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Project Report
Blood Donation Management System

1. Introduction

The Blood Donation Management System is designed to manage and streamline the process of blood donation, inventory management, donor registration, appointment scheduling, and blood group searching. The system provides an efficient way to handle all related tasks, ensuring data consistency, security, and ease of use.

2. Objectives

- **To develop a comprehensive management system for blood donation.**
- **To provide functionalities for user authentication, donor registration, inventory management, appointment scheduling, and blood group search.**
- **To ensure data persistence and secure handling of user and donor information.**

3. Features

1. **User Authentication and Authorization**
    - **User Registration**
    - **User Login**
2. **Inventory Management**
    - **Add Inventory Item**
    - **Remove Inventory Item**
    - **View Inventory**
3. **Donor Registration**
    - **Register Donor**
    - **Search Donor**
4. **Appointment Scheduling**
    - **Book Appointment**
    - **View Appointments**
5. **Blood Group Search**
    - **Add Blood Unit**
    - **Search Blood Group**
    - **View All Blood Units**

4. Data Structures Used

1. **User Authentication**
    - **User: A struct representing a user with attributes for name, email, password, and a pointer to the next user. It is used in a linked list to manage multiple users.**
    - **UserAuth: A class managing the linked list of users, with methods for adding and authenticating users.**
2. **Inventory Management**
    - **Item: A struct representing an inventory item with attributes for blood type and quantity.**
    - **Inventory: A class managing a list of items, typically using a vector, with methods to add, remove, and view inventory items.**
3. **Donor Registration**
    - **Donor: A struct representing a donor with attributes for name, phone, and blood group.**
    - **DonorRegistration: A class managing a collection of donors, typically using an unordered map, with methods to register and search for donors.**
4. **Appointment Scheduling**
    - **Appointment: A struct representing an appointment with attributes for name, phone, blood group needed, and priority.**
    - **AppointmentScheduling: A class managing a list of appointments, typically using a vector, with methods to book and view appointments.**
5. **Blood Group Search**
    - **BloodSearch: A class managing a map of blood groups to their quantities, using an unordered map, with methods to add, search, and view blood units.**
6. **Data Persistence**
    - **DataStore: A class handling data persistence for users, inventory, donors, appointments, and blood search units. This class ensures that all data is saved to and loaded from external storage, maintaining data integrity across sessions.**

5. Conclusion

The Blood Donation Management System successfully meets the objectives by providing a comprehensive solution for managing blood donation activities. It efficiently handles user authentication, inventory management, donor registration, appointment scheduling, and blood group search. The use of appropriate data structures ensures the system is both efficient and easy to maintain.

6. Future Enhancements

- **Implement a GUI for better user interaction.**
- **Add more sophisticated search and filtering options.**
- **Integrate with external databases for large-scale deployment.**