Software requirements specification (SRS) for library management system

1. Introduction

1. Purpose

The purpose of this Software Requirements Specification (SRS) document is to provide a detailed overview of the Library Management System (LMS) developed for our very first client – a library. The LMS is meant to replace the current Microsoft Excel-based management system, offering a more suitable and efficient specialized software.

2. Scope

The Library Management System (LMS) is a software application designed to automate numerous processes involved in managing library operations. It includes functionalities for managing three main types of data: Books, Book copies(physical) and Customers.

The scope of this project covers the implementation of essential features required by our client for efficiently running library operations. These features include:

- Importing a file with books
- Deleting a book
- Importing a file with book copies
- Deleting a book copy
- Importing a file with customers
- Deleting a customer
- Searching for book copies
- Borrowing a book copy
- Returning a book copy
- Reporting:
    - ✓ Output of all books
    - ✓ Output of all borrowed book copies
    - ✓ Output of all non-borrowed book copies
    - ✓ Output of all customers
    - ✓ Output of all currently borrowed book copies of a customer

The scope of the system includes the following constraints:

- ✓ Customers can borrow a maximum of 5 books at a time, and if the maximum borrowing time is exceeded, an overdue fee must be paid upon return.
- ✓ A book and a book copy can only be deleted if they are not currently borrowed.
- ✓ Customers cannot be deleted if they currently have borrowed books.

- ✓ The system is developed in Java to taking into account the experience of our client's staff, their needs and comfort.
- ✓ The system operates via a command-line interface to accommodate our staff's preference.
- ✓ The command-line control is designed to be efficient and user-friendly - with logically arranged menus and easily visible and selectable options, especially the most frequently used ones.

3. Definitions, acronyms, and abbreviations

- LMS: Library Management System
- CLI: Command Line Interface
- SRS: Software requirements specification

4. Overview

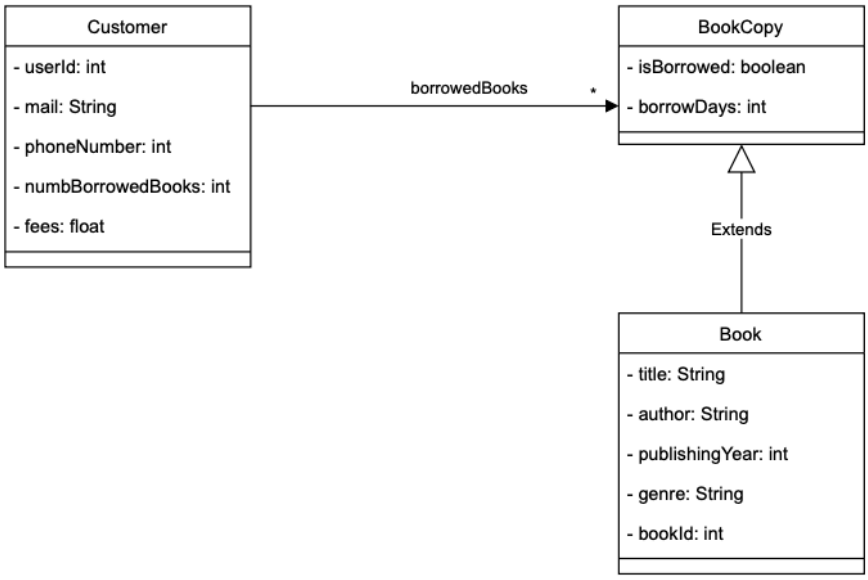
The rest of this document is organized as follows:

- ➢ Section 2 provides a general description of the Library Management System (LMS), including its implementation, core classes, and usage. Additionally, it explains the system's domain model.
- ➢ Section 3 enumerates the system's specific requirements, both functional and non-functional.
- ➢ Section 4 includes use case tables for borrowing and returning a copy of a book.

2. General Description

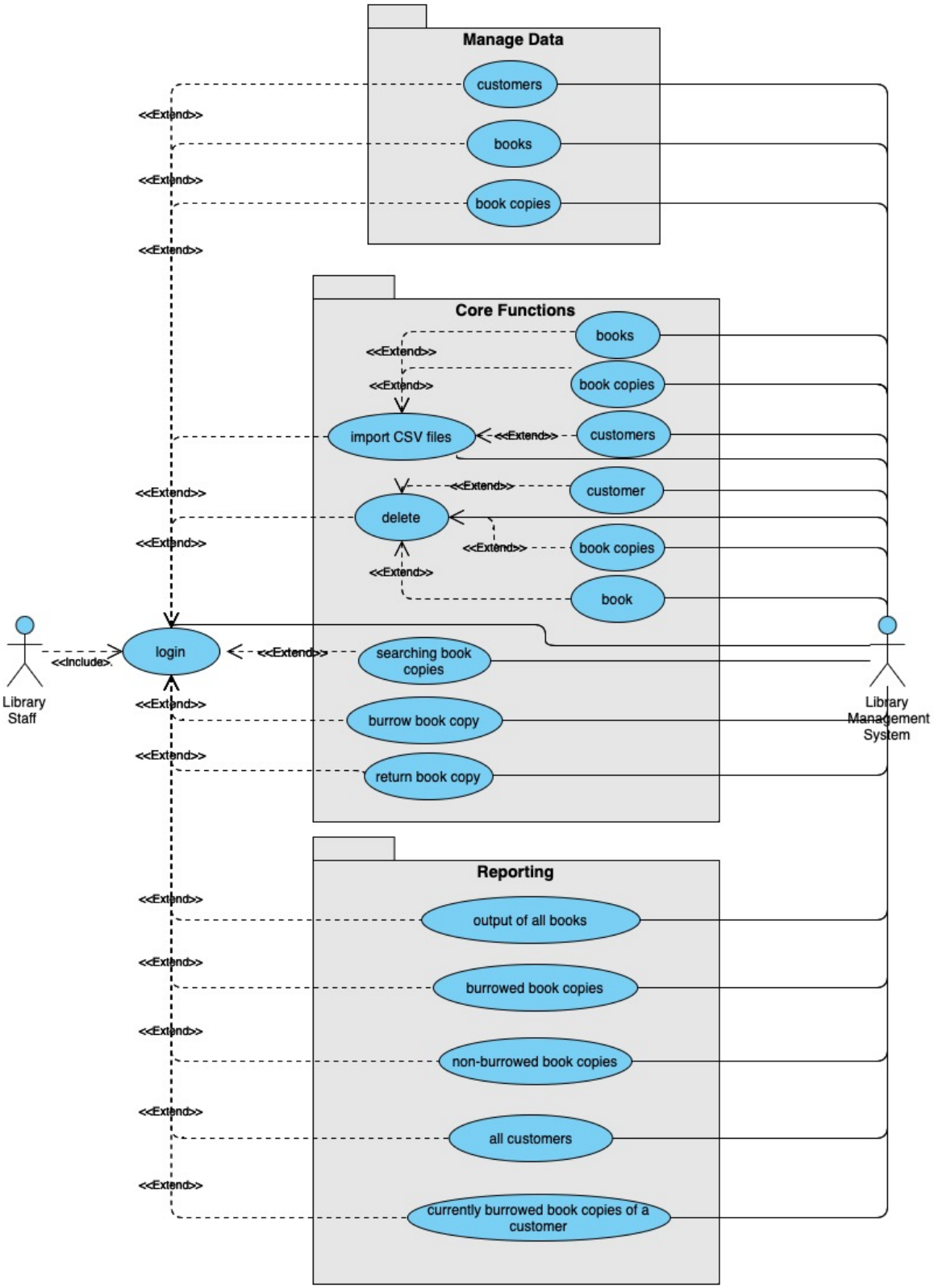
2.1 Domain Model

The system's core domain model consists of the three classes Customer, Book and BookCopy. While the customer himself has the attributes userId, mail and phoneNumber he also has a list of borrowedBooks implemented as an unilateral connection to the BookCopy class as an attribute.
This class extends the Book class with it's attributes title, author, publishingYear, genre, bookId by providing two additional attributes, namely isBorrowed and borrowDays.



2.2 Use Case Diagram

The use case diagram provides a visual representation of the library system functionalities and the main actors involved in using those functionalities. It helps stakeholders understand the system's scope and the interactions between librarian and the system.



3. Specific Requirements

3.1 Functional Requirements:

Librarian should be able to:

- Login into the system
- Import CSV files of books, book copies and customers.
- Delete books, book copies, customers when certain conditions are met.
- Search for book copies: the system should provide certain functionality to search by specific data of the according book (id, title, author, ...)
- Borrowing/returning book copies: in the system a user should be able to borrow/ return a book copy
- Report
  - ✓ Output of all books
  - ✓ Output of all borrowed book copies
  - ✓ Output of all non-borrowed book copies
  - ✓ Output of all customers
  - ✓ Output of all currently borrowed book copies of a customer

3.2 Non-Functional Requirements:

- Java should be used considering the system administrators experience.
- Efficiency: the system should be especially time-efficient (e.g. by allowing import through CSV files) and also shouldn't be using to much computing power and memory space.
- User-friendliness: this is achieved through the command line interface. Additionally, menus should be logically arranged, and the most frequently used options should be easily visible and selectable.
- System maintainability: the system needs to be maintainable easily (probably also by the users themselves or by other technical staff who didn't participate in the development of the system)
- Security: the personal data of the several users/accounts should be stored securely and librarian login to ensure access of the system by authorised users.

4. Use Case Tables

4.1 Borrowing a Book Copy

Name	Borrowing a book copy
Goal	A customer is borrowing a book copy from the library through the system using the help of the librarian.
Precondition	- The Library Management System is fully functioning. - The book copy is available. - Customer has an account in the system. - The customer has not exceeded the maximum number of books allowed to borrow (5 books).
Postcondition	The book copy is borrowed by the customer with the assistance of the librarian using the LMS.
Actors	Customer, Librarian, Library Management System (LMS)
Main success scenario	1. The customer asks the librarian to borrow a specific book copy. 2. The librarian searches the desired book copy in the system. 3. The system confirms the availability of the book copy. 4. The customer provides the required data from the system (name/ customer ID etc.) to the librarian. 5. The system checks if the customer has not exceeded the maximum number of books allowed to borrow(5 books). 6. The system updates the status of the book copy to "borrowed" and saves the borrowing details to use for the reports of all currently borrowed book copies of a customer and the output of all borrowed book copies. 7. The command line displays a message confirming the successful completion of the borrowing process.
Exceptional Case 1	Book copy unavailable - The system notifies the librarian that currently there is no available copy and the borrowing request of the customer is denied.
Exceptional Case 2	Book copy not found - The system notifies the librarian that no matches were found and the borrowing request of the customer is denied.
Exceptional Case 3	Customer exceeds maximum allowed number of borrowed books(5 books) - The system notifies the librarian of the unmet conditions and the borrowing request of the customer is denied.

4.2 Returning a Book Copy

Name	Returning a book copy
Goal	A customer is returning a book copy to the library through the system using the help of the librarian.
Precondition	- The Library Management System is fully functioning. - The book copy must be borrowed by the customer in order to be returned. - Customer has an account in the system.
Postcondition	The book copy is returned to the library by the customer with the assistance of the librarian using the LMS.
Actors	Customer, Librarian, Library Management System (LMS)
Main success scenario	1. The customer requests to return a book to the librarian. 2. The customer provides the required data from the system (name/ customer ID etc.) to the librarian. 3. The system shows the output of all currently borrowed book copies of the customer. 4. The librarian finds the book copy that the customer wants to return among the ones displayed by the system. 5. The system checks if the book is returned on time and if not, it calculates the overdue fees. 6. The system updates the status of the book copy to "available" and saves the return details to use for the reports of all non-borrowed book copies and removes the book copy from the list of currently borrowed book copies of the customer. 7. The system shows a message confirming the successful completion of the return process.
Exceptional Case 1	Book copy not found in the list of currently borrowed book copies of the customer - The system notifies the librarian that no matches were found and the return request of the customer is denied. The librarian notifies the customer of the situation.
Exceptional Case 2	Book copy is returned after the specified borrowing period - The system calculates and notifies the customer of the overdue fee that he must be paid.