed user activity, including the number of books borrowed, genres borrowed, and the frequency of library visits.
Pre-conditions:		**Test Data:**	
1	The user has borrowed books from different genres and visited the library multiple times.	1	User ID: 12345
2		2	Borrowed books: 1. Fiction - 3 times 2. Science - 2 times
3		3	Library visits: 5 times

Step #	Step Details	Expected Results	Actual Results	Remarks (Pass / Fail / Not executed / Suspended)
1	User borrows 3 fiction books and 2 science books.	The system logs the number of books borrowed, the genres, and		

		the frequency of visits.		
2	**User visits the library 5 times in a month.**	**The report accurately reflects the user's borrowing history and visits for analysis.**		
.	**Admin generates a "User Activity Report."**			
.				
n				

System Configuration Management

https://github.com/koklieong12/AMSE-1003-GROUP-3-REPORT.git

We install Git from the official website and set it up by adding our username and email .This lets us track changes in our project .After initialized the repository, we added our project files for version control. Each commit saved a snapshot of the project ,allowing us to keep a history of changes. To back up our work and collaborate , we pushed the project to GitHub . By committing regularly, we could easily track progress and go back to previous version if needed ,and preventing losing any work.