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**Project Title**

**College Library Management System**

**Project Scope**

College Library Management System is software that offers the implementation of automation on management and operation of school libraries. The system is designed to help librarians by taking over the manual and repetitive aspects of book management, records keeping, and transaction processing. The automation will be implemented in the book sorting and in the tracking of due dates and applying the proper fines. The assistance provided by the automation also extends to the users of the library as well, through various functionalities such as Search Functions, Self Check-outs, and due date notification reminders, etc. The whole system will be written in C# in Visual Studio IDE, while the database will be created in Microsoft SQL Server.

**Features**

1. **Automated Book Tracking**: This feature automatically tracks and updates the status of books. The system keeps the data of the borrower and tracks the return date of the books. Late return fees are automatically calculated and will be billed on the borrower. Upon reaching the maximum fine, the system will restrict the borrower’s account and therefore, will not be able to access library features until the fines are paid.
2. **Librarian Module**: This feature serves as the control center of the library system where the librarians can manage the entire book library, member information, set and update fine rates, generate reports, and resolve unique cases that cannot be handled through automated parts of the system. This is a specific module limited to Librarians only.
3. **Book Catalogue Management**: This feature immensely helps the librarian keep track of the books that are currently in and out of the library and manage the library inventory itself. An automatic book sorting algorithm will sort and place the books in their respective genre, then notifies the librarian of necessary changes. All that is left to do is to insert the book in the shelf location indicated by the system.
4. **User Management**: This feature allows the librarian to manage the current members registered in the library. The librarian will be able to record and impose the appropriate fines to users that fail comply with borrowing rules, such as late returns, damage/loss fees, etc. This functionality also includes settlement of fees and user access
5. **Report Generation**: In this feature, reports can be generated based on the selected criteria of the librarian. Report types including but not limited to, entire book inventory count, books that are due on a specific day, books currently being borrowed, borrowers with outstanding fees, frequently borrowed or requested books, etc.

1. **Search Function**: The search functionality will be available for both members/non-members. Users can easily search and check the availability of the book they are after and provide the location of the book within the library. This functionality will also allow users to search books by different criteria such as Author’s information, genre, etc.
2. **User Module**: This allows the user to start borrowing books and other functionalities, settle fees and manage their library account. The user is required to register using their student number to use this feature.
3. **Self Check-in/Check-out**: Using this feature, the user will be able to borrow and/or return the books by themselves before handing it over to the librarian. An email notification will be sent as a borrowing/returning receipt. Books returned will have to be inspected and validated by the librarian on their own module to ensure books have been returned without any issues.
4. **Hold/Extend Placement:** This functionality allows the user to request a hold on books that are currently being borrowed by another user and upon the book’s return, a notification will be sent to the user that filed the hold request. Alternatively, a current borrower may request to extend the borrowing time, which will be approved unless there is already a hold request in the system on the book or the user has exceeded the extension limit.
5. **Email Notification**: The email notification functionality will be implemented in tandem with different transactions and functionalities of the library management system. The first application is upon account creation, a verification email will be sent to the user; other important notifications including but limited to borrowing/return receipts, return date and fees reminder.

**End Users**

This library management system will have 2 types of users:

* **Librarians.**
* **Users** (Students and College Staff).

**Integration of the End users with the project (user stories)**

**As the Librarian**, I want to easily manage the book catalogue, the library inventory, and the user data. I want to able to generate reports based on the data present to make appropriate adjustments on the library inventory and system. I want to be able to focus my efforts, time, and attention to more important issues like assisting the users and let the system handle the bulk of the repetitive sorting/organizing of the books. I want to easily organize the user requests, fee settlements, and let the system handle the calculation part. I want to be able to not constantly check for overdue returns and let the system handle notifying the users about their due dates. I want to make sure that every library item will always be accounted for.

**As the User**, I want to easily search the book that I need. I want to able to register for an account, borrow and return books, with or without any assistance. I want to be notified about return dates and fees that is billed on my account. I want to be able to request hold or renewals on books. I want to be notified of important things regarding my transactions performed in the system.

**Areas covered by this project:**

* **Book Tracking Automation**: The system will be capable of tracking due dates, outstanding fees and other processes that used to be done manually by the librarians.
* **Library Inventory Management**: This system can easily manage the data side of the library inventory management as well as the sorting and organizing of the books. By using a sorting algorithm in the system, the librarians will have easier and far more efficient way organizing the books.
* **Librarian Module**: The system allows the librarian to manage the library data, as well as the users and their respective transactions and assist user’s inquiry regarding their accounts.
* **Report Generation**: By using the Librarian Module, the librarian can request the system to generate tailored reports according to their selected criteria.
* **Search Function**: The system offers a search functionality that makes it easy to determine the availability of requested book within the library inventory. A book catalogue will also be available.
* **User Module**: This module can only be accessed the user registers in the library. This gives the user access to the services offered by the library as well as the ability to manage their own account.
* **Self Check-in/Check-out Module**: This module allows the user to perform most of their library transactions with minimal assistance from the librarian.
* **Request Handling**: By using the User Module’s Request functionality, the system will be able to accept user requests for hold or extension for the books. Depending on the circumstances and restrictions, the system will approve/deny the request and notify the librarian and/or the users concerning the book.

**Project Users, Actors, Vendors, Actuators:**

1. **Users:**
   1. **Users**: Students that are currently enrolled in and/or Staff that are employed by the College.
2. **Actors:**
   1. **Librarians**: People employed by the College who are tasked to operate the system to facilitate fast and secure transactions, ensure proper use and maintenance of library assets, and physically organize the inventory of the library.
3. **Vendors:**
   1. **Microsoft Azure**: the system’s database and some of the features that rely on internet access will greatly benefit on using Microsoft’s cloud computing platform. Not only that it will be more secure storing data in the cloud, but it will also prevent data inconsistencies. Azure will also be able to handle the volume of data that’s needed to be retrieved as fast as possible, compared to relying on a standalone database.
   2. **Seal Report**: The system will be using an open-source reporting generator that is written in C# compatible with Microsoft. NET Framework to generate reports for the librarian.
   3. **Microsoft Power BI**: Aside from Seal Report, Power BI is an alternative reporting tool that can be used in the development of this system.
4. **Actuators:**

* **College Library Management System** will serve as the actuator of this project since the Librarians and Users will be using their respective software modules to harness the system features. These features will then affect their respective software and/or hardware which will execute the desired action. Actions such as accessing user information or searching a book using the search function.

**Project Properties**

College Library Management System will be fully written in C# paired with .NET Framework 4.8 and using Visual Studio 2022 IDE. While the database will be created in Microsoft SQL Server 2022.

* Programming Language: C#
* Database: SQL Server 2022
* Framework: .NET Framework 4.8

Our goal in creating this system is to introduce and implement more automation ideas and eliminate repetitive and time-consuming tasks that comes with managing and maintaining college libraries. This system will have features that aim to provide efficiency and ease of access for librarians and users alike. And when it comes to organizing data and processing transactions, we believe that by letting the system handle the calculations and other scheduling process, we can keep the factor of human error down to the minimum.

Project Timeline

* **Week 1-2: (September 26 – October 10):**

Ideation, Creation and Submission of the Project Proposal.

Planning and Prototyping the Front-end design and flow.

Database Creation and Data Entry:

* Planning and Creation of the Database
* Determine the necessary Queries needed by the whole system.
* Write the Database creation and population Queries in SQL Server.

Development of System to SQL Server connection:

* Perform the Queries passed from the system prototype.
* Integrate and test the queries into system development as the project progresses.
* **Week 3-4 (October 11 - October 24):**

Development of Search Function:

* Search (with filter functionality) and Book Catalogue.

Development of Automated Book Tracking and Sorting algorithm:

* Develop simultaneously with other parts of the system and integrate into system features upon successful development.
* **Week 5-6 (October 25 - November 7):**

Development and Testing of Email Notification

* Integrate the notification feature wherever it is applicable.

Development of Librarian Module and sub-modules:

(Book Catalogue Management, User Management, Report Generation)

* **Week 7-8 (November 8 - November 21):**

Development of User Module and sub-modules/functionalities:

* User Registration
* Self Check-in/Check-out.
* Hold/Extend Placement.
* **Final Week (November 22 – December 2):**
* Complete user documentation
* Perform Final tests and debugging.
* Create backups of the application on each member’s units.
* Preparation and Planning on final presentation approach.