**DDCairo University  
Faculty of Computers and Artificial Intelligent**

**SCS252**

**Software Modeling**

Project Name

Software Requirements Specifications

Team Names

Month & Year

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# Instructions [To be removed]

* **IMPORTANT. Rename this document to SCS252-TAName-LeaderID-SRSDocument.docx**

**(e.g. SCS252-MohamedSamir-20040752-SRSDocument.docx)**

* **Remove the following notes and any red notes.**
* **This document is the template document for your SRS.**
* **For further guidelines and information, READ project details document (SCS252-Project Description-v1.0).**

# Team

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| --- | --- | --- | --- |
| **ID** | **Name** | **Email** | **Mobile** |
|  | 1st name is team leader |  |  |
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# Document Purpose and Audience

1. **This Document Specifies requirements about library management system software for a university library website.**
2. **The developers and designers who will make the system,**

# Introduction

## Software Purpose

**The main purpose of this software is to provide services for university members to access the university library website and browse available books in the library.**

**Only university members who authenticate as certified university members can borrow library books.**

## Software Scope

**The scope of the software includes.**

**1. Description:**

**The library website will provide the ability to borrow books online from library website.**

**Users who do not authenticate as certified university members through registration will be able to browse, explore, and search for any current book in the library only.**

**Users who authenticate as certified university members through registration will be able to borrow and return any current book in the library.**

**The Software includes two systems: a library management system and a payment system (external system)**

**The library management system will be responsible for functions such borrow, searching, and browsing library books.**

**The payment system will be responsible for the payment services.**

**2. Major features of the scope:**

**2.1Availability for users to access easily to the university library website.**

**2.2 Users can borrow books online (through the library management system) from the university library website After Getting Certified**

**2.3 users can pay online through some credit card payment service.**

**3. Minor features of the scope:**

**3.1 the system can recommend books for the user.**

**3.2 the certified user can earn reward points while checking out the book through various actions such as borrowing books and participating in library events or contributing to the library community in other ways. or contributing to the library community in other ways**.

**3.3 For users who are certified and belong to specific** institutes**, the system could provide them an extended period of borrowing**.

## Definitions, acronyms, and abbreviations

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| --- | --- |
| Glossary |  |
| 1. System Administrator | is a person who is responsible for the upkeep, configuration, and reliable operation of computer systems |
| 1. CUM | Certified university member |
| 1. Org. | organization |
|  |  |
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# Requirements

## Functional Requirements

1. Registration & Authentication:

* Users should be able to register in the system with valid email addresses or phone numbers.
* The system verifies the uniqueness of the email address, and password and stores the user’s information in the database.
* Users who already have accounts should be able to sign in with their existing emails or usernames.

1. Authenticate As a Certified:

* The user should be able to request to be certified as a certified university member by providing the needed requirements.
* For authentication as a certified university member. User authentication could be done through the library book borrowing system´s login page or

the user´s Google-based university account. Using university accounts requires

external identity provider participation.

* The system must verify and approve the request for certification if the user’s information meets the requirements and grant access.
* The system should update the information with the new status of the user as certified.

1. Display Books:

* The website must display all the available books in the library with their brief, publisher, target age, show the number of copies and book fees.
* The website should provide the ability to search for a book in a specific field by categorizing the books into different categories.

1. Browse Books:

* All kinds of users should be able to browse books and browse recommended through the website page.
* The user should be able to search for a specific book and explore books in different categories.

1. Borrowing Books:

* The System must accept only requesting to borrow a book for the user who is authenticated as a certified user.
* The system should approve the borrow request based on the availability of copies.
* System should Decrease the number of copies when the book is borrowed.
* The system must put an expiration date for the borrowing period time for users to return books before that.

1. Return Books:

* The system should increase the number of copies when the book is borrowed.
* The system must include penalty fees for returning books after the expiration date.

1. period extension service:

* The certified user who belongs to a specific syndicate(organization)should be able to extend the borrowing period offered by the website by uploading the requirements that the website needs on the privacy &security page.
* The system should verify the user’s information.
* The system should update the new status for the user by mentioning the organization that he belongs to.
* The system should update the expiration date with the new one that is offered.

1. Check-out & Payment:

* The System must accept only for check-out book for the user who is authenticated as a certified user.
* The system should calculate the number of fees based on the number of books borrowed and the
* The application must securely process payments, supporting various payment methods.
* The transferred fees from the user should be transferred to the university library account in the bank.
* Users should receive confirmation of successful transactions.

1. Insert Books:

* the Admin Administrator should be able to insert Books.

## Non Functional Requirements

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| 1. **Usability :** | **The system should have a simple user interface to facilitate easy navigation and usage for university members of varying technical proficiency. This means it should be easy to understand and interact with, even for people who aren't good with computers.**  **Users with disabilities can also interact easily with the system, like those who have trouble seeing or hearing.**  **To measure the usability of the system, feedback is required every month with a rating from 1 to 5. (The overall rating must exceed 4.)**  **Also, measure the time it takes for users to complete common tasks, such as searching for a book or borrowing one. Aim for a target time and track improvements over time.** |
| 1. **Performance:** | **The system should be able to handle lots of people using it at the same time, especially during peak times such as the start of the semester or exam periods.(The website should handle at least 500 concurrent users.)**  **Response times for browsing, borrowing, and returning books should be minimized to enhance user experience. This means when users click on things, the website should respond quickly without making them wait too long.**  **The server response times must stay below 3 seconds.** |
| 1. **Reliability:** | **The website should be running almost all the time, and it should hardly be down for maintenance with minimal downtime. (Uptime percentage must exceed 97%).**  **It must be ensured that maintenance occurs within acceptable limits and does not affect service availability for long time.**  **Data integrity must be maintained, all the information on the website should always be correct and up to date.** |
| 1. **Security:** | **User authentication and authorization mechanisms should prevent unauthorized access to sensitive information and functionalities.**  **Members' personal information, like their name and address, should be kept safe from people who shouldn't see it.**  **If user enters their credit card number to pay for something, that financial information should be encrypted and kept private and secure.**  **Security incidents must be monitored and aim for ZERO incidents.** |
| 1. **Scalability:** | **The system should be able to scale to handle and accept the increasing number of users and growing book inventory without affecting performance or slowing the service.**  **It should be designed to handle future enhancements and expansions without causing problems.**  **Scalability metrics such as requests per second or resource utilization (CPU & memory) must be defined. These metrics are tracked during load testing and ensured they meet targets (700 request per second).** |
| 1. **Integrability:** | **The system should be able to integrate with existing university authentication systems such as Google university accounts.**  **It should also be compatible with potential future integrations with other library systems.**  **Integration with external payment services must be considered, such as credit card payment.**  **This requirement is measurable: as integration success criteria is defined, such as the percentage of successful login attempts using Google university accounts. (The success percentage should be aimed to 100%)** |
| 1. **Maintainability:** | **The system should be well-documented to achieve ease of maintenance and future updates by developers.**  **Developers should follow coding standards and best practices to ensure readability and maintainability.**  **An average time for fixing a bug should not exceed 3 days.** |
| 1. **Auditability and control:** | **The system should maintain logs of member activities, such as book borrowing and returns.**  **If there's a problem, adminstrators should be able to look at what happened and figure out what went wrong.**  **This requirement can be measurable: by defining the frequency of log and the level of details included, monitoring log quality and compliance with defined standards.** |

# System Models

## Use Case Model

A diagram of a diagram

Description automatically generated

## Use Case Tables:

|  |  |  |
| --- | --- | --- |
| Use Case ID: | 1 | |
| Use Case Name: | Registration & login | |
| Actors: | User  System Administrator | |
| Pre-conditions: | * User is not registered or logged in. | |
| Post-conditions: | * User gains access to the website as a university member * User gains access to the website as a certified university member * User gets access to the website as a certified university member belonging to some organization. * User gets access to the website as a guest | |
| Flow of events: | **User Action** | **System Action** |
| * 1. User selects register or log in.   2. User provides registration details.   3. User might provide user’s university account.   4. The user might provide some organization name. | 1. System verifies user’s data.    1. The system sets the user as certified if he provides the necessary requirements.    2. The system sets the user as certified and belongs to an organization if he provides the necessary requirements. |
|  | 3. system authenticate user |
| 1. The user gains access to the website |  |
|  |  |
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| Exceptions: | **User Action** | **System Action** |
| 1. User provides incorrect or incomplete information or User login with an invalid username or password. | 1. The system displays an error message. |
| 1. The user corrects or completes his information and resubmits or logs in. |  |
| 1. The user provides the wrong user’s university account. | 1. The system displays a message with two options “Continue as a user or upload the university account again” |
| 1. The user chooses one of the options. |  |
| 1. The user enters the website as a guest. | 1. The system lets the user access the website but does not authenticate the user |
| Includes: |  | |
| Notes and Issues: | * The website server might be out of service. * To upload the organization, name the user must be certified. | |
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| --- | --- | --- |
| Use Case ID: | 2 | |
| Use Case Name: | Certified as a certified university member | |
| Actors: | * User * System Administrator | |
| Pre-conditions: | 1. The user gets access to the website. 2. The user is not certified yet while making registration | |
| Post-conditions: | 1. The user is certified (authenticated) as a certified university member. 2. System updates the user status to certified user member | |
| Flow of events: | **User Action** | **System Action** |
| 1- The user applies for a certificate as a certified university member | 2-System Asked for User’s Google based on the university account |
| 1. User provides User’s Google account based on university.    1. The user might provide some organization name. | 1. The system verified the account and the other requirements |
|  | 1. The system authenticates the user as a certified university member.    1. The system updates the new status of the user to certified.    2. The system sets the user as certified and belongs to an organization if he provides the necessary requirements.    3. The new statutes of the user to be certified and belong to some organization. |
| 1. The certified user gets access to all the features in the system except extending the borrowing period.   6.1 the certified user who belongs to some organization gets access to all the features in the system. |  |
|  |  |
| Exceptions: | **User Action** | **System Action** |
| 1. The user provides the wrong user’s university account or the wrong organization name or code. | 2. the system displays an error message |
| 1. The user corrects or completes his information and resubmits. | . |
| Includes: |  | |
| Notes and Issues: | * This use case depends on the use case of ID: 1   which we can’t enter this use case without being login to the website. | |

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| --- | --- | --- |
| Use Case ID: | 3 | |
| Use Case Name: | Features in the system | |
| Actors: | * User * System Administrator | |
| Pre-conditions: | * The user gets access to the system. * The User who wants all the available features must be a certified user, not a normal user (not certified or guest ). | |
| Post-conditions: | * Normal users can browse, explore, search, and watch all available books. * The certified user can do all the features on the website. * The system offers to extend the borrowing period for certified users who belong to some organization by entering the organization code. | |
| low of events: | **User Action** | **System Action** |
| 1. The user enters the library website | 1. The system displays all the current books   2.1 the system displays the recommended books |
| 1. The user browses books |  |
| 1. The user wants to borrow a book | 1. The system checks if the user is certified or not |
|  |  |
|  | 6. The system acknowledges the request.   * 1. the system decreases the number of copies of the book.   2. The system put an expiration date for the borrowing period. |
| 1. The user wants to expand the borrowing period | 1. The system checks if the user belongs to some organization. |
|  | 1. The system requests the organization's code |
| 1. The user enters the organization code | 1. The system verifies the code.   11.1 the system accepts the request and updates the old expiration date to the new date. |
| The user returns the book | 1. The system increases the number of copies. |
| Exceptions: | **User Action** | **System Action** |
| 1. A normal user wants to borrow a book.    1. A certified user wants to borrow a book with zero number of copies.    2. a certified user wants to extend his borrow time without uploading the code of his organization.    3. The certified user enters an invalid code for his organization | 1. The system responds with an error message |
| 1. the certified user returns the books after the expiration time | 1. The system make a fee penalty for the delaying |
| Includes: |  | |
| Notes and Issues: | Many functions in this use case depend on the use case of ID: 2  which to make a borrow or return function the user must be certified. | |

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| Use Case ID: | 4 | |
| Use Case Name: | Check-out | |
| Actors: | * Certified User * Admin Administrator * Bank System | |
| Pre-conditions: | * User has checked a book or number of books | |
| Post-conditions: | * The user does the payment process by paying by money or points. * The User sends the required fees from the credit card through the bank system. * The library system received the required fees. * User checks out the number of books successfully. | |
| Flow of events: | **User Action** | **System Action** |
| 1. The user checks out several books | 1. The system displays the requirement fees for the number of books. |
|  | 1. The system displays two options for payment processes pay by credit card or pay by rewards points |
| 1. The user chooses from them |  |
| The user wants to pay with the rewarded points | 1. The system checks the existence of points    1. the system calculates the borrow fees that will be removed based on the number of points. |
|  | 1. the system displays the required fees if exist after the discount by the points |
| 1. The user wants to pay by credit card | 1. The system requests the PIN |
| 1. The user enters the PIN | 1. The system verifies the PIN |
|  | 1. The system checks the transition process |
|  | 1. The Bank system increases the income balance in the library bank account |
|  |  |
| Exceptions: | **User Action** | **System Action** |
| 1. The user chooses to pay with the rewarded points | 1. The number of rewarded points is not enough to borrow the books.   2.1 the system displays an error message |
| 1. The user inserts an invalid PIN | 1. The system shows an error message |
| 1. The user pays with less money than the required | 1. The system stops the transaction process and displays an error message |
|  |  |
| Includes: | * External Actor: Bank System * Calculate the fees for the books * And increase the income by every check-out. | |
| Notes and Issues: | * In the payment process I generalized the payment process to pay by a point or pay by credit card to inherit the functions of the payment process to both classes. So, the user can pay by any method he wants | |

* **Ownership:**

|  |  |
| --- | --- |
| **Item** | **Owners** |
| Non-functional requirements | *Mohamed Khaled* |
| All except non-functional requirements | *Sami Sayed Ahmed* |