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Automated Blood Bank

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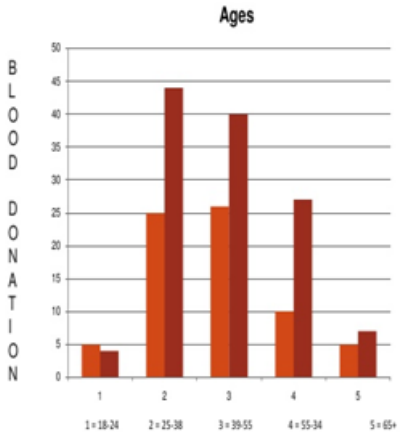
Introduction:

Every year the nation requires about 4 Crore units of blood, out of which only a meager 40 Lakh units of blood are available. There are multiple blood banks around the world, however none of them offer the capability for a direct contact between the donor and recipient. This is often a serious disadvantage notably in cases wherever there is associate degree pressing would like of blood. This project aims to beat this communication barrier by providing an immediate link between the donor.



Literature survey:

Automated online blood bank database: A number of online blood bank databases are available, however none of them offer the capability for a direct contact between the donor and recipient. This is a major drawback particularly in cases where there is an urgent need of blood. Our project aims to overcome this communication barrier by providing a direct call routing technique using Asterisk hardware. A blood bank database is created by collection of details from various sources like Blood banks, NSS, NGO's, hospitals and through web interface. The data collected will be maintained in a central server. This central server will be associated with a contact number that can be used to connect to it. The willingness of donor and the closeness of the donor to the place from where the call is coming are also accounted for in defining this algorithm. Based on the algorithm the most eligible donor is found out.

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From the server the call from the required person is routed to the eligible donor's number. Such a system considerably cuts down on the overheads involved in referring to an online database and then calling the donors and verifying their willingness at a time when there is a critical need for the blood.

Existing system:

Blood bank management system: At present, the public can only know about the blood donation events through conventional media means such as radio, newspaper or television advertisements. There is no information regarding the blood donation programs available on any of the portal. The current system that is using by the blood bank is manual system. With the manual system, there are problems in managing the donors' records. The records of the donor might not be kept safely and there might be missing of donor's records due to human error or disasters. Besides that, errors might occur when the staff keeps more than one record for the same donor. There is no centralized database of volunteer donors. So, it becomes really tedious for a person to search blood in case of emergency. The only option is to manually search and match donors and then make phone calls to every donor. There is also no centralized database used to keep the donors' records. Each bank is having their own records of donors. If a donor makes donation in different hospital, no previous records can be traced except if the donor brings along the donation certificate. Hence, the donor is considered to be a first timer if they make blood donation in a new place. Without an automated management system, there are also problems in keeping track of the actual amount of each and every blood type in the blood bank. In addition, there is also no alert available when the blood quantity is below its par level or when the blood in the bank has expired.

Proposed system:

Automated Blood Bank is an associate work that brings voluntary blood donors and those in need of blood on to a common platform.

The mission is to fulfill every blood request in the country with a promising android application and motivated individuals who are willing to donate blood. The proposed work aims to overcome this communication barrier by providing a direct link between the donor and the recipient by using low cost and low power Raspberry Pi kit. It requires Micro USB of 5V and 2A power supply only. Entire communication takes place via SMS (Short Messaging Service) which is compatible among all mobile types. Automated Blood Bank" is an project that brings voluntary blood donors and those in need of blood on to a common platform. This project aims at servicing the persons who seek donors who are willing to donate blood and also provide it in the time frame required. Automated Blood Bank tries to assist victims/patients/those in want of blood. It is an endeavor to achieve dead set these people in want of blood and connect them to those willing to donate. The proposed work explores to find blood donors by using GSM based Smart Card CPU - Raspberry Pi Kit. This project uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer.

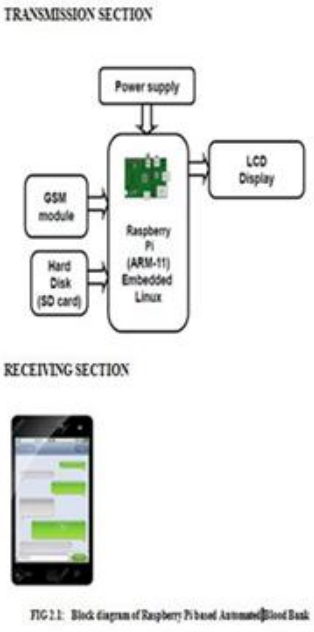

FIG 2.1: Block diagram of Raspberry Pi based Automated Blood Bank

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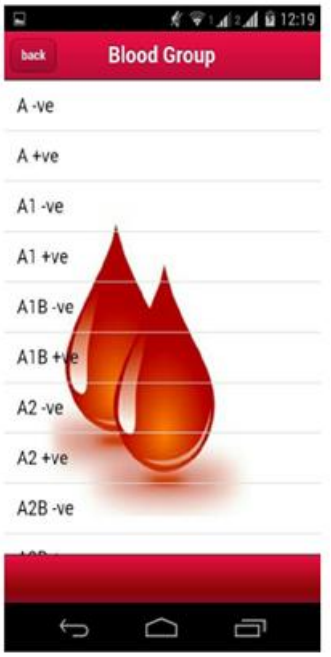


RASPBERRY-PI:

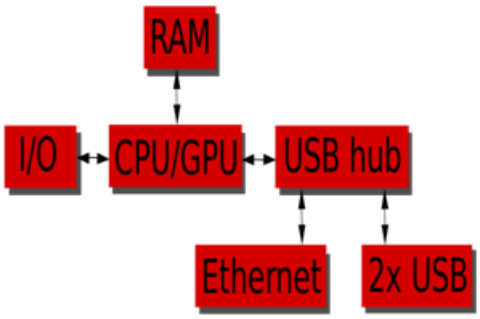
The Raspberry Pi is a credit-card-sized single-board computer developed in the UK by the Raspberry Pi Foundation with the intention of promoting the teaching of basic computer science in schools. The **Raspberry Pi** is manufactured through licensed manufacturing deals with Newark element14 (Premier Farnell), RS Components and Egoman.

All of these companies sell the Raspberry Pi online. Egoman produces a version for distribution solely in China and Taiwan, which can be distinguished from other Pis by their red coloring and lack of FCC/CE marks. The hardware is the same across all manufacturers.

Features:

- System Memory – 1GB LPDDR2
- Storage – micro SD card slot (push release type)
- Video & Audio Output – HDMI and AV via 3.5mm jack.
- Connectivity – 10/100M Ethernet
- USB – 4x USB 2.0 ports, 1x micro USB for power
- Expansion
  2×20 pin header for GPIOs
  Camera header
  Display header
- Power – 5V via micro USB port.
- Dimensions – 85 x 56 mm

Basic Hardware of Raspberry-PI:



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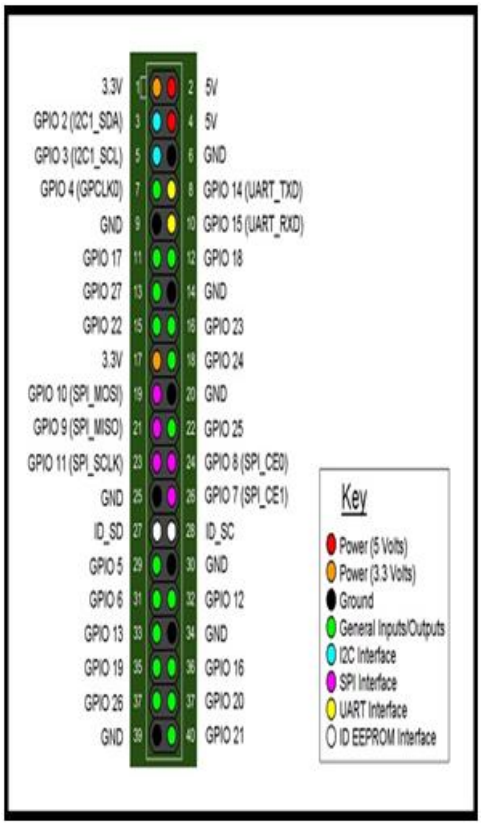
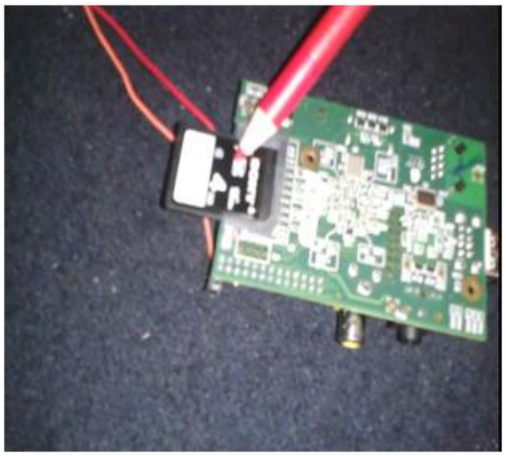
Pin diagram:

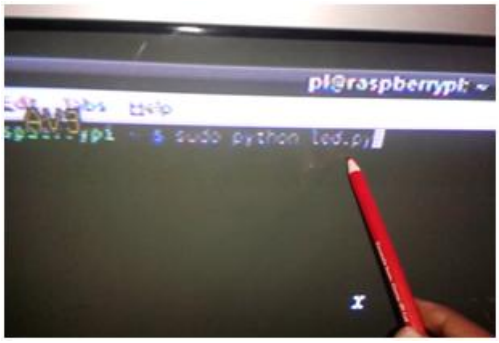


SD card is shown



OS used in Raspberry pi is Linux

Coding will be done in C/python language



Raspbian OS:

The Raspberry Pi primarily uses Linux kernel-based operating systems. Raspbian is an unofficial port of Debian Wheezy arm with compilation settings adjusted to produce code that uses "hardware floating point", the "hard float" ABI and will run on the Raspberry Pi. The port is necessary because the official Debian Wheezy armhf ((**ARM hard float**) refers to an ARM architecture with the additional floating point hardware Vector Floating Point (VFP). Software packages and cross-compiler tools use the armhf vs. arm/armel suffixes to differentiate.) Release is compatible only with versions of the ARM architecture later than the one used on the Raspberry Pi (ARMv7-A CPUs and higher vs. the Raspberry Pi's ARMv6 CPU). It provides some available deb software packages, pre-compiled software bundles. A minimum size of 2 GB SD card is required for Raspbian, but a 4 GB SD card or above is recommended.

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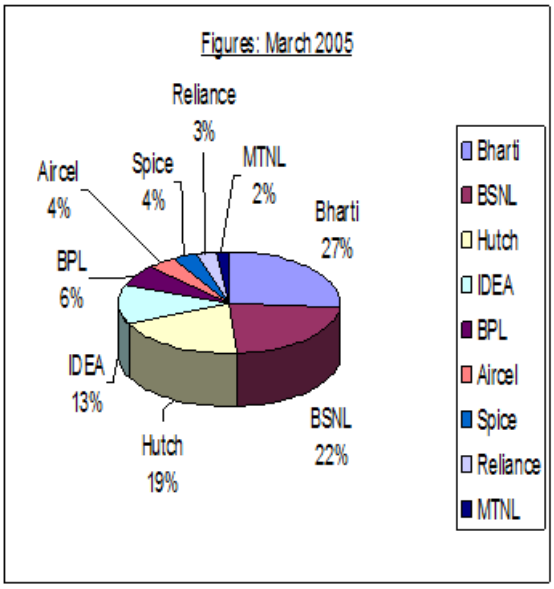
The downloaded Raspbian "wheezy" image file has to be unzipped and then written to a suitable SD card, formatting it for use.

Diagram of API-Connection

Global System for Mobile Communication (GSM):

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

GSM IN INDIA:



MESSAGE SENDING AND WRITING COMMANDS:

Commands always start with AT (which means Attention) and finish with a <CR> character.

AT+CMGS, Send Message

This command sends a short message from the modem to the network (SMSSUBM

Command	Possible Response
If text mode; AT+CMGS=<da>[,<toda>]<cr> text is entered <ctrl+z/esc> If PDU mode; AT+CMGS=<length><cr> PDU mode is given <ctrl+z/esc> e.g. (text mode) AT+CMGS="01763262222"<cr> >Write your test here <ctrl+z>	If text mode and sending successful; +CMGS: <mr> If PDU mode and sending successful; +CMGS: <mr>

Note:

1. Control+z = terminate and send, escape = terminate and quit (without sending).

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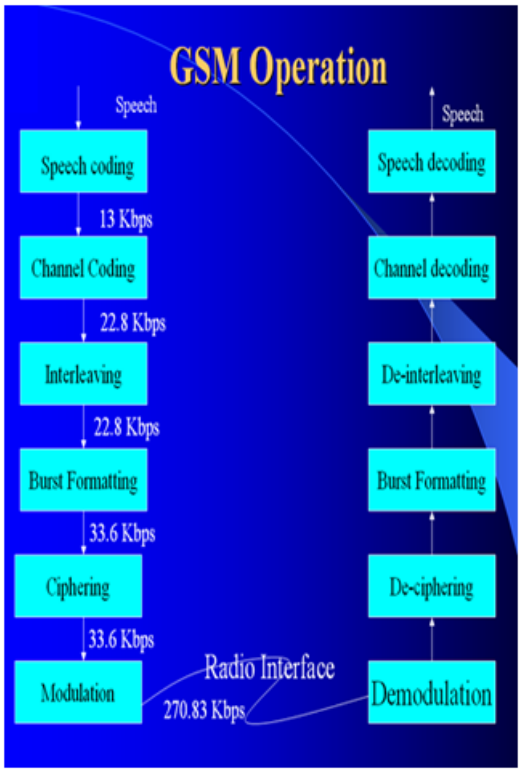
2.After sending the command AT+CMGS="123456" <cr> wait for the character > before sending the text or characters will be lost.
3. The text string is terminated by ctrl+z do not use a carriage return like other commands.

AT+CMGD, Delete Message

This command deletes a message from the location <index> from SIM storage.
Command P

Command	Possible Response
AT+CMGD=?	
AT+CMGD=<index>	



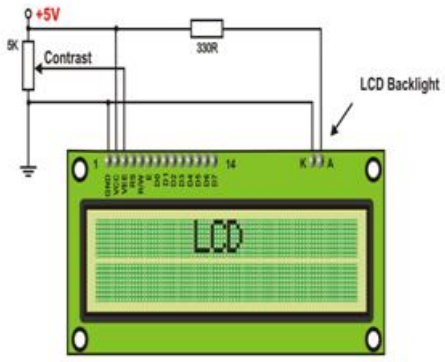
16x2 LCD:

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

1. The declining prices of LCDs.
2. The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
3. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.

Ease of programming for characters and graphics

LCD screen consists of two lines with 16 characters each. Each character consists of 5x7 dot matrix. Contrast on display depends on the power supply voltage and whether messages are displayed in one or two lines. For that reason, variable voltage 0-Vdd is applied on pin marked as Vee. Trimmer potentiometer is usually used for that purpose. Some versions of displays have built in backlight (blue or green diodes). When used during operating, a resistor for current limitation should be used (like with any LE diode).



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Pin Description:

The most commonly used LCDs found in the market today are 1 Line, 2 Line or 4 Line LCDs which have only 1 controller and support at most of 80 characters, whereas LCDs supporting more than 80 characters make use of 2 HD44780 controllers. Most LCDs with 1 controller has 14 Pins and LCDs with 2 controller has 16 Pins (two pins are extra in both for back-light LED connections).

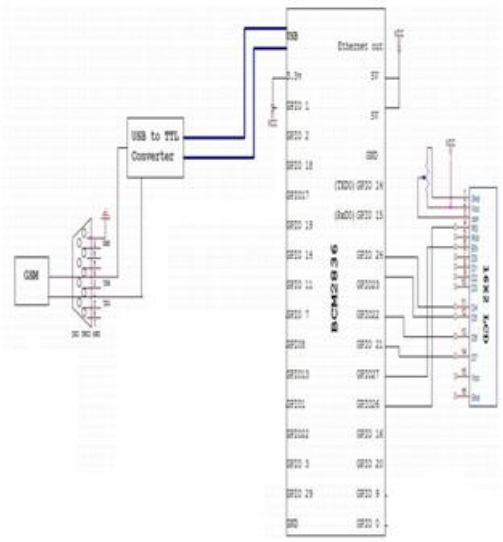
Command	RS	RW	D7	D6	D5	D4	D3	D2	D1	D0	Execution Time
Clear display	0	0	0	0	0	0	0	0	0	1	1.64mS
Cursor home	0	0	0	0	0	0	0	0	1	x	1.64mS
Entry mode set	0	0	0	0	0	0	0	1	ID	S	40uS
Display on/off control	0	0	0	0	0	0	1	D	U	B	40uS
Cursor/Display Shift	0	0	0	0	0	1	D/C	R/L	x	x	40uS
Function set	0	0	0	0	1	DL	N	F	x	x	40uS
Set CGRAM address	0	0	0	1	CGRAM address						40uS
Set DDRAM address	0	0	1	DDRAM address							40uS
Read "BUSY" flag (BF)	0	1	BF	DDRAM address							-
Write to CGRAM or DDRAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	40uS
Read from CGRAM or DDRAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	40uS

Facts about the blood supply:

Blood cannot be factory made - it will solely return from generous donors. Type O-negative blood (red cells) can be transfused to patients of all blood sorts. It is forever in great demand and sometimes in brief offer. Type AB-positive plasma can be transfused to patients of all different blood sorts. AB plasma is additionally typically in brief offer. Facts concerning the blood donation method. Donating blood could be a safe method. A sterile needle is employed one time for every donor and so discarded. Blood donation may be an easy straightforward four-step process: registration, case history, donation and refreshments.

Every blood donor is given a mini-physical, checking the donor's temperature, pressure, pulse and Hb to guarantee it is safe for the donor to administer blood. The actual blood donation usually takes less than 10-12 minutes. The whole method, from the time arrives to the time to go away, takes concerning Associate in Nursing hour and 15 min. The average adult has concerning 10 units of blood in his body. Roughly 1 unit is given throughout a donation. A healthy donor might give red blood cells each 56 days, or double red cells each 112 days. A healthy donor might give platelets as few as 7 days apart, however a most of 24 times a year. All given blood is tested for HIV, hepatitis B and C, syphilis and different infectious diseases before it can be transfused to patients.

Schematic Diagram:



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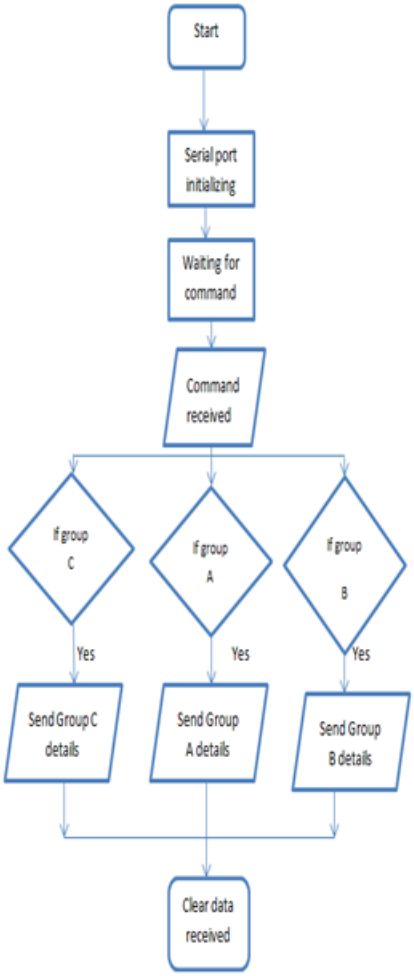
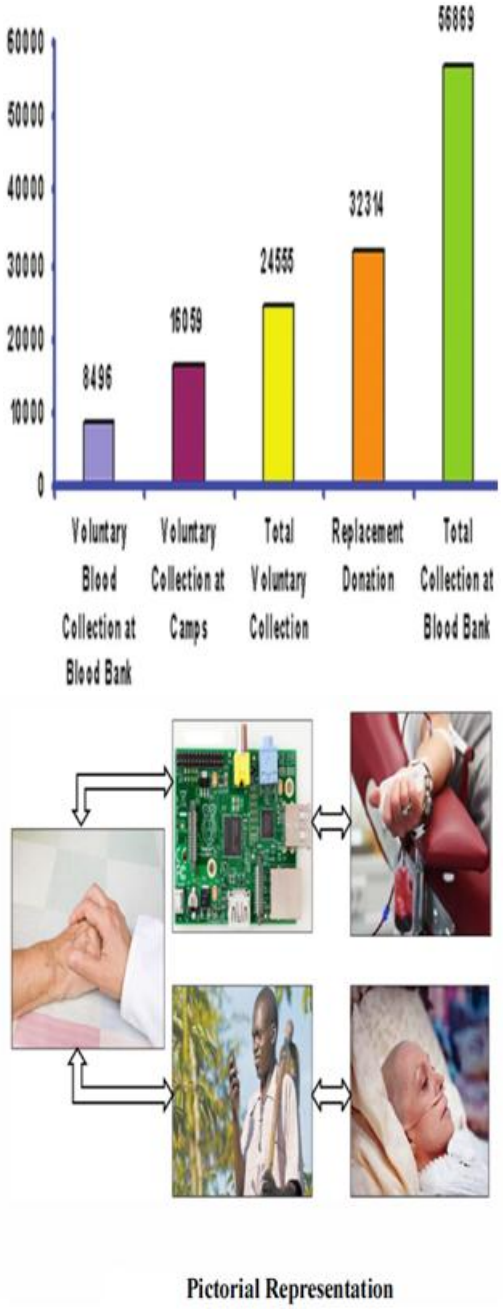
Flow chart



Analysis of blood donation



Disadvantage

Cost of implementation is high

Advantages

Ease of implementation
Loss of life can be avoided

Applications

In hospitals
Medical camps
In urban & rural areas

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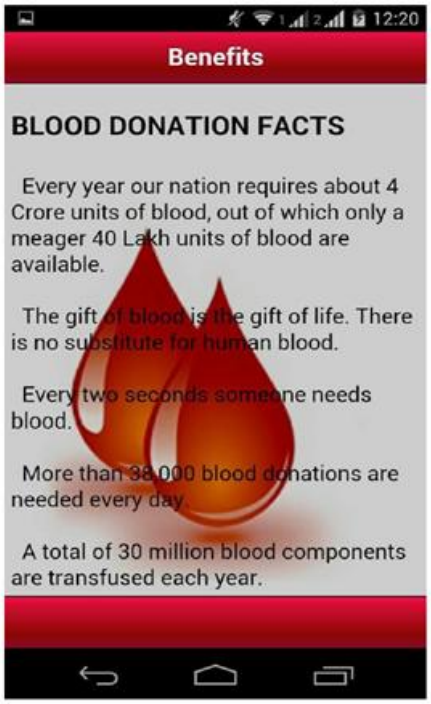

CONCLUSION:

Blood is the primary necessity of life. There are different scenarios available for searching blood donors. This proposed system will be one step ahead from the other blood donation systems.

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