SOFTWARE ENGINEERING SCHEDULE-ANALYSIS DOCUMENT

# Requirements

## Functional requirements:

**Critical priority:**

1. As a librarian, I want to be able to add multimedia items to the system, so library users can borrow them.

2. As a library manager, I want to be able to add librarians to the system, so they can start using it once they are hired.

3. As a librarian, I want to add a library user to the system, so the librarians can lend multimedia items to them.

4. As a librarian, I want to lend a specific item of multimedia to a specific library user for 14 days, so they can borrow it.

**High priority:**

5. As a library manager, I want to be able to remove librarians from the system, so they cannot access it anymore if they are fired or gone.

6. As a librarian, I want to be able to remove multimedia items from the system, so multimedia items will not belong to the system anymore.

7. Both as a librarian and a library user, I want to be able to search for specific multimedia items, so I can check if the desired item is available in the library.

8. As a library user, I want to see the items I have borrowed and their information, including the remaining time, so I know when I have to return them.

9. As a librarian, I want to see the active fines of the library users when they try to borrow a multimedia item, so I can make sure that no one can borrow any items if they have a fine.

10. As a librarian, I want to be able to process a fine, so it can be removed once the library user has paid.

**Low priority:**

20. As a librarian, I want to be able to delete a specific library user, so they won’t be able to borrow any multimedia item anymore.

12. As a library user, I want to be able to see my previous borrowed multimedia items and previous fines and reviews so I can keep track of them.

13. As a librarian, I want to be able to see library users previously borrowed multimedia items, previous fines, and reviews so I can keep track of them.

14. As a library user, I want to be able to extend my borrowing of a specific item up to 3 times, so I can return the item later than it was supposed to.

15. As a library user, I want to be notified of the amount of money I must pay when the time of one of my borrowings has passed, so I know I must go to the library to pay the fine.

16. As a library user, I want to be notified 24 hours before my borrowing expires so I can return the media item or request an extension.

17. As a library user, I want to be able to reserve a multimedia item for 24 hours, so I can make sure that no one else will borrow it before me.

18. As a library user, I want to be able to give a review of the multimedia items I have rented, so other users will be able to read them.

19. As a librarian, I want to be able to delete a specific review, so I can make sure there are no inappropriate or offensive reviews.

11. As a library user, if I try to reserve a book that is not available, I want to be notified when it becomes available, so I know I can borrow it then.

## Non-functional requirements

1. The system will be a client-server system.
2. The system will be implemented in English.
3. All the registered data will be permanently stored in a database unless it is specifically removed by a librarian or manager.
4. The system will include a user guide to document how to use the user interface.
5. The system will include the following information:

* Books: isbn, title, publisher, author, edition, year of publication and genres (the mandatory information is isbn, title, publisher )
* Magazines: title, publisher, volume, genre, date (day, month and year) (the mandatory information is title, publisher and date)
* Library user: social security number (ssn), first and last name, and their password (all the information is mandatory)
* Librarian: social security number (ssn), first and last name, date of employment and their password (all the information is mandatory)
* Library manager: social security number (ssn), first and last name and their password.

1. The manager will be fixed in the system, meaning that it cannot be modified or deleted.

# Use case diagram

* Manage multimedia items librarian (Requirements: 1, 6, )
* Manage librarians- manager (Requirements: 2, 5, )
* Manage library users- librarian (Requirements: 3, 20, )
* Extend a media item -library user (Requirements:)
* Lend a media item- librarian (Requirements:)
* Search multimedia items- librarian/library users (Requirements:)
* See information- librarian/library user (Requirements:)
* Manage fine- librarian/time (Requirements: )
* Write reviews- library user (Requirements: )
* Delete review library user /librarian
* Reserve multimedia item-library user (Requirements:)
* See notification library-user(Requirements:)

# Use cases

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| --- | --- |
| **Use case** | Manage multimedia items |
| **Summary** | A librarian has a multimedia item which needs to be added or removed from the system. The librarian sees a list of the multimedia items that are current stored in the system. In case they want to add it, they will use the system to record all the information about it. The system validates and records the data. On the other hand, if they want to delete it, they will have to select the item and use the system to delete it. The multimedia item will either appear or disappear from the list. |
| **Actor** | Librarian |
| **Precondition** | The librarian is logged in the system.  In case of removing an item, said item must be stored in the system. |
| **Postcondition** | The item and all its information will be successfully added/removed from the system. |
| **Base sequence** | CASE ADD:  1. The librarian selects either book or magazine.  2. System will ask for specific information for the chosen type of item (see non-functional requirement e.) and shows a list of the already stored items.  3. Librarian inserts all the information and add the item. (ES 1)  4. System shows the updated list.  CASE REMOVE:  1. The librarian selects either book or magazine.  2. System displays a list of all the items.  OPTIONAL:  2.1. Filter to find the desired item  2.2. System displays a list of the items that fulfill the filters.  2.3. Possibility to change the filters, go to case delete step 2.1  3. Select the item from the list and delete it.  4. The system displays the list with the remaining items. |
| **Exception sequence** | ES 1: the information is incomplete or against the system restrictions:  5a. System will display and error and ask for the information to  be introduced again  Go back to main flow, case add step 2. |

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| --- | --- |
| **Notes** | This use case fulfills the requirements 1, 6.  Regarding ES 1, the error that the system might display are the following:  -Book:   * Title/Publisher/Isbn cannot be empty. * Invalid date: future date (year of publication cannot be a future date). * There is already a book with that isbn in the system (isbn must be unique) * Duplicate genre (book cannot have the same genre twice). * Edition must be a natural number.   -Magazine:  - Title/Publisher/Day/Month/Year cannot be empty.  - Invalid date (day, month and year creates a date that does not   exist ex. 31/02/2022, -3/13/2000).  - Invalid date: future date (date cannot be a future date).  - Volume must be a natural number. |
|  |  |

Test cases

### Case Add

Normal flow:

|  |  |  |
| --- | --- | --- |
| Action no. | Action | Reaction |
| 1 | Choose add book | System asks for the title, publisher, author, isbn, year of publication, edition and a list of genres. |
| 2 | Introduce the following data:  Title: Daugther of Smoke and Bone  Publisher: Hodder & Stoughton  Author: Laini Taylor  ISBN: 978-0-316-13402-6  Year of publication: 2011  Edition: 1  Genres: fantasy, romance, young adult fiction |  |
| 3 | Choose to add the book | System adds the book with the following information:  Title: Daugther of Smoke and Bone  Publisher: Hodder & Stoughton  Author: Laini Taylor  ISBN: 978-0-316-13402-6  Year of publication: 2011  Edition: 1  Genres: fantasy, romance, young adult fiction.  The book is shown on the list and the values of the filled fields are reset. |

Alternative flow book: Librarian inputs incorrect type of data

1. Null value

Step 1-3 in normal flow except title/ isbn/ publisher is empty

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add the book | System displays an error indicating that it can’t be empty and resets the values of the filled fields |

Go to step 2 normal flow

1. Future year of publication

Step 1-3 in normal flow except year of publication is 2023

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add the book | System displays an error indicating that the year of publication can’t be a future date and resets the values of the filled fields |

Go to step 2 normal flow

1. Duplicate isbn

Step 1-3 in normal flow except isbn is already in the system

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add the book | System displays an error indicating that the isbn must be unique and resets the values of the filled fields |

Go to step 2 normal flow

1. Edition is not an integer

Step 1-3 in normal flow except edition is not a natural number

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add the book | System displays an error indicating that the isbn must be unique and resets the values of the filled fields |

Go to step 2 normal flow

1. Duplicate genre

Step 1-3 in normal flow except the same genre is chosen twice

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add the book | System displays an error indicating that the same book cannot have the same genre twice and resets the values of the filled fields |

Go to step 2 normal flow

Case Remove

Normal Flow (without filtering):

|  |  |  |
| --- | --- | --- |
| Action no. | Action | Reaction |
| 1 | Choose remove magazine | Displays a list of the magazines that are in the system |
| 2 | Choose the 3rd magazine in the list | Highlighted 3rd magazine in the list |
| 3 | Choose to delete | Deletes the magazine and shows the list with the remaining magazines |

Normal Flow (with filtering):

|  |  |  |
| --- | --- | --- |
| Action no. | Action | Reaction |
| 1 | Choose remove magazine | Displays a list of the magazines that are in the system |
| 2 | Include filters and search:  Year: 2021  Month: July  Genre: sports | Displays a list of the sports magazines published in July 2021 that are in the system |
| 3 | Change filters and search:  Month: July to May | Displays a list of the sports magazines published in May 2021 that are in the system |
| 2 | Choose the 3rd magazine in the list | Highlights 3rd magazine in the list |
| 3 | Choose to delete | Deletes the magazine and shows the list with the remaining magazines |

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| --- | --- |
| **Use case** | **Manage librarians** |
| **Summary** | The library manager hires or fires a librarian, and therefore they need to be added or removed from the system. A list of the current librarians is shown. In case they want to add a new librarian, they will use the system to record all the information about it: social security number (ssn), first and last name, date of employment and their password (see non-functional requirement d.). The system validates and records the data.  On the other hand, if they want to delete it, they will have to select the librarian and use the system to delete it.  The librarian will either appear or disappear from the list. |
| **Actor** | Library manager |
| **Precondition** | The library manager is logged in the system.  In case of removing a librarian, it must be stored in the system. |
| **Postcondition** | The librarian is added/removed from the system. |
| **Base sequence** | 1. System displays a list of all the librarians stored in the system .  CASE ADD:   1. The system and asks for the desired information (see non-functional requirement d.) 2. Insert librarian information (social security number (ssn), first and last name and their password) and add it. (ES 1) 3. System shows the updated list.   CASE REMOVE:  2. Select the librarian from the list and delete it.  3. The system displays the list with the  remaining librarians. |
| **Exception sequence** | ES 1: the information is incomplete or against the system restrictions:  3a. System will display and error and ask for the information to  be introduced again  Go back to main flow, case add step 2. |
| **Note** | This use case fulfills the requirements 2, 5  Regarding ES 1, the error that the system might display are the following:   * First name/ Last name/ Ssn/ password cannot be empty. * First name/ last name must have less than 50 characters * The ssn must be 13 digits * The is already a librarian wit that ssn in the system (ssn must be unique) |

Test Case add Librarian

Case Add

Normal flow:

|  |  |  |
| --- | --- | --- |
| Action no. | Action | Reaction |
| 1 | Choose add Librarian | System asks for the ssn, first name, last name, password. |
| 2 | Introduce the following data:  Ssn:1234567890111  First name: Boris  Last name: Johnson  Password: password |  |
| 3 | Choose to add | System adds the librarian with the following information:  Ssn: 1234567890111  Last name: Johnson  Password: password  The librarian is shown on the list and the values of the filled fields are reset. |

Alternative flow. Manager Inputs incorrect type of data

1. Null values

step 1-3 in normal flow except ssn/password/ first name/ last name is null

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add | System displays an error indicating that it can’t be null |

Go to normal flow step 2

1. Incorrect input of data

step1-3 in normal flow except ssn contains letters or symbols or it is not 13 digits (234ab@\*+123)

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add | System displays an error indicating that the ssn is not valid |

Go to normal flow step 2

step 1-3 in normal flow except password is longer than 20 characters (thisPasswordIsTooLongToBeMemorized)

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add | System displays an error indicating that the password needs to be shorter than 20 characters. |

Go to normal flow step 2

1. Duplicate ssn

step1-3 in normal flow except ssn is already registered in the system.

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add | System displays an error indicating that said librarian is already register. |

Go to normal flow step 2

Case Remove

|  |  |  |
| --- | --- | --- |
| Action no. | Action | Reaction |
| 1 |  | Displays a list of Librarians that are in the system |
| 2 | Choose the 1st librarian in the list | Highlighted 1st librarian in the list |
| 3 | Choose remove | Deletes the librarian and shows the updated list |

Alternative Flow No librarian chosen from the list

Normal flow step 1-2 except no librarian has been chosen from the list

|  |  |  |
| --- | --- | --- |
| 3 | Choose remove | System displays an error indicating that no element has been chosen from the list |

|  |  |
| --- | --- |
| **Use case** | **Manage library User** |
| **Summary** | A library user comes into the library and ask the librarian to be register in the library. In this case the librarian will add a new library user, they will record all the information about it: social security number (ssn), first and last name, and their password (see non-functional requirement e.). The system validates and records the data.  On the opposite, a library user comes and asks to be no longer a user in the library. The librarian will select the library-user and use the system to delete it.  The library user will either appear or disappear from the list that it is always shown. |
| **Actor** | Librarian |
| **Precondition** | The librarian is logged in the system.  In case of removing a library-user, it must be stored in the system. |
| **Postcondition** | The library user is added/removed from the system. |
| **Base sequence** | 1. System displays a list of all the library users stored in  CASE ADD:   1. The system and asks for the desired information (see non-functional requirement d.) 2. Insert library-user information (social security number (ssn), first and last name and their password) and add it. (ES 1) 3. System shows the updated list.   CASE REMOVE:  2. Select the librarian from the list and delete it.  3. The system displays the list with the  remaining librarians. |
| **Exception sequence** | ES 1: the information is incomplete or against the system restrictions:  3a. System will display and error and ask for the information to  be introduced again.  Go back to main flow, case add step 2. |
| **Note** | This use case fulfills the requirements 3,20  Regarding ES 1, the error that the system might display are the following:   * First name/ Last name/ Ssn/ password cannot be empty. * First name/ last name must have less than 50 characters * The ssn must be 13 digits   The is already a library user with that ssn in the system (ssn must be unique). |

Test Case add Library User

Case Add

Normal flow:

|  |  |  |
| --- | --- | --- |
| Action no. | Action | Reaction |
| 1 | Choose add Library user | System asks for the ssn, first name, last name, password. |
| 2 | Introduce the following data:  Ssn:1234567890123  First name: Boris  Last name: Johnson  Password: password |  |
| 3 | Choose to add | System adds the librarian with the following information:  Ssn: 1234567890123  Last name: Johnson  Password: password  The librarian is shown on the list and the values of the filled fields are reset. |

Alternative flow. Manager Inputs incorrect type of data

1. Null values

step 1-3 in normal flow except ssn/password/ first name/ last name is null

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add | System displays an error indicating that it can’t be null |

Go to normal flow step 2

1. Incorrect input of data

step1-3 in normal flow except ssn contains letters or symbols or it is not 13 digits (234ab@\*+123)

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add | System displays an error indicating that the ssn is not valid |

Go to normal flow step 2

step 1-3 in normal flow except password is longer than 20 characters (thisPasswordIsTooLongToBeMemorized)

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add | System displays an error indicating that the password needs to be shorter than 20 characters. |

Go to normal flow step 2

1. Duplicate ssn

step1-3 in normal flow except ssn is already registered in the system.

|  |  |  |
| --- | --- | --- |
| 3a | Choose to add | System displays an error indicating that said library user is already register. |

Go to normal flow step 2

Case Remove

|  |  |  |
| --- | --- | --- |
| Action no. | Action | Reaction |
| 1 |  | Displays a list of library users that are in the system |
| 2 | Choose the 1st library users in the list | Highlighted 1st librarian in the list |
| 3 | Choose remove | Deletes the library user and shows the updated list |

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| --- | --- |
| **Use case** | **Requirements associated to it** |
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# Domain model

# Test Case

# Activity diagrams