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eLibrary Application – Specifications and Features**

**1. Introduction**

* **Application Name**: eLibrary
* **Description**: eLibrary is a robust book management and rental application designed specifically for schools and libraries. It allows librarians and educators to manage their book collections, facilitate rentals, and track user activity efficiently. With a user-friendly interface, eLibrary aims to enhance the reading experience for students and community members while simplifying library operations.
* **Technologies**: React, TypeScript, Node.js (Express), PostgreSQL, Sequelize ORM, Tailwind CSS, Ant Design

**2. Target Audience**

* **Primary Users**: Librarians and administrators at schools and libraries.
* **Secondary Users**: Students and community members looking to rent books.

**3. Key Features**

**3.1. For Librarians and Administrators:**

* **User Management**: Easily add, edit, and remove users. Manage librarian roles and permissions to ensure efficient operations.
* **Book Management**: Add, update, and delete book records, including details such as title, author, genre, and availability.
* **Rental Management**: Track book rentals, including rental dates, return deadlines, and overdue items. Generate notifications for overdue books.
* **Profile Management**: View and edit librarian profile information, including options for changing passwords and personal details.
* **Statistics and Reporting**: Access comprehensive reports on book rentals, user engagement, and inventory management. Generate monthly or weekly reports to track performance.

**3.2. For Students and Library Users:**

* **User Registration**: Simple registration process for library accounts, enabling easy access to available books.
* **Book Browsing**: Intuitive search and filter options to help users find books based on categories, authors, or titles.
* **Book Rental**: Ability to request book rentals and view rental history.
* **Profile Management**: Users can view their personal information, rental history, and manage their accounts.

**4. Technical Specifications**

**4.1. Architecture**

* **Frontend**: Developed using React and TypeScript, ensuring a responsive and interactive user experience. Styling is achieved with Tailwind CSS and Ant Design components.
* **Backend**: Powered by Node.js and the Express framework, utilizing PostgreSQL as the database with Sequelize ORM for data management.

**4.2. Database Structure**

* **Users Table**: Stores user details (id, firstName, lastName, email, role).
* **Books Table**: Contains book information (id, title, author, genre, availability).
* **Rentals Table**: Manages rental transactions (id, userId, bookId, rentalDate, returnDate).

**5. Security Measures**

* **Authentication**: Secure user login system with session management.
* **Authorization**: Role-based access control to protect sensitive functionalities.
* **Data Validation**: Implement data validation techniques to maintain data integrity and prevent security vulnerabilities like SQL injection.
* **HTTPS Support**: Ensure secure data transmission over the network.

**6. User Interface Design**

* **Navigation**: A clean, accessible navbar with links to Home, Books, Users, Rentals, and Help, along with easy access to user profiles.
* **Profile Page**: Display user information with options to edit profiles and change passwords.
* **Statistics Page**: Visual representation of rental statistics and user activities, including charts and graphs.

**7. Market Potential**

* **Target Market**: Schools and libraries looking for efficient solutions to manage their book inventory and rentals.
* **Sales Strategy**: Highlight the application’s benefits, including improved efficiency, user engagement, and accessibility to literature for students and community members.

**8. Future Enhancements**

* Introduce a notification system for overdue rentals and user reminders.
* Explore additional features such as book reservations and advanced reporting options.
* Enhance the user interface with customizable themes to suit various institutional branding.

**9. Conclusion**

* The eLibrary application serves as a powerful tool for schools and libraries, aiming to streamline the management of book rentals while providing an engaging experience for users. By focusing on ease of use and efficiency, eLibrary seeks to support educational institutions in fostering a love for reading and learning.