OOMD Lab 2022-23

Library Management System

Problem Statement

With the world now moving towards digitalization of every possible task, it is inevitable that libraries stop relying on physical staff for operation. Library management should allow users to borrow books, return books, pay fines and issue cards.

Introduction

* Purpose

Operate a library efficiently using automation, streamlining tasks involved in running a library such as cataloging, issues, managing membership details, placing fines for delayed returns etc

* Scope of the document:

To specify the functional, behavioral and non-functional requirements of the software application that automates and streamlines various tasks involved in running a library.

* Overview

A library management system is a software application that helps librarians to manage the library operations, such as acquiring, cataloging, circulating, and reporting on library materials. It also helps users to find and access library resources easily and efficiently.

General description:

A library management system is a software application that helps librarians to manage the library operations, such as acquiring, cataloging, circulating, and reporting on library materials. It also helps users to find and access library resources easily and efficiently. Users can search for books, access e-resources, borrow and renew books, view their account details including due dates, participate in online forums etc

Functional requirements:

* System should allow the librarian to add, edit, delete and view the details of books, members and loans
* Users should be allowed to borrow, renew and return books using login credentials and barcode scanners
* System should send notifications to the members and librarian about the overdue books and pending payments
* System should generate reports on the inventory, circulation, and financial transactions of the library
* System should keep track of due dates of books issued and active membership period

Interface requirements

* User Interface
  + UI should be simple, intuitive, responsive and consistent
  + Interface should support different languages and devices as needed
  + UI should display availability and location of books in the library
* Hardware Interface:
  + The system should be compatible with multiple operating systems such as Windows, Linux etc
  + The system should be reliable and secure when communicating with hardware devices
  + The system should use QR codes to scan books and cards, and to facilitate payments
* Software Interface:
  + A working OS
  + Front-end framework like React/Angular/Vue
  + RDBMS like MySQL, PostgreSQL etc
  + Containers and orchestration services like Kubernetes

Performance Requirements

* The number of pages should be minimized for the user’s convenience
* Adding members, borrowing and renewing books should be very quick.
* There should be a procedure for when there is loss of data due to failure of storage device or similar reason.

Design Constraints

* The information of all users, books and libraries must be stored in a database that is accessible by the website.
* The Online Library System is running 24 hours a day.
* Users may access from any computer that has Internet browsing capabilities and an Internet connection.
* Users must have their correct usernames and passwords to enter into their online accounts and do actions.

Non-functional Attributes

* Usability: The UI should be simple enough for everyone to understand and get the relevant information without any special training. Different languages can be provided based on the requirements.
* Accuracy: The data stored about the books and the fines calculated should be correct, consistent, and reliable.
* Availability: The System should be available for the duration when the library operates and must be recovered within an hour or less if it fails. The system should respond to the requests within two seconds or less.
* Performance: The system should be fast and accurate. It should handle expected and unexpected errors. It should be able to handle large amount of data.
* Security: The system should protect the data from unauthorized access and modification. It should use encryption and authentication techniques to ensure data security.
* Scalability: The system should be able to handle increasing number of users and books without degrading the performance or functionality.

Preliminary Schedule and Budget