

CHITKARA
UNIVERSITY



Batch- 2020

Department: Computer Science & Engineering

Project Title:

BloodLink

Topic: An Online Blood Bank

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Group: G-23

Subject: Back-end Engineering [CS187]

Introduction

- **Purpose of the project:** The Online Blood Bank project aims to create a platform for managing and tracking blood donations, connecting donors with recipients, creating & managing blood donation camps and providing real-time information on blood shortages and needs.
- **Objectives:** The primary objectives of the project are to increase the efficiency and accessibility of the blood donation process, improve the matching of donors and recipients, and provide real-time information on blood shortages and needs with a clean UI and experience.
- **Scope of the project:** The scope of the project includes the development of a web-based platform for managing and tracking blood donations, connecting donors with recipients, and providing real-time information on blood shortages and needs. The platform will include both a user-facing interface and an blood bank's interface for managing the data.

Project Description

- BloodLink will work as a platform for users to register as blood to either request/donate blood and blood banks to manage their stocks by managing the pending donations and request along with scheduling blood camps and managing them. The system will authenticate the user/bank using their username(mobile) and password to further perform other actions.
- The milestones for the project include completing the database design, completing the user interface design, completing the back-end functionality, and completing testing.

➤ Project structure & Architecture:

Frontend

```

▼ BLOODLINK
  > public
  ▼ src
    > assets
    ▼ Components
      > Auth
      > Bank
      > context
      ▼ Main
        JS About.js
        JS AboutDonation.js
        JS Banks.js
        JS Camps.js
        JS Contact.js
        JS Home.js
        JS Navbar.js
      > User
      > Util
        JS Api.js
      App.css
      JS App.js
      index.css
      JS index.js
      .env
      .gitignore
      package-lock.json
      package.json
      postcss.config.js
      README.md
      tailwind.config.js

```

Backend

```

▼ SERVER
  ▼ middleware
    JS auth.js
  ▼ models
    JS models.js
  > node_modules
  ▼ routers
    JS authRouter.js
    JS bankRouter.js
    JS campRouter.js
    JS userRouter.js
  .env
  JS app.js
  package-lock.json
  package.json

```

- **Home:**

The home page of the website displays the navbar with position fixed at the top of the webpage with options available for the user to navigate across other pages with option available to switch between dark and light theme.



- **About, Contact, About Blood Donation, Blood Bank Directory & Blood Donation Camps:**

These are the options in the submenu of the navbar for user to know about us, the system, the process of blood donation and to get access to the list of the blood donation camps scheduled by different blood banks that can be filtered by either state, district and the date scheduled. The Blood Bank Directory option lets the user to see the list of all the blood banks registered and the details on the system.



[About Us](#)
[Looking For Blood](#)
[Want To Donate Blood](#)
[Blood Bank Login](#)

State: Haryana
District: Charkhedi District
Date: 15-02-2023

Date	Camp Name	Address	Contact	Conducted By	Organized By	Time
2/15/2023	Chitar Fir	Charkhedi District	712382718	Sankalp India Foundation	Varinder Sharma	07:00-19:00

[About Us](#)
[Looking For Blood](#)
[Want To Donate Blood](#)
[Blood Bank Login](#)

State: Maharashtra
District: Mumbai City
Date: 04-04-2023

Date	Camp Name	Address	State	Conducted By	Organized By	Time
4/17/2023	Elon Ship	parvel	Maharashtra	Sankalp India Foundation	Jeff Bezos	10:00-21:00

[About Us](#)
[Looking For Blood](#)
[Want To Donate Blood](#)
[Blood Bank Login](#)

State: Haryana
District: Gurgaon

[Patient Login/Register](#)
[Blood Bank Directory](#)

Capital	Category	State	District	Address	Contact	Website	Email
Capital	Red Cross	Haryana	Gurgaon	DLF City - II, Opposite Westin Hotel M G Road, Gurgaon	5642	yoyo.com	5642@gmail.com
Capital	Govt.	Haryana	Gurgaon	832	832		832@gmail.com

localhost:3000/bloodDirect

• Patient/Donor Registration & Login:

Either donor or the one who is requesting for blood can register as a user using the Donor or Patient SignUp/Login page available by entering all the essential details like Name, Age, Gender, Blood Group, Email, Mobile, Password & Address Details.

[About Us](#)
[Looking For Blood](#)
[Want To Donate Blood](#)
[Blood Bank Login](#)

[Patient Login/Register](#)
[Blood Bank Directory](#)

Patient Sign Up

User Details

Name:
Age:

Gender:
Blood Group:

Email:

Mobile:
Password:

State:
District:

Address:

[About Us](#)
[Looking For Blood](#)
[Want To Donate Blood](#)
[Blood Bank Login](#)

[Donor Login/Register](#)
[Blood Donation Camps](#)
[About Blood Donation](#)

Donor Log In

Username:

Password:

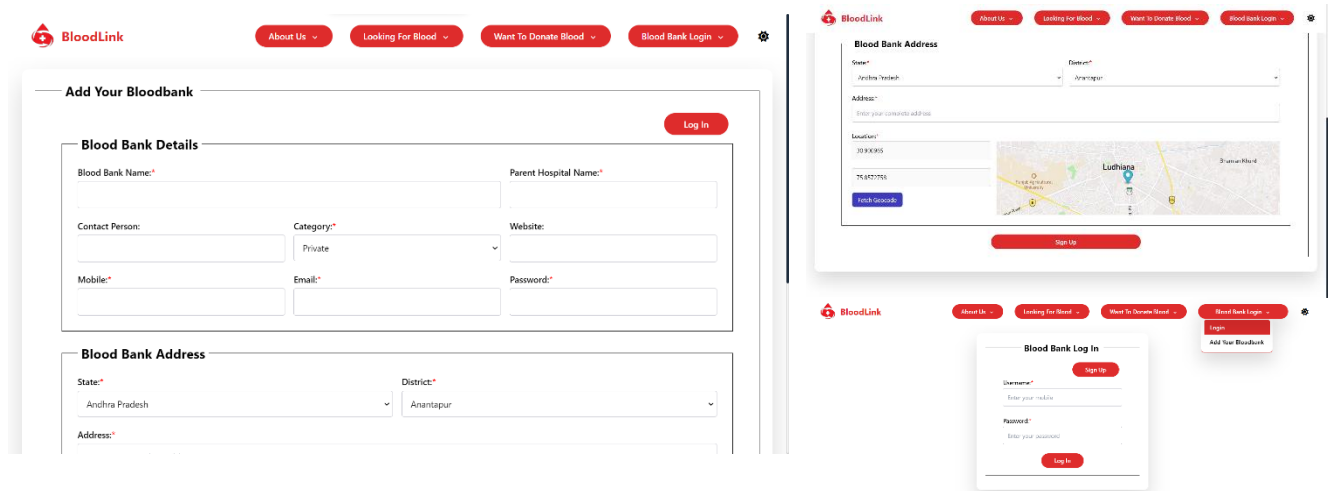
localhost:3000/registerPatient

localhost:3000/registerDonor

- **Blood Bank Registration & Login:-**

New Blood Banks can register on the portal using `Add your Bloodbank` option available under `Blood Bank Login` in Navbar and the already registered can login using `Login` available under the same.

Blood Banks can register by entering the essential info including BloodBank Name, Parent Hospital Name, Contact Person, Category, Website, Mobile, Email, Password & Address details. Here, the address will include the state, district and complete address including the geographic location co-ordinates of the bank which can be fetched at that time using `Fetch Geocode` option available.



- **Authentication:**

- The authentication of the users during registration and logging in has been done using JWTs (Json Web Tokens), a JWT will be signed everytime any user/bank registers or logs into the website which will be stored as the cookie in the user's browser with a max expiration age scheduled after which user will need to log in again.
- This JWT token will be a random string of characters which will get verified at the backend and authenticate the user. To check the authenticity of the user logged in, a request will be sent to the backend using a api route which will return a Boolean value after verifying the JWT token of the user basis on which the logged in bank/user will be able to access all services.

- **Security:**

- For security purpose, the password saved at the server will be a encrypted hash value generated after the user's registration which will neither be known to database administrators nor the system managers and the backend. The

middle-ware will match the hash value of the entered password by user on logging in with the hash value stored in the database to authenticate the user.

- Further, complete authentication has been done on the system with securing all routes which shouldn't be accessible to the user who is not logged in.

User Side

➤ Main:

- The user logged in will have an access to different options for editing his/her profile, donate blood, request for blood, see donation/requests history and to register for a blood donation camp.
- The navbar will be changed for the logged-in user for navigating to the about, contact us, my profile page and to logout.

The image shows two versions of the BloodLink user profile page. The left version is the 'Edit Profile' form, and the right version is the 'Cancel' and 'Save' buttons.

Left Screenshot (Edit Profile):

- Navbar: About Us, Log Out
- Left Sidebar: My Profile, Donate Blood, Donation History, Blood Donation Camps, Blood Request, Request History
- Form Fields: Name (Ujjwal), Age (19), Gender (Male), Blood Group (O+), Mobile (456), Password, Email (Enter your email), State (Haryana), District (Charkhi Dabri), Address (cld)
- Buttons: Edit

Right Screenshot (Cancel/Save):

- Navbar: About Us, Log Out
- Left Sidebar: My Profile, Donate Blood, Donation History, Blood Donation Camps, Blood Request, Request History
- Form Fields: Name (Ujjwal), Age (19), Gender (Male), Blood Group (O+), Mobile (456), Password, Email (ujjwal2024@gmail.com), State (Haryana), District (Charkhi Dabri), Address (cld)
- Buttons: Cancel, Save

➤ Donate Blood:

- The logged-in user can donate blood by entering the units they want to donate and any disease if they have and can choose blood bank by state and district where they want to donate. Name & age will get auto-filled as per the details of the current logged-in user.

The image shows the BloodLink 'Donate Blood' form. The form includes fields for Name, Units (in mL), State, and a dropdown for District. A table shows the selected blood bank and hospital. The 'Submit' button is at the bottom.

Form Fields:

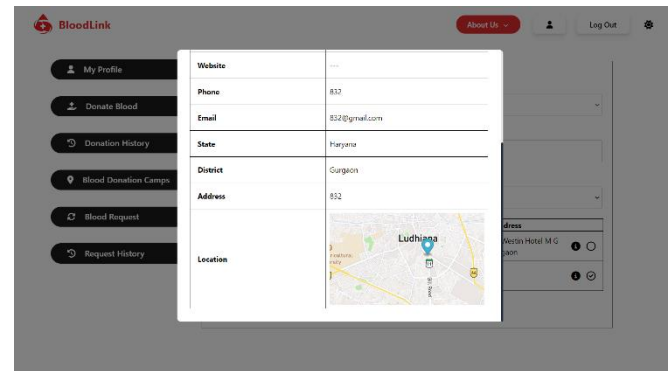
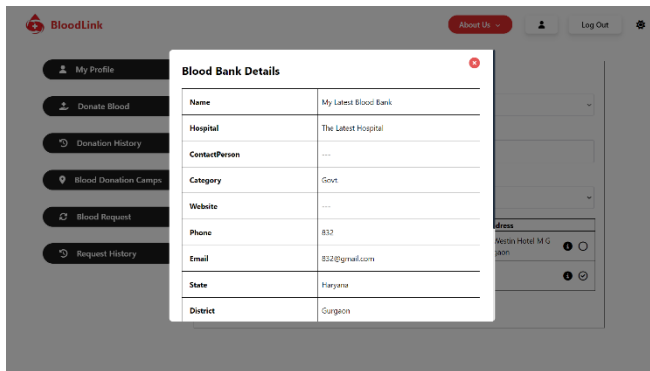
- Name: Ujjwal
- Units (in mL): 0
- State: Haryana
- District: Gurgaon

Table:

Blood Bank	Parent Hospital	Category	Address
Sankalp India Foundation	A&I Hospital	Red Cross	DLF City - II, Opposite Westin Hotel M G Road, Gurgaon
My Latest Blood Bank	The Latest Hospital	Govt.	832

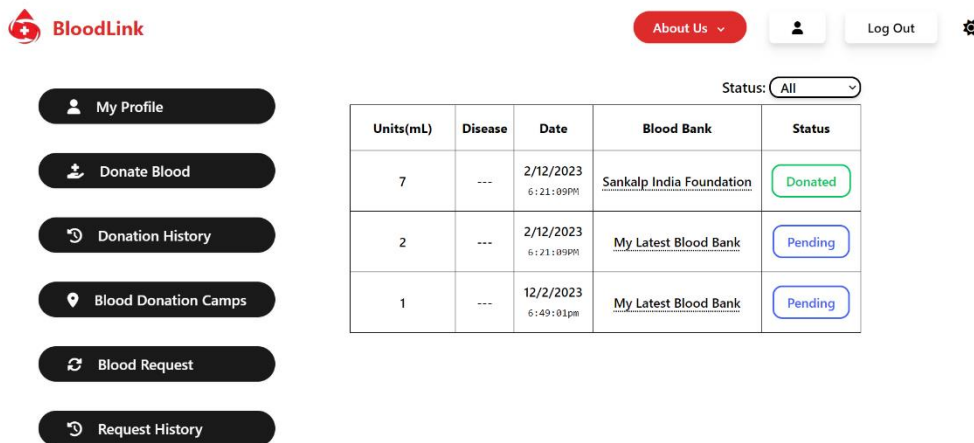
Buttons: Submit

- There will be an extra option also available for the user to see the complete details of the blood bank.

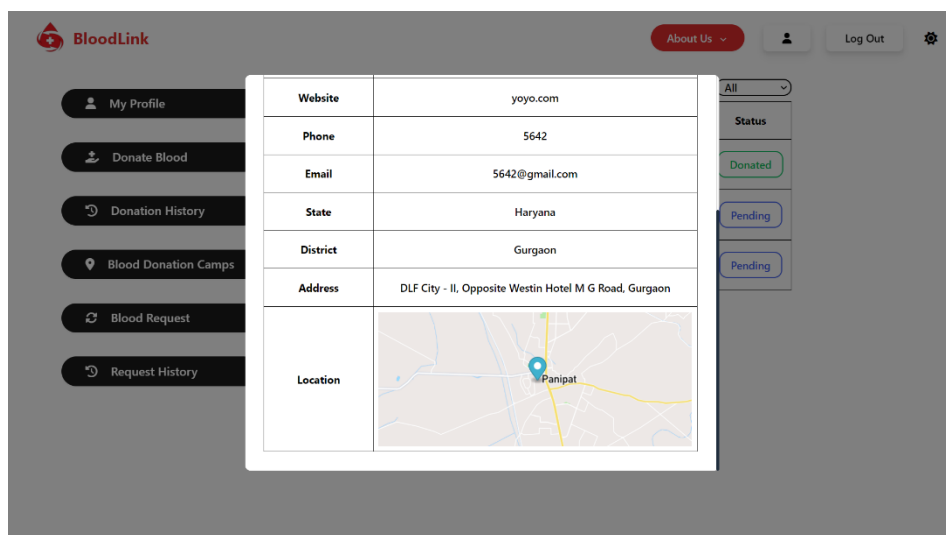


➤ Donation History:

- The user will have an access to see his past donation history and their status (Pending/Approved/Donated/Denied)



- The user can click on the bank name to see the complete bank details also.



➤ Blood Donation Camps:

- User can register for the blood donation camps scheduled by different blood banks and can also filter them by the state & district.

BloodLink About Us Log Out

State: Haryana

District: Charkhi Dadri

District	Organizer	Contact	Time
Charkhi Dadri	Vaibhav Sharma	712382718	07:00-19:00

Register

➤ Blood Request:

- Users can request blood either for himself or any other person, if he will be requesting blood for himself, the name, age, blood group & gender values will get auto-filled accordingly and the users will need to enter the units required, reason and selecting the bank by filtering them all by state and districts.
- The user can see the complete bank details using the 'i' button again same as on the donate blood panel.

BloodLink About Us Log Out

Make Blood Request ☐ For me

Patient Name: Enter your full name

Blood Group: A+

Age: 0

Gender: Male

Units (in mL): 0

Reason:

State: Puducherry (UT)

District: Karaikal

Blood Bank	Parent Hospital
Siri Donations	Siri Quinz

Submit

➤ Request History:

- The user will have an access to see his past requests history and their status (Pending/Approved/Completed /Denied)
- The option to see the complete details of the bank by click on bank will be available here also.

The screenshot shows the BloodLink application interface. On the left is a sidebar with navigation buttons: My Profile, Donate Blood, Donation History, Blood Donation Camps, Blood Request, and Request History. The main area displays a table of request history. A status dropdown menu is open, showing options: All, Pending, Approved, Denied, and Completed. The table has columns: Units(mL), Reason, Date, Blood Bank, and Status. The first row shows a request for 1 unit with a reason of '---' and status 'Completed'. The second row shows a request for 70 units with a reason of 'Runtime Error' and status 'Pending'. The third row shows a request for 2 units with a reason of 'Something' and status 'Completed'. The fourth row shows a request for 100 units with a reason of '---' and status 'Pending'.

Units(mL)	Reason	Date	Blood Bank	Status
1	---	2/12/2023 6:21:09PM	My Latest Blood Bank	Completed
70	Runtime Error	2/12/2023 6:21:09PM	Sankalp India Foundation	Pending
2	Something	12/2/2023 11:34:58pm	Sankalp India Foundation	Completed
100	---	13/2/2023 1:52:54am	Sankalp India Foundation	Pending

Blood Bank Side

➤ Main:

- The blood-bank logged in will have an access to different options for its profile, see blood stock, donations, requests, blood donation camps and can register a new blood donation camp.
- The navbar will be changed for the logged-in bank for navigating to the about, contact us, my profile page and to logout.

The screenshot shows the BloodLink application interface for a logged-in blood bank. The sidebar on the left has buttons: Bank Profile, Blood Stock, Donations, Requests, Blood Donation Camps, and Register new Camp. The main area is a form for editing the bank's profile. The form includes fields for Blood Bank Name, Parent Hospital Name, Contact Person, Category, Mobile, Password, Email, Website, State, District, Address, and Location. The 'Edit' button is visible. The location is shown on a map of Panipat.

Blood Bank Name: Sankalp India Foundation

Parent Hospital Name: A&I Hospital

Contact Person:

Category: Red Cross

Mobile: 5642

Password:

Email: 5642@gmail.com

Website: yoyo.com

State: Haryana

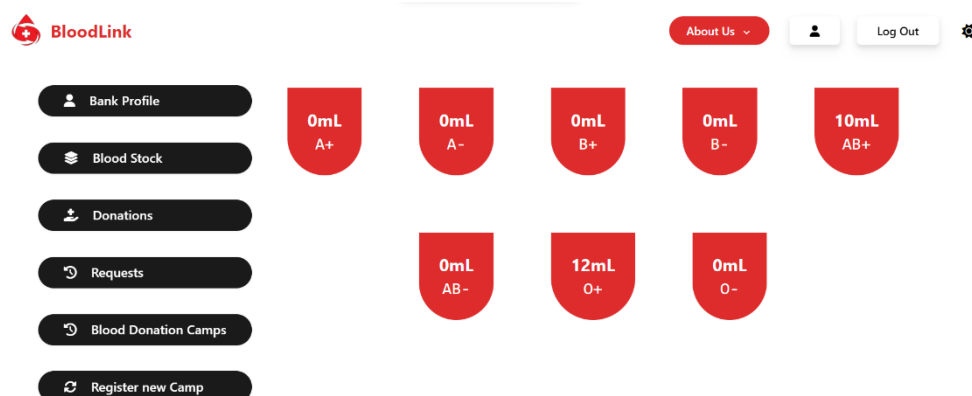
District: Gurgaon

Address: DLF City - II, Opposite Westin Hotel M G Road, Gurgaon

Location: 29.3909464, 76.9635023

➤ Blood Stock:

- `Blood stock` will show the current available blood stock at the current logged-in blood bank.



➤ Donations/Requests:

- These options will let the logged-in blood bank to see and manage the blood donation requests and the requests for blood by updating their status accordingly by the user details.
- The complete details of the user can be seen here by clicking on the user's name underlined.

Requests Table:

Patient Name	Age	Blood Group	Gender	Units(mL)	Reason	Date	Status
Urvashi	70	AB+	Female	70	Runtime Error	2/10/2023 8:21:12AM	Pending
Urvashi	19	O+	Male	2	Something	12/2/2023 11:12:12PM	Approved
ms	1	O-	Female	100	- - -	19/2/2023 1:12:12AM	Completed

User Details Modal:

User Details	
Name	Sumit Saini
Age	21
Gender	male
BloodGroup	AB+
Email	sumit@gmail.com
Phone	123
State	Goa
District	North Goa
Address	goa jaskie beach pe

- The option to update the status of the request will get automatically disabled after the status gets updated to “Donated” for donations and “Completed” for the requests.

➤ Blood Donation Camps:

- Bank currently logged-in can see all of his registered blood donation camps and can edit using the “Edit” button provided.
- On clicking the “Edit” button, a new window will be popped-up showing all the camp donors registered for the camp. Further clicking on the “i” button mentioned under every donor will open another pop-window and will show the complete details of the donor.

- Bank can here update the donation value after the donation completion at the blood camp by the donor, any new user at the camp can register for the same by signing up directly from the options mentioned previously.

BloodLink About Us Log Out

Navigation: Bank Profile, Blood Stock, Donations, Requests, Blood Donation Camps, Register new Camp

Date	Camp Name	Address	State	District	Organizer	Contact	Time	
2/15/2023	Chittar Far	dance	Haryana	Charkhi Dadri	Vaibhav Sharma	712382718	07:00 - 19:00	Edit
4/17/2023	Elon Ship	panvel	Maharashtra	Mumbai City	Jeff Bezos	1111111111	10:02 - 21:00	Edit

Camp Donors

Sumit Saini 2mL
AB+ | 21yrs

Ujjwal 0mL
O+ | 19yrs

User Details

Name	Sumit Saini
Age	21
Gender	Male
BloodGroup	AB+
Email	sumit@gmail.com
Phone	9876543210
State	India
District	North Goa
Address	Sumit Saini Road

➤ Register new camp:

Bank can create/register a new blood donation camp by `Register new Camp` option available by specifying all details with the date & time duration of the camp.

BloodLink About Us Log Out

Navigation: Bank Profile, Blood Stock, Donations, Requests, Blood Donation Camps, Register new Camp

New Blood Donation Camp

Camp Details

Camp Name: Conducted By:

Organized By: Contact:

Date: Start time: End time:

Address

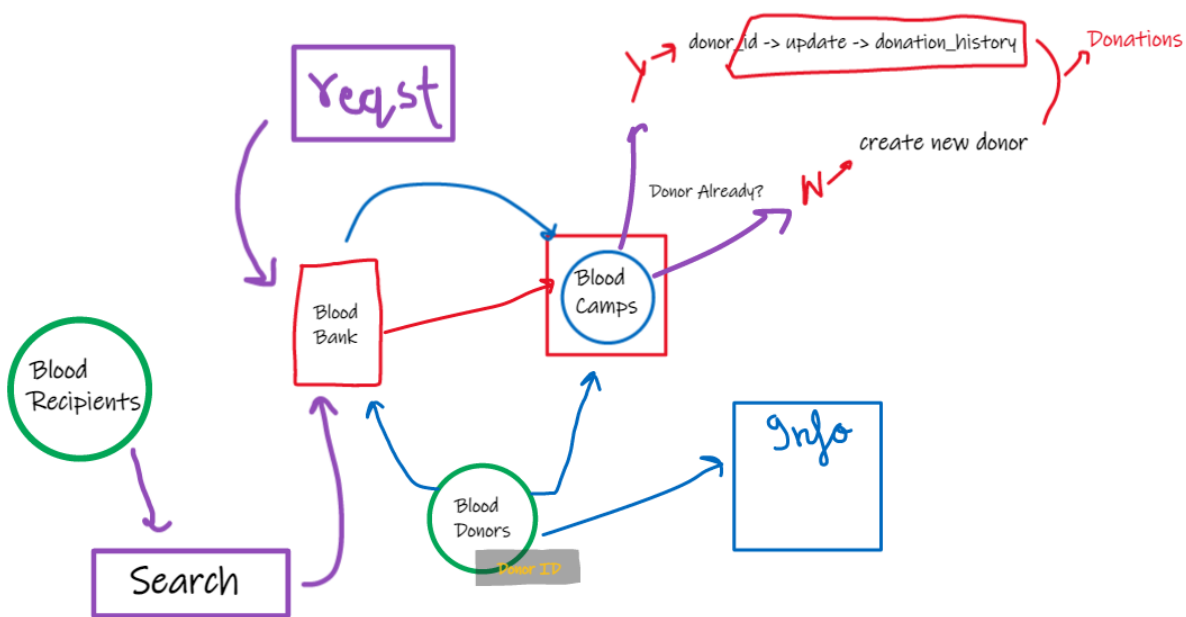
State: District:

Address:

Technical Specification

- **Front-end:** React.js
- **Back-end:** Node.js, Express.js
- **Database:** MongoDB

Database Design & Schema



The database used for the BloodLink project is MongoDB, a NoSQL database.

The following collections are being used to store and organize the data for the project:

Users, BloodBanks, Donations, Requests, Camps

➤ Users:

```
// ----- User Model -----  
  
// Create schema for Users  
const userSchema = new mongoose.Schema({  
  name: { type: String, required: true },  
  age: { type: Number, required: true },  
  gender: { type: String, required: true },  
  bloodGroup: { type: String, enum: bloodGroups, required: true },  
  email: { type: String },  
  phone: { type: Number, unique: true, required: true },  
  password: { type: String, required: true },  
  state: { type: String, required: true },  
  district: { type: String, required: true },  
  address: { type: String },  
});  
  
// Create model for Users  
const User = mongoose.model('Users', userSchema);
```

➤ BloodBanks:

```
// Create schema for Blood Banks  
const bloodBankSchema = new mongoose.Schema({  
  name: { type: String, required: true },  
  hospital: { type: String, required: true },  
  contactPerson: { type: String },  
  category: { type: String, required: true },  
  website: { type: String },  
  phone: { type: Number, required: true },  
  email: { type: String, required: true },  
  password: { type: String, required: true },  
  state: { type: String, required: true },  
  district: { type: String, required: true },  
  address: { type: String, required: true },  
  latitude: { type: Number, required: true },  
  longitude: { type: Number, required: true },  
  requests: [{  
    requestId: { type: mongoose.Schema.Types.ObjectId, ref: 'Requests' },  
  }],  
  donations: [{  
    donationId: { type: mongoose.Schema.Types.ObjectId, ref: 'Donations' },  
  }],  
  stock: {  
    'A+': { type: Number, default: 0 },  
    'A-': { type: Number, default: 0 },  
    'B+': { type: Number, default: 0 },  
    'B-': { type: Number, default: 0 },  
    'AB+': { type: Number, default: 0 },  
    'AB-': { type: Number, default: 0 },  
    'O+': { type: Number, default: 0 },  
    'O-': { type: Number, default: 0 }  
  }  
});  
  
// Create model for Blood Banks  
const BloodBank = mongoose.model('BloodBanks', bloodBankSchema);
```

➤ Donations:

```
// ----- Donations Model -----  
  
// Create schema for Donations  
const bloodDonations = new mongoose.Schema({  
  userId: { type: mongoose.Schema.Types.ObjectId, ref: 'Users', required: true },  
  bankId: { type: mongoose.Schema.Types.ObjectId, ref: 'BloodBanks', required: true },  
  units: { type: Number, required: true },  
  date: { type: String, required: true },  
  disease: { type: String },  
  status: { type: String, required: true,  
    enum: ['Pending', 'Approved', 'Denied', 'Donated'],  
    default: 'Pending'  
  },  
});  
  
// Create model for Donors  
const Donations = mongoose.model('Donations', bloodDonations);
```

➤ Requests:

```
// ----- Requests Model -----  
  
// Create schema for Patients  
const bloodRequests = new mongoose.Schema({  
  userId: { type: mongoose.Schema.Types.ObjectId, ref: 'Users', required: true },  
  bankId: { type: mongoose.Schema.Types.ObjectId, ref: 'BloodBanks', required: true },  
  name: { type: String, required: true },  
  age: { type: Number, required: true },  
  gender: { type: String, required: true },  
  bloodGroup: { type: String, enum: bloodGroups, required: true },  
  units: { type: Number, required: true },  
  date: { type: String, required: true },  
  reason: { type: String },  
  status: { type: String,  
    enum: ['Pending', 'Approved', 'Denied', 'Completed'],  
    default: 'Pending'  
  },  
});  
  
// Create model for Patients  
const Requests = mongoose.model('Requests', bloodRequests);
```


➤ Camps:

```
// Create schema for Camps
const campSchema = new mongoose.Schema({
  name: { type: String, required: true },
  date: { type: Date, required: true },
  address: { type: String, required: true },
  state: { type: String, required: true },
  district: { type: String, required: true },
  bankId: { type: mongoose.Schema.Types.ObjectId, ref: 'BloodBanks' },
  organizer: { type: String, required: true },
  contact: { type: Number, required: true },
  startTime: { type: String, required: true },
  endTime: { type: String, required: true },
  donors: [{
    _id: { type: mongoose.Schema.Types.ObjectId, ref: 'Users', unique: true },
    units: { type: Number, required: true, default: 0 },
    status: { type: Number, enum: [0, 1], default: 0 }
  }]
});

// Create model for Camps
const Camp = mongoose.model('Camps', campSchema);
```

➤ Description:

- The `Users` collection stores complete details of any registered user.
- `BloodBanks` collection stores complete details of the registered blood banks,
 - The `requests` field here is an array of objects having requestID referring to the `Requests` collection.
 - The `donations` field here is an array of objects having donationID referring to the `Donations` collection.
 - The `stock` field is an object with all the blood groups as keys and value of the units of the stock of each blood group available.
- `Donations` collections stores every donation request made by the user, with userId referring to the `Users` collection and bankId referring to the `BloodBanks` collection with the status of the request, units to be donated.

- `Requests` collections stores every request made for blood by the user, with `userId` referring to the `Users` collection and `bankId` referring to the `BloodBanks` collection with the status of the request, units requested,.
- `Camps` schema stores the details of any camp scheduled by any blood bank where `bankId` is referring to `BloodBanks` collection and `donors` field is an array of objects with `_id` referring the `Users` collection, the units donated and the status.
- All the fields referring to other collections will get populated using the `populate()` in mongoose accordingly to get the complete data.

----- Thank You