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**COEN 6312– Model Driven Software Engineering – Winter 2024**

**“Library Management System”**

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# ABSTRACT:

In the milestone 1 of the model driven software engineering project, we are presenting our model for the project with domain analysis, textual description, potential users, list of features, use case diagram, functional and non-functional diagrams. Our concept is Library management system to make the library resources well managed and bringing all the aspects of managing different resources of library to one digital platform.

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# INTRODUCTION: DOMAIN ANALYSIS:

A domain analysis for a Library Management System (LMS) delves into the systematic exploration of the library domain to understand the requirements, functionalities, and challenges associated with managing library operations. This analysis is crucial for developing a system that not only streamlines library processes but also enhances user engagement with library resources, both physical and digital. The library field encompasses a range of activities related to collecting organizing maintaining and distributing information resources. These resources include books, journals, magazines, newspapers, digital media and more. Libraries serve an array of users, with varying needs and expectations. This includes students, staff, and the public etc.,

Modern libraries face several challenges that necessitate the adoption of an efficient LMS. These include managing a growing and diverse collection of materials, providing easy access to digital and physical resources, ensuring efficient circulation of items, and maintaining accurate records of inventory, memberships, and transactions. Additionally, libraries need to adapt to the evolving expectations of tech-savvy patrons who demand quick and remote access to resources. Implementing an LMS can significantly enhance library operations and user experiences. It can lead to improved access to resources, streamlined workflows, and better inventory management. For patrons, it means quicker and easier access to a broader range of materials, both physically and online. For libraries, it translates into operational efficiency, better resource utilization, and the ability to adapt services to meet user needs more effectively.

**Key Functionalities of LMS:**

* **Catalog Management:** A core function of the LMS is to provide a robust cataloging system that supports comprehensive descriptions of items, including title, author, ISBN, publication details, and digital resource links. This system should accommodate various formats and facilitate easy searching and categorization.
* **Circulation and Inventory Management:** The LMS must efficiently manage the circulation of library materials, including checkouts, returns, renewals, and reservations. It should also keep accurate and real-time records of inventory, including the status of items as available, checked out, or reserved.
* **Membership Management:** Managing user data, including registration, profiles, borrowing privileges, and history, is essential. The system should support different user roles and permissions, from administrators and librarians to general library members.
* **Digital Content Access:** With the increasing importance of digital collections, the LMS should facilitate access to e-books, online journals, databases, and multimedia content. This includes managing digital rights, licenses, and integration with external content providers.
* **User Interface and Experience:** The system should offer an intuitive and accessible interface for both patrons and library staff. For patrons, it should provide seamless navigation, efficient search capabilities, and personalized services such as book recommendations and alerts. For staff, it should offer tools for easy management of library operations.
* **Analytics and Reporting:** The LMS should be capable of generating reports and analytics to provide insights into usage patterns, popular titles, inventory levels, and member activity. This data is invaluable for decision-making related to collection development, marketing, and service improvements.

# TEXTUAL DESCRIPTION:

The objective of the Library Management System (LMS) is to provide an effective and organized Digital system for managing library resources, like keep tracking of physical resources including books, tablets, DVD’s, stationery, presentation rooms and other materials as well as digital resources including e-books, audiobooks, e-magazines, newsletters that are currently available/borrowed.

The system aims to manage these assets with real time status updates of these assets for user convenience, automate various library operations like deadline and fine notifications etc., and improve user experience for both library staff and patrons.

The system also comes with various levels of access for different users. The access rights are briefly explained in the following potential user’s section.

A user needs to create an account using an e-mail address to access the system. Users can browse the catalogue to see the available resources. The catalogue will show if the assets can be borrowed or restricted to use in the library premises for certain assets like limited edition books etc., The catalogue also displays the available presentation practice rooms and allows the users to book a time slot to reserve the room.

# POTENTIAL USER/CUSTOEMRS:

Librarians: Librarians are the main individuals in charge of maintaining the library's resources, taking care of administrative duties, and supervising daily activities and to perform all these activities they have the access rights to all the features of the library management system.

Library Staff: The system may also be used by other library employees, such as clerks and assistants, to carry out duties that have been assigned to them.

Faculty: Faculty refers to the university to which the library belongs, with respective access limitation to utilize the library services to borrow books, search for materials, and access information resources.

Students: Students refer to the university to which the library belongs to who has access to most of the resources for free.

Paid users: The paid users are non university students who needs a subscription to use the library resources.

Free users: Free users are also non-university students who has very limited access to library resources and mostly limited to browsing the available resources.

# LIST OF FEATURES:

1. Resource Management –

* Add, edit, and delete books, journals, and other materials to the library catalog.
* Organize materials into categories and subcategories & provide floor, row, section and shelf information for ease of navigation bar.
* Update item details such as title, author, publication date, ISBN/ISSN, and availability status, rental status, and access links.

1. User Management:
   * Register and maintain a database of library users/patrons/staff members.
   * Maintain all user accounts, library cards, contact information, borrowing history, Penalty status.
   * Provide user authentication and authorization mechanisms to control access to library services.
2. Search and Discovery:
   * To support search options, including keyword search, author/title search, and filters by format, genre, or subject.
3. Staff and Administrative management:
   * To set up admin/staff settings, including loan policies, penalty rates, and borrowing limits.
   * To browse through student/borrower’s history with library resources.

# USE CASE DIAGRAM:

# LIST OF FUNCTIONAL AND NON-FUNCTIONAL REQUIREMETNS:

Functional:

1. As a user, I should be able to Register to the Library Management System, so that I can use the LMS system.

2. As a user, I should be able to Login to the Library Management System, so that I can use the LMS system.

3. As a user, I should be able to search the catalogue based on author, title, publisher, etc, so that I can borrow the books.

4. As a user, I should be able to borrow books/magazines, etc, so that I can read them.

5. As a user, I should be able to browse other assets like calculator, laptop, tablet, etc in the library and loan them, so that I can use them.

6. As a user, I should be able to see my borrowing history, so that I can analyse it.

7. As a librarian, I should be able to see all the activity happening in the library, so that I can monitor.

Non-functional:

1. As a User, I want the system to load search results within 2 seconds, so that I can quickly find the books I am interested in.

2. As a User who uses multiple devices, I want the library management system to be accessible and fully functional on any device I choose to use, so I can manage my library account without restrictions.

3. As a librarian, I expect the system to process check-in and check-out transactions in less than 3 seconds, ensuring efficient service to members.

4. As a library administrator, I expect the system to be available 99.9% of the time, ensuring continuous access for all users.

5. As a User, I want the system to accurately reflect book availability and my account status in real-time, so I can rely on the information for my borrowing decisions.

6. As a User, I expect my personal and transaction data to be securely stored and transmitted, ensuring my privacy, and preventing unauthorized access

# CONCLUSION: