**COMSATS UNIVERSITY ISLAMABAD**

ABBOTABAD CAMPUS



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| --- | --- | --- |
| NAME | : | Muhammad Masood Khan (FA21-BSE-028)  Sofia Aamir (FA21-BSE-028)  Mahnoor Qazi (FA21-BSE-028) |
| SECTION | : | 4A |
| COURSE | : | OOSE |
| SUBMITTED TO | : | SIR Mukhtiar Zamin |

Table of Contents

[CHAPTER1: 3](#_Toc132641054)

[INTRODUCTION: 3](#_Toc132641055)

[VISION AND BUSINESS CASE: 3](#_Toc132641056)

[EXECUTIVE SUMMARY 3](#_Toc132641057)

[USE CASE MODEL: 4](#_Toc132641058)

[1. LOGIN: 4](#_Toc132641059)

[2. ADD BOOK TO LIBRARY: 4](#_Toc132641060)

[3. DELETE BOOK FROM LIBRARY: 4](#_Toc132641061)

[4. SEARCH BOOK BY NAME: 4](#_Toc132641062)

[5. DISPLAY BOOKS DETAILS: 4](#_Toc132641063)

[6. BORROW A BOOK: 4](#_Toc132641064)

[7. RETURN BOOK: 4](#_Toc132641065)

[8. REGISTER: 5](#_Toc132641066)

[9. REGISTER COMPLAINT: 5](#_Toc132641067)

[10. MANAAGE ACCOUNTS: 5](#_Toc132641068)

[11. FEEDBACK: 5](#_Toc132641069)

[12. ORDER BOOK: 5](#_Toc132641070)

[13. UPDATE BOOKS: 5](#_Toc132641071)

[SUPPLEMETARY SPECIFICATION: 5](#_Toc132641072)

[Introduction: 5](#_Toc132641073)

[Non-Functional Requirements 5](#_Toc132641074)

[1) SECURITY: 5](#_Toc132641075)

[2) RELAIBILITY/MAINTAINIBILITY: 5](#_Toc132641076)

[3) PERFOMANCE: 5](#_Toc132641077)

[4) UNDERSTANDABLE/USEABLE: 5](#_Toc132641078)

[5) FLEXIBILITY: 5](#_Toc132641079)

[GLOSSARY 6](#_Toc132641080)

[Risk List & Risk Management Plan 7](#_Toc132641081)

[1) Business Risks: 7](#_Toc132641082)

[2) Technical Risks: 7](#_Toc132641083)

[3) Resource Risks: 7](#_Toc132641084)

[4) Schedule Risks: 7](#_Toc132641085)

[CHAPTER 2 USE CASES 8](#_Toc132641086)

[USE CASE DIAGRAM: 8](#_Toc132641087)

[Use Cases Distribution 9](#_Toc132641088)

[Brief Level Use Cases 9](#_Toc132641089)

[Masood khan (FA21-BSE-028) 9](#_Toc132641090)

[Mahnoor Qazi (FA21-BSE-020) 9](#_Toc132641091)

[Sofia Aamir (FA21-BSE-036) 10](#_Toc132641092)

[Fully Dressed Use Cases 11](#_Toc132641093)

# CHAPTER1:

## INTRODUCTION:

A library management system is a computerized system which is used to have the record of the books ,students and staff records .which has a software installed in it which helps the user in handling all the books of library and with that keeping everything up to date,

It helps the manager to know how many books are there in that particular library, how many are given to the students, how many books of same author do we have and many other features that I will explain later.

This system is easy to use and at times helps both the members of the library and the manager. There will be different sections for the student and staff to use the applications. Librarian will use complete features of application.

Futermore, the system will be flexible it will run on many machines across the world, we are using iterative development strategy we are going to processed through requirements ,object oriented analysis design and implementation.

## VISION AND BUSINESS CASE:

Out Application will be fast, reliable, robust and flexible it will be very user friendly.

**Problems:** the speed will be decrease if there are multiple users using at a time too much load will reduce speed.

Our application is in English language when people don’t know English they will not understand the use of application.

**Constraints:** Including design constraints, performance, supportability, reuseability, and Documentation.

## EXECUTIVE SUMMARY

Our traditional libraries are getting hard to manage day by day as the world is advancing with every passing day. Student life is way too busy now and it is difficult to take out time from your busy schedule to go to library. While during studies, library always acts as ours best friend. Libraries help students in studies, it not only helps students but everyone that has keen interest of reading books.

In our library management system application, there will be an admin (librarian) login. He has the access to most of the functions of the library. He registers the students, keeps a check on the students whether they are returning books on time or not.

The librarian manages all the books in library. In this library management application, it is easy for the librarian to tell which book is available, which book is currently not available in library. How many books of same author are present in our library.

Librarian issues a certificate i.e. registration of the students who desires to be a permanent member of the library. After the registration the students are able to borrow a book. In our LMS application when a student gets registered, he/she is provided with a student login account. Through this account they can borrow any book and stay up to date.

In this library management application, there is a student login that makes this software different from others, way too much interesting and attractive for users. Student login account helps student to get information about any books within few seconds. There is a search bar where they can type author’s name, book id or book name and they can know if their desired book is available or not. Students can see the date they borrowed a book and the date when they have to return the book.

Students have to pay the fine if they fail to return the book on time. They can see all the information of fine through their accounts.

The UI (user interface) will be simple to understand easily by the user, no complicated buttons will be used which that can require any special training, everyone even the beginners will learn how to use the System easily and also the system will be programmed well to avoid cyber-attacks, the System will have data of many users.

To make it safe we will add authentication processes so that unauthorized people are unable to access the data.

## USE CASE MODEL:

### 1. LOGIN:

### 2. ADD BOOK TO LIBRARY:

When new books will come the system will update the list of books by adding all information of that book and at the end letting the manager know the total number of books in the library.

### 3. DELETE BOOK FROM LIBRARY:

If a book is no longer available in the library for one reason or other the system will delete it too

### 4. SEARCH BOOK BY NAME:

If a student doesn’t knows the author name he/she will tell the librarian the book name and using thus software system, librarian will give the information about that particular book to the student.

### 5. DISPLAY BOOKS DETAILS:

### 6. BORROW A BOOK:

There will an option/feature of borrowing books. A user can borrow 2 books of their choice at a time.

7. RETURN BOOK:

When user borrows the book they have to return it after a certain mentioned time period. If they do not return the book due to one reason or other, fine will be imposed which will increase by 100RS with every passing day.  
8. REGISTER:

### 9. REGISTER COMPLAINT:

### 10. MANAAGE ACCOUNTS:

### 11. FEEDBACK:

### 12. ORDER BOOK:

### 13. UPDATE BOOKS:

## SUPPLEMETARY SPECIFICATION:

### Introduction:

This document is the repository of all Library Management system not captured in the use cases.

### Non-Functional Requirements

### SECURITY:

My software has many accounts which keeps the user data their bank info, CNIC and other information which is confidential. So, lots of data must be kept safe avoid cyberattacks and recognize the unauthorized access directly and block access to that person.

### RELAIBILITY/MAINTAINIBILITY:

The software will be reliable and work properly make sure no errors and bugs will affect the performance of the system. If any Bug or Error arises the system will only make that Function out of service not the whole system and the system will do Maintenance of that certain Function which is causing error and bugs.

### PERFOMANCE:

We will make sure our system will do a certain operation faster and the start-up time of system will be less. Whenever the customer does a certain function, the operation will be done in a fraction of a second. Our goal: authorization in less than 1minute 90% of the time.

### UNDERSTANDABLE/USEABLE:

Make the system more user friendly more understandable by the user and easily to interact with.

### FLEXIBILITY:

The system can handle Thousands of users at a time.

**Human Factors:**

* Text should be visible from 1 meter
* Avoid colors associated with common forms of color blindness.

## GLOSSARY

|  |  |
| --- | --- |
| **SDLC** | Software development life cycle |
| **LMS** | Library Management System |
| **OOP** | Object Oriented Programming |
| **ICT** | Introduction to Computer Technology |
| **SSO** | Single Sign-on |

## Risk List & Risk Management Plan

A library management system is a critical system that help to manage the books resources and along that there are also many other difficulties faces by library. Just like other systems library also face the security issues, performance issues and also maintenance issues.

### Business Risks:

Business risk that a library can face in market is that they sometimes can’t meet the needs of targeted audience. Sometimes also the budget of one project is so much that it exceed the finance.

**Mitigation/Response:**

Analyse your customer base and also we can conduct the interviews to come to know their needs. Also before planning any project we have to look to our finance and then plan the things according to that.

### Technical Risks:

There are security risks the librarian managers can face. That other cyber attacker can also reach out the accounts in the library which is not good.

**Mitigation/Response:**

Regularly perform security audits and updates the system for its security. The library should heir the well qualified employees with technical skills that they have the knowledge to use the robust security protocols such as firewall, encryption to protect the system from security threats.

### Resource Risks:

The project may require a high qualified technical skills sometimes the resources are not allocate to the right person than they leave the project in midway.

**Mitigation/Response:**

Build a team with a diverse skills and all employees must be independent and they must be one alone individual.

### Schedule Risks:

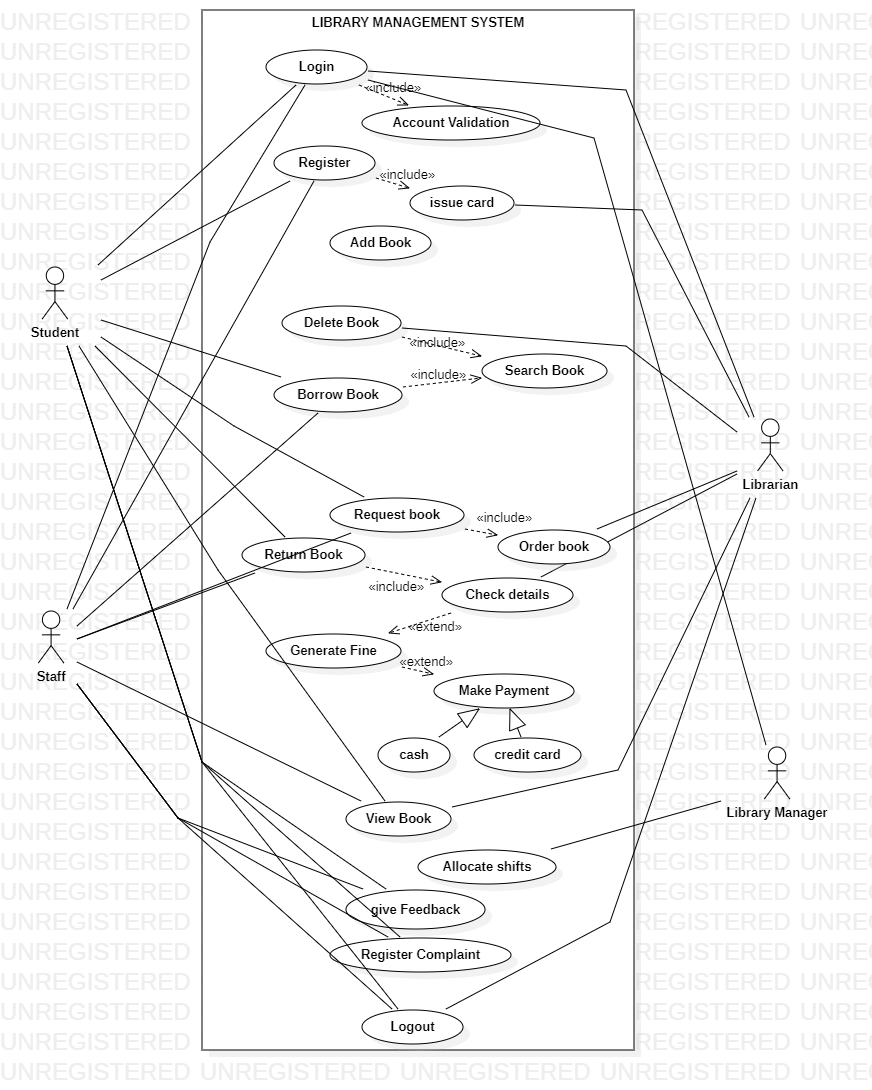
Sometimes the task assigned to one person may busy in some other project that he can’t give time to this project so there is delay in project.

**Mitigation/Response:**

Develop a project time by keeping the schedule in mind of all other staff. That they give their full time to the project.

# CHAPTER 2 USE CASES

USE CASE DIAGRAM:



## Use Cases Distribution

|  |  |  |
| --- | --- | --- |
| S#. | Group Member | Assigned Use Cases |
| 1 | Masood Khan | Add book  Update books  Manage accounts  Order books  Read book |
| 2 | Mahnoor Qazi | Search book  Login  Logout  Return book  Generate fine |
| 3 | Sofia Aamir | Register accounts  Delete book  Borrow book  Show all books  Give feedback  payment |

## Brief Level Use Cases

### Masood khan (FA21-BSE-028)

* **Add book:**

As a librarian or admin, I should be able to add new books to the library system by providing book details such as title, author, ISBN, genre, publisher, and quantity.

* **Update books:**

As a librarian or admin, I should be able to update the record of books by name, by author name, by publisher name, by ISBN of the books that are already available in library.

* **Manage accounts:**

As a librarian or admin, I should be able to manage accounts of the users of the library. I can also update, delete the accounts of the users. I can also change the password of the user account if user forgot their password.

* **Order books:**

As a library member, I should be able to search for the book and if I can’t find that book I will place order for the desired book and the librarian will order that book.

* **Read books:**

As a library member, I should be able to search for available books and I can read that book online also in pdf form or whatever form.

### Mahnoor Qazi (FA21-BSE-020)

* **Search book:**

As a library member, I should be able to search the book by IBSN author name, title, publisher name.

* **Login:**

As a library member or guest, I should be able to login in library by username and password. If I don’t have an account I have to find make an account and then I will be able to use the functionalities of library. After login I should be able to see my account details, books borrowing history etc.

* **Logout:**

As a library member, I should be able to logout from my library account to ensure the security after using all the functionalities of library for that time.

* **Return book:**

As library member, I should be able to return the book after borrowing the book and the status of book will be update to available and also there will be fine generated if I have return the book after the return date.

* **Generate fine:**

As a library staff, I should be able to generate the fine or late fee for the overdue books based on the library policy and the number of days the book is overdue. The system should automatically calculate the fine amount and notify the member via email or SMS. The staff should also be able to mark the fine as paid once the member clears the dues.

### Sofia Aamir (FA21-BSE-036)

* **Register accounts:**

As a library member, I should be able to create a new account by providing my personal details such as name, email, phone number, and address. After registration, I should be able to login to the library system and access the available features based on my account role and permissions.

* **Delete book:**

As a librarian or staff, I should be able to delete the book from library details if it is borrowed, lost or damaged. The system should update the book details.

* **Borrow book:**

As a library member, I should be able to borrowed the book from library by IBSN, title name, author name. the system should update the status of book to unavailable and should also generate the date for returning the book.

* **Show all books:**

As a library member, I should be able to view all the available books in the library system. The system should display the book details such as title, author, ISBN, genre, publisher, availability status, location, and number of copies.

* **Give feedback:**

As a library member, I should be able to give feedback on the books available in library after reading the book. That feedback should be visible to all other users also.

* **Payment:**

As a library member, I should be able to pay the fines or overdue charges online using various payment modes such as credit/debit card, net banking, or digital wallets. The system should process the payment securely and update the payment status for the corresponding fines or dues.

## Fully Dressed Use Cases

1. MASOOD KHAN (FA21-BSE-028)

| **Use Case UC1: ADD BOOK** |  |  |
| --- | --- | --- |
| **Scope**: Library Management application  **Level**: user goal  **Primary** **Actor**: Librarian  **Users and Interests**:  - Librarian: Wants accurate, fast entry, and well managed book in the library which can be easily accessible.  - User : want to buy borrow a book from the library  - University: Wants to accurately record book details so it can be easily available for the students and Faculty members to buy or borrow a book and will facilitate them better.  - User: he/she will be at the top level and can manage all the operations in the library can override all the features of librarian.  **Preconditions**: Librarian is authorized and authenticated. |  |  |

**Success Guarantee** (or Postconditions): Book will be added the Library Management system and will be assigned the correct shelf number and will be visible to the users of Library management system.

**Main Success Scenario (or Basic Flow):**

1. Book will be Added
2. Users will now see the book in the library
3. Users can read a book within the application an electronic book facility is available for users to read.
4. Users can now borrow a book

**Extensions (or Alternative Flows):**

\*a. At any time, User requests an override operation:

1. System enters Manager-authorized mode.
2. Librarian performs one Manager-mode operation.
3. System reverts to Librarian-authorized mode.

\*b. At any time, System fails:

If there occur any error while adding a book to the library there must be alternate method to do the operation

1. Librarian restarts the system and check the system if it works fine or not then enter prior state
2. System reconstructs prior state.

**Special Requirements:**

- Book will be added easily and fast within 30secounds 90%of time.

- better Machines will be provided to the librarian for fast data entry

- Language internationalization on the text displayed.

**Technology and Data Variations List**:

\*a. to add a book Multiple authentication process will be done. Fingerprint will be scanned .

3a. book identifier entered by bar code laser scanner (if bar code is present) or keyboard.

7a. Entry will be done through IBAN.

1. SOFIA AAMIR (FA21-BSE-036)

| **Use Case UC2: BORROW BOOK** |
| --- |
| **Scope**: Library Management application  **Level**: user goal  **Primary** **Actor**: User  **Users and Interests**:  - Librarian: will authorize the permission of the user when user wants to borrow a book from the library.  - User : wants to buy borrow a book from the library.  - University: Wants to accurately record book details, will request more when certain book is not available. So it can be easily available for the students and Faculty members to buy or borrow a book and will facilitate them better.  - User: he/she will get request by the librarian for new books then User will approve or reject the request.  **Preconditions**: User is authorized and authenticated. |

**Success Guarantee** (or Postconditions): Book will be borrowed and a time will be generated for the returning of book.

**Main Success Scenario (or Basic Flow):**

1. Book will be Borrowed
2. User must login to their account to borrow book and a time will be generate for returning the book.

**Extensions (or Alternative Flows):**

\*b. At any time, when book cannot be borrowed any error occured:

If there occur any error while adding a book to the library there must be alternate method to do the operation

1. User will restart the system and try again with better and fast internet connection .
2. If it does not work then user will submit a complaint in the application and can email the user for the desired book he want to borrow.

**Special Requirements:**

- Book will be borrowed easily and fast within 30secounds 90%of time.

- a simple UI will be designed for the users to easily understand the Library Management system features.

- better Machines will be provided to the librarian for fast data entry

- Language internationalization on the text displayed.

**Technology and Data Variations List**:

\*a. to borrow a book Multiple authentication process will be done. Fingerprint will be scanned.

3a. before borrowing a book user will get the approval from the librarian to borrow a book

7a. Entry will be done through IBAN.

1. Mahnoor Qazi (FA21-BSE-020)

| **Use Case UC3: SEARCH BOOK** |
| --- |
| **Scope**: Library Management application  **Level**: user goal  **Primary** **Actor**: User, Librarian  **Users and Interests**:  - Librarian, User, User: he/she will search a book in the library where the book is located in the library shelf number rack number will be provided.  **Preconditions**: User, Librarian and User is authorized and authenticated. |

**Success Guarantee** (or Postconditions): Book will be searched and rack number and shelf number will be provided.

**Main Success Scenario (or Basic Flow):**

1. Find a book in the Library
2. User must login to their account to search book.

**Extensions (or Alternative Flows):**

\*b. At any time, when book cannot be found any error occured:

If there occur any error while searching a book to the library there must be alternate method to do the operation

1. User and librarian will restart the system and try again with better and fast internet connection .
2. If it does not work then user will submit a complaint in the application
3. User can email to User and can access book.

**Special Requirements:**

- searching will take only 3sec because normal response time is 3sec or less

- a simple UI will be designed for the users to easily understand the Library Management system features.

- better Machines will be provided to the librarian for fast searching.

- Language internationalization on the text displayed.

**Technology and Data Variations List**:

1a. when searching book there will be provided the best match or you can search a book by author name.

2a. Every book will be available in electronic form for quick review before borrowing.

1. Mahnoor Qazi (FA21-BSE-020)

| **Use Case UC3: LOGIN** |
| --- |
| **Scope**: Library Management application  **Level**: user goal  **Primary** **Actor**: User, Librarian  **Users and Interests**:  - Librarian, User, User: he/she will search a book in the library where the book is located in the library shelf number rack number will be provided.  **Preconditions**: The library system is running and accessible.  The User has a valid user account in the library system. |

**Success Guarantee** (or Postconditions): The User is successfully authenticated and granted access to their account in the library system.

The User is able to perform actions that are authorized for their account, such as borrowing, returning, and reserving books.

**Main Success Scenario (or Basic Flow):**

The User launches the library system's login page.

The User enters their username and password in the designated fields.

The system verifies the entered credentials against the stored user account information.

If the entered credentials are invalid, the system displays an error message indicating that the login failed, and the use case ends.

If the entered credentials are valid, the system authenticates the User's account and grants access to their account.

The system logs the User's successful login event for auditing purposes.

**Extensions (or Alternative Flows):**

If the User forgets their password, they can request a password reset through the "Forgot Password" feature, which may involve additional steps such as answering security questions or receiving a password reset link via email.

If the User's account is locked due to too many failed login attempts or other security measures, they may need to contact a librarian or the system administrator for assistance in unlocking their account.

If the library system is experiencing technical issues or downtime, the User may receive an error message indicating that the login is temporarily unavailable, and they should try again later.

**Technology and Data Variations List**:

If the library system is down or inaccessible, the system may display an error message indicating that the login is not available, and the use case ends.

If the User's account is suspended, deactivated, or banned, the system may display an error message indicating that the login is denied, and the use case ends.

1. Mahnoor Qazi (FA21-BSE-020)

| **Use Case UC3: LOGOUT** |
| --- |
| **Scope**: Library Management application  **Level**: user goal  **Primary** **Actor**: User, Librarian ,library manager  **Users and Interests**:  - As a user of a social media platform, I want to be able to log out of my account while fully dressed, so that I can securely end my session and protect my personal information.  **Preconditions**: User must be logged in to their social media account.  User must be wearing appropriate clothing for the situation. |

**Success Guarantee** (or Postconditions):

User is logged out of their social media account.

User's personal information is protected from unauthorized access.

User's session is securely ended.

User can no longer access their account until they log in again

**Main Success Scenario (or Basic Flow):**

* User will first login into the account
* Then user will do some operation in the library
* Logout from the account

**Extensions (or Alternative Flows):**

If the user cancels the logout action, they remain logged in to their account.

If the user encounters an error during the logout process, they may need to try again or contact customer support for assistance.

1. Mahnoor Qazi(FA21-BSE-020)

| **Use Case UC3: Return Book** |
| --- |
| **Scope**: Library Management application  **Level**: user goal  **Primary** **Actor**: User, Librarian , library manager  **Users and Interests**:  This use case describes the steps and interactions involved in returning a book to a library in a fully dressed state, meaning the book is in its original condition, including all accessories or additional items that were originally provided with the book, such as dust jackets, bookmarks, or CDs  **Preconditions**:  The Library Patron must have previously borrowed a book from the library.  The Library Patron must have all the accessories or additional items that were originally provided with the book, such as dust jackets, bookmarks, or CDs, in their possession and in good condition.  The Library Patron must be returning the book within the library's designated return period. |

**Success Guarantee** (or Postconditions):

The book is returned to the library in its original condition, including all accessories or additional items that were originally provided with the book.

The Library Patron's library account is updated to reflect the return of the book.

The book is available for other library patrons to borrow

**Main Success Scenario (or Basic Flow):**

The Library Patron approaches the library's circulation desk where the Librarian is stationed.

The Library Patron presents the book they are returning to the Librarian.

The Librarian checks the book for any damage or missing accessories or additional items, such as dust jackets, bookmarks, or CDs, to ensure that the book is in its original condition.

If the book is in its original condition and all accessories or additional items are present, the Librarian updates the Library Patron's library account to reflect the return of the book.

The Librarian thanks the Library Patron for returning the book in a fully dressed state and provides any necessary receipts or documentation, if applicable.

The Library Patron may ask questions or seek clarification from the Librarian regarding the return process or any other library-related matters.

The Library Patron leaves the library after completing the return process

.**Extensions (or Alternative Flows):**

If the book is not in its original condition, or if any accessories or additional items are missing or damaged:

The Librarian informs the Library Patron of the issue.

The Librarian may request the Library Patron to replace or repair the missing or damaged items or charge the Library Patron for any necessary repairs or replacements, as per the library's policies.

The Librarian updates the Library Patron's library account accordingly and provides any necessary receipts or documentation, if applicable.

The Library Patron may need to resolve the issue before completing the return process.

1. Sofia Aamir(FA21-BSE-036)

| **Use Case UC3:Register** |
| --- |
| **Scope**: Library Management application  **Level**: user goal  **Primary** **Actor**: User, Librarian , library manager  **Users and Interests**:  As a librarian or library staff member, I want to register a patron's account for borrowing fully dressed items, such as books that include additional components like CDs, DVDs, or other multimedia materials. This use case covers the process of registering a patron's account for borrowing fully dressed items and ensuring that the patron understands the additional responsibilities and potential fines associated with borrowing such items.  **Preconditions**:  The library has fully dressed items available for borrowing, such as books with accompanying CDs, DVDs, or other multimedia materials.  The patron is registered with the library and has a valid library card.  The patron wishes to borrow fully dressed items from the library and has expressed an interest in doing so |

**Success Guarantee** (or Postconditions):

User will be able to do operation in the Library management system they will be able to access all the features of library.

**Main Success Scenario (or Basic Flow):**

The librarian or library staff member greets the patron and confirms their desire to borrow fully dressed items.

The librarian or library staff member explains to the patron the additional responsibilities and potential fines associated with borrowing fully dressed items, such as keeping the additional components safe and in good condition, returning all components together, and paying fines for lost or damaged components.

The librarian or library staff member confirms that the patron understands and accepts these responsibilities and potential fines.

The librarian or library staff member updates the patron's account in the library's system to indicate that they are registered for borrowing fully dressed items.

The librarian or library staff member provides the patron with any additional information or instructions related to borrowing fully dressed items, such as loan periods, renewal options, and return procedures.

The patron presents their library card and selects the desired fully dressed item(s) for borrowing.

The librarian or library staff member checks out the fully dressed item(s) to the patron's account, following the library's standard check-out procedures.

.**Extensions (or Alternative Flows):**

If the patron does not accept the responsibilities and potential fines associated with borrowing fully dressed items, the librarian or library staff member may offer alternative borrowing options or decline the patron's request to register for borrowing fully dressed items.

If the patron fails to return all components of a fully dressed item or returns them in a damaged condition, the librarian or library staff member may follow the library's procedures for assessing fines or charges for lost or damaged items, as well as for replacement or repair of the components.

If the patron wishes to renew a borrowed fully dressed item, the librarian or library staff member may follow the library's standard renewal procedures, including checking the condition of the additional components before renewing the item.

If the patron encounters issues or problems with a borrowed fully dressed item, such as damaged or malfunctioning components, the librarian or library staff member may assist the patron in resolving the issue or may follow the library's procedures for handling such situations, including potential fines or charges.