**BLOOD BANK SYSTEM**

**Client:** Dr. Mark Chai

**GitHub Link:** [**https://github.com/S562695/GDP\_Team5**](https://github.com/S562695/GDP_Team5)

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**Outline:**

The Blood Bank System is a comprehensive platform designed to facilitate seamless interactions among donors, patients, and blood banks. For donors, the system offers user-friendly authentication processes, detailed profile management capturing vital information, and efficient request handling. Patients benefit from an intuitive interface for searching and viewing potential donors, live chat capabilities, and scheduling options. The system ensures robust administration with features like profile management, oversight of donation relationships, and dedicated customer support/chat functionality. With a focus on security, the system implements secure authentication methods and data encryption. The project encompasses thorough testing phases, including unit testing and user acceptance testing, and outlines a deployment plan for both the mobile app and backend systems. Future enhancements and maintenance considerations are also integrated, ensuring the long-term viability and adaptability of the Blood Donation Management System.

**Introduction:**

In the evolving landscape of healthcare technology, the Blood Donation Management System stands as a pivotal solution, addressing the critical need for efficient coordination among donors, patients, and blood banks. Recognizing the significance of timely and well-managed blood donations, this system aims to streamline the donation process, enhance user experiences, and contribute to the overall effectiveness of blood transfusion services. By leveraging modern technologies and frameworks, the platform ensures secure and user-friendly authentication for donors and patients, detailed profile management, and real-time communication channels. Administered by robust administrative features, including oversight of donation relationships and customer support, the system embodies a comprehensive approach to blood donation management. This introduction sets the stage for a closer examination of the project's functionalities, technological underpinnings, security measures, testing protocols, deployment strategies, and future, all working synergistically to fulfil a vital role in the realm of healthcare technology.

* The application facilitates seamless operations for blood banks by streamlining donor management, inventory tracking, and efficient blood distribution.
* With its comprehensive features, the app serves as an all-in-one solution, encompassing donor sign-ups, inventory control, testing, and analytics through a user-friendly admin site.
* Enhancing the donor experience, the iOS app provides real-time alerts and simplified scheduling, fostering smoother interactions. Ensuring both security and integration, the application prioritizes data safety through iOS encryption and seamlessly integrates into existing systems using iPhone or iPad hardware.

This holistic approach not only optimizes the internal processes of blood banks but also enhances the overall efficiency and reliability of blood management systems.

**Problem Statement:**

* **Old-fashioned System:** The local blood bank relies on manual methods and paperwork,

making it tough to connect donors with patients efficiently.

* **Scattered Information:** Donor details are all over paper files, making it hard for staff to

quickly find important information like availability, blood types, and health history.

* **Inventory Challenges:** Counting blood units manually and using paper logs makes

tracking supply and identifying shortages or expired units on time difficult.

* **Need for Digital Upgrade:** The blood bank needs a simple mobile app to work better.

This would help manage inventory, track requests, coordinate with donors, and analyze

data. However, the cost and training should be considered.

**Use Cases:**

* **Donor Registration:**
  + Donors sign up by entering name, contact, and blood type.
  + The system checks details, creates a new account, and tells the donor.
* **Find Patients:**
  + Donor looks for patients by location and blood type.
  + The system shows related patient requests.
  + Donor picks a request to learn more.
* **Manage Donor Profile:**
  + Donor logs in, and edits contact and health info.
  + System saves changes and offers FAQs and live chat.
* **Patient Registration:**
  + Patient signs up, giving name, contact, and blood type.
  + System checks, creates a new account and confirms.
* **Request Blood:**
  + Patient logs in and specifies blood needs.
  + System validates and notifies matching donors.
* **Manage Patient Profile:**
  + Patient logs in, and updates contact and health info.
  + System saves changes and provides FAQs and live chat.
* **Admin Handles Donors:**
  + Admin logs in, and searches for donors.
  + Views and updates donor details.
  + System saves updates.
* **Admin Handles Patients:**
  + Admin logs in, and searches for patients.
  + Views and updates patient details.
  + System saves updates.
* **Admin Manages Blood Supply:**
  + Admin logs in, and checks blood levels.
  + Updates inventory with new donations.
  + System saves changes.

**Functional Requirements**

* **Registration Features:**
  + Offer user registration and admin registration functionalities.
* **Profile Management:**
  + Provide profile management for both donors and patients.
* **Authentication:**
  + Use legitimate credentials to authenticate registered users.
* **Donor Interaction**
  + Permit users to search for blood donors by location and blood type.
  + Allow users to make blood donation requests to available donors.
* **Notification System:**
  + Notify donors when a blood request matches their blood type and location.
* **Blood Supply Management:**
  + Keep a secure database of authorized blood donors.
  + Monitor and control blood supply levels.
* **Data Maintenance:**
  + Allow authorized staff to maintain and update donor data.
* **Support Features:**
  + Provide a Frequently Asked Questions (FAQ) section with email and textbox for inquiries.
  + Implement live chat functionality for patients.
  + Include an emergency contact option.

**Recommended Features (Should):**

* **User Interface:**
  + Provide a simple user interface for entering and amending donor information.
* **Appointment Scheduling:**
  + Make blood donation appointments available to donors.
* **Interaction Tools:**
  + Allow contributors and recipients to interact through a chat or message tool.
* **Feedback System:**
  + Permit users to critique and grade their donations.
* **Informational Materials:**
  + Provide informational materials on the value of blood donation.
* **Notification Feature:**
  + Allow users to receive notifications while using the application.

**Optional Features (May):**

* **Donated Blood Tracking:**
  + Provide information on the travel of donated blood and a tracking tool for blood donations.
* **Social Media Integration:**
  + Permit users to update their social media profiles with their donation status.
* **Scheduler for Blood Donations:**
  + Consists of a scheduler for blood donations that suggests ideal donation intervals.
* **Wearable Device Integration:**
  + Provide wearable device integration to monitor user health and eligibility for donations.
* **Donor Loyalty Program:**
  + Create a donor loyalty program to encourage blood donations.
* **EHR System Integration:**
  + Support electronic health record (EHR) system integration.
* **Blood Drive Locator:**
  + Make it possible for donors to look for nearby blood drives and activities.

**Restrictions (Shall Not):**

* **Data Privacy:**
  + Disclose personal information about users to third parties without their permission.
* **Data Visibility:**
  + Make donor data visible to unauthorized users.
  + Permit anonymous access to donor records.
* **Medical Records Handling:**
  + Maintain private medical records past the point of basic eligibility.

**Non-Functional Requirements:**

* **Smooth Performance:**
* The app should respond quickly and work smoothly, even with many users.
* It must use memory efficiently for a seamless experience on different iPhones and iPads.
* **Handling Growth:**
* As more people use the app, it should still perform well.
* It should easily add resources or parts to keep working smoothly as more people and data are added.
* **Reliable and User-Friendly:**
* The app should work consistently without crashes.
* It needs to be user-friendly, with clear instructions for people of all tech levels.
* If something goes wrong, the app should guide users and prevent any data loss.

**Architecture diagram:**

* **Model Components:**
* Encompasses Donor Model, Donation History, Blood Inventory, and Business Logic for handling various aspects of data and logic.
* **Controller and View:**
* Controller manages user interactions, coordinating data flow between the View (UI elements) and the Model. Data Storage (Core Data or Realm) interacts with Business Logic in both the Controller and Model.

A diagram of a data flow

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**Architecture Plan**

* **Platforms and Technologies:**
* **Frontend Development:** iOS using Swift (Xcode).
* **Backend Development, Database**: JSON **f**or flexibility in handling varied data types.
* **Third-Party Libraries:**
* **Authentication:** Firebase Authentication for secure login.
* **Real-time Communication:** Socket.IO for live chat and notifications.
* **FAQ and Chat Functionality:** Twilio for integrated email and chat support.
* **Hosting Strategy and Requirements:**
* **Cloud Hosting:** AWS (Amazon Web Services) for scalability.

**Data Management Plan:**

The key data entities needed are:

* **Donor:** name, contact info, blood type, medical report
* **Patient:** name, contact info, blood type needed, medical report
* **Request:** blood type, quantity, urgency, status
* **Appointment:** date, time, location
* **Notification:** message, recipient
* **Inventory:** blood type, quantity, expiration, storage

A diagram of a software company

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**Prototype demos**

* **GUI mockups**
* In the iOS Blood Bank System, We have developed secure user login and registration pages, incorporating Firebase for efficient authentication. The admin section facilitates easy management.
* Donor’s benefit from a robust profile system, featuring management tools and an editing option. Additionally, the system allows donors to schedule appointments using location services, enhancing convenience.
* To enhance communication, users can set preferences for email and mobile number notifications, ensuring a seamless and user-friendly experience.

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**GUI – Admin, Registration and Login Pages**

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Description automatically generated**GUI - Donor home page, Services and Schedule button that uses our location**

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A map of the north america

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**GUI – Donor Profile Management & Communication Services**

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**What has been accomplished?**

* With features such as username/password fields, error handling to privacy laws, an iOS login page for a Blood Bank app ensures secure access to critical health data.
* The registration screen of the Blood Bank iOS app makes it easier for new users to join by gathering crucial personal and contact information, providing secure access.
* The front page of the Blood Bank iOS app prominently displays separate areas for Accepters and Donors, simplifying access to crucial blood donation services i.e., Scheduling appointments, profile management, communication preferences, etc.

**Spring 2024 plan:**  
  
**Patient Profiles**

* Allow patients to create profiles, manage their history, and receive notifications for blood drives or urgent donation needs and live chats and notifications along with providing FAQs.

**Real-time updates**

* Implement a feature to provide real-time updates on blood availability, ensuring accurate and up-to-date information for users.

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