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1. SOFTWARE REQUIREMENT SPECIFICATION

1.1. INTRODUCTION

1.1.1. AIM OF THE DOCUMENT

The purpose of this document is to objectively present the fundamental and specific requirements of the Library Management System. It provides a comprehensive overview of the system's internal and external aspects, supported by diagrams that help illustrate its structure and behaviour.

1.1.2. OVERVIEW OF THE DEFINED SYSTEM

The system described is an application designed to fully and efficiently manage a library.

It allows users to browse and search for books, check their availability, place reservations, purchases or loans, and manage their personal profile.

Administrators can manage the book catalog, monitor reservations, record sales and loans, and analyze useful statistics related to the library's operations.

The system includes advanced search and filtering features, enabling users to quickly find the books they are looking for. Additionally, it supports the creation and management of new resources and categories, making the system flexible and easily expandable.

1.1.3 HARDWARE AND SOFTWARE REQUIREMENTS

The basic hardware requirements of the system are a computer that can run JAR files, as well as some space in the disc to save the files with the personal information if the offline version is on.

In the case of the basic software requirements of the system are the oracle JDK SE 21 correctly installed on it to be able to run properly the JAR file, as well as a server or a local server that can hold the DBMS so in the online version of the system the information can be obtained by queries in SQL to the server or local server correctly.

1.1.4. RELATED SYSTEMS, PROS AND CONS

Some systems related to our Library Management System are:

KOHA

- Pros: A very complete open-source system for library management, with cataloging, loans, user management, and advanced statistics.
- Cons: Can be complex to configure and requires technical skills for installation and maintenance.

EVERGREEN

- Pros: Stable and reliable open-source system for managing loans and catalogs, with advanced reporting.
- Cons: User interface can feel outdated and unintuitive for non-expert users.

1.2. USER STORIES

1.2.1. US-1

As a User, I want to search for books in the store so that I can reserve them.

1.2.2. US-2

As a User, I want to add unavailable books to my wishlist so that I can be notified when they become available again.

1.2.3 US-3

As an Admin, I want to manage book sales so that the system's inventory and organization are always updated.

1.3 FUNCTIONAL REQUIREMENTS

1.3.1. FR-1

The system shall provide user and admin registration and login in order to access restricted functionalities and interact with system data.

1.3.2. FR-2

The system shall provide access to a catalog of available books to users.

1.3.3. FR-3

The system shall provide a search function that allows users to find books based on title, author, category, year, so they can find the desired books.

1.4. USE CASES

1.4.1. OVERVIEW DIAGRAM

Use case Diagram

1.4.2. INTERNAL STEPS

Reserve Book to Loan

1. The User request to view the catalog of the books.
2. The System gets available books from the Books System.
3. The User selects the desired book.
4. The System gets selected book's details.
5. The User selects to reserve the book to loan.
6. The System checks if the User has loan's prerequisites.
7. The System saves the loan and notifies the User of the reservation success.

Extensions:

- 6a. User is not logged: System prepares the login schedule.
- 6b. User has reached the limit of active loans: System notifies the User and terminates the use case.
- 6c. User has expired loans: System notifies the User to return the expired loan before reserve a new loan and terminates the use case.
- 7a. Saving loan error: System notifies the User and terminates the use case.

2. STORYBOARDS

The first storyboard shows a fixed menu at the top to help Users navigate all the system's features. By default, the first screen seen is the Catalogo storyboard where all available books are displayed.

Catalogo storyboard

Library Project

By navigating with the menu at the top Users can switch to Search storyboard to help users who already know what they are looking for find the desired book.

Cerca storyboard

The Post storyboard allows Users to view chronologically ordered posts from Library administrators to stay update on news.

Post storyboard

The About storyboard is a static screen that consists of informing Users about the system policy.

About storyboard

By selecting a book from the Catalog or Search Users access the Book Details storyboard which allows the user to view the book's specifications and to be able to reserve the book to buy or loan.

Book detail storyboard

The Login storyboard allows Users to login to access restricted system features.

Login storyboard

Reservations storyboard allows Administrators to search for reservations made by users through the platform by scrolling through all reservations or narrowing the search by user. The administrator can accept or reject the sale or loan.

Reservations storyboard

Manage books storyboard allows Administrators access Book detail storyboard by searching for it, to add new books or update and delete existing books in the system.

Manage Books storyboard

Manage users storyboard allows Administrators to view Users details and delete profiles.

Manage Users storyboard

New post storyboard allows Administrators to view posts and create a new one.

New Post storyboard

3. DESIGN

3.1 CLASS DIAGRAM

3.1.1. VOPC

VOPC Diagram

3.1.2. DESIGN-LEVEL DIAGRAM

Design level diagram

3.2. DESIGN PATTERNS

Used patterns

3.3. ACTIVITY DIAGRAM

Activity Diagram

3.4. SEQUENCE DIAGRAM

Sequence Diagram

3.5. STATE DIAGRAM

State Diagram

4. TESTING

testing

5. EXCEPTIONS

exceptions

6. DATA BASES

We have two types of data bases in the described system:

6.1. FILE SYSTEM

File System

6.2. MYSQL

The other type of DBMS in the system is the connection to a *MySQL server* to access the information. Internally this SQL must follow the struct specified in the file ***MySQL_Code.sql***.

7. SONAR CLOUD

To check the correct behavior of this project, it was used *SonarCloud* system. This system points out the possible bugs, possible vulnerabilities, and review that the functions are well implemented. You can check the results of the project in the following link:

Library Project

SonarCloud link