CSE3086 – NoSQL Databases

J Component - Project Report

BLOOD MANAGEMENT SYSTEM USING ANALYTICAL DASHBOARD

By

20MIA1134	ATUL PATEL
20MIA1023	SHREE NIKHILA
20MIA1084	PRATYANSH SONI

M.Tech CSE with Specializaton

Submitted to

Dr.A.Bhuvaneswari
, Assistant
Professor Senior,
SCOPE, VIT,
Chennai

School of Computer Science and Engineering

January 2023

School of Computing Science and Engineering

VIT Chennai

Vandalur - Kelambakkam Road, Chennai - 600 127

WINTER SEM 22-23

Worklet details

Programme	M.Tech with Specialization	
Course Name / Code	CSE3086	
Slot	C2+TC2	
Faculty Name	DR. A BHUVANESWARI	
Digital Assignment		
Team Members Name | Reg. No	ATUL PATEL	20MIA1134
	SHREE NIKHILA	20MIA1023
	PRATYANSH SONI	20MIA1084

Team Members(s) Contributions – Tentatively planned for implementation:

Worklet Tasks	*Contributor's Names*
Dataset Collection	ATUL PATEL
Preprocessing	SHREE NIKHILA
Architecture/ Model/ Flow diagram	PRATYANSH SONI
Model building (suitable algorithm)	ATUL PATEL, PRATYANSH SONI
Results – Tables, Graphs	PRATYANSH SONI, SHREE NIKHILA
Technical Report writing	PRATYANSH SONI, SHREE NIKHILA
Presentation preparation	ATUL PATEL, SHREE NIKHILA

ABSTRACT

The Blood Management System (BMS) is an innovative healthcare project aimed at optimizing blood resource utilization and enhancing patient care through the integration of an Analytical Dashboard. Leveraging the MongoDB database and the MERN (MongoDB, Express.js, React, Node.js) stack technology, this system focuses on improving blood inventory management, donor engagement, and medical staff decision-making.Blood transfusions are critical medical interventions, often involving a complex process of blood collection, testing, storage, and distribution. Inefficiencies in this process can lead to shortages, wastage, and compromised patient care. The BMS aims to address these challenges by providing a comprehensive solution that combines data-driven insights with user-friendly interfaces.The system's foundation lies in MongoDB, a NoSQL database known for its scalability and flexibility. By employing MongoDB, the BMS can handle vast amounts of structured and unstructured blood-related data efficiently.

This includes donor information, blood type compatibility, storage conditions, expiration dates, and historical usage patterns. Such data can be complex and heterogeneous, making a relational database less suitable for the task.The MERN stack, composed of MongoDB, Express.js, React, and Node.js, is the cornerstone of the system's technology. Node.js powers the backend server, Express.js simplifies API development, React facilitates dynamic frontend interfaces, and MongoDB stores and retrieves data seamlessly. This stack ensures a smooth and responsive user experience while accommodating real-time updates, a necessity in healthcare settings.

One of the core features of the BMS is its Analytical Dashboard. The dashboard serves as a centralized platform that aggregates and visualizes key performance indicators, trends, and insights related to blood management. Authorized personnel, including medical professionals and administrators, can access this dashboard to monitor blood inventory levels, track donor engagement campaigns, predict demand, and identify usage patterns. These data-driven insights empower healthcare providers to make informed decisions, allocate resources effectively, and minimize wastage.The donor engagement module of the BMS enhances the blood supply chain by fostering a strong donor-donation relationship. Donors can register, schedule appointments, and receive notifications about blood drives or urgent needs. This two-way communication promotes regular donations, which in turn contributes to a stable blood supply. Additionally, the system can send personalized appreciation messages and updates to donors, fostering a sense of involvement and loyalty.Real-time alerts and notifications play a crucial role in the BMS. Healthcare facilities can receive automated alerts about critically low inventory levels, expiring blood units, or urgent requests. Such notifications enable rapid responses and prevent supply shortages during emergencies or unexpected spikes in demand.The implementation of the BMS involves multiple stages, including requirements analysis, system design, database schema development, backend and frontend coding, testing, and deployment. The Agile methodology is recommended for its iterative and collaborative approach, ensuring that the system meets evolving user needs and industry standards.

1. <u>Introduction</u>

A. Problem Statement:

The efficient management of blood resources within healthcare systems remains a critical challenge. Blood transfusions are an essential aspect of medical care, yet the processes surrounding blood collection, storage, distribution, and utilization often lack optimization. This can result in issues such as blood shortages, wastage, and compromised patient outcomes. Conventional approaches to blood management are often manual and lack data-driven insights, leading to inefficiencies and suboptimal decisions. The need for an innovative solution to address these challenges prompted the development of the Blood Management System (BMS).

B. Reason for Choosing the Project:

The decision to embark on the Blood Management System project stems from the pressing need for a comprehensive solution that leverages technology to enhance blood resource management. Traditional methods are labor-intensive and prone to human error, resulting in unpredictable blood availability and distribution. By utilizing MongoDB and the MERN stack, we aim to create an integrated system that offers real-time insights, seamless communication, and streamlined processes.

C. Objectives:

The Blood Management System project is designed to achieve several key objectives:

1. **Optimized Blood Inventory Management:** The BMS aims to ensure that blood supplies are maintained at optimal levels across healthcare facilities. By analyzing historical data and usage patterns, the system can predict demand and supply, preventing shortages and excesses.

2. **Enhanced Donor Engagement:** The project seeks to increase donor participation through streamlined registration processes, appointment scheduling, and personalized communication. By cultivating a strong donor-donation relationship, a stable and consistent blood supply can be maintained.

3. **Real-time Data Insights:** The Analytical Dashboard component of the system provides healthcare professionals with real-time data insights. This empowers them to make informed decisions, track inventory levels, and respond swiftly to critical situations.

4. **Efficient Blood Distribution:** The BMS aims to improve the distribution of blood products to hospitals and clinics. By identifying demand trends and efficiently allocating resources, the system minimizes the risk of shortages and wastage.

5. **Emergency Preparedness:** Rapid response during emergencies is vital. The BMS can send automated alerts about critical inventory levels or urgent blood needs, enabling healthcare providers to take immediate action.

D. Challenges:

The development and implementation of the Blood Management System come with several challenges:

1. **Data Complexity:** Blood management involves a variety of complex and heterogeneous data, including donor information, blood types, storage conditions, and usage history. Handling and structuring this data for efficient analysis is a significant challenge.

2. **User Adoption:** Convincing healthcare facilities to adopt a new technology can be challenging. Overcoming resistance to change and ensuring the system aligns with existing workflows is essential.

3. **Real-time Updates:** Ensuring that the system provides real-time updates while maintaining data accuracy and consistency is a technical challenge. Achieving this without compromising performance is crucial for the success of the system.

4. **Security and Privacy:** Healthcare data is sensitive and must be protected. Ensuring the security of patient information, donor details, and medical records is a priority.

5. **Integration with Existing Systems:** Integrating the BMS with existing hospital management systems, laboratory information systems, and electronic health records requires careful planning and coordination.

6. **Scalability:** As the system gains users and data volume increases, ensuring that the system remains scalable and can handle growing demands is vital.

2. Literature Survey: -

Title	Author/ Journal Name/ Year	Technique	Result
Blood Donation Management with Modern Engineering	Tanisha Madan Assistant Professor Computer Science and Engineering, BPIT, Rohini, New Delhi, INDIA Narender Bhardwaj Computer Science and Engineering , Scholar of BPIT Rohini, New Delhi, INDIA Shivam Kumar Mishra Computer Science and Engineering, Scholar of BPIT, Rohini, New Delhi, INDIA	This paper discusses a modern blood donation management system called Rudhiram built using technologies like React, Redux, Node, Express and MongoDB.	The goal of Rudhiram is to reduce the latency in the blood donation process by making it easier to manage and connect donors with patients who need blood. The key stakeholders of Rudhiram are: Donors who can register and search for nearby blood donation camps to schedule a visit. Patients who can search for compatible blood from hospitals and registered donors. Hospitals that can register and provide details of available blood types. Blood camps that can register to be listed for donors to find. Administrators who manage and verify all records. Rudhiram aims to simplify and automate the process of finding blood donors and maintain a centralized record of donors, recipients and blood stocks. The paper concludes that although Rudhiram provides a modern solution, there is still scope for improvement by adding features like live tracking, data analytics and SMS notifications.
Blood Bank Management System		Some key features of the proposed system are: admin access to	The paper proposes an automated blood

		registered user data, a notification alert system, and GPS tracking via registration. Cloud storage is also suggested for scalability. The system uses XAMPP and PHPMyAdmin for database hosting and management.	bank management system to reduce the efforts required to search for blood donors and manage their data. The current manual system is inefficient and leads to wastage of blood inventory. The proposed system would connect blood requesters and donors through a safe web-based platform with a simple registration process. The authors chose the Rational Unified Process methodology with four phases - Inception, Elaboration, Construction, and Transition. The study found that the system would reduce hassles of manual data entry and fears during emergencies. The authors believe the system will improve communication between donors, hospitals and blood banks. In summary, the proposed blood bank management system aims to provide a reliable platform for both blood donors and recipients through a faster and more efficient web-based

			application. This is expected to increase the chances of saving lives by making blood availability and accessibility better.
A Research Paper on Blood Donation Management System		The system uses the Django framework with modules for blood inventory management, donor management and administration. It can potentially be used during disasters to coordinate blood donors.	This paper proposes a blood donation management system to address issues related to the shortage of blood supply and inefficiency of the current system. The current blood bank system relies on physical records which makes information retrieval time-consuming and prone to errors. The authors developed a website that allows people to register as donors, hospitals to search for available donors, and maintains a centralized database of donor and health information. The system aims to provide timely supply of safe blood by collecting from voluntary unpaid donors. It allows donors to be notified of emergencies and hospitals to search for donors by location. The authors focus on security of data, tackling fake donors and requests, and updating donor health status regularly. In the future, the authors plan to explore data mining tools and develop a mobile app to connect with more donors. The system provides an effective web-based solution that can help save lives during emergencies by providing information on available blood

			donors.
Centralized Blood Bank Database and Management System		The cloud database, PHP API, and Android app are used to build the system	This paper proposes a centralized blood bank management system that aims to improve the efficiency of blood banks and make blood more accessible for patients, especially during emergencies in Nigeria. Currently, patients in Nigeria face difficulties accessing blood from blood banks due to manual and unorganized processes. The proposed system is an Android app connected to a secure cloud database that contains information on blood donors, patients, and blood banks. The system allows donors to easily register and locate nearby blood banks for screening and donation. Patients can search for matching blood donors near them and contact donors through the app. All blood banks on the system are government approved to ensure safe blood supply. The system aims to address challenges specific to Nigeria like logistical issues and poor network coverage. The app is designed to efficiently store, search, and sort large amounts of blood data in real-time.. The results show the app allows donors to book screening appointments, patients to search and request blood, and blood banks to manage donor information efficiently. The system has the potential to be scaled up with more features to improve its effectiveness.

| Research Paper on Blood Bank Donation and Management using Django | Shravani BS1, Raghavendra. R2 | The application will be developed using Django for the frontend GUI and MySQL for the database | This paper proposes a web application called Blood Warrior to help efficiently manage blood donations and connect blood donors with patients in need. There are currently manual blood bank systems that are inefficient, time consuming and prone to errors. The proposed application aims to address these issues by automating the process and connecting donors and patients online.

The application will have three types of users - patients, donors and hospitals. Donors can register by providing their details and blood group. Patients can search for donors based on their required blood group. The application will provide contact details of matching donors so patients can reach out to them directly. Hospitals can act as an intermediary to manage communication. An experimental prototype is presented with donor registration, donor search functionality and a chatbot for user assistance. The study concludes that the online platform can help make blood available to those who need it. There is scope to improve the application further using machine learning and GPS technology. The proposed system aims to efficiently manage blood donations and save lives. |
|---|---|---|---|
| **Blood Bank Management System using Global Position** | Mrs.A.Sunitha, M.E., Professor of Computer Science Department, | This paper proposes a new technique for managing blood banks using GPS | The proposed system aims to ensure the quality of blood and |

System	Ms.J.Jenifer Emima, Student of Computer Science Department, Ms.P.Pavithra, Student of Computer Science Department, Ms.D.Sarulatha, Student of Computer Science Department, St.Joseph College of Engineering, Sriperumbudur, Chennai Volume: 6, Issue: 3,Special Issue: 1 ,Apr,2021 ,ISSN_NO: 2321-3337	and Android applications. Two Android applications are developed - one for blood requesters and another for blood donors. An intermediate server contains the database of previous blood donors. Blood requesters can send queries to the server for specific blood types using Google Cloud Messaging. The server then processes the query and notifies suitable blood donors. The blood donor's application will then send the GPS coordinates and contact number to the requester, only if the donor accepts the notification. This ensures the privacy of blood donors and their information is not shared without permission.	increase operational efficiency of blood banks. The fingerprint sensor is used to identify blood donors reliably. GPRS is also applied to transmit real-time data between the bloodmobile and blood center. RFID technology is used to manage the system conveniently. The web-based Android applications are scalable, efficient and adaptable to meet the complex needs of blood banks, which are key facilitators for the healthcare sector. In future, the system can be linked with other hospitals to share data. Statistical analysis and backup of databases can also be implemented. In summary, the proposed blood bank management system uses GPS and Android applications to identify and notify suitable blood donors. The system aims to provide blood in emergency situations reliably while ensuring donors' privacy.
Automated Blood Bank Using Embedded System	Abhijeet Moharkar 1, Akanksha Somani 2 ISSN (Online): 2319-8753 ISSN (Print) : 2347-6710	The system consists of an Android application for patients, a Raspberry Pi computer for the blood bank administrator, and a cloud server for communication between patients and the blood bank. The Android application will allow patients to request blood groups and components based on their needs. The blood bank administrator will update the blood bag data in real time using the Raspberry Pi. The cloud server, which is a web page, is created using programming languages like HTML, PHP, CSS	The paper proposes an automated blood bank system using embedded systems to efficiently manage blood stocks and meet patient requirements. The aim of the system is to connect all blood banks on a common platform to better match blood requests with available stocks and provide transparency between patients and blood banks. This centralized system has the potential to improve the management of blood stocks and reduce wastage.

|			
		and JavaScript. It allows communication between the Android application and the Raspberry Pi. SMS is also used to notify patients about the status of their blood requests.	
Smart Blood Bank as a Service on Cloud	Bharathwaj Muralidaran1 , Akshay Raut2 , Yogesh Salve3 Shivshankar Dange4 ,Likhesh Kolhe5 IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 18, Issue 2, Ver. I (Mar-Apr. 2016), PP 121-124	Three main cloud service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). The technique used for development is the Rapid Application Development (RAD) model, emphasizing modularization, iterative development, and prototyping. Additionally, algorithms are presented for the registration and usage of the system by blood banks and donors.	The text discusses developing a web application hosted on the cloud to provide fast access to reports for blood banks. The cloud computing concept allows a multi-tenant environment for blood banks to store their data in the cloud database. A website is provided to users to see blood availability during emergencies. Currently, there are three main cloud service models: Infrastructure as a Service, Platform as a Service, and Software as a Service. The proposed system aims to improve the conventional blood bank management system using cloud computing. It will provide a website framework for blood banks to register and get their own account and data storage space. The data entered by blood banks will be stored in the cloud database. A customer website will then be created using this data to inform customers about blood availability. Each customer will have a unique login to access the website. This proposed system is more efficient, elastic, multi- tenant, secure, and user-friendly compared to traditional software. The Rapid Application Development model is used which focuses on modularization, iterative development, and prototyping. Algorithms are also presented for blood banks and donors to

			register and use the system. In conclusion, the new system plays a vital role in blood bank management and service quality.
CLOUD BASED ONLINE BLOOD BANK MANAGEMENT SYSTEM	1Aditya S. Iyer, 2Dr. C Menaka, 3Adnan Faisal , 4Ammar Hussain , 5Chethan S.D JETIR.ORG (ISSN-2349-5162)	Use of cloud computing for the development of the online blood bank management system. Specifically, it highlights the use of cloud computing to enable accessibility from anywhere at any time. The text also touches upon the challenges associated with cloud-based systems, such as ensuring data security, privacy, and system reliability.	The text discusses the concept of a cloud-based online blood bank management system. Such a system can help ensure the safe collection and storage of blood and make it easily accessible when needed, especially in emergency situations. The key benefits of such a system are: ● Improved availability of blood by connecting multiple blood banks and hospitals online. ● Donors can access blood from any blood bank, not just where they donated. ● Faster access to donor and blood bag information through a centralized online system. This can help save lives in emergencies. ● Better record keeping of donors and their blood donation activities. ● Quick identification of suitable blood bags for patients who need them urgently. The proposed system would allow hospitals, donors and recipients to

			register and login. Hospitals can add details of available blood groups to the system. Recipients can search and request for specific blood groups. An admin manages the entire database and system security. Cloud computing enables such a system to be accessible from anywhere at any time. However, some challenges include ensuring data security, privacy and reliability of the system. Overall, an online blood bank management system has the potential to improve the safety and efficiency of blood transfusion services.
ON-LINE BLOOD BANK MANAGEMENT SYSTEM USING ANDROID	1Sunita Bhujbal, #2Kajal Jadhav, #3Snehal Kalokhe, #4Varsha Pingale International Engineering Research Journal (IERJ), Volume 2 Issue 10 Page 4228-4231, 2017 ISSN 2395-1621	The system architecture would involve tools like Android, Java, and a database to store donor information. An algorithm would be used to find eligible donors based on blood group and location.	The text discusses the concept of an online blood bank management system using Android. Such a system aims to make the process of obtaining blood from a blood bank more efficient and effective. The key features of the proposed system include finding blood donors nearby using GPS, sending alerts to registered donors, and enabling direct contact between donors and recipients. The goals are to reduce the scarcity of rare blood groups, make the process faster, and increase awareness about blood donation. The text mentions several advantages of such a system like helping people find donors quickly in emergencies. Some existing systems are also briefly discussed. In summary, an online blood bank management system that enables direct contact between donors and recipients has the potential to improve the current process of obtaining blood, especially during urgent situations.

3. Dataset and Database specific Tool to be used

• Dataset of government health centre
• Blood donation centre of regional area

4. Block Diagram of the proposed work/system design
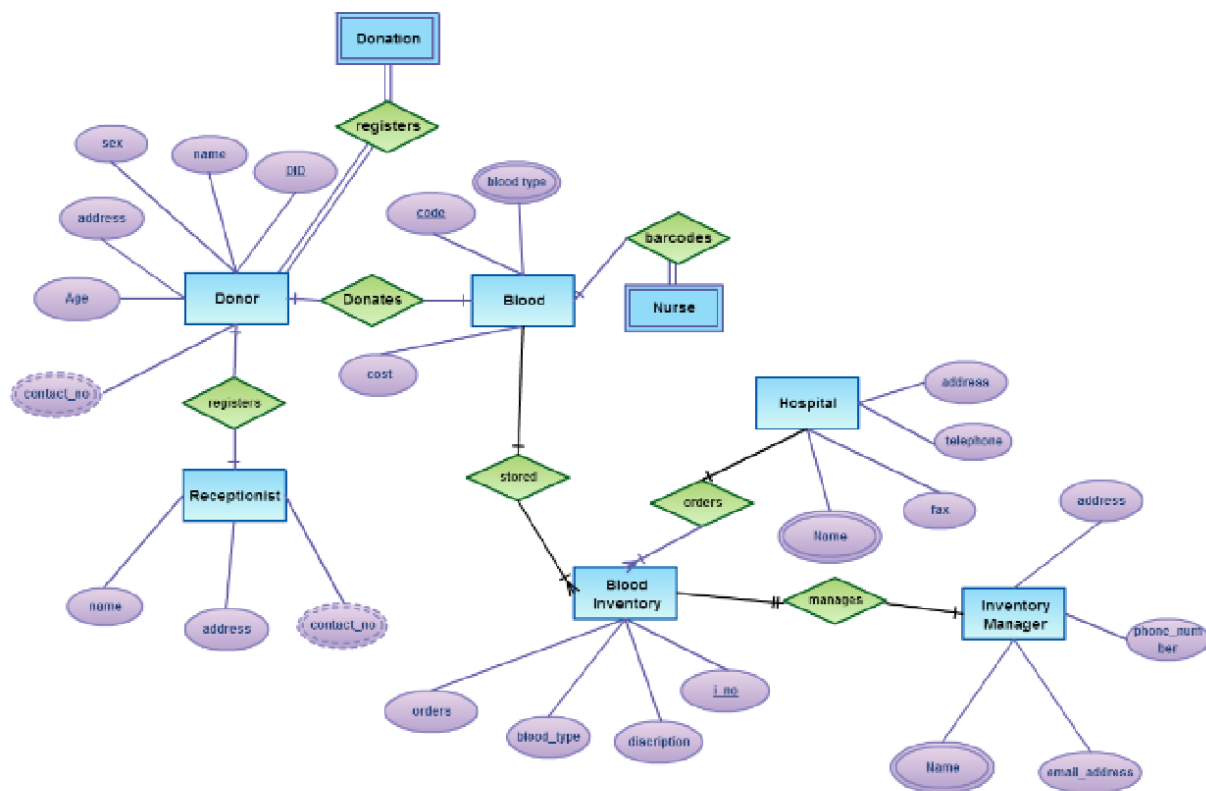
5. Class Diagram
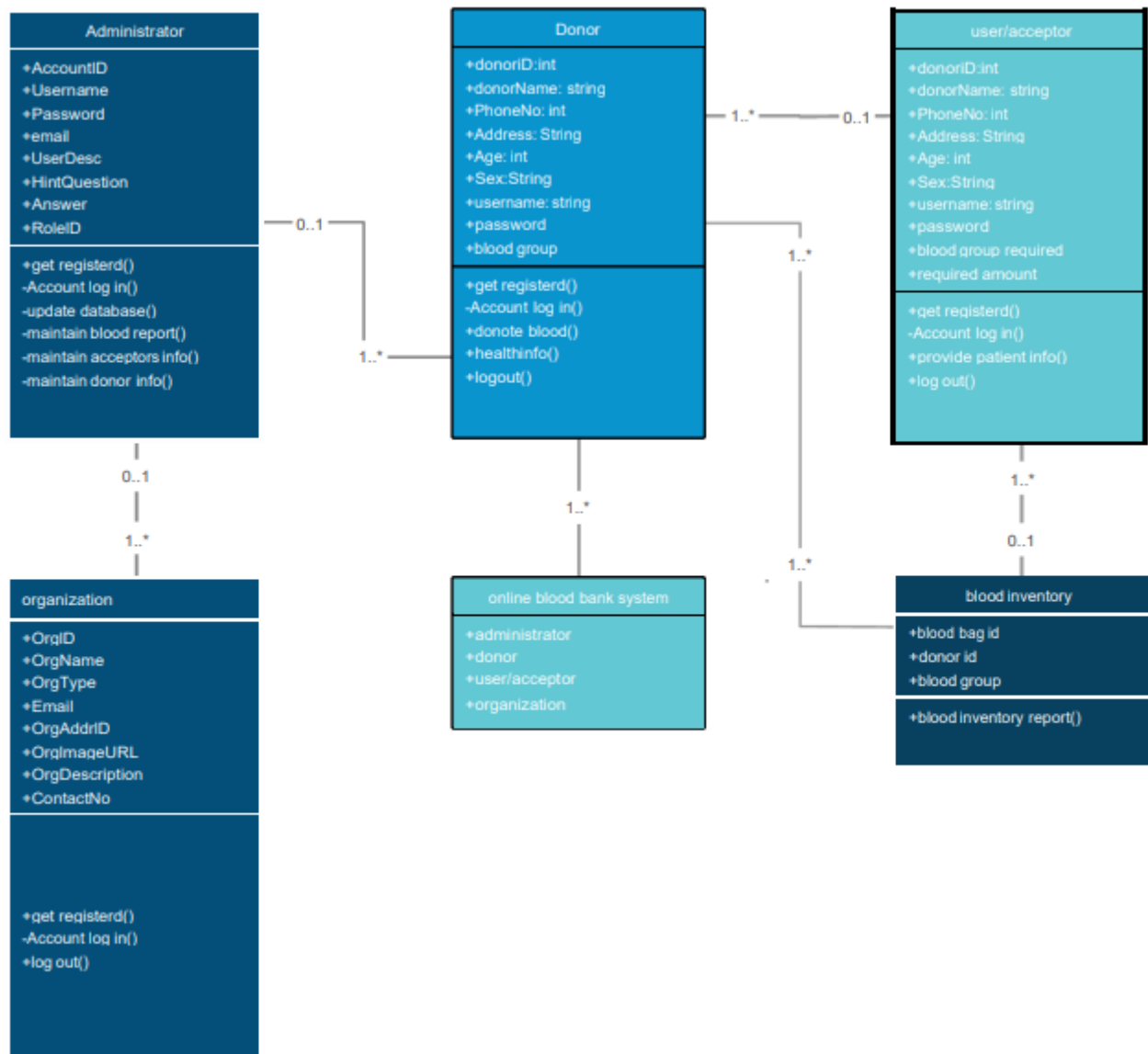
6. Github Repository Link (where your j comp project work can be seen for assessment)

https://github.com/783atulpatel/BloodManagementSystemUsing-AnalyticalDashboard

USE CASE DIAGRAM

Atul Patel | November 2, 2023

BLOOD BANK MANAGEMENT System

- INVENTORY ANALYTICS
- DONOR ANALYTICS
- RECIPIENT ANALYTICS
- LOGIN
- MODIFY ACESS

HAS

AFTER LOGIN

HAS

HAS

HOSPITAL

DONOR

ADMIN
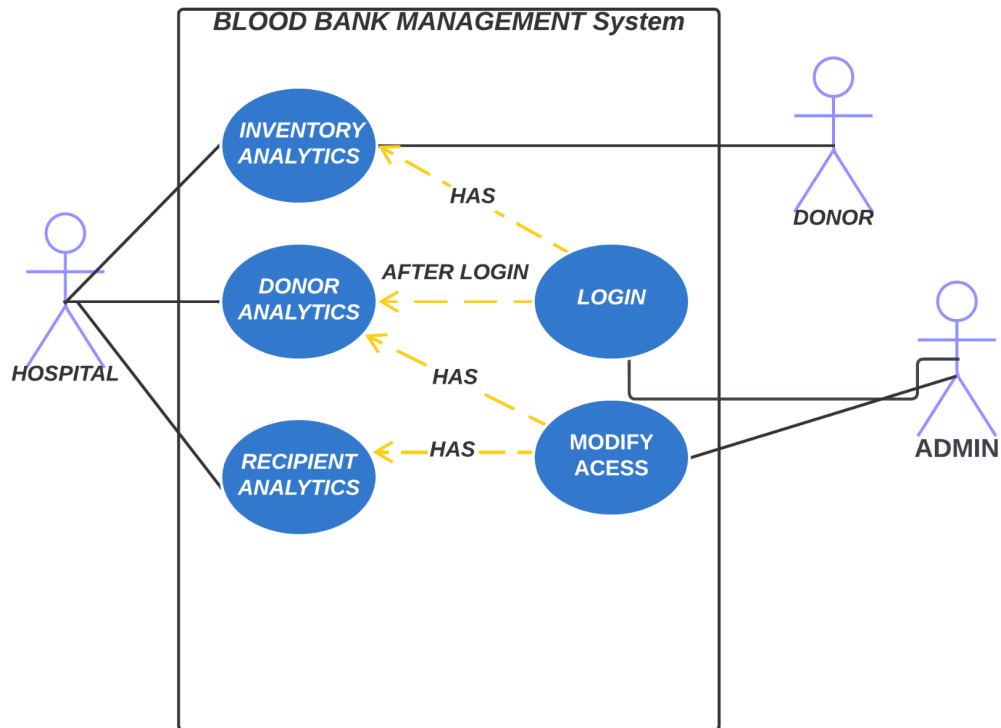
BLOOD BANK MANAGEMENT SYSTEM USING ANALYTICAL DASHBOARD

ATUL PATEL
PRATYANSH SONI
J SHREE NIKHILA

```python
In [1]: import pymongo
```

```python
In [2]: client=pymongo.MongoClient()
```

```python
In [3]: db=client.userdb
```

```python
In [34]: #https://data.gov.in/catalog/digital-india-land-records-modernization-programme-progress
         collection = db["BloodBank"]
```

```python
In [5]: import pandas as pd
```

```python
In [6]: df=pd.DataFrame(list(db.BloodBank.find({})))
```

```python
In [7]: # %matplotlib inline

        # json_file = open("C:\Users\Lenovo\Downloads\csvjson.json", "r", encoding="utf-8")
        # sh_json= json.load(json_file)
        # json_file.close()

        # #print(type( sh_json['Costco_Front_Image_0013.jpg193064']))
        # for person in sh_json['Costco_Front_Image_0013.jpg193064']:
        #     print(sh_json['Costco_Front_Image_0013.jpg193064'][person])
```

```python
In [8]: df
```

Out[8]:

	_id	Sr No	Blood Bank Name	State	District	City	Address	Pincode	Contact No	Mobile	...	Qualification Nodal Officer	C
0	65268fdbc3fb6482062a4dd8	1	G.B. Pant Hospital Blood bank	Andaman And Nicobar Islands	SOUTH ANDAMAN	Port Blair	Atlanta Point\nNear Cellular Jail\nP.O. Aberde...	744104	03192 230628	9434266561.0	...		Gov
1	65268fdbc3fb6482062a4dd9	2	I.N.H.S. Dhanwantri	Andaman And Nicobar Islands	SOUTH ANDAMAN	Port Blair	Ashvini Nagar, Port Blair, Andaman and Nicobar...	744103	03192 248759	8001452200.0	...	MBBS, MD (Pathology)	Gov
2	65268fdbc3fb6482062a4dda	3	Pillar Health Centre Blood Bank	Andaman And Nicobar Islands	SOUTH ANDAMAN	Port Blair	Lamba Line,\nP.B. 526,\nP.O. Junglighat, \nOpp...	744104	03192 233193, 03192 233993	9474247585.0	...	MBBS, MD (Medicine)	
3	65268fdbc3fb6482062a4ddb	4	Indian Red Cross Society Blood Bank, District ...	Andhra Pradesh	ANANTAPUR	Anantapur	Near JNTU Engineering College, Sarada Nagar, A...	515002	08554 246344	9441192365.0	...	MBBS, MD, DCP	
4	65268fdbc3fb6482062a4ddc	5	Government General Hospital Blood Bank	Andhra Pradesh	ANANTAPUR	Ananthapur	Government General Hospital, Ananthapur	515001	08554 275024	9666695858.0	...	MBBS, MD (Pathology)	Gov
...	...	...	...	...	...	...	...	...	...	...	...	...	...
2818	65268fdbc3fb6482062a58da	2819	Jawaharlal Nehru Memorial Hospital Blood Bank	West Bengal	NADIA	NADIA	P.O. Kalyani	741235	033 25828386	9434005862.0	...		Gov
2819	65268fdbc3fb6482062a58db	2820	Nabadwip SGH Blood Bank	West Bengal	NADIA	Nadia	Nadia	741302	N/A	9434160366.0	...	MBBS	Gov
2820	65268fdbc3fb6482062a58dc	2821	Deben Mahato (Sadar) Hospital Blood Bank	West Bengal	PURULIA	Purulia	P.O.Purulia	723101	03252 222678	9433204823.0	...	MBBS	Gov
2821	65268fdbc3fb6482062a58dd	2822	Sub Divisional Hospital Blood Bank Islampur	West Bengal	Uttar Dinajpur	Islampur	P.O. Islampur	733202	N/A	9830385878.0	...	MBBS	Gov
2822	65268fdbc3fb6482062a58de	2823	Raiganj Blood Bank, Uttar Dinajpur Raiganj Dis...	West Bengal	Uttar Dinajpur	N/A	P.O. Raiganj	733134	03523 241400	9475112860.0	...	MBBS	Gov

2823 rows × 28 columns

Out[8]:

	_id	Sr No	Blood Bank Name	State	District	City	Address	Pincode	Contact No	Mobile	...	Qualification Nodal Officer	C
0	65268fdbc3fb6482062a4dd8	1	G.B. Pant Hospital Blood bank	Andaman And Nicobar Islands	SOUTH ANDAMAN	Port Blair	Atlanta Point\nNear Cellular Jail\nP.O. Aberde...	744104	03192 230628	9434266561.0	...		Gov
1	65268fdbc3fb6482062a4dd9	2	I.N.H.S. Dhanvantri	Andaman And Nicobar Islands	SOUTH ANDAMAN	Port Blair	Ashvini Nagar, Port Blair, Andaman and Nicobar...	744103	03192 248759	8001452200.0	...	MBBS, MD (Pathology)	Gov
2	65268fdbc3fb6482062a4dda	3	Pillar Health Centre Blood Bank	Andaman And Nicobar Islands	SOUTH ANDAMAN	Port Blair	Lamba Line,\nP.B. 526,\nP.O. Junglighat, \nOpp...	744104	03192 233193, 03192 233993	9474247585.0	...	MBBS, MD (Medicine)	
3	65268fdbc3fb6482062a4ddb	4	Indian Red Cross Society Blood Bank, District ...	Andhra Pradesh	ANANTAPUR	Anantapur	Near JNTU Engeneering College, Sarada Nagar, A...	515002	08554 246344	9441192365.0	...	MBBS, MD, DCP	
4	65268fdbc3fb6482062a4ddc	5	Government General Hospital Blood Bank	Andhra Pradesh	ANANTAPUR	Ananthapur	Government General Hospital, Ananthapur	515001	08554 275024	9866695858.0	...	MBBS, MD (Pathology)	Gov
...	...	...	...	...	...	...	...	...	...	...	...	...	
2818	65268fdbc3fb6482062a58da	2819	Jawaharlal Nehru Memorial Hospital Blood Bank	West Bengal	NADIA	NADIA	P.O. Kalyani	741235	033 25828386	9434005862.0	...		Gov
2819	65268fdbc3fb6482062a58db	2820	Nabadwip SGH Blood Bank	West Bengal	NADIA	Nadia	Nadia	741302	N/A	9434160366.0	...	MBBS	Gov
2820	65268fdbc3fb6482062a58dc	2821	Deben Mahato (Sadar) Hospital Blood Bank	West Bengal	PURULIA	Purulia	P.O.Purulia	723101	03252 222678	9433204823.0	...	MBBS	Gov
2821	65268fdbc3fb6482062a58dd	2822	Sub Divisional Hospital Blood Bank Islampur	West Bengal	Uttar Dinajpur	Islampur	P.O. Islampur	733202	N/A	9830385878.0	...	MBBS	Gov
2822	65268fdbc3fb6482062a58de	2823	Raiganj Blood Bank, Uttar Dinajpur Raiganj Dis...	West Bengal	Uttar Dinajpur	N/A	P.O. Raiganj	733134	03523 241400	9475112860.0	...	MBBS	Gov

2823 rows × 28 columns

In [9]: `df.head(20)`

Out[9]:

	_id	Sr No	Blood Bank Name	State	District	City	Address	Pincode	Contact No	Mobile	...	Qualification Nodal Officer
0	65268fdbc3fb6482062a4dd8	1	G.B. Pant Hospital Blood bank	Andaman And Nicobar Islands	SOUTH ANDAMAN	Port Blair	Atlanta Point\nNear Cellular Jail\nP.O. Aberde...	744104	03192 230628	9434266561.0	...	
1	65268fdbc3fb6482062a4dd9	2	I.N.H.S. Dhanvantri	Andaman And Nicobar Islands	SOUTH ANDAMAN	Port Blair	Ashvini Nagar, Port Blair, Andaman and Nicobar...	744103	03192 248759	8001452200.0	...	MBBS, MD (Pathology)
2	65268fdbc3fb6482062a4dda	3	Pillar Health Centre Blood Bank	Andaman And Nicobar Islands	SOUTH ANDAMAN	Port Blair	Lamba Line,\nP.B. 526,\nP.O. Junglighat, \nOpp...	744104	03192 233193, 03192 233993	9474247585.0	...	MBBS, MD (Medicine)
3	65268fdbc3fb6482062a4ddb	4	Indian Red Cross Society Blood Bank, District ...	Andhra Pradesh	ANANTAPUR	Anantapur	Near JNTU Engeneering College, Sarada Nagar, A...	515002	08554 246344	9441192365.0	...	MBBS, MD, DCP
4	65268fdbc3fb6482062a4ddc	5	Government General Hospital Blood Bank	Andhra Pradesh	ANANTAPUR	Ananthapur	Government General Hospital, Ananthapur	515001	08554 275024	9866695858.0	...	MBBS, MD (Pathology)
5	65268fdbc3fb6482062a4ddd	6	Indian Red Cross Society	Andhra Pradesh	ANANTAPUR	Ananthapur	Blood Bank Medical Officer,Blood Bank, Indian ...	515001	8554246344.0	Dist.Secretary 9866023293	...	
6	65268fdbc3fb6482062a4dde	7	Rural Development Trust Hospital Blood Bank	Andhra Pradesh	ANANTAPUR	Bathalapalli	Kadiri Road, Bathalapalli, Ananthapur	515661	08559 244259	9493268861.0	...	MD (Pathology)
7	65268fdbc3fb6482062a4ddf	8	South Central Railway Hospital Blood Bank	Andhra Pradesh	ANANTAPUR	Guntakal	S.C. Railway Hospital, Guntakal, Ananthapuramu	515801	08552 227166	9701374501.0	...	NA
8	65268fdbc3fb6482062a4de0	9	Indian Red Cross Society Blood Bank	Andhra Pradesh	ANANTAPUR	Hindupur	Government General Hospital Blood Bank, Hindup...	515201	08556 225900	NA	...	MBBS
9	65268fdbc3fb6482062a4de1	10	Indian Red Cross Society Blood bank RCH -II KA...	Andhra Pradesh	ANANTAPUR	Kadiri	Ground Floor, APVVP (Government General Hospit...	515591	08494 221544	9989738689.0	...	MBBS, Diploma in Dermatology
10	65268fdbc3fb6482062a4de2	11	S.S.S.I.H.M.S. Blood Bank	Andhra Pradesh	ANANTAPUR	Puttaparthy	Prasanthigram, Puttaparthy, Ananthapuramu	515134	08555 287900	9490360321.0	...	MBBS
11	65268fdbc3fb6482062a4de3	12	District Head Quarters Hospital Blood Bank.	Andhra Pradesh	CHITTOOR	Chittoor	Head Quarters Hospital Compound, Chittoor	517001	NA	9849229482.0	...	MBBS MD (Dermatology)
12	65268fdbc3fb6482062a4de4	13	Indian Red Cross Society	Andhra Pradesh	CHITTOOR	Chittoor	The Secretary, Indian Red Cross Society, D:No:...	517001	8572220287.0		...	
13	65268fdbc3fb6482062a4de5	14	M/s IRCS Blood Bank.	Andhra Pradesh	CHITTOOR	Chittoor	D.No. 20 - 119, Prakasam High Road, Chittor	517001	08572 220287	9849229482.0	...	MBBS, DO
14	65268fdbc3fb6482062a4de6	15	M/s PESIMSR Blood Bank.	Andhra Pradesh	CHITTOOR	Kuppam	PES Institute of medical sciences premises, Ku...	517425	08570 256737	9391833741.0	...	MBBS, MD (Pathology)
15	65268fdbc3fb6482062a4de7	16	Blood Bank AH Madanapalli	Andhra Pradesh	CHITTOOR	Madanapalli	The Blood Bank Medical Officer, Area Hospital,...	517325	8571222087.0		...	
16	65268fdbc3fb6482062a4de8	17	Indian Red Cross Society, Madanapalli RCH 2	Andhra Pradesh	CHITTOOR	Madnapalli	Area Hospital, Patel Road, Madanapalli.	517325	08571 222087	9440580272.0	...	MBBS
17	65268fdbc3fb6482062a4de9	18	Aswini Hospital Blood Bank, TTD	Andhra Pradesh	CHITTOOR	Tirumala	Tirumala Tirupati Devastanam (TTD), Tirumala, ...	517507	9490651605.0	9490651605.0	...	
18	65268fdbc3fb6482062a4dea	19	SVRRGGH - Model Blood Bank	Andhra Pradesh	CHITTOOR	Tirupati	S.V.R.R. Government General Hospital, Tirupati	517502	0877 2286290	NA	...	MBBS, MD (Pathology)

	_id	Sr No	Blood Bank Name	State	District	City	Address	Pincode	Contact No	Mobile	...	Qualification Nodal Officer
19	65268fdbc3fb6482062a4deb	20	Sri Venkateswara Institute of Medical sciences...	Andhra Pradesh	CHITTOOR	Tirupati	Sri Venkateswara Institute of Medical Sciences...	517507	0877 2287777		...	

20 rows × 28 columns

In [10]: `df.info()`

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 2823 entries, 0 to 2822
Data columns (total 28 columns):
 #   Column                       Non-Null Count  Dtype
---  ------                       --------------  -----
 0   _id                          2823 non-null   object
 1   Sr No                        2823 non-null   int64
 2   Blood Bank Name              2823 non-null   object
 3   State                        2823 non-null   object
 4   District                     2823 non-null   object
 5   City                         2823 non-null   object
 6   Address                      2823 non-null   object
 7   Pincode                      2823 non-null   object
 8   Contact No                   2823 non-null   object
 9   Mobile                       2823 non-null   object
 10  Helpline                     2823 non-null   object
 11  Fax                          2823 non-null   object
 12  Email                        2823 non-null   object
 13  Website                      2823 non-null   object
 14  Nodal Officer                2823 non-null   object
 15  Contact Nodal Officer        2823 non-null   object
 16  Mobile Nodal Officer         2823 non-null   object
 17  Email Nodal Officer          2823 non-null   object
 18  Qualification Nodal Officer  2823 non-null   object
 19  Category                     2823 non-null   object
 20  Blood Component Available    2823 non-null   object
 21  Apheresis                    2823 non-null   object
 22  Service Time                 2823 non-null   object
 23  License #                    2823 non-null   object
 24  Date License Obtained        2823 non-null   object
 25  Date of Renewal              2823 non-null   object
 26  Latitude                     2823 non-null   float64
 27  Longitude                    2823 non-null   float64
dtypes: float64(2), int64(1), object(25)
memory usage: 617.7+ KB
```

In [11]: `df.shape`

Out[11]: `(2823, 28)`

Over here we can see that there are 2823 rows in the dataset

In [12]: `df.isnull()`

Out[12]:

	_id	Sr No	Blood Bank Name	State	District	City	Address	Pincode	Contact No	Mobile	...	Qualification Nodal Officer	Category	Blood Component Available	Apheresis	Service Time	License #	L Ob
0	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	
1	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	
2	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	
3	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	
4	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
2818	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	
2819	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	
2820	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	
2821	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	
2822	False	False	False	False	False	False	False	False	False	False	...	False	False	False	False	False	False	

2823 rows × 28 columns

In [13]: `df.isnull().sum()`

```
Out[13]:  _id                            0
          Sr No                          0
          Blood Bank Name                0
          State                          0
          District                       0
          City                           0
          Address                        0
          Pincode                        0
          Contact No                     0
          Mobile                         0
          Helpline                       0
          Fax                            0
          Email                          0
          Website                        0
          Nodal Officer                  0
          Contact Nodal Officer          0
          Mobile Nodal Officer           0
          Email Nodal Officer            0
          Qualification Nodal Officer    0
          Category                       0
          Blood Component Available      0
          Apheresis                      0
          Service Time                   0
          License #                      0
          Date License Obtained          0
          Date of Renewal                0
          Latitude                       0
          Longitude                      0
          dtype: int64
```

Question 1: "How many blood banks are there in the

```python
In [14]:  total_blood_banks = collection.count_documents({})

          print(f"Total number of blood banks: {total_blood_banks}")
```

```
Total number of blood banks: 2823
```

```python
In [15]:  import matplotlib.pyplot as plt

          import plotly.express as px
          # Query the data to get the count of blood banks in each state
          pipeline = [
              {
                  "$group": {
                      "_id": "$State",
                      "count": {"$sum": 1}
                  }
              },
              {
                  "$sort": {"count": -1}
              }
          ]
          result = list(collection.aggregate(pipeline))

          # Extract data for the plot
          states = [doc["_id"] for doc in result]
          counts = [doc["count"] for doc in result]


          # Create a bar chart
          plt.figure(figsize=(12, 6))
          plt.bar(states, counts)
          plt.xlabel("States")
          plt.ylabel("Number of Blood Banks")
          plt.title("Number of Blood Banks in Each State")
          plt.xticks(rotation=45)

          # Display the plot
          plt.tight_layout()
          plt.show()
```

Number of Blood Banks in Each State
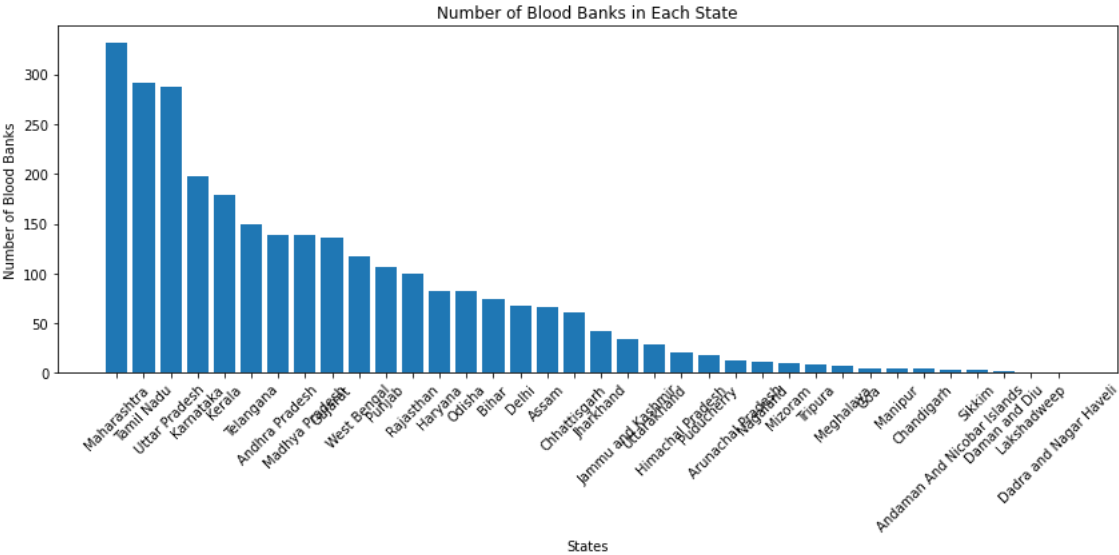
In [16]:
```python
import plotly.express as px
```

Distribution of Blood Banks by Category

In [17]:
```python
# Query the data to get the count of blood banks in each category
pipeline = [
    {
        "$group": {
            "_id": "$Category",
            "count": {"$sum": 1}
        }
    }
]
result = list(collection.aggregate(pipeline))

# Extract data for the plot
categories = [doc["_id"] for doc in result]
counts = [doc["count"] for doc in result]

# Create a pie chart with Plotly
fig = px.pie(
    names=categories,
    values=counts,
    title="Distribution of Blood Banks by Category",
)

# Show the plot
fig.show()
```

Distribution of Blood Banks by Category
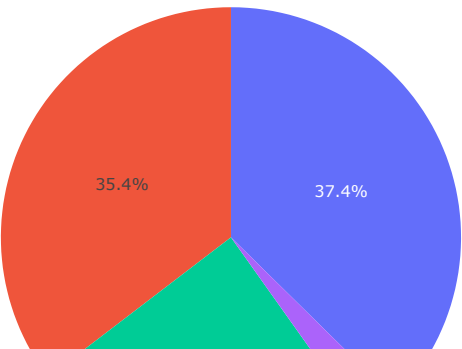
Display the data to get the count of blood banks based on apheresis availability

```python
In [18]:  # Query the data to get the count of blood banks based on apheresis availability
          pipeline = [
              {
                  "$group": {
                      "_id": "$Apheresis",
                      "count": {"$sum": 1}
                  }
              }
          ]
          result = list(collection.aggregate(pipeline))

          # Extract data for the plot
          availability = [doc["_id"] if doc["_id"] is not None else "Not Specified" for doc in result]
          counts = [doc["count"] for doc in result]

          # Create a bar chart with Plotly
          fig = px.bar(
              x=availability,
              y=counts,
              title="Distribution of Blood Banks by Apheresis Availability",
              labels={"x": "Apheresis Availability", "y": "Number of Blood Banks"},
          )

          # Show the plot
          fig.show()
```

Distribution of Blood Banks by Apheresis Availability
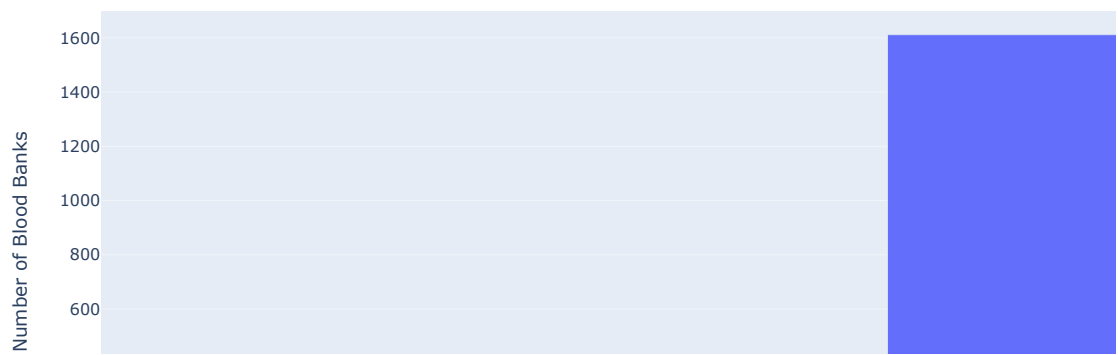
Question 2: "What is the distribution of blood banks by state?"

```python
In [19]:  # Query
          pipeline = [
              {"$group": {"_id": "$State", "count": {"$sum": 1}}},
              {"$sort": {"count": -1}}
          ]
          state_distribution = list(collection.aggregate(pipeline))

          for state_info in state_distribution:
              print(f"State: {state_info['_id']}, Number of Blood Banks: {state_info['count']}")
```

```
State: Maharashtra, Number of Blood Banks: 332
State: Tamil Nadu, Number of Blood Banks: 291
State: Uttar Pradesh, Number of Blood Banks: 288
State: Karnataka, Number of Blood Banks: 198
State: Kerala, Number of Blood Banks: 179
State: Telangana, Number of Blood Banks: 149
State: Andhra Pradesh, Number of Blood Banks: 139
State: Madhya Pradesh, Number of Blood Banks: 139
State: Gujarat, Number of Blood Banks: 136
State: West Bengal, Number of Blood Banks: 117
State: Punjab, Number of Blood Banks: 106
State: Rajasthan, Number of Blood Banks: 100
State: Haryana, Number of Blood Banks: 82
State: Odisha, Number of Blood Banks: 82
State: Bihar, Number of Blood Banks: 74
State: Delhi, Number of Blood Banks: 68
State: Assam, Number of Blood Banks: 66
State: Chhattisgarh, Number of Blood Banks: 61
State: Jharkhand, Number of Blood Banks: 42
State: Jammu and Kashmir, Number of Blood Banks: 34
State: Uttarakhand, Number of Blood Banks: 29
State: Himachal Pradesh, Number of Blood Banks: 21
State: Puducherry, Number of Blood Banks: 18
State: Arunachal Pradesh, Number of Blood Banks: 12
State: Nagaland, Number of Blood Banks: 11
State: Mizoram, Number of Blood Banks: 10
State: Tripura, Number of Blood Banks: 8
State: Meghalaya, Number of Blood Banks: 7
State: Goa, Number of Blood Banks: 5
State: Manipur, Number of Blood Banks: 5
State: Chandigarh, Number of Blood Banks: 4
State: Andaman And Nicobar Islands, Number of Blood Banks: 3
State: Sikkim, Number of Blood Banks: 3
State: Daman and Diu, Number of Blood Banks: 2
State: Lakshadweep, Number of Blood Banks: 1
State: Dadra and Nagar Haveli, Number of Blood Banks: 1
```

In [20]:
```python
import plotly.express as px

# Pymongo Query
pipeline = [
    {"$group": {"_id": "$State", "count": {"$sum": 1}}}]

state_distribution = list(collection.aggregate(pipeline))

# Prepare the data for the pie chart
state_names = [state['_id'] for state in state_distribution]
state_counts = [state['count'] for state in state_distribution]

# Create the pie chart
fig = px.pie(names=state_names, values=state_counts, title="Distribution of Blood Banks by State")
fig.show()
```


Distribution of Blood Banks by State
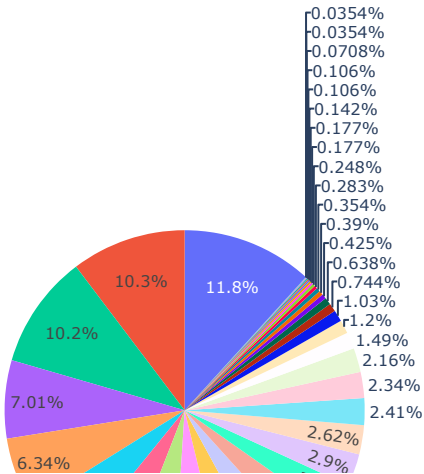
Question 3: "Which blood banks are open 24/7 (service time is '24X7')?"

In [21]:
```python
open_24_7_blood_banks = collection.find({"Service Time": "24X7"})


for blood_bank in open_24_7_blood_banks:
    print(f"Blood Bank: {blood_bank['Blood Bank Name']}, Service Time: 24X7")
```

Blood Bank: G.B. Pant Hospital Blood bank, Service Time: 24X7
Blood Bank: I.N.H.S. Dhanvantri, Service Time: 24X7
Blood Bank: Pillar Health Centre Blood Bank, Service Time: 24X7
Blood Bank: M/s PESIMSR Blood Bank., Service Time: 24X7
Blood Bank: Indian Red Cross Society, Madanapalli RCH 2, Service Time: 24X7
Blood Bank: NRI Medical College and General Hospital Blood Bank, Service Time: 24X7
Blood Bank: NRT Blood Bank, Service Time: 24X7
Blood Bank: Anjireddy Multi Specality Blood Bank, Service Time: 24X7
Blood Bank: Best Rotary Blood Bank, Service Time: 24X7
Blood Bank: M/s. Anil Neerukonda Hospital Blood Bank, Service Time: 24X7
Blood Bank: M/s. Lions Club of Visakhapatnam Blod Bank Trust, Service Time: 24X7
Blood Bank: M/s. N.T.R. Memorial Trust Blood Bank, Service Time: 24X7
Blood Bank: ASN Raju Charitable Trust Blood Bank, Service Time: 24X7
Blood Bank: Uddaraju Anandaraju Foundation Blood Bank, Service Time: 24X7
Blood Bank: M/s. Alluri Sitrarama Raju Academy of Medical Sciences Blood Bank, Service Time: 24X7
Blood Bank: M/s. Good Samaritan Blood Bank, Service Time: 24X7
Blood Bank: M/s. Indian Red Cross Society Blood Bank jangareddi gudem, Service Time: 24X7
Blood Bank: Palakol Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Sri Buddala Narasimhamurty Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Meera Nursing Home Blood Bank and Research Centre, Service Time: 24X7
Blood Bank: Rastra Kavi Dinkar Blood Bank, Service Time: 24X7
Blood Bank: Sadar Hospital Ara Blood Bank, Service Time: 24X7
Blood Bank: Sadar Hospital Jamui Blood Bank, Service Time: 24X7
Blood Bank: Mata Gujri Memorial Medical College & Lions Kenra Hospital Blood Bank, Service Time: 24X7
Blood Bank: Sadar Hospital Muzaffarpur Blood Bank, Service Time: 24X7
Blood Bank: Indian Red Cross Society (IRCS) Blood Bank, Service Time: 24X7
Blood Bank: Daman Raktadan Kendra, Service Time: 24X7
Blood Bank: Diu District Blood Bank, Service Time: 24X7
Blood Bank: Pitampura Blood Bank, Service Time: 24X7
Blood Bank: Holy Family Hospital Blood Bank, Service Time: 24X7
Blood Bank: Rockland Hospital Qutab Blood Bank, Service Time: 24X7
Blood Bank: Mata Chanan Devi Hospital Blood Bank, Service Time: 24X7
Blood Bank: Jan Jagriti Blood Bank, Service Time: 24X7
Blood Bank: V. S. Hospital Blood Bank, Service Time: 24X7
Blood Bank: Smt. Shardaben Hospital Blood Bank, Service Time: 24X7
Blood Bank: L. G. Hospital Blood Bank, Service Time: 24X7
Blood Bank: Civil Hospital Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Sola, Service Time: 24X7
Blood Bank: Indian Red Cross Society Blood Bank, Service Time: 24X7
Blood Bank: The Gujarat Cancer & Research Institute Blood Bank, Service Time: 24X7
Blood Bank: Institute of Kidney Disease and Research Centre, Service Time: 24X7
Blood Bank: Help Voluntary Blood Bank, Service Time: 24X7
Blood Bank: GUJARAT CANCER MEDICAL COLLEGE, Service Time: 24X7
Blood Bank: General Hospital Blood Bank, Service Time: 24X7
Blood Bank: Military Hospital Blood Bank, Service Time: 24X7
Blood Bank: Dr. Jivraj Mehta Smarak Health Foundation Blood Bank, Service Time: 24X7
Blood Bank: Gujarat Blood Bank Paldi, Service Time: 24X7
Blood Bank: Karnavati Blood Bank and Pathology Lab, Service Time: 24X7
Blood Bank: Cross World Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Maha Gujarat Blood Bank, Service Time: 24X7
Blood Bank: Supratech Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Sterling Hospital, Service Time: 24X7
Blood Bank: Ami Pathology Laboratory and Blood Bank, Service Time: 24X7
Blood Bank: Gujarat Blood Bank Naranpura, Service Time: 24X7
Blood Bank: Indian Red Cross Society Blood Bank, Service Time: 24X7
Blood Bank: Indian Red Cross Society Blood Bank, Service Time: 24X7
Blood Bank: Indu Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Ghanshyam Pathlology Laboratory and Blood Bank, Service Time: 24X7
Blood Bank: Lions Club Khambat Blood Bank, Service Time: 24X7
Blood Bank: A.D. Gorwala Karamsad Blood Bank, Service Time: 24X7
Blood Bank: Indian Red Cross Society Blood Bank Petlad, Service Time: 24X7
Blood Bank: Gandhi Lincon Hospital Blood Bank, Service Time: 24X7
Blood Bank: M. U. Pethani Voluntary Blood Bank, Palanpur, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Palanpur, Service Time: 24X7
Blood Bank: Gayatri Pathology Laboratory and Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Bhoomi Voluntary Blood Bank Palanpur, Service Time: 24X7
Blood Bank: Indian Red Cross Society Blood Bank, Service Time: 24X7
Blood Bank: Sir T. General Hospital Blood Bank, Service Time: 24X7
Blood Bank: Bhavnagar Blood Bank, Service Time: 24X7
Blood Bank: Bambhaniya Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Navkar Charitable Trust Mahuva Blood Bank, Service Time: 24X7
Blood Bank: Smt. Sonalien A. Shah Blood Bank, Service Time: 24X7
Blood Bank: Kiran Voluntary Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Ahwa, Service Time: 24X7
Blood Bank: Indian Red Cross Society (IRCS), Kalol, Gandhinagar, Service Time: 24X7
Blood Bank: GMERS MEDICL COLLEGE ATTACHED GENERAL HOSPITAL, GANDHINAGAR, Service Time: 24X7
Blood Bank: Apollo Hospital International Limited Blood Bank, Service Time: 24X7
Blood Bank: Indian Medical Association (IMA) Blood Bank, Service Time: 24X7
Blood Bank: G.G.Hospital Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank, Service Time: 24X7
Blood Bank: Tata Chemical Limited Blood Bank Mithapur, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Junagadh, Service Time: 24X7
Blood Bank: Divyajyoti Charitable Voulantary Blood Bank, Service Time: 24X7
Blood Bank: Shri Jivanprakash Foundation Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Navjeevan Blood Bank and Clinical Laboratory, Veraval, Service Time: 24X7
Blood Bank: Navdeep Blood Bank, Service Time: 24X7
Blood Bank: Sardar Patel voulantary Blood Bank, Keshod, Service Time: 24X7
Blood Bank: G.K. General Hospital Blood Bank, Bhuj, Service Time: 24X7
Blood Bank: Rajabhai Patel Blood Bank (IMA), Service Time: 24X7
Blood Bank: Jivan Jyot Blood Bank, Service Time: 24X7
Blood Bank: Matrushri Meghbai Pramji Jetha Hospital and Research Centre, Bhuj, Service Time: 24X7
Blood Bank: Indian Red Cross Society Blood Bank, Service Time: 24X7
Blood Bank: Indian Red Cross Society Blood Bank Nadiad, Service Time: 24X7
Blood Bank: Muljibhai Patel Urological Hospital Blood Bank, Service Time: 24X7
Blood Bank: Gujarat Methodist Church Cardiac Care and Research Society Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Mehsana, Service Time: 24X7

Blood Bank: Mehsana Jaycees Charitable Trust Blood Bank, Service Time: 24X7
Blood Bank: Sardar Seva Trust, Unjha Nagrik Sahkari Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Visnagar Voluntary Blood Bank, Service Time: 24X7
Blood Bank: Indian Red Cross Society Blood Bank Navsari, Service Time: 24X7
Blood Bank: Lions Medical Trust Blood Bank Chikhali, Service Time: 24X7
Blood Bank: N. M. Patel Blood Bank Bilimora, Service Time: 24X7
Blood Bank: Indian red Cross Society Blood Bank Godhara, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Godhra,, Service Time: 24X7
Blood Bank: Raktdan Kendra Voluntary Blood Bank Godhra, Service Time: 24X7
Blood Bank: Seventilal Kantilal Blood Bank, Service Time: 24X7
Blood Bank: GMERS Medical College and Hospital Blood Bank Dharpur, Service Time: 24X7
Blood Bank: Bahansali Trust Raktdan Kendra, Radhanpur, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Siddhpur, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Porbandar, Service Time: 24X7
Blood Bank: Asha Children Hospital and Blood Bank, Service Time: 24X7
Blood Bank: Astha Voluntary Blood Bank Gondal, Service Time: 24X7
Blood Bank: P.D.U. Medical College Blood Bank, Service Time: 24X7
Blood Bank: Rajkot Voluntary Blood Bank and Research Centre, Service Time: 24X7
Blood Bank: Red Cross Blood Bank Rajkot, Service Time: 24X7
Blood Bank: Saurastra Voluntary Blood Bank Rajkot, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Morbi, Service Time: 24X7
Blood Bank: Nationality Development Foundation Blood Bank Rajkot, Service Time: 24X7
Blood Bank: Nathani Voluntary Blood Bank, Rajkot, Service Time: 24X7
Blood Bank: Shiv Voluntary Blood Bank Morbi, Service Time: 24X7
Blood Bank: Jetpur Medical Foundation Trust Blood Bank Jetpur, Service Time: 24X7
Blood Bank: Jagruti Charitable Trust Blood Bank Dhoraji, Service Time: 24X7
Blood Bank: GMERS Medical College Attach Sir Pratap General Hospital Blood Bank, Service Time: 24X7
Blood Bank: Indian Red Cross Society Blood Bank Himmatnagar, Service Time: 24X7
Blood Bank: Patel Voluntary Blood Bank Modasa, Service Time: 24X7
Blood Bank: Trimurti Blood Bank, Service Time: 24X7
Blood Bank: Late N.H. Ramani Memorial Voluntary Blood Bank and Navchetan Pathology Lab Modasa, Service Time: 24X7
Blood Bank: New Civil Hospital Blood Bank, Service Time: 24X7
Blood Bank: Surat Raktdan Kendra, Service Time: 24X7
Blood Bank: Lok Samarpan Raktadan Kendra, Surat, Service Time: 24X7
Blood Bank: Shree Mahavir Health And Medical Relief Society Blood Bank, Service Time: 24X7
Blood Bank: Shree Sardar Smarak Hospital Blood Bank, Service Time: 24X7
Blood Bank: SMIMER Hospital Blood Bank, Service Time: 24X7
Blood Bank: Surat Health Care Foundation Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Surendranagar Blood Bank, Service Time: 24X7
Blood Bank: C. U. Shah Medical College and Hospital Blood Bank, Service Time: 24X7
Blood Bank: Sharddha Voluntary Blood Bank and Pathology Laboratory Dhangadhra, Service Time: 24X7
Blood Bank: Laxmiben Kushalbhai Patel Blood Bank, Service Time: 24X7
Blood Bank: Maliba Raktdan Kendra (IRCS), Service Time: 24X7
Blood Bank: S. S. G. Hospital Vadodara, Service Time: 24X7
Blood Bank: Jamnabai Blood Bank, Service Time: 24X7
Blood Bank: Medical Care Centre Trust, Shri Jalaram Blood Bank, Vadodara, Service Time: 24X7
Blood Bank: Suraktam Blood Bank Vadodara, Service Time: 24X7
Blood Bank: Kailash Cancer Hospital & Research Centre Blood Bank., Service Time: 24X7
Blood Bank: GMERS Medical College and General Hospital Blood Bank, Service Time: 24X7
Blood Bank: Indu Blood Bank Vadodara, Service Time: 24X7
Blood Bank: Dhiraj General Blood Bank Vadodara, Service Time: 24X7
Blood Bank: Bhailal Amin General Hospital Blood Bank, Service Time: 24X7
Blood Bank: SBPP Cooperative Bank Foundation Blood Bank, Service Time: 24X7
Blood Bank: General Hospital and GMERS Medical College Blood Bank, Service Time: 24X7
Blood Bank: Valsad Raktdan Kendra, Service Time: 24X7
Blood Bank: Nukem Blood Bank, Vapi, Service Time: 24X7
Blood Bank: Smt. Puriben Popat Lakha Blood Bank, Service Time: 24X7
Blood Bank: MM Institute of Medical Sciences and Research Blood Bank, Service Time: 24X7
Blood Bank: Sanjeevani Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Ambala City, Service Time: 24X7
Blood Bank: General Hospital Bhiwani Blood Bank, Service Time: 24X7
Blood Bank: Gold Field Hospital and Research Centre, Service Time: 24X7
Blood Bank: Badshah Khan General Hospital Blood Bank, Service Time: 24X7
Blood Bank: Escorts Hospital and Research Center Limited Blood Bank, Service Time: 24X7
Blood Bank: M/s Sunflag Hospital and Research Centre Blood Bank, Service Time: 24X7
Blood Bank: Sarvodaya Hospital and Research Centre, Service Time: 24X7
Blood Bank: QRG Central Hospital and Research Centre Blood Bank, Service Time: 24X7
Blood Bank: Asian Institute of Medical Sciences Blood Bank, Service Time: 24X7
Blood Bank: Metro Heart Institute with Multispecialty, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Fatehabad, Service Time: 24X7
Blood Bank: Jagdambe Blood Bank, Service Time: 24X7
Blood Bank: Paras Health Care Private Limited Blood Bank, Service Time: 24X7
Blood Bank: Artemis Medicare Services Limited Blood Bank, Service Time: 24X7
Blood Bank: Medanta The Medicity Hospital Blood Bank, Service Time: 24X7
Blood Bank: Alchemist Institute of Medical Sciences Blood Bank, Service Time: 24X7
Blood Bank: SGT Medical College Hospital and Research Institute Blood Bank, Service Time: 24X7
Blood Bank: Park Hospital Blood Bank, Service Time: 24X7
Blood Bank: Fortis Memorial Research Institute Blood Bank, Service Time: 24X7
Blood Bank: Fortis Memorial Research Institute Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank, Gurugram, Service Time: 24X7
Blood Bank: Nalwa Pathology and Microbiology Laboratory Blood Bank, Service Time: 24X7
Blood Bank: Central Medical Centre (CMC) Hospital Blood Bank, Service Time: 24X7
Blood Bank: Haryana Blood Bank, Service Time: 24X7
Blood Bank: Manglam Blood Bank, Service Time: 24X7
Blood Bank: Dr. Anant Ram Janta Hospital Blood Bank, Service Time: 24X7
Blood Bank: National Blood Bank, Kharab Hospital Blood Bank, Service Time: 24X7
Blood Bank: Sarvodaya Blood Bank services, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Hisar, Service Time: 24X7
Blood Bank: Maharaja Agrasen Medical College, Agroha, Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Jhajjar, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Jind, Service Time: 24X7
Blood Bank: Gangaputra Hospital and Research Centre Blood Bank, Service Time: 24X7
Blood Bank: Smt. Indira Gandhi Government Multispeciality Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Karnal, Service Time: 24X7
Blood Bank: Nirmal Institute of Medical Sciences and Technology Blood Bank, Service Time: 24X7
Blood Bank: Pandit Ram Prakash Hospital and Kidney Centre Blood Bank, Service Time: 24X7

Blood Bank: Save Life Blood Bank, Service Time: 24X7
Blood Bank: LNJP District Government Hospital Blood Bank, Service Time: 24X7
Blood Bank: Kurukshetra Blood Bank, Service Time: 24X7
Blood Bank: Civil Hospital Narnaul, Service Time: 24X7
Blood Bank: Shaheed Hasan Khan Mewati Government Medical College Blood Bank, Service Time: 24X7
Blood Bank: Diamond Blood Bank LLT, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Palwal, Service Time: 24X7
Blood Bank: Alchemist Hospital Panchkula Blood Bank, Service Time: 24X7
Blood Bank: District Hospital Panchkula Blood Bank, Service Time: 24X7
Blood Bank: Red Cross Blood Bank, Service Time: 24X7
Blood Bank: Prem Blood Bank, Service Time: 24X7
Blood Bank: Panipat Blood Bank, Service Time: 24X7
Blood Bank: Rewari Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Rewari Blood Bank, Service Time: 24X7
Blood Bank: Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences (PGIMS) Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Sirsa, Service Time: 24X7
Blood Bank: Shiv Shakti Blood Bank, Service Time: 24X7
Blood Bank: Bapu Maghar Singh Ji International Blood Bank, Service Time: 24X7
Blood Bank: General Hospital Blood Bank Sonipat, Service Time: 24X7
Blood Bank: Sonipat Blood Bank, Service Time: 24X7
Blood Bank: Bhagat Phool Singh Government Medical College for Women Blood Bank, Service Time: 24X7
Blood Bank: Shree MAA Blood Bank, Service Time: 24X7
Blood Bank: MLGH Trauma Centre Yamuna Nagar Blood Bank, Service Time: 24X7
Blood Bank: Bilaspur Regional Hospital Blood bank, Service Time: 24X7
Blood Bank: Chamba Regional Hospital Blood Bank, Service Time: 24X7
Blood Bank: Dharamshala Zonal Hospital Blood Bank, Service Time: 24X7
Blood Bank: Dr Rajendra Prasad Government Medical College (RPGMC) Blood Bank Tanda, Service Time: 24X7
Blood Bank: Military Hospital,Yol Cant, Kangra, Service Time: 24X7
Blood Bank: Civil Hospital Blood Bank Palampur, Service Time: 24X7
Blood Bank: Kullu Regional Hospital Blood Bank, Service Time: 24X7
Blood Bank: Netaji Subhash Chander Bose Zonal Hospital Blood Bank, Service Time: 24X7
Blood Bank: Rohru Civil Hospital Blood Bank, Service Time: 24X7
Blood Bank: Indira Gandhi Medical College Blood Bank Shimla, Service Time: 24X7
Blood Bank: Kamla Nehru Hospital Blood Bank, Service Time: 24X7
Blood Bank: Mahatma Gandhi Medical Services Blood Bank Rampur, Service Time: 24X7
Blood Bank: Nahan Regional Hospital Blood Bank, Service Time: 24X7
Blood Bank: Maharishi Markendeshwar Medical College and Hospital Blood Bank, Service Time: 24X7
Blood Bank: Solan Regional Hospital Blood Bank, Service Time: 24X7
Blood Bank: Una Regional Hospital Blood Bank, Service Time: 24X7
Blood Bank: MMAB memorial District Hospital Blood Bank Anantnag, Service Time: 24X7
Blood Bank: Doda District Hospital Blood Bank, Service Time: 24X7
Blood Bank: Government Hospital Blood Bank Gandhi Nagar, Service Time: 24X7
Blood Bank: Government Medical College and Hospital Blood Bank, Service Time: 24X7
Blood Bank: Sri Maharaja Gulab Singh (SMGS) Hospital Blood Bank, Service Time: 24X7
Blood Bank: Bee Enn General Hospital Blood Bank, Service Time: 24X7
Blood Bank: Kishtwar District Hospital Blood Bank, Service Time: 24X7
Blood Bank: SNM Hospital Blood Bank, Service Time: 24X7
Blood Bank: Raja Sukhdev Singh District Hospital Poonch, Service Time: 24X7
Blood Bank: General Hospital Blood Bank (Army), Service Time: 24X7
Blood Bank: Rajouri District Hospital Blood Bank, Service Time: 24X7
Blood Bank: Ramban District Hospital Blood Bank, Service Time: 24X7
Blood Bank: District Hospital Blood Bank Shopian, Service Time: 24X7
Blood Bank: Shri Maharaja Hari Singh (SMHS) Hospital Blood Bank, Service Time: 24X7
Blood Bank: 92 Base Hospital Blood Bank, Service Time: 24X7
Blood Bank: Sher-I-Kashmir Institute of Medical Sciences (SKIMS) Blood bank, Service Time: 24X7
Blood Bank: Government Lal Ded Hospital Blood Bank, Service Time: 24X7
Blood Bank: Government Bone and Joint Surgery Hospital Blood Bank, Service Time: 24X7
Blood Bank: Jawahar Lal Nehru Memorial Hospital Blood Bank, Service Time: 24X7
Blood Bank: Command Hospital Blood Bank, Service Time: 24X7
Blood Bank: Udhampur District Hospital Blood Bank, Service Time: 24X7
Blood Bank: K.M. Memorial Hospital & Research Center Blood Bank, Service Time: 24X7
Blood Bank: Deoghar Sadar Hospital Campus Blood Bank, Service Time: 24X7
Blood Bank: Patliputra Medical college and Hospital (PMCH) Blood Bank Dhanbad, Service Time: 24X7
Blood Bank: Central Hospital Blood Bank BCCL Dhanbad, Service Time: 24X7
Blood Bank: S. N. Chakraborty Memorial Chakraborty Nursing Home Blood Bank, Service Time: 24X7
Blood Bank: Dwarka Das Jalan Memorial Hospital Bartand Blood Bank, Service Time: 24X7
Blood Bank: Dumka Sadar Hospital Blood Bank, Service Time: 24X7
Blood Bank: MGM Medical College Hospital Campus Blood Bank Jamshedpur, Service Time: 24X7
Blood Bank: Jamshedpur Blood Bank, Service Time: 24X7
Blood Bank: Garhwa Sadar Hospital Campus Blood Bank, Service Time: 24X7
Blood Bank: Giridih Sadar Hospital Blood Bank, Service Time: 24X7
Blood Bank: Gumla Sadar Hospital Blood Bank, Service Time: 24X7
Blood Bank: Hazaribag Sadar Hospital Blood Bank, Service Time: 24X7
Blood Bank: TISCO West Bokaro Hospital Blood Bank, Service Time: 24X7
Blood Bank: Koderma Sadar Hospital Blood Bank, Service Time: 24X7
Blood Bank: Lohardaga Sadar Hospital Blood Bank, Service Time: 24X7
Blood Bank: Palamu Sadar Hospital Blood Bank, Service Time: 24X7
Blood Bank: CCL Hospital Blood Bank Ramgarh, Service Time: 24X7
Blood Bank: Military Hospital Blood Bank Ramgarh, Service Time: 24X7
Blood Bank: Apurva Blood Bank Ramgarh, Service Time: 24X7
Blood Bank: Heavy Engineering Corporation, Plant Hospital Blood Bank, Service Time: 24X7
Blood Bank: Rajendra Institute of Medical Science (RIMS) Blood Bank, Bariyatu, Service Time: 24X7
Blood Bank: CCL Hospital Blood Bank Ranchi, Service Time: 24X7
Blood Bank: Indian Red Cross Society (IRCS) Blood Bank Morabadi, Service Time: 24X7
Blood Bank: Abdur Razzaque Memorial Weavers Hospital (ARAM) Blood Bank, Service Time: 24X7
Blood Bank: Nagarmal Modi Seva Sadan Hospital Blood Bank, Service Time: 24X7
Blood Bank: Rinchi Trust Hospital Blood Bank, Service Time: 24X7
Blood Bank: Devkamal Hospital and Research Centre Blood Bank, Service Time: 24X7
Blood Bank: Gurunanak Hospital and Research Centre Blood Bank, Service Time: 24X7
Blood Bank: Sainik Hospital Blood Bank Namkum, Service Time: 24X7
Blood Bank: Birsa Blood Bank Bariyatu, Service Time: 24X7
Blood Bank: Jharkhand Blood Bank Bariatu, Service Time: 24X7
Blood Bank: Archi Blood Bank Jharkhand, Service Time: 24X7
Blood Bank: Sahebganj Sadar Hospital Blood Bank, Service Time: 24X7
Blood Bank: Simdega Sadar Hospital Blood Bank, Service Time: 24X7
Blood Bank: Chaibasa Sadar Hospital Blood Bank, Service Time: 24X7

Blood Bank: Kiriburu Meghahatuburu General Hospital Blood Bank, Service Time: 24X7
Blood Bank: TATA (TISCO) Hospital Blood bank, Service Time: 24X7
Blood Bank: Bagalkot Blood Bank, Service Time: 24X7
Blood Bank: B. V. V. Sanghas HSK Hospital Blood Bank, Service Time: 24X7
Blood Bank: District Hospital Blood Bank Bagalkot, Service Time: 24X7
Blood Bank: M/s. Vijay Mahant Blood Bank, Service Time: 24X7
Blood Bank: Mounesh Hospital's The Jhamkandi Blood Bank, Service Time: 24X7
Blood Bank: Ramanagoudar Hospital Blood Bank, Service Time: 24X7
Blood Bank: M/s. Sai Aadhar Hospital Blood Bank, Service Time: 24X7
Blood Bank: K.L.E.Society & Medical Research Centre Blood Bank, Service Time: 24X7
Blood Bank: Belgaum Blood Bank and Diagnostic Laboratory, Service Time: 24X7
Blood Bank: District Hospital Blood Bank, Service Time: 24X7
Blood Bank: Shree Mahaveer Blood Bank, Service Time: 24X7
Blood Bank: M/s. Sri Sai Blood Bank, Service Time: 24X7
Blood Bank: Rotary Charitable Trust Blood Bank, Service Time: 24X7
Blood Bank: Rotary Seva Sangh Blood Bank, Service Time: 24X7
Blood Bank: Medical College Hospital Blood Bank, Service Time: 24X7
Blood Bank: District Hospital Blood Bank Bellary, Service Time: 24X7
Blood Bank: Swamy Vivekananda Charitable Blood Bank, Service Time: 24X7
Blood Bank: Smt. Vasantidevi Baldota Blood Bank, Service Time: 24X7
Blood Bank: Chiranjeevi Blood Bank, Service Time: 24X7
Blood Bank: M/s. Sri Siddartha Medical College Hospital Blood Bank, Service Time: 24X7
Blood Bank: MVJ Medical College and Research Hospital Blood Bank, Service Time: 24X7
Blood Bank: BGS Global Hospitals Blood Bank, Service Time: 24X7
Blood Bank: Harsha Hospital Blood Bank, Service Time: 24X7
Blood Bank: Narayana Hrudayalaya Blood Bank, Service Time: 24X7
Blood Bank: Government Haji Sir Ismail Sait Gosha Hospital Blood Bank, Service Time: 24X7
Blood Bank: Swamy Vivekananda Voluntary Blood Bank, Service Time: 24X7
Blood Bank: M/s. Aster CMI Hospital Blood Bank, Service Time: 24X7
Blood Bank: M/s. East Point Hospital Blood Bank Virgonagar, Service Time: 24X7
Blood Bank: Unique Blood Bank & Diagnostic Centre, Service Time: 24X7
Blood Bank: SHUSHRUTHA VOLUNTARY BLOOD BANK, Service Time: 24X7
Blood Bank: E.S.I.Hospital Blood Bank, Service Time: 24X7
Blood Bank: Rashtrotthana Blood Bank, Service Time: 24X7
Blood Bank: Life Care Voluntary Blood Bank, Service Time: 24X7
Blood Bank: The Oxford Medical College Hospital Blood Bank and Research Centre, Service Time: 24X7
Blood Bank: INDIAN RED CROSS SOCIETY, Service Time: 24X7
Blood Bank: Hubli Lions Blood Bank, Service Time: 24X7
Blood Bank: M/S Indian Red Cross Society, Service Time: 24X7
Blood Bank: District Hospital, Service Time: 24X7
Blood Bank: NIMS Hospital Blood Bank, Service Time: 24X7
Blood Bank: District Hospital, Service Time: 24X7
Blood Bank: District Hospital, Service Time: 24X7
Blood Bank: SIDDHESHWAR BLOOD BANK, Service Time: 24X7
Blood Bank: District Hospital Blood Bank, Service Time: 24X7
Blood Bank: Sant Baba Rangi Ram Ji Charitable Hospital Blood Bank, Service Time: 24X7
Blood Bank: RAJKIYA MAHILA CHIKITSALAYA, AJMER, Service Time: 24X7
Blood Bank: GBH American Hospital Blood bank, Service Time: 24X7
Blood Bank: CANCER INSTITUTE HOSPITAL BLOOD BANK, Service Time: 24X7
Blood Bank: Rajiv Gandhi Government General Hospital, Service Time: 24X7
Blood Bank: The Institute of Child Health and Hospital for Children, Service Time: 24X7
Blood Bank: Southern Railway Headquarters Hospital, Service Time: 24X7
Blood Bank: Jeevan Blood Bank and Research Centre, Service Time: 24X7
Blood Bank: Apollo Speciality Hospital Blood Bank, Service Time: 24X7
Blood Bank: Vijaya Hospital Blood Bank, Service Time: 24X7
Blood Bank: MIOT Hospital Blood Bank, Service Time: 24X7
Blood Bank: Rotary Blood Bank, Service Time: 24X7
Blood Bank: St Thomas Blood Bank and Research Centre St Thomas Hospital, Service Time: 24X7
Blood Bank: Right Hospitals Blood Bank, Service Time: 24X7
Blood Bank: Landsteiner Lakshmi Memorial Research Foundation, Service Time: 24X7
Blood Bank: Government Peripheral Hospital Blood Bank, Service Time: 24X7
Blood Bank: ESI Hospital Blood Bank, Service Time: 24X7
Blood Bank: Rotary Central TTK Voluntary Health Services (Dr Raganathan Memorial Blood Bank), Service Time: 24X7
Blood Bank: Muthukumaran Medical College Hospital and Research Institute, Service Time: 24X7
Blood Bank: Fortis Malar Hospitals Limited Blood Bank, Service Time: 24X7
Blood Bank: Government Stanley Hospital Blood Bank, Service Time: 24X7
Blood Bank: Lions Club of Coimbatore Legend Blood Bank Research Centre, Service Time: 24X7
Blood Bank: Kamaraj Government Hospital Blood Bank, Service Time: 24X7
Blood Bank: Idayam Hospitals Erode Limited Blood Bank, Service Time: 24X7
Blood Bank: Military Hospital Blood Bank, St. Thomas Mount, Service Time: 24X7
Blood Bank: Government Head quarters Hospital, Service Time: 24X7
Blood Bank: Narayana Hrudayalaya Mallareddy Hospital Blood Bank, Service Time: 24X7
Blood Bank: Military Hospital, Service Time: 24X7
Blood Bank: Samarpan Blood Bank, Service Time: 24X7
Blood Bank: G.R. Hospital and Research Centre Private limited, Service Time: 24X7
Blood Bank: Har Prasad Blood Bank, Service Time: 24X7
Blood Bank: Mahamaya Rajkiya Allopathic Medical College, Service Time: 24X7
Blood Bank: Yashoda Hospital and Research, Service Time: 24X7
Blood Bank: District Hospital Blood Bank, Service Time: 24X7

Question 4: "What are the blood banks in a specific city?"

In [22]:
```python
# lets suppose city is mumbai
city = "Mumbai"
blood_banks_in_city = collection.find({"City": city})


print(f"Blood Banks in {city}:")
for blood_bank in blood_banks_in_city:
    print(blood_bank['Blood Bank Name'])
```

```
Blood Banks in Mumbai:
Global Hospital Blood Bank
ACTREC
Deepak Foundation&#39;s Anviksha Blood Bank
Ashirwad Blood Bank
Asian Heart Institute and Research Center
B.S.E.S M.G. Hospital Blood Bank
Bandra Holy Family Hospital Society Blood Bank
Bhabha Atomic Research Centre Hospital Blood Bank
Bhatia General Hospital and Blood Bank
Bombay Hospital Trust Blood Bank
Borivali Blood Bank (Doshi Memorial Charitable Trust)
Breach Candy Hospital And Research Centre Blood Bank
B. Y. L. Nair Hospital Blood Bank
Cama and Albles Hospital - Abdul Fazalbhoy Blood Bank
Cumbala Hill Hospital And Heart Institute Blood Bank
Dr. Babasaheb Ambedkar Memorial Hospital - Central Railway Hospital Blood Bank
Dr. L. H. Hiranandani Hospital Blood Bank
ESIC Model Hospital cum ODC Blood Bank
Fortis Hospital Blood Bank
G. T. Hospital Blood Bank
Hematology Laboratory Blood Bank
Harilal Bhagwati Hospital Blood Bank
Suburban Hi-tech Blood Bank
Holy Spirit Hospital Blood Bank
Indian Red Cross Society Bombay City Branch Blood Bank
INS - Ashwini Blood Bank
Jaslok Hospital And Research Centre Blood Bank
K. B. Bhabha General Hospital Blood Bank
K. J. Somaiya Medical College and Hospital Blood Bank
Kapoorben Vasanji Lathiya Blood Bank - Nanavati Hospital
K. E. M. Hospital Blood Bank
Kohinoor Hospital Blood Bank
Kokilaben Dhirubhai Ambani Blood Bank
Lilavati Hospital and Research Centre Blood Bank
Lokmanya Tilak Municipal Hospital Blood Bank
M. T. Agarwal Municipal General Hospital Blood Bank
Mahatma Gandhi Seva Mandir Blood Bank
Manas Serological Institute Blood Bank
Masina Hospital Blood Bank
Mumbai Port Trust Blood Bank
N.  Wadia Maternity  Hospital Blood Bank
Matoshri Valbai Mulji Shah - Arpan Blood Bank
Navjivan Blood Bank and Lab
P. D. Hinduja National Hospital And Medical Research Centre Blood Bank
Meenatai Thackeray Blood Bank - Siddharth Hospital
Prince Aly Khan Hospital Blood Bank
Dr. R. N. Cooper General Hospital Blood Bank
Rajawadi Blood Bank - Seth V. C. Gandhi & M. A. Vora Municipal General Hospital
S. L. Raheja Hospital Blood Bank
S. R. Mehta and Sir. K.P. Cardiac Institute Blood Bank
Saifee Hospital Trust Blood Bank
Sarvodaya Hospital Samarpan Blood Bank
Seven Hills Health Care Private Limited Hospital Blood Bank
Shushrusha Citizens Co-operative Hospital Blood Bank
Sir J.J.Group of Hospital Blood Bank
Sir J.J.Mahanagar Rakthapedhi
Saint George&#39;s Hospital & Regional  Blood Bank
Tata Memorial Hospital Blood Bank
The B.D. Petit Parsee General Hospital Blood Bank
V. N. Desai Municipal General Hospital Blood Bank
West Coast Blood Bank
M/s. Balasaheb Thackerey Blood Bank
M/s. Pallavi Blood Bank
ESI-PGIMSR, MGM Hospital Blood Bank
M/s Sion Blood Bank
Harkisandas  Marottamdas Hospital Blood Bank
```

Question 5: "What are the blood banks that offer Apheresis services?"

```python
In [23]:  # Pymongo Query
          blood_banks_with_apheresis = collection.find({"Apheresis": "YES"})

          # Answer
          print("Blood Banks Offering Apheresis Services:")
          for blood_bank in blood_banks_with_apheresis:
              print(blood_bank['Blood Bank Name'])
```

Blood Banks Offering Apheresis Services:
S.V.S. Charitable Trust Blood Bank and Transfusion Centre
M/s. Indian Red Cross Society Blood Bank
M/S. Dhanwantari Voluntary Blood Bank.
M/s. Needs Blood Bank
Manipal Hospital Bloodbank
NRT Blood Bank
Vijaya Sri Blood Bank
M/s. Chaitanya Blood Bank
Smt CH. Manju Vani Vara Prasad, Lions District 316D Blood Bank
M/s Ayush Nri Lepl Health Care Private Limited
M/s. Indian Red Cross Society Blood Bank
M/s. R.R. Hospital Blood Bank
M/s. Belief Blood Bank
Narayana Medical College & Hospital Blood Bank
M/s. Rotary Blood Bank (Vishaka Port City Rotary Charitable Trust)
M/s. N.T.R. Memorial Trust Blood Bank
M/s. Gitam Institute of Medical Sciences and Research Blood Bank
Palakol Voluntary Blood Bank
Sri Buddala Narasimhamurty Voluntary Blood Bank
Jawaharlal Nehru Medical College Hospital (JNMCH) Blood Bank
Department of Transfusion Medicine, PGIMER Blood Bank
Government Medical College and Hospital Blood Bank
Apollo Hospital Blood Bank
Durg District Hospital Blood Bank
Dr B R Ambedkar Memorial Hospital, Model Blood Bank
City Blood Bank
Indian Red Cross Society (IRCS) Blood Bank
Dr. Ram Manohar Lohia Hospital Blood Bank
Sucheta Kriplani Hospital Blood Bank
Govind Ballabh (G.B.) Pant Hospital Blood Bank
Regional Blood Tranfusion Center Blood bank, Central Zone
Kasturba Hospital Blood Bank
Sir Ganga Ram Hospital Blood Bank
Max Super Specialty Hospital Blood Bank
Lions Blood Bank East Delhi
Dharamshila Cancer Foundation and Research Centre Blood Bank
Northern Railway Central Hospital Blood Bank
Pushpawati Singhania Research Institute Blood bank
Cardio Neuro Centre Blood Bank, AIIMS
Hindu Rao Hospital Blood Bank
Sant Pramanand Hospital Blood Bank
Mission Jan Jagriti Blood Bank
Central Poly Clinic Blood Bank
Sunder Lal Jain Charitable Hospital Blood Bank
Max Super Specialty Hospital Blood Bank
Lions Blood Bank
Mission Jan Jagriti Blood Bank
Saroj Super Speciality Hospital Blood Bank
Rajiv Gandhi Cancer Institute and Research Center Blood Bank
Park Hospital Blood Bank
Fortis Hospital Blood Bank
Pitampura Blood Bank
Brahm Shakti Hospital and Research Centre Blood Bank
Guru Tegh Bahadur Hospital Blood Bank
Holy Family Hospital Blood Bank
Batra Hospital and Medical Research Centre Blood Bank
All India Institute of Medical Sciences (AIIMS) Blood Bank
Safdarjung Hospital Blood Bank
Max Super Specialty Hospital Blood Bank
Saket City Hospital Blood Bank
Primus Ortho and Spine Hospital Blood Bank
White Cross Blood Bank
Rotary Blood Bank
Fortis Escort Heart Institute Blood Bank
Hakeem Abdul Hameed Centenary Hospital Blood Bank
Apollo Hospital Blood Bank
Fortis Flt. Lt. Rajan Dhall Hospital Blood Bank
Institute of Liver and Biliary Sciences Blood Bank
Mata Chanan Devi Hospital Blood Bank
Bhagat Chandra Hospital Blood Bank
Maharaja Agrasen Hospital Blood Bank
Sri Balaji Action Medical Institute Blood Bank
Dr. B. L. Kapoor Memorial Hospital Blood Bank
Kalra Hospital and Shri Ram Cardiothoracic and Neurosciences Center (SRCNC) Blood Bank
R.B.T.C (wz), Deen Dayal Upadhyay Hospital
Jaipur Golden Hospital Blood Bank
Jan Jagriti Blood Bank
L. G. Hospital Blood Bank
Civil Hospital Blood Bank
Institute of Kidney Disease and Research Centre
Prathama Blood Centre
Sterling Hospital
A.D. Gorwala Karamsad Blood Bank
Sir T. General Hospital Blood Bank
Bhavnagar Blood Bank
Apollo Hospital International Limited Blood Bank
G.G.Hospital Blood Bank
New Civil Hospital Blood Bank
Surat Raktdan Kendra
Lok Samarpan Raktadan Kendra, Surat
Shree Mahavir Health And Medical Relief Society Blood Bank
Shree Sardar Smarak Hospital Blood Bank
SMIMER Hospital Blood Bank
S. S. G. Hospital Vadodara
Medical Care Centre Trust, Shri Jalaram Blood Bank, Vadodara

Kailash Cancer Hospital & Research Centre Blood Bank.
Indu Blood Bank Vadodara
Bhailal Amin General Hospital Blood Bank
Valsad Raktdan Kendra
Gold Field Hospital and Research Centre
Escorts Hospital and Research Center Limited Blood Bank
M/s Sunflag Hospital and Research Centre Blood Bank
Sarvodaya Hospital and Research Centre
QRG Central Hospital and Research Centre Blood Bank
Asian Institute of Medical Sciences Blood Bank
Metro Heart Institute with Multispecialty
Paras Health Care Private Limited Blood Bank
Artemis Medicare Services Limited Blood Bank
Medanta The Medicity Hospital Blood Bank
Alchemist Institute of Medical Sciences Blood Bank
Park Hospital Blood Bank
Fortis Memorial Research Institute Blood Bank
Nalwa Pathology and Microbiology Laboratory Blood Bank
Gangaputra Hospital and Research Centre Blood Bank
Nirmal Institute of Medical Sciences and Technology Blood Bank
Diamond Blood Bank LLT
Alchemist Hospital Panchkula Blood Bank
Prem Blood Bank
Bharat Blood Bank
Rewari Blood Bank
Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences (PGIMS) Blood Bank
Bapu Maghar Singh Ji International Blood Bank
Bhagat Phool Singh Government Medical College for Women Blood Bank
Government Hospital Blood Bank Gandhi Nagar
Government Medical College and Hospital Blood Bank
Rajouri District Hospital Blood Bank
Shri Maharaja Hari Singh (SMHS) Hospital Blood Bank
Sher-I-Kashmir Institute of Medical Sciences (SKIMS) Blood bank
Rajendra Institute of Medical Science (RIMS) Blood Bank, Bariyatu
B. V. V. Sanghas HSK Hospital Blood Bank
Medical College Hospital Blood Bank
Swamy Vivekananda Charitable Blood Bank
Narayana Hrudayalaya Blood Bank
Bengaluru Rotary TTK Medical Service Trust Blood Bank
M. S. Ramaiah Medical Teaching Hospital Blood Bank
Transfusion Medicine Centre Blood Bank
St. John's Medical College Blood Bank
Mallya Hospital Blood Bank
Rashtrotthana Blood Bank
Vydehi Institute of Medical Science Hospital Blood Bank
Rajarajeshwari Medical College Hospital Blood Bank
Columbia Asia Referral Hospital Blood Bank
Fortis Hospital Private Limited Blood Bank
Sagar Hospital Blood Bank
Sakra World Hospital Blood Bank
Sri Shankara Cancer Hospital and Research Centre Blood Bank
Karnataka Medical College Hospital Blood Bank
The Karnataka Cancer Therapy and Research Institute Smt. Valbai N. Dharamsey Blood Bank
Life Line 24x7 Blood Bank
M/s. Vaatsalya Life Hospitals Navajeeva Blood Bank
Nuveen Medical Relief and research Foundation Blood Bank
Shimoga Mid Town Rotary Charity Foundation Blood Bank
Subbaiah Medical College Blood Bank
P. V. S. Memorial Hospital Limited Blood Bank
Malabar Cancer Centre Society Blood Bank
Malabar Institute of Medical Sciences Blood Bank
Karuna Medical College Hospital Blood Bank
Palakkad Blood Bank
Kerala Institute of Medical Sciences Blood Bank
Gandhi Medical College Blood Bank
Bhopal Memorial Hospital and Research Centre Blood Bank
Chirayu Health and Medicare Blood Bank
JK Hospital and Medical Research Centre Blood Bank
Blood Bank (Component & Apheresis Unit) G.R.Medical College
MY Hospital & MGM Medical College - State of ART Model Blood Bank
NSCB Medical College Blood Bank
District Victoria Hospital Blood Bank
District Hospital Blood Bank
Jankalyan Blood Bank Nalegaon
Shri Sainath Blood Bank
Nandkishor Education Society - Arpan Blood Bank
Poonam Janjagruti Sanstha Sanchit, Ashtavinayak Blood Bank
District General Hospital Blood Bank Amravati
Shri Balaji Blood Bank & component lab Amravati
Dr. P.D.M.H.C. Hospital and Research Centre Blood Bank
Mahatma Gandhi Mishan (MGM) Hospital Blood Bank
Dattaji Bhale Blood Bank - Hedgewar Hospital
Seth Nandlal Dhoot Hospital Blood Bank
Lions Blood Bank
Navjeevan Medical Relief & Research Society's Shree Navjeevan Blood Bank and Component Laboratary
Late Shri Mukeshbai Patel Blood Bank
Dhanwantri Blood Bank
Indian Red Cross Society Blood Bank
M/s. Jalgaon Blood Bank and Component
Noor Hospital Blood Bank
Dr. D. Y. Patil Hospital Blood Bank
Shri.R.R.Patil Shikashan Sheti sanshodhan Aani vikas sanstha Blood Bank
Government Medical College General Hospital Blood Bank
IRCS - Dr. Bhalchandra Blood Bank
Arpan Blood Bank Latur
Global Hospital Blood Bank

Fortis Hospital Blood Bank
Suburban Hi-tech Blood Bank
Indian Red Cross Society Bombay City Branch Blood Bank
K. E. M. Hospital Blood Bank
Kokilaben Dhirubhai Ambani Blood Bank
Lokmanya Tilak Municipal Hospital Blood Bank
Mahatma Gandhi Seva Mandir Blood Bank
P. D. Hinduja National Hospital And Medical Research Centre Blood Bank
Meenatai Thackeray Blood Bank - Siddharth Hospital
Prince Aly Khan Hospital Blood Bank
S. L. Raheja Hospital Blood Bank
S. R. Mehta and Sir. K.P. Cardiac Institute Blood Bank
Saifee Hospital Trust Blood Bank
Sarvodaya Hospital Samarpan Blood Bank
Seven Hills Health Care Private Limited Hospital Blood Bank
Sir J.J.Mahanagar Rakthapedhi
Tata Memorial Hospital Blood Bank
Central India Institute of Haematology & Oncology's Blood & Blood Component Bank and Apheresis Unit
Jeevan Jyoti Blood Bank and Component
Lifeline Blood Bank Components and Apherisis Centre Blood Bank
Dr. Shankarrao Chavan Government Medical College and Guru Govindsinghji Memorial Hospital Blood Bank
Malegaon Blood Bank
Jankalyan Blood Bank
Samta Blood Bank
Civil Surgeon, General Hospital Blood Bank
Armed Forces Blood Bank
Jankalyan Raktapedhi Pune
Indian Serological Institute Blood Bank
Garware Blood Bank - Talegaon Rural Hospital
Grant Medical Foundation A.H. Wadia Trust Blood Bank
Aditya Birla Memorial Hospital Blood Bank
Noble Hospital Blood Bank
R.G Gholap Memorial Blood Bank
Advanced Centre for Treatment Reasearch and Education in Cancer
Rotary Club New Panvel charitable Trust s Late Dr. B.V. Limaye Blood Bank
Indian Red Cross Blood Bank
Indian Red Cross Society Blood Bank - Shirgaonkar Blood Bank
Instutute of Medical Science and Research Blood Bank and Blood Component Seperation Unit
M/s. Balaji Blood Bank
Yashwantrao Chavan Blood Bank
Civil Surgeon - General Hospital Blood Bank
Shri Markendya Charitable and Medical Trust Irrapanna N Boli Blood Bank
Dr. Hegdewar Rakta Pedhi Sanstha, Solapur
IMA - Sahakar Maharshi Shankarrao Mohite Patil Blood Bank
M. M. Patel Public Charitable Trust - Ashwini Rural Medical College and Hospital Blood Bank
Indian Red Cross Soceity - Shriman Rambhai Shah Blood Bank
Indian Red Cross Society - Smt. Gopabai Damani Blood Bank
Lokmanya TSSIA Blood Bank Thane
Kasturba Health Society Blood Bank
Jawaharlal Nehru Medical College Blood Bank
Sau Kantadevi Dale Blood Bank
Shija Blood Bank and Transfusion Services
Jawahar Institute of Post Graduate Medical Education & Research (JIPMER) Hospital Blood Bank
Sri Guru Ram Das Institute of Medical Sciences and Research Blood bank
Adhlakha Medical Center Blood Bank
Fortis Hospital Limited Blood Bank
Jallianwala Bagh Martyr's Memorial (JBMM) Civil Hospital Blood Bank
Bhathinda Civil Hospital Blood Bank
Max Super Speciality Hospital Blood Bank
Guru Gobind Singh Medical College Blood Bank Hospital Blood Bank
Shivam Hospital Blood Bank
Hoshiarpur Civil Hospital Blood Bank
Bhai Ghanaiya Ji Charitable Blood Bank and Hospital
Jalandhar Civil Hospital
Tagore Hospital & Heart Care Center Blood Bank
SGL Charitable Hospital Blood Bank
Patel Hospital Private Limited Blood Bank
Joshi Hospital and Trauma Centre Blood Bank
Punjab Institute of Medical Sciences (PIMS) Blood Bank
Capitol Hospital Blood Bank
Johal Multispeciality Hospital Blood Bank
Dayanand Medical College & Hospital Blood Bank
Christian Medical College and Brown Memorial Hospital Blood Bank
Mohan Dai Oswal Cancer Treatment & Research Foundation Blood Bank
Ludhiana Civil Hospital Blood Bank
Shri Krishna Charitable Hospital Blood Bank
Fortis Hospital Blood Bank
Satguru Pratap Singh Hospital (SPS) Blood Bank
Deep Nursing Home and Children Hospital Blood Bank
Government Medical College and Rajindra Hospital Blood Bank
Life Line Blood Centre
Gian Sagar Medical College and Hospital Blood Bank
Sri Guru Harkrishan Sahib Charitable Eye Hospital Trust Blood Bank
Fortis Hospital Mohali, Blood Bank
Ivy Health and Life Sciences Private Limited
Max Super Specialty Hospital Blood Bank
Mohali Civil Hospital Blood Bank
Guru Nanak Dev Super Speciality Hospital Blood Bank
Seth Makhan Lal Mahawar Charitable Blood Bank Society
Kailash Hospital Blood Bank
Jindal Super Speciality Hospital Blood Bank
Prince Bijoy Memorial Man's Hospital Blood bank
Shri Haridev Joshi General Hospital Blood bank
Sawai Man Singh (S.M.S) Hospital Blood Bank
Bhagwan Mahaveer Cancer Hospital & Research Centre Blood Bank
Jaipuria Hospital Blood Bank

Mahatama Gandhi National Institute of Medical Sciences (MGNIMS) Blood Bank
Monilek Hospital and Research Center Blood Bank
National Institute of Medical Sciences Blood bank
S.K. Soni Blood Bank
Narayana Multispeciality Hospital Blood bank
Apex Swasthya Kalyan Blood Bank
Metro Blood Bank
Umaid Hospital Blood Bank
Kanun Devi Parasmal Mehta Medical and Blood Bank
Ambika Hospital Blood Bank
AIIMS Hospital Blood Bank
Krishna Rotary Blood Bank
Sudha Blood Bank
Bharat Vikas Parishad Chikitshalya Blood Bank
S.K. Hospital Blood Bank
Tapovan Blood Bank
Maharana Bhupal Government Hospital Blood Bank
Geetanjali Medical College and Hospital Blood Bank
Pacific Medical College and Hospital Blood Bank
CANCER INSTITUTE HOSPITAL BLOOD BANK
Rajiv Gandhi Government General Hospital
Apollo Hospital Enterprises Limited Blood Bank
Apollo Speciality Hospital Blood Bank
MIOT Hospital Blood Bank
Dr.Kamatchi Memorial and Blood Component Research Centre
Global Hospitals Blood Bank (A unit of Rabindranath GE Medical Association Pvt Ltd
Sri Ramachandra Medical College and Research Institute Blood Bank
Right Hospitals Blood Bank
Dhanvandri Blood Bank and Research Centre of Sreemahalakshmi Charitable Health Trust
Billroth Hospitals Limited Blood Bank
Government Stanley Hospital Blood Bank
M/S SRM Institutes For Medical Science
The Tamil Nadu Dr. MGR Medical University Blood Bank
PSG Hospital Blood Bank
G. Kuppusamy Naidu Memorial Hospital Blood Bank
Ramakrishna Hospital Blood Bank
Rajah Muthiah Medical College and Hospital Blood Bank
Meenakshi Mission Hospital and Research Centre Blood Bank
Maruti Blood Bank
Sri Kaali Blood Bank
KMC Speciality Hospitals Blood Bank (Kaveri Hospitals)
CMC Hospital Blood Bank
Masonic Blood Bank
Indian Red Cross Society Blood Bank
Challa Hospital Blood Bank (A Multi Speciality Hospital)
NTR Trust Blood Bank
Mythri Charitable Trust Blood Bank and Transfusion Centre
Sanjeevini Blood Bank
Rudhira Voluntary Blood Bank
Satya Nursing Home Blood Bank
Nizams Institute of Medical Sciences Blood Bank
The Osmania General Hospital Blood Bank
Andhra Mahila Sabha Durgabhai Deshmukh Hospital & Blood Bank
Aditya Hospital Blood Bank
Genetic Products Charitable Association Blood Bank
Thalassemia and Sickle Cell Society Vuppala Venkaiah Memorial Blood Bank
Apollo Hospital Blood Bank
Employees State Insurance Corporation Medical College Hospital Blood Bank
Yashoda Super Speciality Hospitals Blood Bank
Chiranjeevi Blood Bank
Global Hospital Blood Bank
Sri Balaji Blood Bank (A Unit of Sri Balaji Educational Society)
Health, Agriculture, Rural Development Society (HARD) Blood Bank
St. Theresa's Hospital Blood Bank
Gandhi Hospital Blood Bank
Yashoda Hospital (A Unit of Datta Chandra Hospital Pvt. Ltd.) Blood Bank
Krishna Institute of Medical Sciences Blood Bank
Jeevadhara Voluntary Blood Bank (A Unit of Jeevadhaara Society)
Sunshine Hospital Blood Bank
Chalmeda Ananda Rao Institute of Medical Sciences Blood Bank
Life Care Voluntary Blood Bank
Prathima Institute of Medical Sciences Blood Bank
Apollo Reach Hospitals - Apollo Blood Bank
Rudhira Voluntary Blood Bank
Siva Multi Speciality Hospital Blood Bank
Indian Red Cross Society ,RCH-II
BBR Multispeciality Hospital Blood Bank
Ozone Institute of Medical Sciences Hospital Blood Bank
Rajyalakshmi Charitable Trust Blood Bank (A Unit of Rajyalakshmi Charitable Trust)
Continental Hospital Blood Bank
ADRM Hospital and Blood Bank
Ram Hospital Blood Bank
Citizens Hospital Blood Bank
Indian Red Cross Society, Blood Bank
Mother Voluntary Blood Bank
Samarpan Blood Bank
Life Line Charitable Blood Bank
Pushpanjali Hospital and Research Centre Private limited
Lokhitam Blood Bank
G.R. Hospital and Research Centre Private limited
Pushpa Maa Samaj Charitable Blood bank
Life Care Charibable Blood Bank
AMA (Allahabad Medical Association) Blood Bank
District Hospital Blood Bank
Kailash Hospital Llimited
Metro Hospital and Heart Institute

```
Jaypee Hospital Blood Bank
Yashoda Hospital and Research
Life Line Blood Bank
Yashoda Hospital and Research Centre Limited, Kaushambi
Pushpanjali Crossley Hospital (Max Superspeciality Hospital, Vaishali)
M/s Shanti Gopal Hospital Blood Bank
Family Health Care Hospital Blood Bank
Bhagwan Buddha Charitable Blood Bank
Rama Medical College and Research Centre Blood Bank
Narinder Mohan Hospital and Heart Centre
Guru Shri Gorakhnath Chikitsalaya Blood Bank
Parakh Voluntary Blood Bank
GSVM Medical College Blood Bank
Sanjay Gandhi Post-Graduate Institute (SGPGI)
Shekhar Hospital Private Limited Blood Bank
Sahara Hospital Blood Bank
Medison Hospital Private Limited Blood Bank
Fehmina Hospital and Blood Bank
Sadbhawna Charitable Blood Bank
Lokpriya Hospital Blood Bank
Subharti Hospital Blood Bank
Sri Sai Hospital and Blood Bank
Cosmos Hospital, Multi Speciality and Trauma Centre
Muzaffarnagar Medical College and Hospital
Banaras Heart Hospital Component Blood Bank
IMA Blood Bank of Uttarakhand
The Mission Hospital Blood Bank (A Unit of Durgapur Medical Centre Private Limited)
ESI Hospital, Maniktala Blood Bank
Calcutta Medical College Hospital Blood Bank
N.R.S. Medical College and Hospital Blood Bank
Saroj Gupta Cancer Centre and Research Institute Blood Bank
```

Question 6: "Which blood banks in a specific state offer Apheresis services?

```python
# Pymongo Query
state = "Andhra Pradesh"
apheresis_blood_banks_in_state = collection.find({"State": state, "Apheresis": "YES"})

# Answer
print(f"Apheresis Blood Banks in {state}:")
for blood_bank in apheresis_blood_banks_in_state:
    print(blood_bank['Blood Bank Name'])
```

```
Apheresis Blood Banks in Andhra Pradesh:
S.V.S. Charitable Trust Blood Bank and Transfusion Centre
M/s. Indian Red Cross Society Blood Bank
M/S. Dhanwantari Voluntary Blood Bank.
M/s. Needs Blood Bank
Manipal Hospital Bloodbank
NRT Blood Bank
Vijaya Sri Blood Bank
M/s. Chaitanya Blood Bank
Smt CH. Manju Vani Vara Prasad, Lions District 316D Blood Bank
M/s Ayush Nri Lepl Health Care Private Limited
M/s. Indian Red Cross Society Blood Bank
M/s. R.R. Hospital Blood Bank
M/s. Belief Blood Bank
Narayana Medical College & Hospital Blood Bank
M/s. Rotary Blood Bank (Vishaka Port City Rotary Charitable Trust)
M/s. N.T.R. Memorial Trust Blood Bank
M/s. Gitam Institute of Medical Sciences and Research Blood Bank
Palakol Voluntary Blood Bank
Sri Buddala Narasimhamurty Voluntary Blood Bank
```

Question 7: "What is the average latitude and longitude of all blood banks?"

```python
# Pymongo Query
pipeline = [
    {"$group": {"_id": None, "avg_latitude": {"$avg": "$Latitude"}, "avg_longitude": {"$avg": "$Longitude"}}}
]
average_location = list(collection.aggregate(pipeline))[0]

# Answer
print(f"Average Latitude: {average_location['avg_latitude']}, Average Longitude: {average_location['avg_longitude']}")
```

```
Average Latitude: 17.981589419688273, Average Longitude: 68.18880218129296
```

Question 8: "What are the blood banks in a specific district and state?"

```python
# Pymongo Query
state = "Andhra Pradesh"
district = "ANANTAPUR"
blood_banks_in_district = collection.find({"State": state, "District": district})

# Answer
print(f"Blood Banks in {district}, {state}:")
for blood_bank in blood_banks_in_district:
    print(blood_bank['Blood Bank Name'])
```

```
Blood Banks in ANANTAPUR, Andhra Pradesh:
Indian Red Cross Society Blood Bank, District Branch
Government General Hospital Blood Bank
Indian Red Cross Society
Rural Development Trust Hospital Blood Bank
South Central Railway Hospital Blood Bank
Indian Red Cross Society Blood Bank
Indian Red Cross Society Blood bank RCH -II KADIRI
S.S.S.I.H.M.S. Blood Bank
```

In [27]:
```python
import plotly.express as px

# Pymongo Query
pipeline = [
    {"$match": {"State": "Andhra Pradesh"}},
    {"$group": {"_id": "$District", "count": {"$sum": 1}}},
    {"$sort": {"count": -1}},
    {"$limit": 5}
    ]
top_districts_in_ap = list(collection.aggregate(pipeline))

# Prepare the data for the bar chart
district_names = [district['_id'] for district in top_districts_in_ap]
district_counts = [district['count'] for district in top_districts_in_ap]

# Create the bar chart
fig = px.bar(x=district_names, y=district_counts, title="Top Districts with the Highest Number of Blood Banks in Andhra Pradesh")
fig.update_xaxes(title_text="District")
fig.update_yaxes(title_text="Count")
fig.show()
```

Top Districts with the Highest Number of Blood Banks in Andhra Pradesh
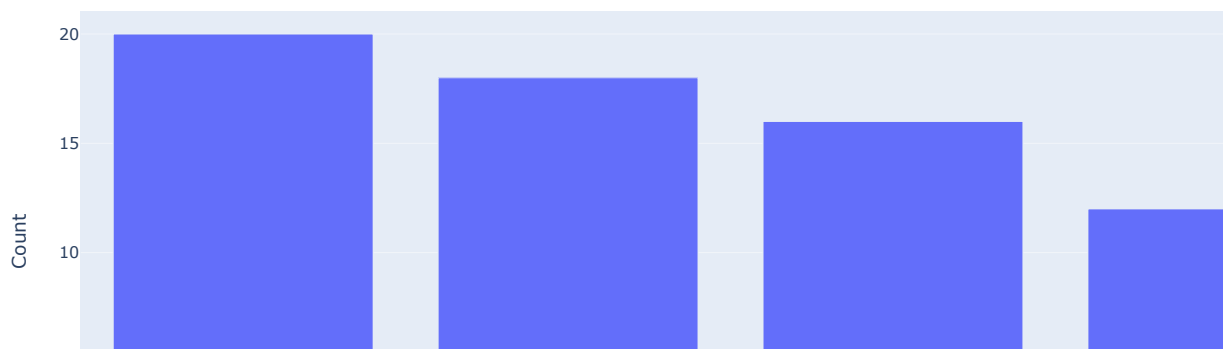
Question 9: "What is the license information for a specific blood bank?"

In [28]:
```python
# Pymongo Query
blood_bank_name = "G.B. Pant Hospital Blood bank"
license_info = collection.find_one({"Blood Bank Name": blood_bank_name})

# Answer
if license_info:
    print("License Information:")
    print(f"License Number: {license_info.get('License #')}")
    print(f"Date License Obtained: {license_info.get('Date License Obtained')}")
    print(f"Date of Renewal: {license_info.get('Date of Renewal')}")
else:
    print(f"Blood bank '{blood_bank_name}' not found.")
```

```
License Information:
License Number: DL1/CLAA/ANI
Date License Obtained: 14.6.1996
Date of Renewal: 01.01.2012
```

Question 10: "Which blood banks are categorized as 'Charity' and are located in 'Andaman And Nicobar Islands'?

In [29]:
```python
# Pymongo Query
charity_blood_banks_in_islands = collection.find({"State": "Andaman And Nicobar Islands", "Category": "Charity"})

# Answer
print("Charity Blood Banks in Andaman And Nicobar Islands:")
```

```
for blood_bank in charity_blood_banks_in_islands:
    print(blood_bank['Blood Bank Name'])
```

```
Charity Blood Banks in Andaman And Nicobar Islands:
Pillar Health Centre Blood Bank
```

Question :Service Availability by Blood Bank Category

In [30]:
```python
# Pymongo Query
pipeline = [
    {"$group": {"_id": {"Category": "$Category", "Service Time": "$Service Time"}, "count": {"$sum": 1}
                }
    },
    {"$sort": {"_id.Category": 1}}
    ]
service_availability = list(collection.aggregate(pipeline))

# Prepare the data for the grouped bar chart
categories = [entry['_id']['Category'] for entry in service_availability]
service_times = [entry['_id']['Service Time'] for entry in service_availability]
counts = [entry['count'] for entry in service_availability]

# Create the grouped bar chart
fig = px.bar(x=categories, y=counts, color=service_times, barmode="group", title="Service Availability by Blood Bank Category")
fig.update_xaxes(title_text="Blood Bank Category")
fig.update_yaxes(title_text="Count")
fig.show()
```

Service Availability by Blood Bank Category
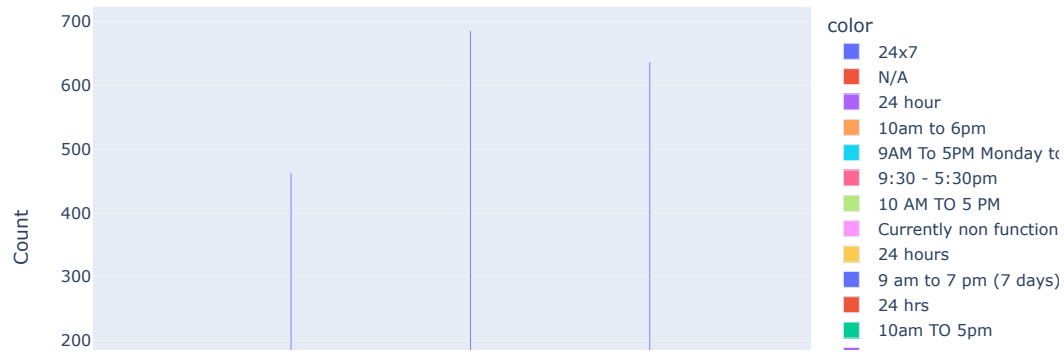
Question 11: "What is the license information for a specific blood bank?"

In [31]:
```python
# Pymongo Query
blood_bank_name = "G.B. Pant Hospital Blood bank"
license_info = collection.find_one({"Blood Bank Name": blood_bank_name})

# Answer
if license_info:
    print("License Information:")
    print(f"License Number: {license_info.get('License #')}")
    print(f"Date License Obtained: {license_info.get('Date License Obtained')}")
    print(f"Date of Renewal: {license_info.get('Date of Renewal')}")
else:
    print(f"Blood bank '{blood_bank_name}' not found.")
```

```
License Information:
License Number: DL1/CLAA/ANI
Date License Obtained: 14.6.1996
Date of Renewal: 01.01.2012
```

GEO SPATIAL ANALYSIS

Blood Bank Locations Worldwide

In [32]:
```python
import plotly.express as px

# Pymongo Query
pipeline = [
    {"$match": {"Latitude": {"$exists": True}, "Longitude": {"$exists": True}}},
```

```
        {"$project": {"_id": 0, "Latitude": 1, "Longitude": 1}}
]
locations = list(collection.aggregate(pipeline))

# Create a DataFrame from the Pymongo result
import pandas as pd
df = pd.DataFrame(locations)

# Create a scatter plot on a world map
fig = px.scatter_geo(df, lat='Latitude', lon='Longitude', title="Blood Bank Locations Worldwide")
fig.update_geos(projection_type="natural earth")
fig.show()
```

Blood Bank Locations Worldwide

Question : "Which states have the highest concentration of blood banks in India? Plot the top 5 states on a map."

```
In [33]:   import plotly.express as px

           # Pymongo Query to find states with the highest concentration of blood banks
           pipeline = [
               {"$group": {"_id": "$State", "count": {"$sum": 1}}},
               {"$sort": {"count": -1}},
               {"$limit": 5}
           ]
           top_states = list(collection.aggregate(pipeline))

           # Prepare the data for the map
           state_names = [state['_id'] for state in top_states]

           # Create a DataFrame with state coordinates (you may need to add these coordinates manually)
           state_coordinates = {
               "State": ["State1", "State2", "State3", "State4", "State5"],
               "Latitude": [ 92.747338 ,  92.730714 ,  77.596684  ,88.455524,70.569874  ],
               "Longitude": [11.675442,    14.654936 ,  22.975118 ,    26.257667,30.459856]
           }
           df = pd.DataFrame(state_coordinates)

           # Create a scatter plot on a map
           fig = px.scatter_geo(df, lat='Latitude', lon='Longitude', text='State', title="Top 5 States with Highest Concentration of Blood Banks
           fig.update_geos(projection_type="natural earth")
           fig.show()
```

Top 5 States with Highest Concentration of Blood Banks
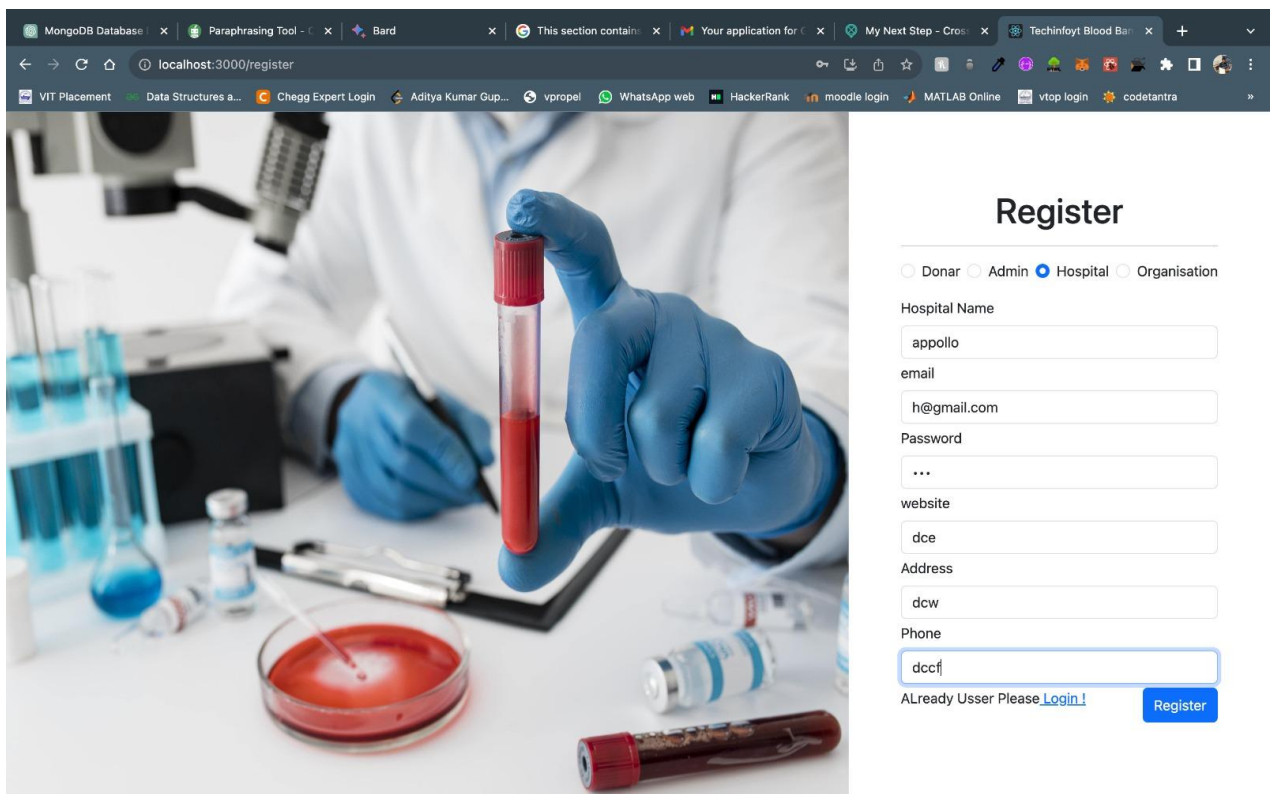

In [ ]:

In [ ]:

The Application can be accessed from four different user perspectives:

- **Donor/Receiver**: The donors and the ones in need can have their own login IDs to access the facilities of the system. A donor can add/remove an entry.They also can access the analytical dashboard tailored for them to get information they need.

- **Admin:** The administrator who has the control over the whole system. They can access all the information stored on the system. Admin has all the CRUD accessibility, i.e. it can Create, Read, Update and Delete any record that it wants to over the entire database. It also has access to an analytical dashboard which will show the visual representation of numbers.

- **Hospital:** Hospital can also be one of the points of access where they can have separate IDs and they can maintain their own stock of blood available. They can also raise a requirement of blood in case of need for it. Hospitals also have the accessibility to add or remove any of the records it wants to alongwith access to the analytical dashboard.

- **Organization:** Several NGOs and blood banks can also have their login IDs where they can maintain stock of blood available.

Development of The Project

Screenshots of the Frontend:

SIGNUP/SIGNIN PAGE: A new user can register themselves or an existing user can login to their ID to access the features of the system

MongoDB Database | × | Paraphrasing Tool - C | × | Bard | × | This section contains | × | Your application for C | × | My Next Step - Cross | × | Techinfoyt Blood Bank | × | +

← → C ⌂ ⓘ localhost:3000/register

VIT Placement | Data Structures a... | Chegg Expert Login | Aditya | oodle login | MATLAB Online | vtop login | codetantra

localhost:3000 says

User Registerd Successfully

OK

MongoDB Database | × | Paraphrasing Tool - C | × | Bard | × | Aditya | This section contains | × | Your application for C | × | My Next Step - Cross | × | Techinfoyt Blood Bank | × | +

← → C ⌂ ⓘ localhost:3000/login

VIT Placement | Data Structures a... | Chegg Expert Login | Aditya Kumar Gup... | vpropel | WhatsApp web | HackerRank | moodle login | MATLAB Online | vtop login | codetantra

Login Page

○ Donar ● Admin ○ Hospital ○ Organisation

email

a@gmail.com

Password

•••

Not registerd yet ? Register Here !

Login
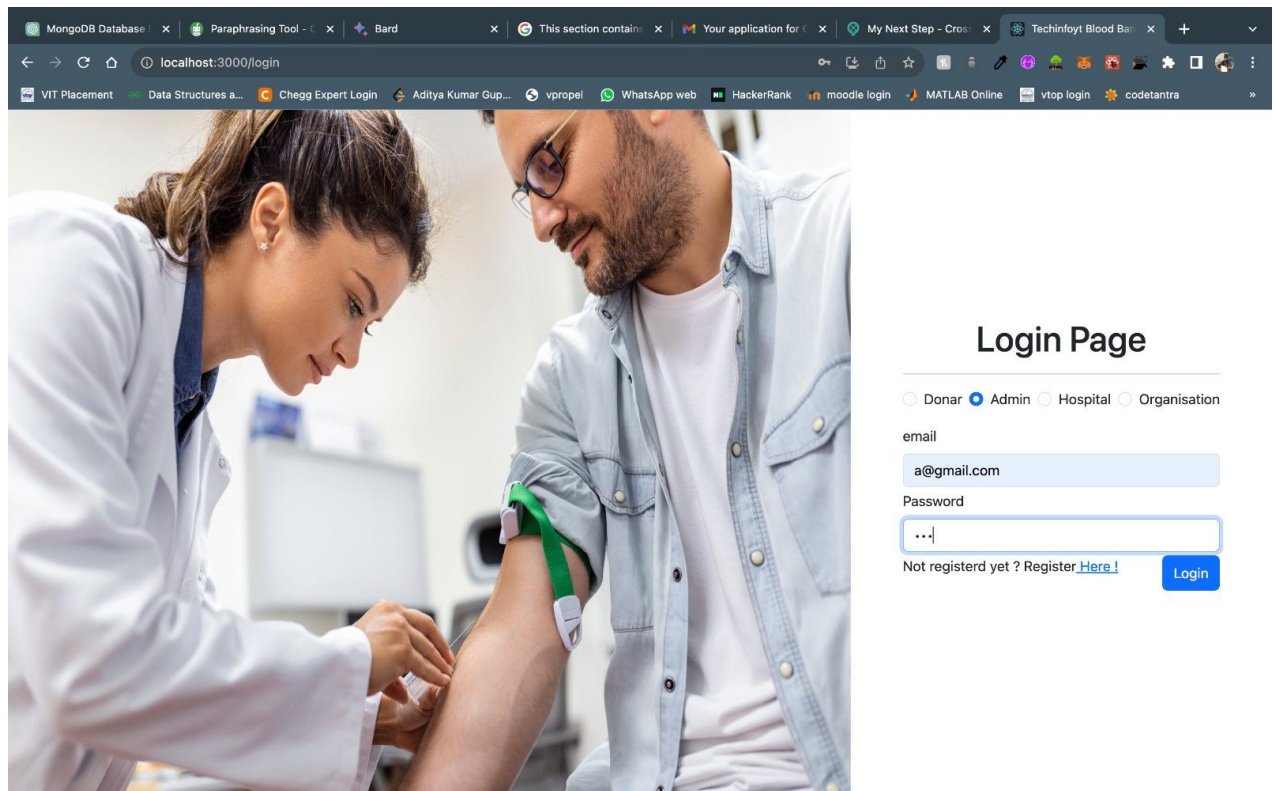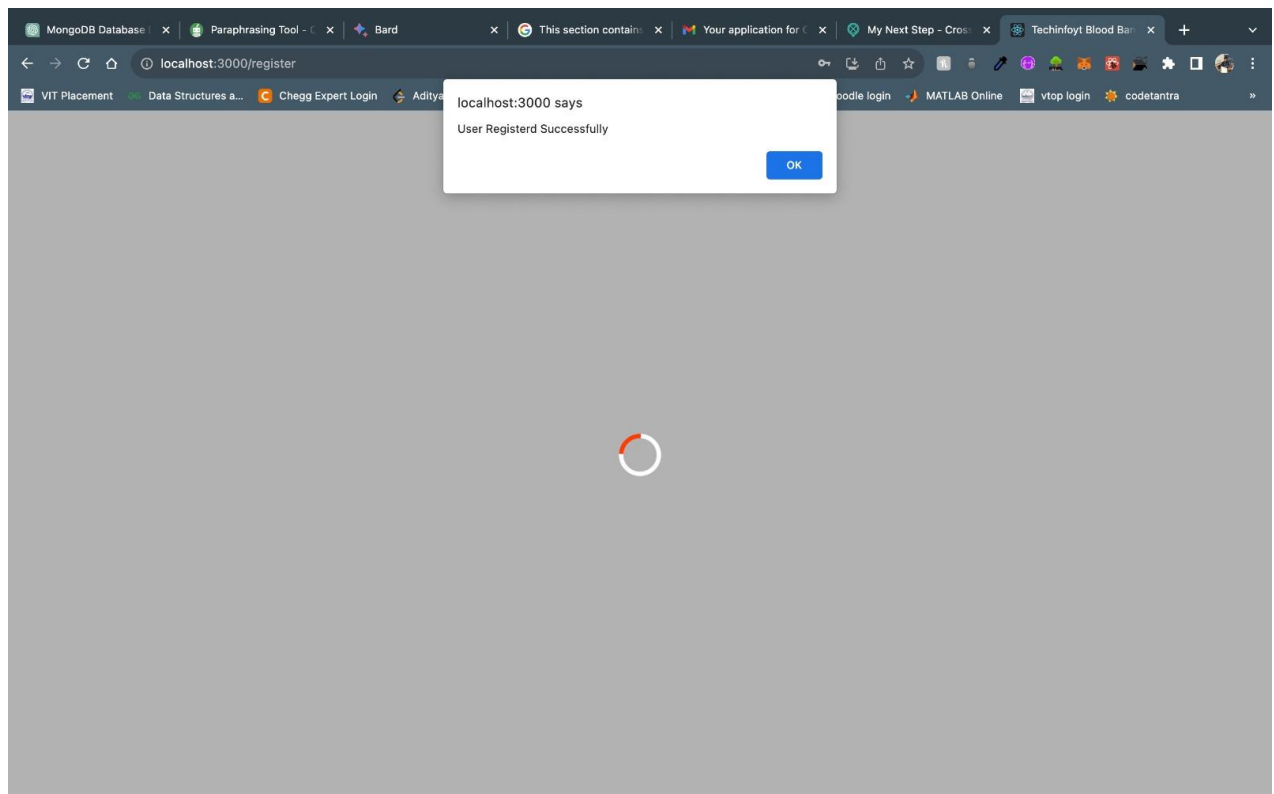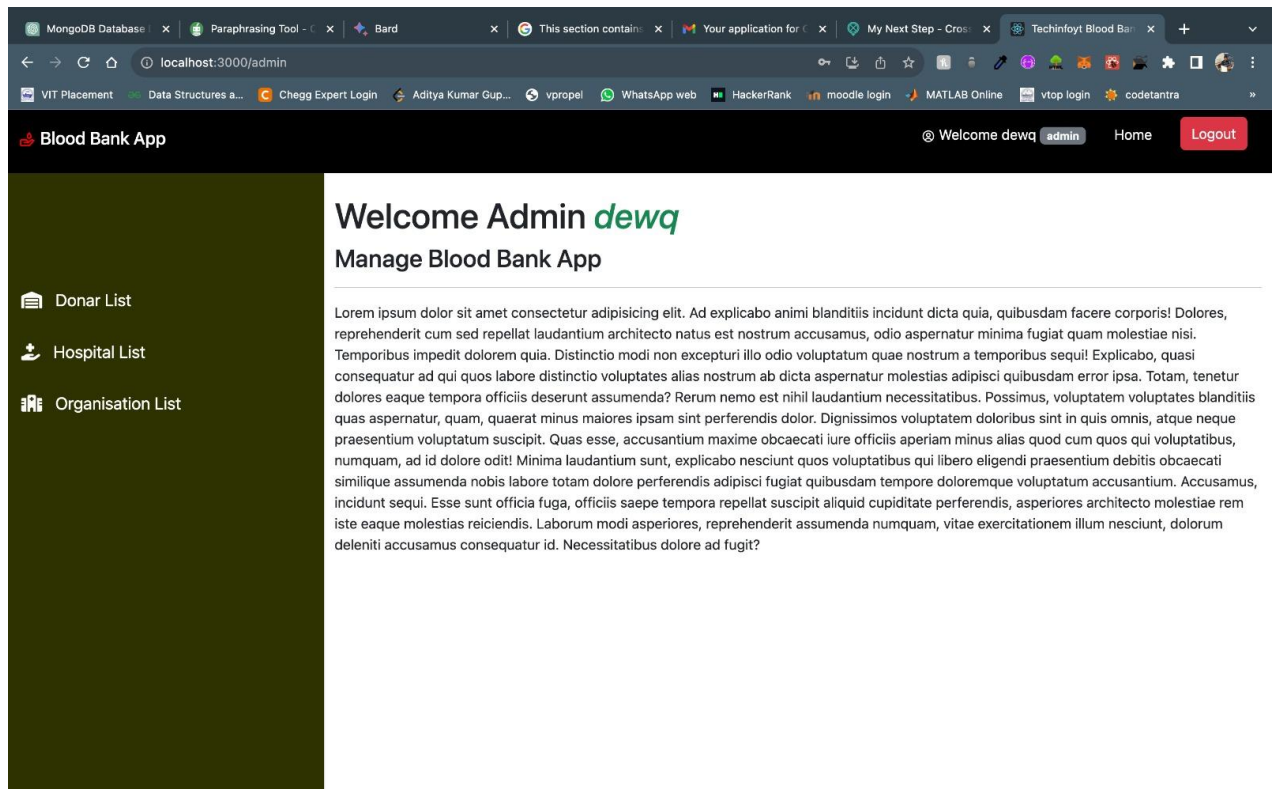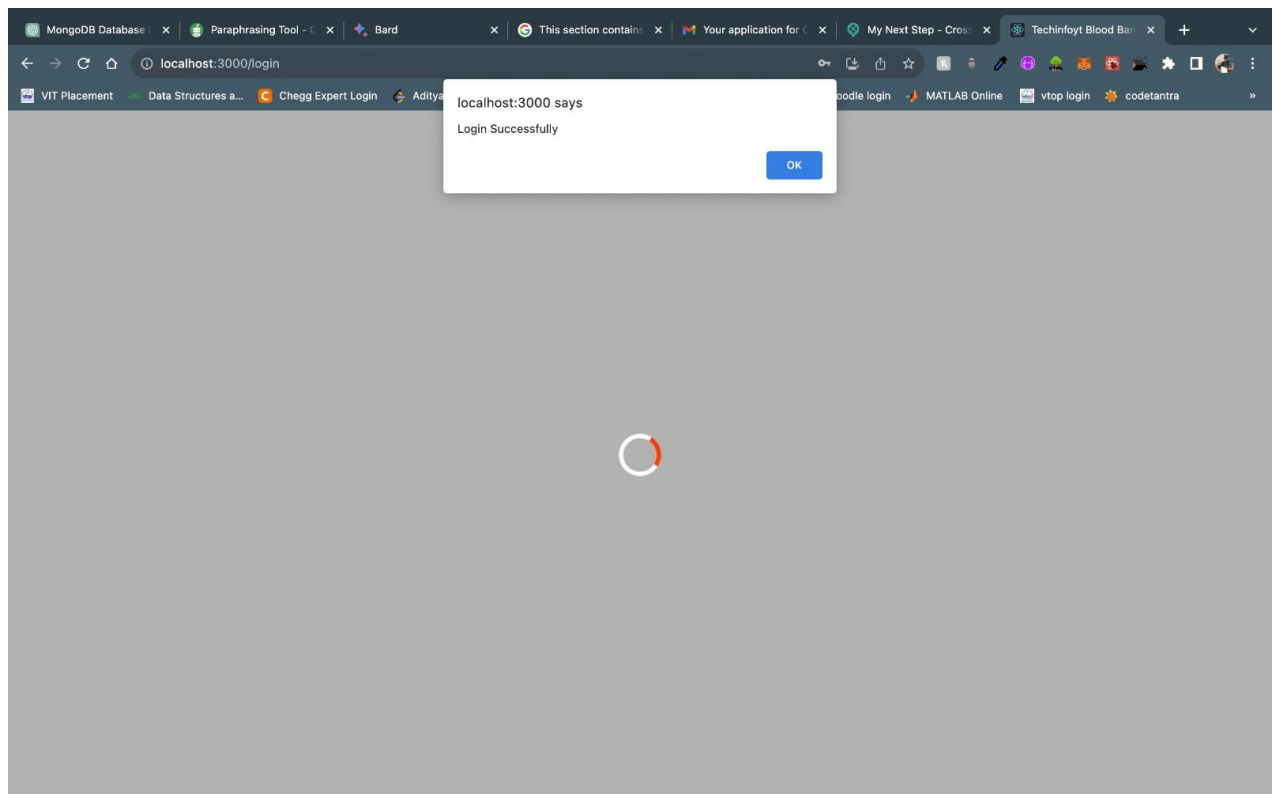
Create: Users can add new entries using the CREATE functionality of the database. Here we can see that the user is using the CREATE operation to add a new entry for a blood sample.

Screenshot 1

localhost:3000

localhost:3000 says

New Record Created

OK

Blood Bank App

® Welcome jndf **donar**   Analytics   Logout

🏦 Orgnaisation

🏦 Donation

+Add Inventory

Blood Group		nar Email	TIme & Date
O+		gmail.com	02/11/2023 12:22 AM

Blood Type: ○ IN ● OUT

O+ ▼

Donar Email

d@gmail.com

Quanitity (ML)

10

Close   Submit

Screenshot 2

localhost:3000

Blood Bank App

® Welcome jndf **donar**   Analytics   Logout

🏦 Orgnaisation

🏦 Donation

+Add Inventory

Blood Group	Inventory Type	Quantity	Donar Email	TIme & Date
O+	out	10 (ML)	d@gmail.com	02/11/2023 12:25 AM
O+	in	12 (ML)	d@gmail.com	02/11/2023 12:22 AM

Read: Users can use the READ functionality to fetch specific information from the database. In the scenario, we can see the data can be fetched using an analytical dashboard.
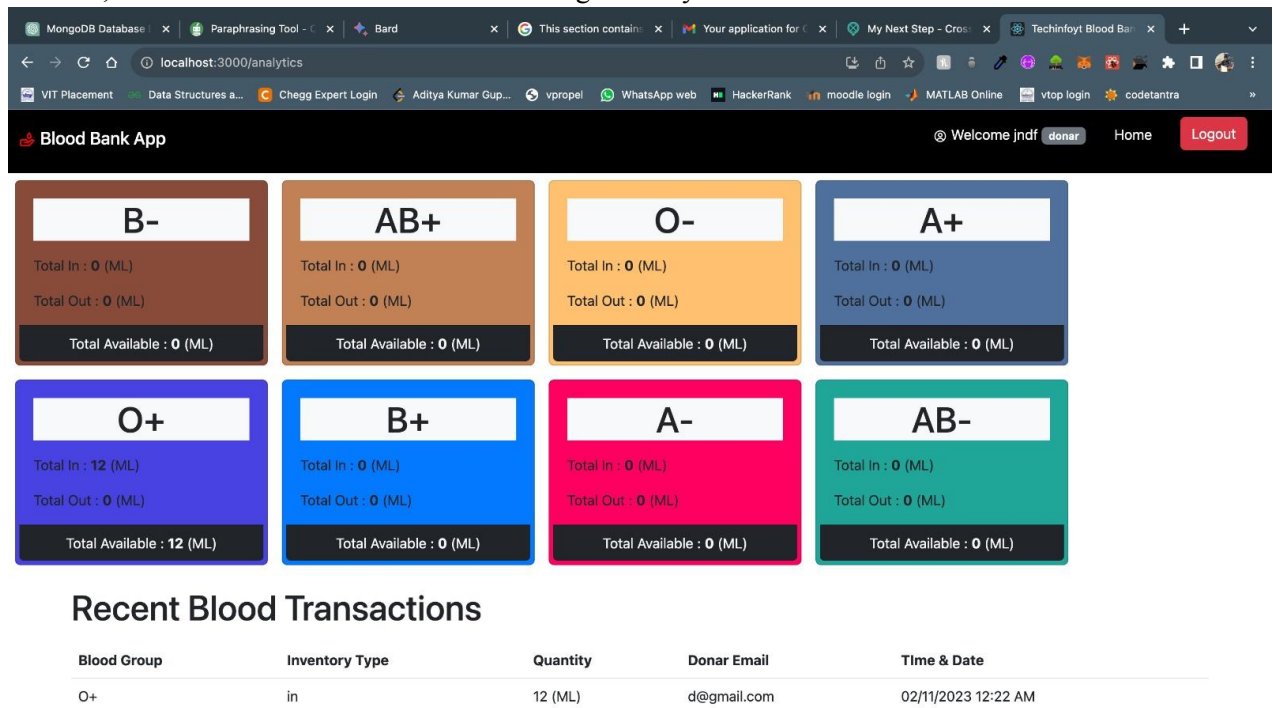
Update: Using the UPDATE functionality, users can update any of the record that needs to be modified.

Delete: Any unwanted record can be removed from the database by using the DELETE functionality.

🩸 Blood Bank App

⊛ Welcome dewq admin   Home   Logout

Name	Email	Phone	Date	Action
jndf	d@gmail.com	cwc	02/11/2023 12:21 AM	Delete
donor	donor@123	0123456789	25/10/2023 11:22 PM	Delete

🏛 Donar List

⚖ Hospital List

🏢 Organisation List

---

localhost:3000 says

Are You SUre Want To Delete This Donar

Sure

Cancel   OK

🩸 Blood Bank App

⊛ Welcome dewq admin   Home   Logout

Name	E		ate	Action
jndf			2/11/2023 12:21 AM	Delete
donor	donor@123	0123456789	25/10/2023 11:22 PM	Delete

🏛 Donar List

⚖ Hospital List

🏢 Organisation List

🩸 Blood Bank App

@ Welcome dewq **admin**   Home   Logout

Name	Email	Phone	Date	Action
jndf	d@gmail.com	cwc	02/11/2023 12:21 AM	Delete
donor	donor@123	0123456789	25/10/2023 11:22 PM	Delete

🏠 Donar List

⬇ Hospital List

🏢 Organisation List

🩸 Blood Bank App

@ Welcome dewq **admin**   Home   Logout

Name	Email	Phone	Date	Action
donor	donor@123	0123456789	25/10/2023 11:22 PM	Delete

🏠 Donar List

⬇ Hospital List

🏢 Organisation List

7. References

[1] Tanisha Madan, et. al. International Journal of Engineering Research and Applications   www.ijera.com ISSN: 2248-9622, Vol. 11, Issue 3, (Series-III) March 2021, pp. 21-27 Avinash Bharadwaj , Brinda Ashar, June 2020. Source Based Fake News Classification using Machine Learning (e-ISSN: 2319-8753, p-ISSN: 2320-6710)

[2] Isha Chawan1, Sumedh Shinde2, Yashwant Gaddam3, Ankit Talele4, Dr. Asawari Dudwadka International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 p-ISSN: 2395-0072

[3] 1Devanjan K. Srivastava, 2Utkarsh Tanwar, 3M.G.Krishna Rao, 4Priya Manohar, 5Balraj Singh Osunlana Ismail1, Sanjay Misra1, Jonathan Oluranti1 , Ravin Ahuja21Covenant University, Ota, Nigeri2Shri Vishwakarma Skill University, Gurgaon, India

[4] International Journal for Research in Applied Science & Engineering Technology (IJRASET) ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538Volume 10 Issue IV Apr 2022

[5] Ms.J.Jenifer Emima, Student of Computer Science Department, Ms.P.Pavithra, Student of Computer Science Department, Ms.D.Sarulatha, Student of Computer Science Department,St.Joseph College of Engineering, Sriperumbudur, Chennai,Volume: 6, Issue: 3,Special Issue: 1 ,Apr,2021 ,ISSN_NO: 2321-3337

[6] IOSR Journal of Computer Engineering (IOSR-JCE)e-ISSN: 2278-0661,p-ISSN: 2278-8727, Volume 18, Issue 2, Ver. I (Mar-Apr. 2016), PP 121-124

[7] CLOUD BASED ONLINE BLOOD BANK MANAGEMENT SYSTEM1,Aditya S. Iyer, 2Dr. C Menaka, 3Adnan Faisal , 4Ammar Hussain , 5Chethan S.DJETIR.ORG (ISSN-2349-5162)

[8] ON-LINE BLOOD BANK MANAGEMENT SYSTEM USING ANDROID1Sunita Bhujbal, #2Kajal Jadhav, #3Snehal Kalokhe, #4Varsha PingaleInternational Engineering Research Journal (IERJ), Volume 2 Issue 10 Page 4228-4231, 2017 ISSN 2395-1621

[9] Automated Blood Bank Using Embedded System, ISSN (Online): 2319-8753 ISSN (Print) : 2347-6710 International Journal of Innovative Research in Science, Engineering and Technology

[10] Blood Bank Management System using Global Position System, nternational Journal of Advanced Research in Computer Science Engineering and Information Technology Volume: 6, Issue: 3,Special Issue: 1 ,Apr,2021 ,ISSN_NO: 2321-3337