

Integrated Library Management System

Addis Ababa University Center of Information Technology and
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Software Engineering Department

System Requirement Specifications (SDS) Document

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Acronyms

ILMS – Integrated Library Management System

ISBN – International Standard Book Number

AAiT – Addis Ababa institute of Technology

MVC – Model View Control

1. Introduction

Software testing is the process of a program or an application with the intent of validating, verifying and finding a software bug if any. This testing plan document is conducted on the library management system called ILMS that has two components as an application. These components being the web and desktop application.

Conducting this test helped our team on ensuring that the software we developed is quantifiable, computable and ideal for the user.

1.1 Purpose of the document

The purpose of this documentation is to identify and verify the reliability of the developed system. By conducting this test it assists us in to reveal bugs or any unseen errors that may reduce the performance of the system and ensures the right product is developed and used without any problem.

2. Features to be tested/not to be tested

2.1. Features to be tested

Since the ILMS has three category of users we divided the features to be tested in to three

Functional requirement

Librarian.as a user:

Features to be tested:

- Maintaining a book
 - Adding a book
 - Removing a book
 - Updating book record
- Lending a book
- Search
 - Searching a book
 - Searching a member
- Generating report

Admin as a user:

Features to be tested:

- Register a member
- Remove a member
- Search a member

Patron

Features to be tested:

- Searching a book
- Reserving a book

Non-functional requirements to be tested

- Security
- Performance

2.2. Features not to be tested

Operational Requirements: this nonfunctional requirement is chosen not to be tested because this project is oriented under the Addis Ababa Institute of technology and the system that the ILMS operates on is provided by AAIT. So we don't really have an option to choose from.

Look and feel of the User interface: This nonfunctional requirement is chosen not to be tested because every user has his/her own perspective on viewing the interface and it may be updated on the next version.

Usability: this nonfunctional requirement is chosen not to be tested because its not that relevant. Its assumed that the patron knows their way around the system. Besides the system is made as a click on click process which makes it easy to use.

3. Pass/Fail criteria

Functional requirement testing

Book management

Criteria:

- ❖ This feature should have options such as book addition, book removal and book update options for authorized library personnel.
- ❖ It should go to the required option on click

Add a book

Criteria:

- ❖ Each book should contain these attributes: Book Title, Book ID(ISBN), Title, Author name, publish date.
- ❖ The retrieved book information should contain the five attributes in the form to be filled.
- ❖ After filling the form when clicking the submit button the data should be written to the database
- ❖ A notification message should appear notifying the book has been added to the database

Update a book

Criteria:

- ❖ The book item can be retrieved using the Book ID(ISBN),
- ❖ The data items which can be updated are: Book Title, Book ID(ISBN), Title, Author name, publish date.
- ❖ The updated values should be saved on the database
- ❖ A notification message should appear notifying the book's update

Remove a book

Criteria:

- ❖ The book item can be retrieved using the Book ID(ISBN), Title or Author name
- ❖ The book can be deleted only if the book is no longer used
- ❖ The removed book should not appear in further search.
- ❖ A notification message should appear notifying the book's removal

Lend a book

Criteria:

- ❖ A form requiring the patrons id, the needed Book ID(ISBN) and Book Title should appear
- ❖ It should conduct an internal search, match the required book and show the availability of the book
- ❖ The due date would automatically be stamped for two weeks from current date.
- ❖ The database should update the number of existing books
- ❖ A patron who has books due should not be allowed to check out any books if the limit is reached, which is four per a patron.

Registering a member

Criteria:

- ❖ Each patron should have following attributes: Student ID/SSN (unique), Name, Address and Phone number.
- ❖ The retrieved patron information should contain the four attributes in the form to filled.
- ❖ A notification message should appear notifying the patron has been added to the database
- ❖ The database should be updated adding the patron as a member

Removing a member

Criteria:

- ❖ The record would be selected using the patron ID
- ❖ The database should no longer contain the removed member information
- ❖ A notification message should appear notifying the patron has been added to the database

Reserve a book

Criteria:

- ❖ The product should display list of books that are available at the current time
- ❖ When a patron makes a reserve request the book that is chosen should be marked as reserved
- ❖ The database should update the quantity of that book

Search for book

Criteria:

- ❖ The product permits Librarian/patron to retain books' detail information by their ISBN number or Author or Title.
- ❖ The search results would produce a list of books, which match the search parameters with following Details: ISBN number, Title, Author
- ❖ The search result will be restricted to 20 results per page
- ❖ The displayed result should also provide the number of copies which is available for issue
- ❖ The patron can perform multiple searches before finally selecting a set that is needed

Search for a member

Criteria:

- ❖ The product should allow the Librarian/admin to retrieve members detail information by their ID number or name.
- ❖ The search results would produce a list of existing members, which match the search parameters with their ID or name.
- ❖ The search result will be restricted to 20 results per page
- ❖ The patron can perform multiple searches before finally selecting the member needed

Reviewing a book

- ❖ The patron can make any review on a book based on their opinion
- ❖ This transaction should be saved in the patrons history list

Generating a report

- ❖ The system should enable an authorized user to with two options of generate report given as patron based report and book based report
- ❖ A form consisting a date form should appear
- ❖ The authorized user can inter the needed date from which the report is going to generated
- ❖ The system should display a list of detailed report

Nonfunctional Requirements testing

Security

Criteria:

- ❖ The system provides a password that enables the patron to login to their account
- ❖ The system should provide an email verification in case a patron forgot password

Performance

Criteria

- ❖ The system works well under a specific expected load (load testing).
- ❖ The system has undergone a specific stress testing to check the upper limits of capacity within the system

All in all, the system functional and nonfunctional requirement test is a pass.

4. Approach/Strategy

The tests applied on the web and desktop components of ILMS have taken functional and non-functional requirements specified on the requirements engineering section of the project.

The functional requirements have been tested accordingly with the test procedures specified below. Of nonfunctional requirements security has been tested extensively to account to security issues of the architectural model since the architectural style specified is MVC. Furthermore the specified nonfunctional requirements have been tested accordingly.

Our test accounts to 80% of the goal specified. (This is an educated assumption).

4.1. Types of tests

4.1.1 Data and database integrity testing

Data and database integrity testing techniques verify data is being stored by the system in a manner where the data is not compromised by updating, restoration or retrieval processing. This type test is intended to uncover design flaws that may result in data corruption and unauthorized data access. The database, data files, and the database or data file processes should be tested as a subsystem within the application.

4.1.2 System testing

System testing of a software is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirement. This includes the functions listed under 2.1 features to be tested.

4.2 Test strategy

The test strategy presents the recommended approach to the testing of the software application. This strategy describes how the tests described in the previous part will be tested.

4.2.1 Checklist of unit test

Verify the input data format specified in each form, classes and interaction with database. This will help us in decreasing the number of simple test cases.

4.2.2 Data and database integrity testing

This data and database processing should be tested separately from the application.

Test objectives	Ensures database access methods and process function properly and without data corruption.
Technique	Call each database access method and process with correct and incorrect data.
Completion criteria	All database access methods and process function as designed

Table 1: Data and Database integrity testing

4.2.3 System testing

The purpose of system testing is to check proper data acceptance on the fields, processing, and retrieval, and appropriate implementation of the business rules and policy.

Test objectives	Assure the proper processing of catalog data, user account and all the functional features regarding Book and the library user. Assure valid input entry and processing of user requests on the web (request for book reserve).
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Technique	Test each use case entry entailing the deployment of both desktop and web apps.
Completion criteria	In order to ensure the integrity of work flow, error handling is extensively pertained.

Table 2: System Testing

Meetings

The team had a weekly meeting that helps in the evaluating every members progress and identify error that may have occurred. This meeting helped the testing process by giving a wide range of perspective in what to be test so that the users may not stumble up on these errors and assume it is a feature of the software.

Test Metrics

Test metrics measures the progress and level of success of the test will be developed and shared with in the team the below are some of the metrics

Report	Description	Frequency
Test preparation & Execution Status	To report on % complete, Pass, Fail Defects severity wise Status – Open, closed, any other Status	Once a week
execution status	To report on Pass, Fail, Total defects, highlight , Critical defects	Daily
Project Status report	Project driven reporting	Every 3 days

Table 3: Test Metrics

5. Test cases with specifications

Name = Add Book				
Purpose = To Add Book To the Systems Database				
Test Data = Book ID (empty , Invalid Book id, valid Book id)				
	Book ISBN (ISBN, empty)			
	Book Title (Book title, empty)			
	Book Author (Author Name, empty)			
	Book Edition (Edition, Empty)			
	Book Course (Book Course, empty)			
	Department (Department, Empty)			
	Page Number (valid password, Empty)			
Input	Expected result	Data	Actual output	Pass/fail
Empty Book Id and all other fields are valid	“Empty Fields detected”	Empty Id or Any Invalid data for other fields	“Empty Fields detected: make sure you have Required Fields”	Fail
Invalid Book ID (Duplicate Book ID)	“Empty Fields detected”	Book Id already existing in Database		Fail

			“Duplicate Id Detected”	
Valid Book ID all other fields are valid	“Book Added”	Valid Book ID If Book ID<20 characters and all valid data for other fields	“Book Added”	Pass
Valid book ID but one or more other fields are Invalid(not Filled)	“Empty Fields detected”	If Book Id<20 characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid ISBN and all other fields are Valid	“Book Added”	Valid ISBN If Book ISBN<characters13 All Fields are Valid	“Book Added!”	Pass
empty ISBN and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	ISBN field is empty If Book ISBN<characters0	“Empty Fields detected: make sure you have Required Fields”	Fail

		Other fields are filled		
Valid Book Title all other fields are valid	“Book Added”	Valid Book Title If Book Title<100 characters and all valid data for other fields	“Book Added”	Pass
Valid book Title but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If Book Title<100characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
empty Book Title and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty If Book Title<characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid Book Author all other fields are valid	“Book Added”	Valid Book Author If Book Title<50 characters and all valid data for other fields	“Book Added”	Pass

Valid book Author but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If Book Author<50characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
empty Book Author and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty If Book Author<characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid Book Edition all other fields are valid	“Book Added”	Valid Book Edition If Book Edition<50 characters and all valid data for other fields	“Book Added”	Pass
Valid book Edition but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If Book Edition<50characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
empty Book Edition and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty If Book Edition<characters0	“Empty Fields detected: make sure you have Required Fields”	Fail

		Other fields are filled		
Valid Book Course all other fields are valid	“Book Added”	Valid Book Course If Book Course <50 characters and all valid data for other fields	“Book Added”	Pass
Valid book Course but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If Book Course <50characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
empty Book Course and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty If Book Course <characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid Book Department all other fields are valid	“Book Added”	Valid Book Course If Book Department <50 characters and all valid data for other fields	“Book Added”	Pass
Valid book Department but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If Book Department <50characters	“Empty Fields detected: make sure you have Required Fields”	Fail

		One or more other fields have invalid or no input		
empty Book Department and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty If Book Department <characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
Empty No Pages and All other Felids are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
All fields And No pages filed	“Book Added”	All Fields are filled and are valid	“Book Added”	Pass

Table 4: Add Book

Name = Update Book				
Purpose = To Update existing Book in the Systems Database				
Test Data = Book ID (empty , Invalid Book id, valid Book id)				
	Book ISBN	(ISBN, empty)		
	Book Title	(Book title, empty)		
	Book Author	(Author Name, empty)		
	Book Edition	(Edition, Empty)		
	Book Course	(Book Course, empty)		
	Department	(Department, Empty)		
	Page Number	(valid password, Empty)		
Input	Expected result	Data	Actual output	Pass/fail
Empty Book Id and all other fields are valid	“Empty Fields detected”	Empty Id or Any Invalid data for other fields	“Empty Fields detected: make sure you have Required Fields”	Fail

Valid Book ID all other fields are valid	“Book Added”	Valid Book ID If Book ID<20 characters Book ID must already Exist and all valid data for other fields	“Book Added”	Pass
Valid book ID but one or more other fields are Invalid(not Filled)	“Empty Fields detected”	If Book Id<20 characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid ISBN and all other fields are Valid	“Book Added”	Valid ISBN If Book ISBN<characters13 All Fields are Valid	“Book Added!”	Pass
empty ISBN and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	ISBN field is empty If Book ISBN<characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid Book Title all other fields are valid	“Book Added”	Valid Book Title If Book Title<100 characters	“Book Added”	Pass

		<p>and</p> <p>all valid data for other fields</p>		
Valid book Title but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	<p>If Book Title<100characters</p> <p>One or more other fields have invalid or no input</p>	“Empty Fields detected: make sure you have Required Fields”	Fail
empty Book Title and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	<p>Title field is empty</p> <p>If Book Title<characters0</p> <p>Other fields are filled</p>	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid Book Author all other fields are valid	“Book Added”	<p>Valid Book Author</p> <p>If Book Title<50 characters</p> <p>and</p> <p>all valid data for other fields</p>	“Book Added”	Pass
Valid book Author but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	<p>If Book Author<50characters</p> <p>One or more other fields have invalid or no input</p>	“Empty Fields detected: make sure you have Required Fields”	Fail

empty Book Author and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty If Book Author<characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid Book Edition all other fields are valid	“Book Added”	Valid Book Edition If Book Edition<50 characters and all valid data for other fields	“Book Added”	Pass
Valid book Edition but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If Book Edition<50characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
empty Book Edition and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty If Book Edition<characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid Book Course all other fields are valid	“Book Added”	Valid Book Course If Book Course <50 characters and	“Book Added”	Pass

		all valid data for other fields		
Valid book Course but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If Book Course <50characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
empty Book Course and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty If Book Course <characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid Book Department all other fields are valid	“Book Added”	Valid Book Course If Book Department <50 characters and all valid data for other fields	“Book Added”	Pass
Valid book Department but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If Book Department <50characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
empty Book Department and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty If Book Department <characters0	“Empty Fields detected: make sure you have Required Fields”	Fail

		Other fields are filled		
Empty No Pages and All other Fields are Valid	“Empty Fields detected: make sure you have Required Fields”	Title field is empty Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail
All fields And No pages filed	“Book Added”	All Fields are filled and are valid	“Book Added”	Pass

Table 5: Update Book

Name = Add member/Patron				
Purpose= To Add patron/member in the Systems Database				
Test Data = Patron ID (empty , Invalid patron ID, valid patron id)				
Input	Expected result	Data	Actual output	Pass/fail

Empty Patron Id and all other fields are valid	“Empty Fields detected”	Empty Id or Any Invalid data for other fields	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid Patron ID all other fields are valid	“Patron Added”	Valid Book ID If Patron ID<50 characters Patron ID must not already Exist and all valid data for other fields	“Patron Added”	Pass
Valid Patron ID but one or more other fields are Invalid(not Filled)	“Empty Fields detected”	If Patron Id<50 characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
Valid patron Name and all other fields are Valid	“Patron Added”	Valid ISBN If Patron Name<characters 100 All Fields are Valid	“Patron Added!”	Pass
empty patron Name and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	patron Name field is empty	“Empty Fields detected: make sure you have Required Fields”	Fail

		If Book ISBN<characters0 Other fields are filled		
Valid patron Email Title all other fields are valid	“Book Added”	Valid patron Email If Book Title<80 characters Must contain @ character and all valid data for other fields	“Book Added”	Pass
Valid patron Email e but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If Book Title<80characters Must contain @ character One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
empty patron Email and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	patron Email field is empty If Book Title<characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail

Valid patron Department all other fields are valid	“Book Added”	Valid patron Department If Book Title<50 characters and all valid data for other fields	“Book Added”	Pass
Valid patron Department but one or more other fields are Invalid(not Filled)	“Empty Fields detected: make sure you have Required Fields”	If patron Department <50characters One or more other fields have invalid or no input	“Empty Fields detected: make sure you have Required Fields”	Fail
empty patron Department and all other fields are Valid	“Empty Fields detected: make sure you have Required Fields”	patron Department field is empty If Book Author<characters0 Other fields are filled	“Empty Fields detected: make sure you have Required Fields”	Fail

Table 6: Add Member/Patron

Name = Rent Book				
Purpose = Rent Book to a Patron and Update corresponding fields in the database				
Test Data = Patron ID (empty , Invalid patron ID, valid patron id) Book ID (empty , Invalid patron ID, valid patron id)				
Input	Expected result	Data	Actual output	Pass/fail
Both Book and Patron Id are Valid	“Book Rented”	Both book and Patron Id exist in the system Database	“Book Rented”	pass
One or Both of Book or Patron ID are invalid or empty	“Invalid Input”	Either book or Patron Id is not in Database or Both do not exist in Database	“Invalid Input”	Fail

Table 7: Rent Book

Name = Administrator/Librarian Login				
Purpose= To Give access to administrator privilege for authorized personnel				
Test Data = User Name (empty , Invalid User Name, valid User Name) User Password (empty , Invalid password, valid password)				
Input	Expected result	Data	Actual output	Pass/fail
Both User Name and Password are Valid	System enters to the Administrator/ Librarian home page	Both User Name and Password exist in the system Database and are paired for one User	System enters to the Administrator/ Librarian home page	pass
One or Both of User Name or Password are invalid or empty	“Invalid Username/Password”	Either book or Patron Id is not in Database or Both do not exist in Database or User name and password are not registered and paired for the same user	“Invalid Username/Password”	Fail

Table 8: Adminstrator/Librarian Login

Name = Administrator/Librarian Change Password				
Purpose= To change Librarian/ Administrator Password by the Owner of the Account				
Test Data = New Password (short , Invalid password, valid Password)				
New Password repeat (short , Invalid password, valid password)				
Input	Expected result	Data	Actual output	Pass/fail
Both New Password and Confirm Password are Valid and Identical	“Administrator/Librarian password changed”	Both Password and Confirm password fields are identical	“Administrator/Librarian password changed”	pass
One or Both of New Password or Confirm Password are invalid or are not Identical	“The password You typed didn’t Match”	Both Password and Confirm password fields are not identical	“The password You typed didn’t Match”	Fail
The New Password typed has less than 5 characters	“Password Too Short”	The Password typed has very short characters If characters<5	“Password Too Short”	Fail

Table 9: Adminstrator/Librarian Change Password

Name = Patron Password Change				
Purpose= To change The patrons Password by the patron him/her self				
Test Data = Current Password (Invalid password, valid Password, empty) New Password (Invalid password, valid Password, empty) New Password repeat (short , Invalid password, valid password, empty)				
Input	Expected result	Data	Actual output	Pass/fail
One or All New Password, Confirm Password, Current Password are empty	“please fill all the fields”	All New Password and Confirm password and Current password fields are empty	“please fill all the fields”	Fail
Invalid Current password and all other fields are Valid and identical	“Invalid Current Password”	The Current Password is Not Correct but All the other Fields filled and Match	“Invalid Current Password”	Fail
Valid Current password both New and confirm password are identical But are too short	“Password Length Should be more than or equal to 6”	Current password is Valid and The Password typed in confirm and New password fields has very short characters If characters<=6	“Password Length Should be more than or equal to 6”	Fail

Current password is Valid but New and Confirm password fields are not identical	“Cannot Password” Reset	Current Password is Valid but password typed in Confirm and New password fields is not identical	“Cannot Reset Password”	Fail
All Current, New and Confirm Password fields are Valid and Identical	“Your Password has been reset Successfully”	Current password Field is Valid and New and Confirm passwords are also Valid and identical	“Your Password has been reset Successfully”	Pass

Table 10: Patron Password Change

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