-LIFE BLOOD ALLIANCE-ADVANCED PLANNING DOCUMENT

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LIFE BLOOD ALLIANCE - Agile Management Division

Table of Contents

Executive Summary

This report has been created to ensure Blood Life Alliance is staying on the front edge of technology in its given markets. Blood Life Alliance is an important part of every community in which it operates, providing to the needs of the medical community when it comes to Blood Plasma. This system, through our processes helps to improve the quality of life and is often lifesaving when tragedy strikes a community. Our team followed the agile methodology in the undertaking of this document as is the charter of our project management division.

Looking at the current processes and policies in place at our company was the first step to understanding the footing we are on and give us something to build upon reasonable expectations for our company moving forward. Our team personally interviewed each employee to create accurate "use cases" for all that employee's responsibilities and actions performed throughout their day. When all the employees were finished with and the use cases completed the team created a business process map to give the overlay of all the functions happening within the company.

With the "As is Assessment" completed we moved on to the next step of our groups process. This process happened in two phases; the first was individual interviews with each followed by a meeting of all together. The purpose for these two phases was to better understand the employees needs vs. what happens when group think happens when C-suite people are present. There must be a meld of ideas from department heads and the c-suite to ensure value will be created for the company when the system is in place.

We have come up with several options for those in charge to choose regarding the acquisition strategy in moving forward from our team's work. Like most things in life there are always trade-offs with different choices and we have focused on those specially to help our company understand what way forward is most reasonable to expectations and most cost efficient with the resources that will be allocated to fund this transformation for our company. The three options are as follows; In-House, COTS, or Mixed Bag.

In conclusion we recommend the mixed bag for making this system a reality. This will give us the ability to maintain control and direction of the project. It will give our end users the ability to help in the design and interfaces with which they will be working with. This buy-in will allow us to not need change-management specialist from outside. We can then spend the bulk of money on consultants that have subject matter expertise in this type of undertaking prior. When the new system is completed, we will run it as a pilot program across our own blood banks. Once the system has been introduced and proven successful in five of our blood banks, we will then move to a go-live in the rest of our organization. As we sell this service to our customers, they will be brought online into the system in same manor.

As Is Assessment

With our 'As-Is' system, we discovered that our existing system has a few limitations.

✓ In our current system, the blood acquisition process timing is often inefficient in meeting the needs of emergency patients. There is a considerable amount of time lag between the placement of a blood request by the hospital and the actual blood delivery, there is a high need for this time to be minimized.

✓ In addition, our inability to transmit blood units between blood banks has led to expiration of shelved blood units, resulting in loss of revenue obtained from hospital orders.

✓ There is also an inability to generate new streams of revenue in our current system due to the domain in which we operate.

We plan to eliminate these business problems through the introduction of our proposed system.

To Be Assessment

This "To Be Assessment" helps lay the foundation of what is wanted and needed to ensure our company stays competitive and profitable in the future.

✓ To address the inefficiency in the blood acquisition process we plan to implement an end-user input screen that allows the Hospital to enter in requests instead of the Blood Bank. In the current system the hospital had to call the Blood Bank, and the nurse had to take the required information and put in a request.

✓ To prevent the expiration of shelved blood units, upon the donation a every blood unit, the unit is given a specific identification number which is tied with details such as data of donation, expiration date, etc. So, the system keeps track of which blood units to deliver first when compared to others.

✓ To generate new streams of revenue we plan on creating a database to aggregate data from external sources, which will allow us to connect the existing system to other Blood Banks and hospitals. With this feature we can charge a monthly access fee to the hospitals that access our data to make blood requests. We can also charge a service to other blood banks that have received orders through our system.

System Assumptions

- ✓ A donor must be registered with the blood bank to donate blood.

- ✓ Before the donor donates blood, the nurse checks the donor's age, weight, height, and BMI index.

- ✓ A blood unit is checked for its usefulness prior to it being assigned a unique identification number and bar code.

- ✓ The hospital making the request can only see the blood types that are available, this fasten the request process by not allowing the hospital to select a blood type that the blood bank currently doesn't have.

- ✓ Once the blood types are selected, only the available quantities that are present in the blood bank for those specific blood types are displayed.

- ✓ All three actors can check for blood availability in the system, regardless of if they are registered or not.

- ✓ The blood request can be only made by the hospital and not the donor.

- ✓ The blood request involves both availability check and payment.

- ✓ The reports generated by the system can only be viewed by the blood bank but not the hospitals.

- ✓ Donor information is kept confidential and not shared with other donors or the hospital to which the specific donor's blood is sent to.

Use Cases

Use Case Name: Blood Donation		ID: 1	Priority: 1
Actor: Donor			
Description: Donor comes to the blood bank to donate blood.			
Trigger: Donor decided to donate blood. **Type:** External			

Preconditions:
    1. Donor must be registered.
    2. Donor must fulfill minimal BMI.
    3. Donor must meet the minimum age requirements.			

Normal Course:
    1. Donor is given a form to fill out with some mandatory information.
    2. Form is checked by registered nurse.
    3. Form verified. (Alternative Course 1)
    4. Donor information is entered into the system.
    5. Donor is assigned a unique identification number.
    6. Blood is donated.
		Information for Steps:
		    1. Name, Age, Gender, Phone Number, Medical history.
		
		    4. Information in the form is entered into the system.
		    5. Unique donor ID.	

Alternative Course:
    1. Form not verified.
        1.1 Donor is notified.
        1.2 Form discarded.			

Postconditions:
    1. Blood can be sent for usability testing.
    2. Donor information gets updated in the Blood Bank's database.			

Exceptions:
    1. Donor faints during blood donation.
    2. Donor is treated.			

Summary Inputs	**Source**	**Outputs**	**Destination**
Form Information	Customer	Information Entered	Database

Use Case Name: Blood Usefulness Check	**ID:** 2	**Priority:** 1
Actor: Blood Bank		
Description: Once the blood is donated by the donor, it is checked and verified before storing and being available to hospitals.		
Trigger: Blood is donated by donor. **Type:** External		
Preconditions: Blood is donated by donor. Minimum amount of blood must be donated.		

Normal Course:	**Information for Steps:**
7. Blood is collected by the registered nurse. 8. Blood is taken to the lab. 9. Blood is tested for usability. 10. Blood is verified. (Alternative Course 1) 11. The blood type is identified. 12. The blood pint is assigned a unique blood ID. 13. Blood details are entered into the system.	

Alternative Course:
2. Blood not verified.
    2.1   Discard blood.
    2.2 Notify patient	

Postconditions:
3. Blood Bank's database is updated with the new blood pint information.
4. The new blood is available to the hospitals to request.

Exceptions:
1. Donor is identified to have a rare disease.

Summary Inputs	**Source**	**Outputs**	**Destination**
Blood Units	Nurse	Blood Information	Database

Use Case Name: Blood Request		ID: 3	Priority: High
Actor: Hospital			
Description: When there is a requirement of blood in the hospital, it makes the request for blood to the blood bank. The blood bank fulfills the request as per blood availability.			
Trigger: Need for blood in the hospital			
Type: External			
Preconditions: 1. Hospital should have access to Blood Bank's webpage. 2. It should have registered account in the Blood Bank's webpage. 3. There should be someone to handle the online blood request in the blood bank 24/7.			

Normal Course:	Information for Steps:
1. The blood bank logs into the webpage. 2. He clicks on 'Request Blood' tab found on the navigation bar. 3. The user is redirected to the blood request application form. 4. The user selects blood type. 5. The system displays the available quantity of specified blood type. (Alternative course 1) 6. The user enters blood quantity required referring to the available quantity. 7. The user chooses an urgency level from the dropdown list. 8. The system displays the estimated time of delivery. 9. The user confirms the order. 10. Invoice is generated.	1. Username and Password. 4. Blood type. 6. Blood quantity. 7. Urgency level (High, Medium, Low)

Alternative Course:
 1. Availability check
    1.1 Blood is not available.
 	
    1.2a The user enters another blood type.
    1.2b The user exits.	

Postconditions: 1. The blood bank's database gets updated.   2. Order is generated in the blood bank.   3. Request is submitted to the blood bank.

Exceptions:

Summary Inputs	Source	Outputs	Destination
Username/Password	Hospital	Invoice	Hospital

Use Case Name: Order Fulfillment	**ID:** 4	**Priority:** 1
Actor: Blood Bank		

Description: Once the blood request is received by the blood bank, the blood is delivered to the hospital.

Trigger: Blood request received by blood bank.
Type: External

Preconditions: Blood request received by blood bank.
        Valid invoice generated and paid.
        Valid delivery address.
        Transport available.

Normal Course:	**Information for Steps:**
1. The blood type and quantity in the blood order is matched with the respective blood IDs. 2. Verification of blood quantity and blood type with label on blood bag. 3. Package blood. 4. Ship blood. 5. Send notification to the hospital of blood shipment	
Alternative Course:	

Postconditions:
    5. The requested blood is received by the blood bank.

Exceptions:
    1. Truck breaks down**.**

Summary Inputs	**Source**	**Outputs**	**Destination**
Order Details	Database	Order Shipped	Database

UML Diagrams

Use Case Diagram

✓ The Bank Management System contains use cases that allow the user, hospital, and the blood bank to access information regarding registration, blood requests and blood request fulfillment respectively.

✓ Our system consists of three actors namely: the donor, the nurse and the hospital.

✓ The donor has the option to either register online or at a kiosk present in the blood bank premises before the actual blood donation. The online registration process includes registration help service in case the user has queries during the registration process.

✓ Once the user registers, they can login and check their personal details along with the number of times that they have donated blood, their blood type, appointment details, etc. It is made mandate that the donor registers before donating blood.

✓ Once the blood is donated, the nurse check is the blood is useful, if the blood is useful, it gets stored and if given a unique identification number along with a bar code. In case it is not useful, the blood unit gets discarded.

✓ The blood that is stored can now be requested by the hospital.

✓ Once a request is put in, the nurse receives a request notification on the system displaying the details of the request along with the hospital's details and priority of the request.

✓ Now all the nurse has to do is pack the required blood units keeping in mind the quantities specified in the request and ship them to the respective hospital.

✓ The blood units are scanned before they are shipped, this process updated the blood unit details in the database.

✓ Once the blood units are shipped and received by the hospital, the order is fulfilled.
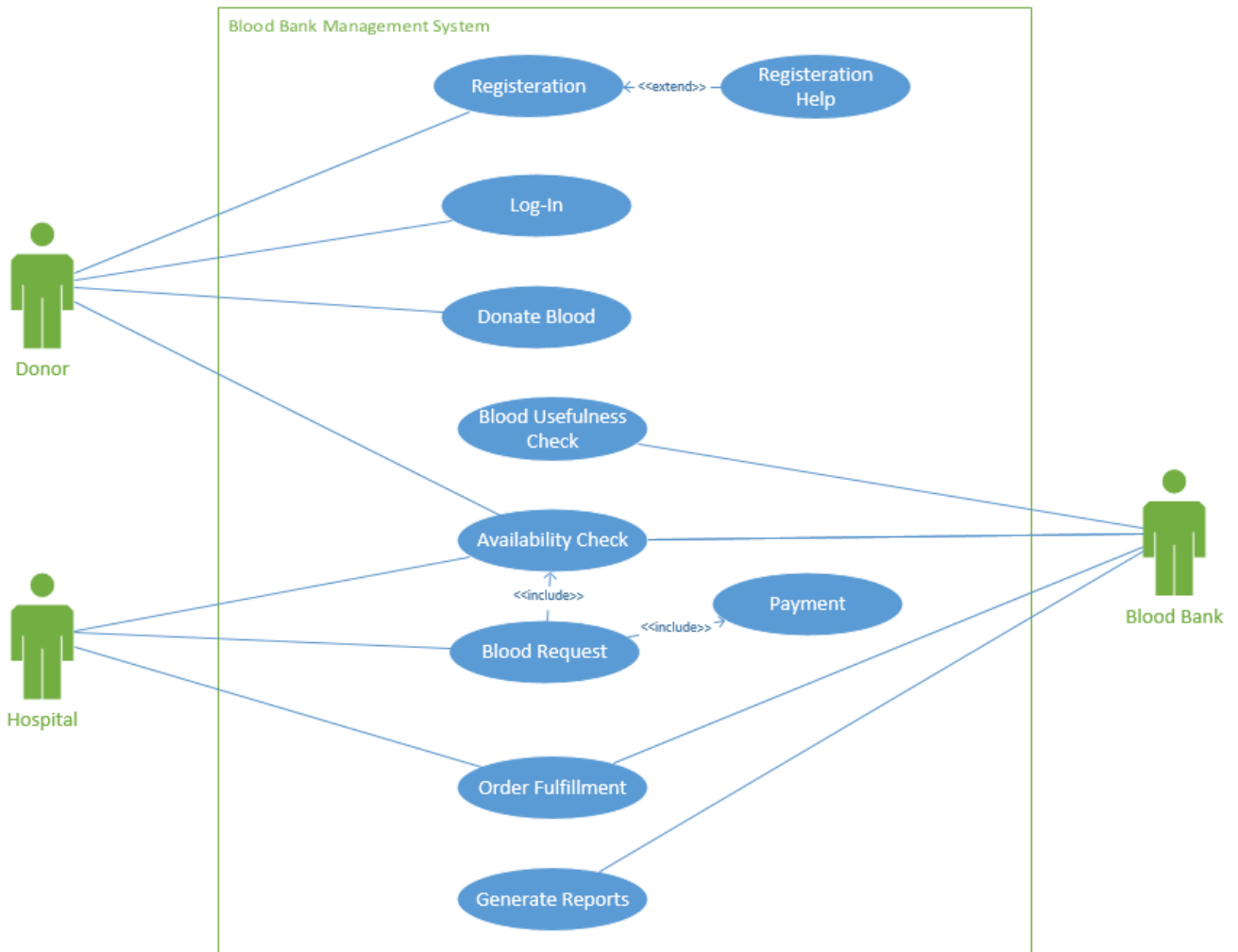
Class Diagram

We have six classes in our class diagram which are explained below. Each class has its own attributes and operations that help define its characteristics and function that is can perform.

I.   Donor:
     Donors are identified based on a unique Donor ID that they are assigned upon registration They also have personal information such as e-mail and a contact number for the blood bank to get in touch with them. A donor can donate blood to our blood bank and they can check the blood availability by logging onto our website.

II.   Blood:
This class is used to represent the individual pints of blood a donor donates. Each pint has its own unique ID that it is associated with in the system. It also has an expiration date as the attribute. The operations that this class performs are blood verification, blood donated, transferred and expiration.

III. Hospital:
We have Location and License Number as attributes of this class. Hospitals are our customers and we identify them based on these attributes. Operations that this class performs are request blood and make payment.

IV.   Nurse:
This class has Nurse ID and Nurse Name as attributes. A nurse can perform operations such as are verifying blood, checking availability, storing blood, etc.
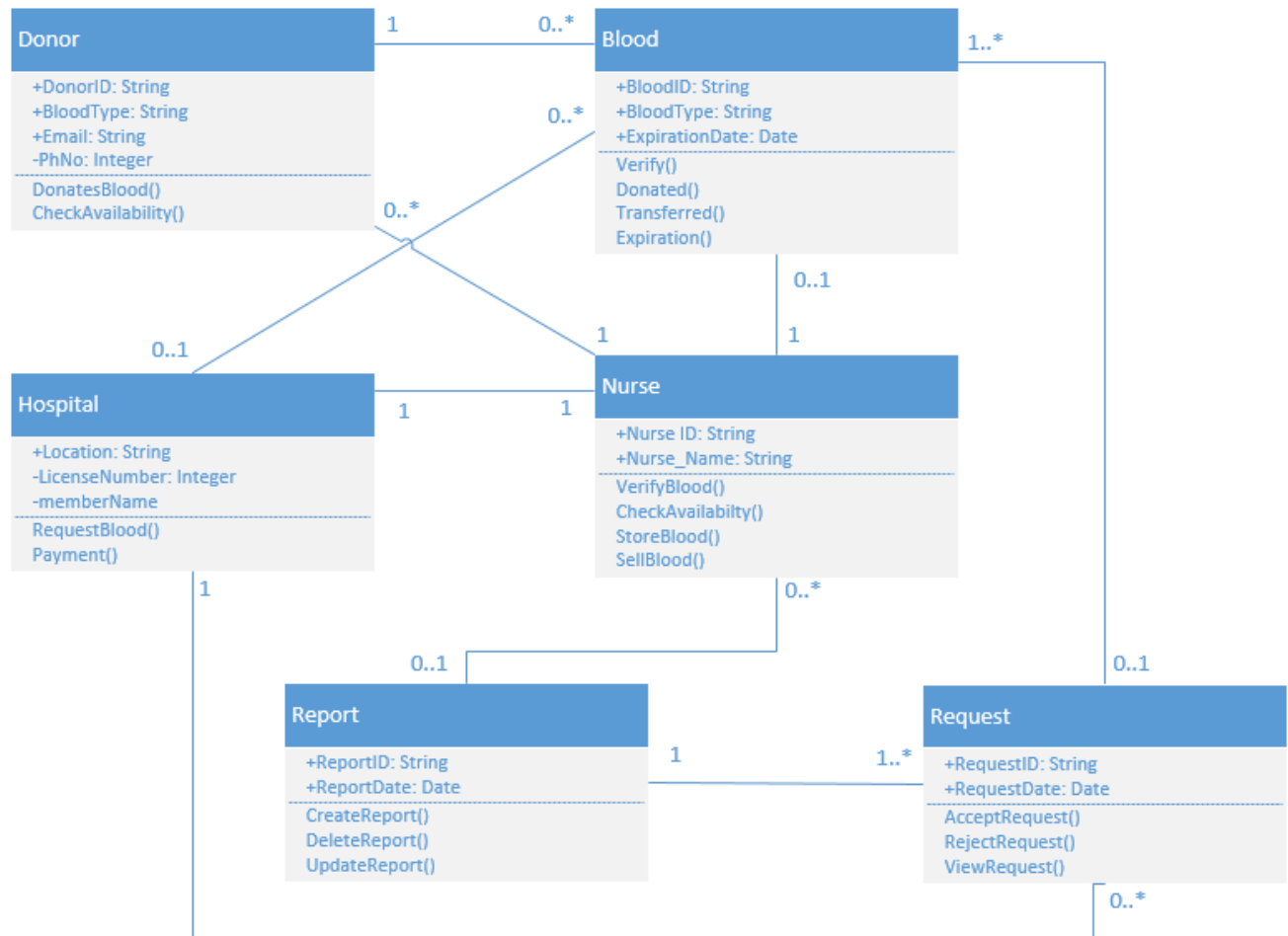
V.   Report:
Reports are generated in the system to keep track of data. A report has its own unique Report ID and Report Date as its attributes. A report can be created, deleted and updated.

Class Relationships:

✓ A donor can donate blood multiple times, or they can just create an account but not donate the blood, whereas one blood unit can belong to only one donor.

✓ One blood pint with a unique Blood ID can be supplied to only one hospital but a hospital can have zero or many blood units.

✓ A nurse handles multiple donors at a time, but a donor can only be addressed by one nurse for blood collection.

✓ A nurse can verify zero or no blood units at a single point of time, and a blood unit can be handled by zero or one nurse at time.

✓ Requests can be made for zero or multiple blood units, but one blood unit can belong to either no request or only one request.

✓ A single request can only belong to one report, but a report can contain only one or multiple request information.

✓ A hospital can make multiple or no blood request, but a request can be associated with only one hospital.

✓ A nurse can create zero or one report at a time, similarly a report can be viewed by zero or many nurses at a time.

✓ Hospital makes request for blood to only one nurse at a time, similarly one nurse can interact with only one hospital at a time.

Donor

+DonorID: String
+BloodType: String
+Email: String
-PhNo: Integer

DonatesBlood()
CheckAvailability()

Blood

1 — 0..*

+BloodID: String
+BloodType: String
+ExpirationDate: Date

Verify()
Donated()
Transferred()
Expiration()

0..*

1..*

0..1

Hospital

0..1

+Location: String
-LicenseNumber: Integer
-memberName

RequestBlood()
Payment()

1 — 1

Nurse

1   1

+Nurse ID: String
+Nurse_Name: String

VerifyBlood()
CheckAvailabilty()
StoreBlood()
SellBlood()

0..*

1

0..1

Report

+ReportID: String
+ReportDate: Date

CreateReport()
DeleteReport()
UpdateReport()

1   1..*

Request

0..1

+RequestID: String
+RequestDate: Date

AcceptRequest()
RejectRequest()
ViewRequest()

0..*

Sequence Diagram

The sequence diagram articulates that process involved in a donor donating blood. It is for the 'donate blood' use case. It is a pre-requisite that the donor is registered with the system prior to the actual blood donation. The donor fills out the form and submits it to the nurse. This form includes latest information that might have changed from the day of registration. The nurse reviews the information and verifies it, once all the information entered is valid the donor can donate blood. Meanwhile, the information is entered into the system and the database is updated.

Sequence Diagram for Donating Blood
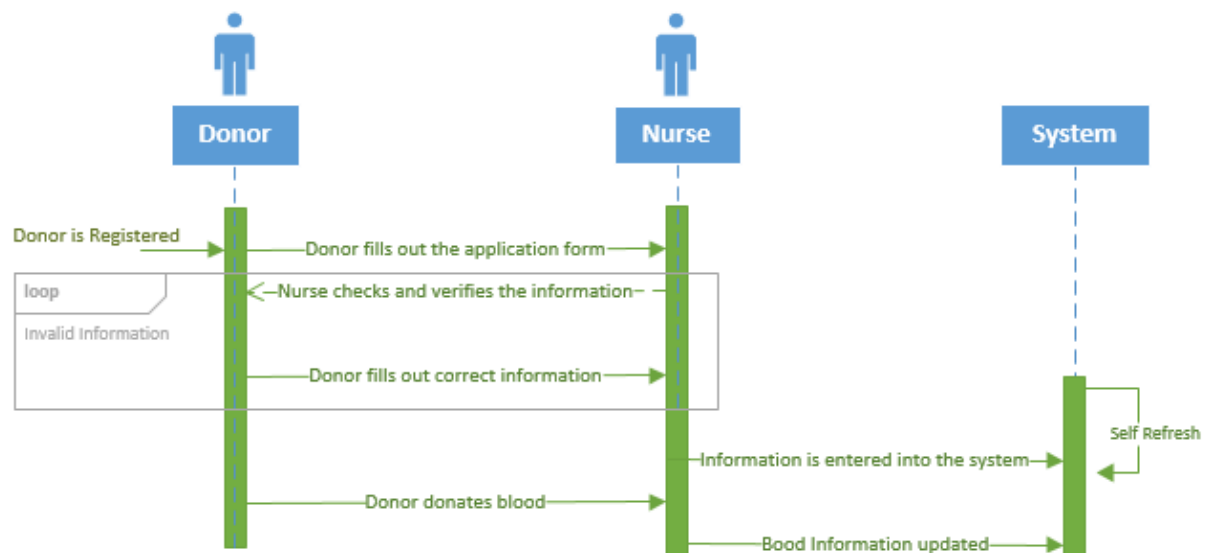
State Machine Diagram

The state machine diagram shows various states that the blood unit goes through in our system. Initially, when the donor decides to donate blood, the blood unit is in the donated state. Once the blood unit is donated, it is tested for purity/usefulness, only if the test is successful the blood gets stored or else it gets discarded. Once the blood is in a stored state, a hospital will be able to request for it, upon a request, the nurse updates the blood unit data in the database. Once the request is accepted, the nurse searches for the blood followed by packing and shipping it to the respective hospital address. Once the blood is shipped, it is received by the hospital and this is the last stage that a blood unit participates in, in the system.

State Machine Diagram for Blood

Donor donates blood

Blood Donated

Idle

Nurse checks purity of blood

Blood Discarded ←Test un-successful— **Blood Tested**

Test successful

Blood Stored

self refresh

Blood Data ←Info updated— **Blood Requested**

Hospital requests blood

Nurse looks for the specific units in the request

Search Blood

Nurse packs the requested blood units

Blood Packed

Packed blood is sent to hospital

Future request

Blood Shipped

Blood is sent to hospital

Blood Received

User Interface

While designing our user interface screens we kept in mind the design principle that had to be followed, such as consistency, aesthetics, user experience and ease of use. Below is the UI of different front-end screens of our system.

Homepage

The homepage of our website includes the basic information about our service. The donor has an option to enter their zip-code to know if there is an area around them that supports a blood donation service. They can also create an account and make an appointment to donate blood. Users can log in to make the request for blood. They can also check for blood availability.
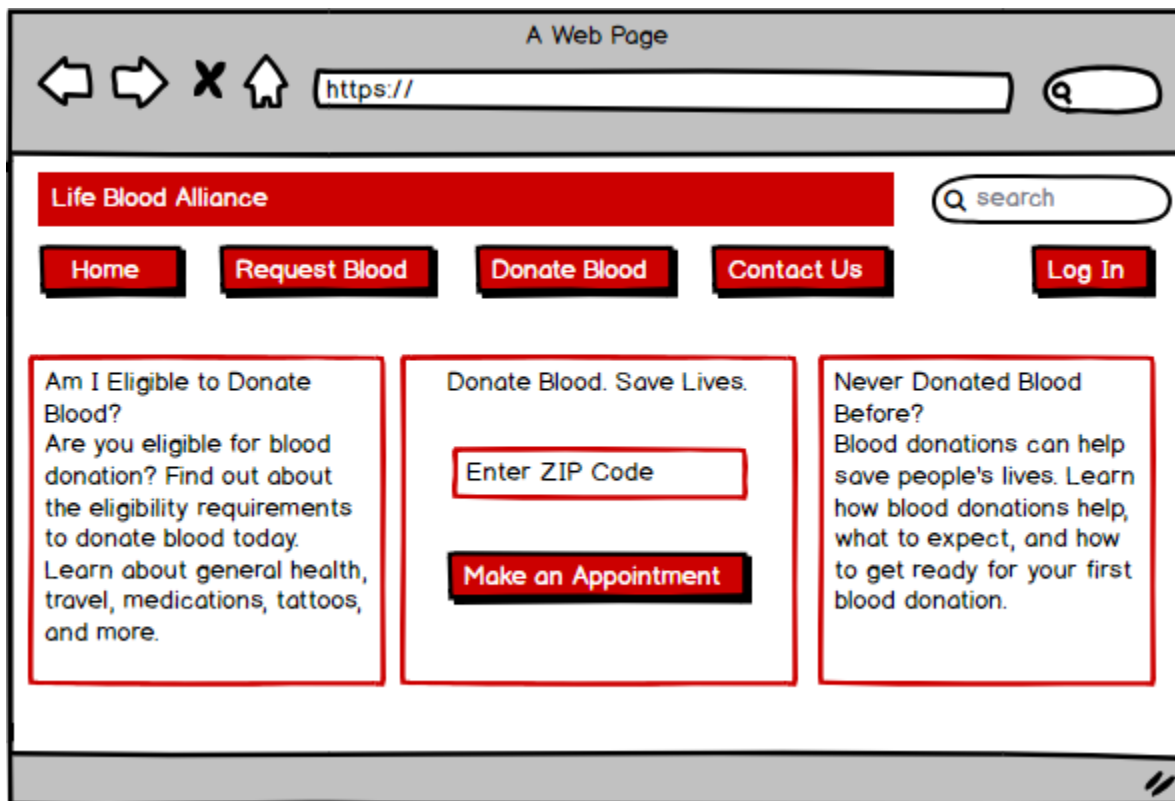
Registeration Page

This is our registration webpage. Users must create an account to make blood request. They must enter their email address and password to create an account. Also, we provide an option for users to create an account online and make an appointment for blood donation. They don't have to fill out the form coming to the blood bank and wait for their turn.

Blood Request Screen

This is the Blood Request webpage. To make a blood request, hospitals must click on the request blood tab, which will redirect them to the blood request application form. Here, they can fill out the type of blood they need and the quantity they require. They can make an order for multiple blood types at a time. The Blood Bank handles the request based on urgency level that is specified in the request.

Request Notice Screen

It contains the same information that is displayed on the interface that the hospital sees when entering a blood request. This screen helps the nurse in fulfilling the request, by providing information such as the name of the hospital, its address, the priority of the request and the blood types and quantities that are needs. The nurse can either go ahead and accept the request or reject the request, and in case the nurse has any additional queries the contact hospital button can be clicked, which further redirects the nurse to a new page containing details of the respective hospital.

System Acquisition Strategy

With the "As Is" and the "To Be" completed and in hand our team has set about to create a road map on how to get there. We used the "Gap Analysis" as the process to help make this happen. We have come up with several options for those in charge to choose regarding the acquisition strategy in moving forward from our team's work. Like most things in life there are always trade-offs with different choices and we have focused on those specially to help our company understand what way forward is most reasonable to expectations and most cost efficient with the resources that will be allocated to fund this transformation for our company.

The first option that we came up with is Custom Development. We can build our system in house. This way, the confidentiality is maintained, and it helps to develop technical expertise of the company. The next option that we can consider is Packaged System. Here we buy the system available in the market, developed for meeting the common business needs and installed in the company. The last option that we can consider is Mixed Bag. It is the mix of both Custom Application and Outsourcing. In Mixed bag, we hire the vendor to build the system in house. It helps the company to maintain confidentiality. The employees within the company who are the actual users of the new to be system, will be involved in the development of the system. This will increase the user acceptance of the system. We provide them with system specification and vendor will build the system accordingly. That way, we won't have to worry about the resources and technical expertise required to build the system.

We, as a team recommend the company to use Mixed Bag. Mixed bag will allow the company to develop the system in house and meet the business need. We will provide the system requirements to the vendor. Based on that vendor will develop the system and will be implemented in our blood bank. Since, the system is built in house, it will develop the company's technical expertise and there will be clear communication between us, blood bank and the vendor.

Test Plan

Program ID: 1000   **Version Number:** 101
Tester: Team   **Date Designed:** 11/01/2018   **Date Conducted:** 11/07/2018
Results: Passed

Test ID: 121   **Requirement Addressed:** Functionality
Objective: Detection of system error and fixation of issue if any.

Test Cases:

Interface ID	Data Field	Value Entered
1. LBA - 001	Email and Password in the login page.	xyz@gmail.com, 54321
2. LBA - 002	Blood Type selected from dropdown list.	0+, B+, AB-
3. LBA - 003	Blood Quantity entered as per availability.	1, 2, 3, 4
4. LBA - 004	Priority is chosen from Radio Button List.	Low, Medium, High

Expected Result:
Users are logged in successfully.
Request for blood is made successfully.

Actual Results:
Passed

System Conversion Strategy

To deploy the system, we recommend using the parallel style. Currently, the system we have is a manual system. The donors must come to the blood bank and fill out the form to donate blood. Similarly, customers must make a call to the blood bank to make blood request. The nurse takes the call, accepts the request and let the people in the respective department know about the blood request. Then the blood availability is checked. As per blood availability, the blood requests are handled. Currently everything we are doing is manual. But the system we are proposing is online.

So, we are recommending the parallel style for system deployment. In this style, both old system and new system run parallel. Since, the new system is completely different from the existing one, it will be difficult for employees to adopt to the new one at once. It is a gradual process. We will need certain time to make users familiar with the system. We will have to train them and make them proficient so that the they can use the new system in the efficient and effective manner and we can get the maximum benefit out of it.

Also, we don't have to replace the whole system. Both the systems run parallel to each other. That way we will always be on the safest side. Even if the new system does not work, we can always go back to the old system. That way our blood bank's operation will not get affected. Once the new system meets our requirements and we are fully confident about it, we can replace the old one.

Conclusion

With our advancements in the new system we believe that Life Blood Alliance would be able to better serve our customers by being able to reach out to more hospitals and blood banks than ever before. We target to improve the overall system efficiency by providing our end-users with a fault free system supported with reliable uptime. This will not only help our customers but will improve the way that our employees deal with the system as well. On a long run we vision to deliver blood to patients wherever and whenever they may need it.