
Group Project Documentation Advanced Cross-Platform Application Programming with .NET

Blood Donor

Group Happy 3 Friends	
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Ho Chi Minh City, 2022

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Revision History

Name	Date	Reason For Changes	Version
Quan Nguyen	28 September 2022	Initial version	1.0
Tien Huynh	15 October 2022	Update system architecture	1.1
Phuong Nguyen	29 October 2022	Update Screenshots	1.2

1. Project Introduction

1.1 Product Perspective

Voluntary blood donation is always a noble gesture to the community. Thousands of patients are treated promptly every year with blood and blood products. It is estimated that in 2021, more than 1.3 million blood units have been donated and this number is still expected to increase in the coming years.

With those expectations and needs, the Blood Donor website was born to better manage and propagate blood donation campaigns to volunteers, helping voluntary blood donation be more popular in society.

It is expected that the Blood Donor website will be part of the blood storage and management system in locations across the country. BloodDonor will perform the main functions such as:

- Create voluntary blood donation projects called campaigns (with certain deadlines and regulations).
- Management of voluntary in blood donation projects: Number of participants, the total amount of blood collected.

1.2 User Classes and Characteristics

The system is divided into 4 basic User Roles as follows:

- **Guest:** User who only view information on the web.
- **Volunteer:** The person who donates blood.
- **Organization:** An employee of the organization entrusted with the management of blood donations.
- **Admin:** The general manager of the organization.

Each role will have different functions and operations on the system, specifically as follows:

- **Guest:**
 - View information about blood donation website.
 - View blood donation campaigns (search, view).
- **Volunteers must login to do these actions:**
 - Login/log out.
 - Sign up by phone number.
 - View - edit account information.
 - View blood donation history and personal health in historical campaign.
 - Receive alerts about suitable campaign.
 - Register to participate in the campaign.
 - Request blood for themselves/relatives.
- **Hospital/Red Cross must login to do these actions:**
 - Login/log out.
 - Close/open 1 campaign.
 - Manage volunteers in campaign:
 - ✓ Their status: registered, participated.
 - ✓ Their information: blood type, volunteer health information.
 - Manage campaign list (search, view, history, volunteers who participated, total amount of blood (ml) donated, volunteer health information).
 - CRUD accounts for volunteers (View, search, adjust blood type).
 - Recieve/Accept/Reject blood request from volunteers.
- **Admin must login to do these actions:**
 - Manage the Hospital/Red Cross information list (search, view).
 - CRUD Hospital/Red Cross account.

2. Database Design

2.1 Conceptual Entity Relationship Diagram

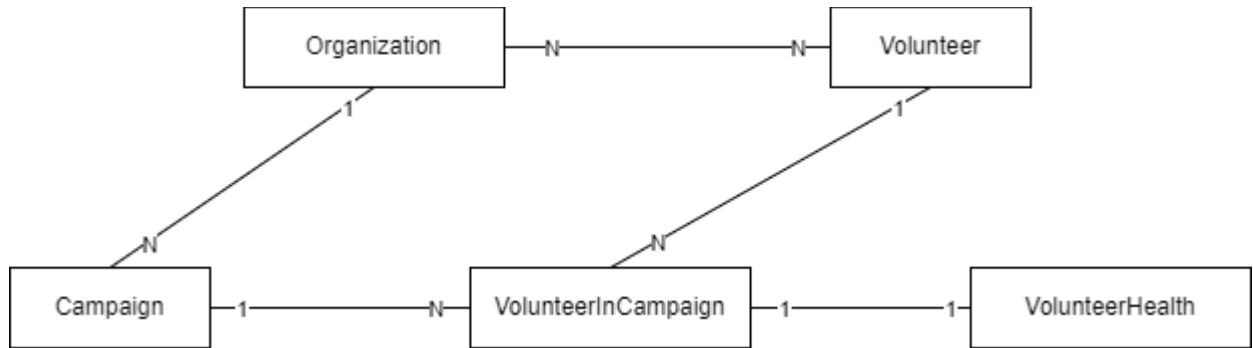


Figure 1. Conceptual Entity Relationship Diagram

Entity Data dictionary: describe content of all entities	
Entity Name	Description
Organization	Describe all organizations (including hospital or Red Cross society) in the system.
Campaign	Describe all campaigns in the system.
Volunteer	Describe all blood donated volunteers in the system.
VolunteerInCampaign	Describe all blood donated volunteers' information in a campaign in the system.
VolunteerHealth	Describe all blood donated volunteers' health information in a campaign in the system.

Table 1 Conceptual Entity Relationship Diagram Data Dictionary

2.2 Logical Entity Relationship Diagram

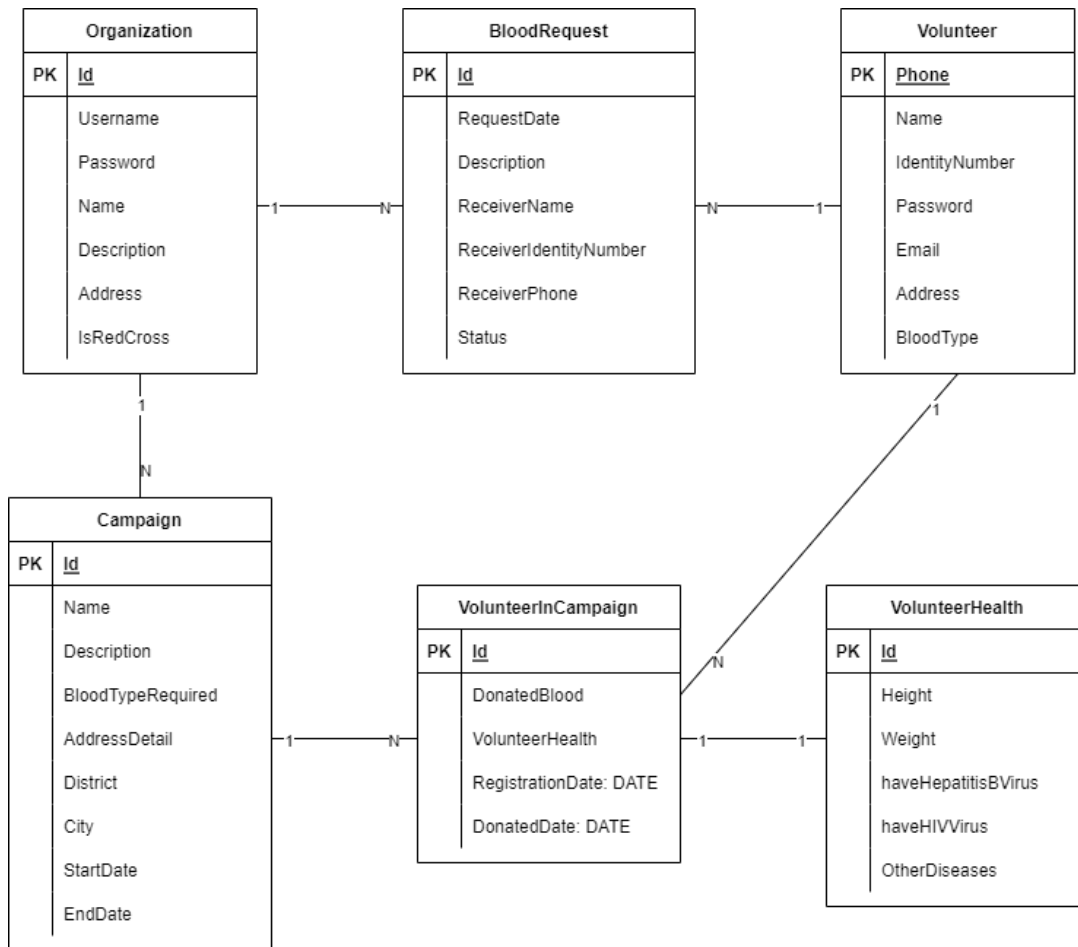


Figure 2. Logical Entity Relationship Diagram

Entity Data dictionary: describe content of all entities	
Entity Name	Description
Organization	Describe all organizations (including hospital or Red Cross society) in the system.
Campaign	Describe all campaigns in the system.
Volunteer	Describe all blood donated volunteers in the system.
VolunteerInCampaign	Describe all blood donated volunteers' information in a campaign in the system.
VolunteerHealth	Describe all blood donated volunteers' health information in a campaign in the system.
BloodRequest	Describe the information when a volunteer requests blood for their relatives.

Table 2 Logical Entity Relationship Diagram Data Dictionary

Entity name	Attribute	Description	Domain	Null
Organization	Id {PK}	Unique identity of each organization.	INT	No
	Username	Unique username of each organization.	VARCHAR(20)	No
	Password	Password belong to username of each organization for login.	VARCHAR(16)	No
	Name	Name of each organization.	NVARCHAR(100)	No
	Description	Description of each organization.	NTEXT	Yes
	AddressDetails	Address details of each organization.	NVARCHAR(100)	Yes
	District	District name of each organization.	NVARCHAR(30)	No
	City	City name of each organization.	NVARCHAR(30)	No
	IsRedCross	Check if organization is Red Cross society or hospital.	BIT	No
Campaign	Id {PK}	Unique identity of each campaign.	INT	No
	Name	Name of each campaign.	NVARCHAR(100)	No
	Description	Description of each campaign.	NTEXT	Yes
	BloodTypeRequired	Type of blood is required in each campaign.	NVARCHAR(10)	No
	AddressDetails	Address details of each campaign.	NVARCHAR(100)	Yes
	District	District name of each campaign.	NVARCHAR(30)	No
	City	City name of each campaign.	NVARCHAR(30)	No
	StartDate	Start date of each campaign.	DATETIME	No
	EndDate	End date of each campaign.	DATETIME	No
Volunteer	Phone {PK}	Unique phone of each volunteer for login.	CHAR(10)	No
	Name	Name of each volunteer.	NVARCHAR(100)	No
	IdentityNumber	Identity number of each volunteer.	CHAR(12)	No
	Password	Password belong to phone of each volunteer for login.	VARCHAR(16)	No
	Email	Email of each volunteer.	VARCHAR(50)	Yes
	DateOfBirth	Date of birth of each volunteer.	DATE	No

	AddressDetails	Address details of each volunteer.	NVARCHAR(100)	Yes
	District	District name of each volunteer.	NVARCHAR(30)	No
	City	City name of each volunteer.	NVARCHAR(30)	No
	BloodType	Blood type of each volunteer.	NVARCHAR(10)	No
	LastDonatedDate	The last blood donated date of each volunteer.	DATE	Yes
VolunteerIn Campaign	Id {PK}	Unique identity of each volunteer in campaign.	INT	No
	BloodType	Blood type of volunteer's blood donation.	NVARCHAR(10)	Yes
	BloodAmount	Blood amount of volunteer's blood donation.	INT	Yes
	RegistrationDate	The day when volunteers register to donate blood.	DATETIME	No
	DonatedDate	The day when volunteers join to donate blood.	DATETIME	No
	Status	The status of volunteer's blood donation in each campaign.	NVARCHAR(30)	No
	RejectedReason	The reason for rejecting a volunteer to donate blood in the campaign.	CHAR(3)	Yes
VolunteerHealth	Id {PK}	Unique identity of each volunteer health information in campaign.	INT	No
	Height	Height of each volunteer.	INT	Yes
	Weight	Weight of each volunteer.	FLOAT	Yes
	haveHepatitisBvirus	Check if volunteer has Hepatitis B Virus in blood donation campaign.	BIT	Yes
	haveHIVVirus	Check if volunteer has HIV Virus in blood donation campaign.	BIT	Yes
	OtherDiseases	Other diseases of each volunteer in blood donation campaign.	NTEXT	Yes
BloodRequest	Id {PK}	Unique identity of each blood request information to organization	INT	No

	RequestDate	The day when volunteer request blood for their relatives.	DATE	No
	Description	The description for request blood information.	NTEXT	No
	ReceiverName	The name of receiver who will receive blood from requested blood of volunteer.	NVARCHAR(100)	No
	ReceiverIdentity Number	The indentity number of receiver who will receive blood from requested blood of volunteer.	CHAR(12)	No
	ReceiverPhone	The phone of receiver who will receive blood from requested blood of volunteer.	CHAR(10)	No
	Status	The status of blood request information.	NVARCHAR(20)	No

Table 3 Logical Entity Relationship Diagram Attribute Data Dictionary

2.3 Physical Design Diagram

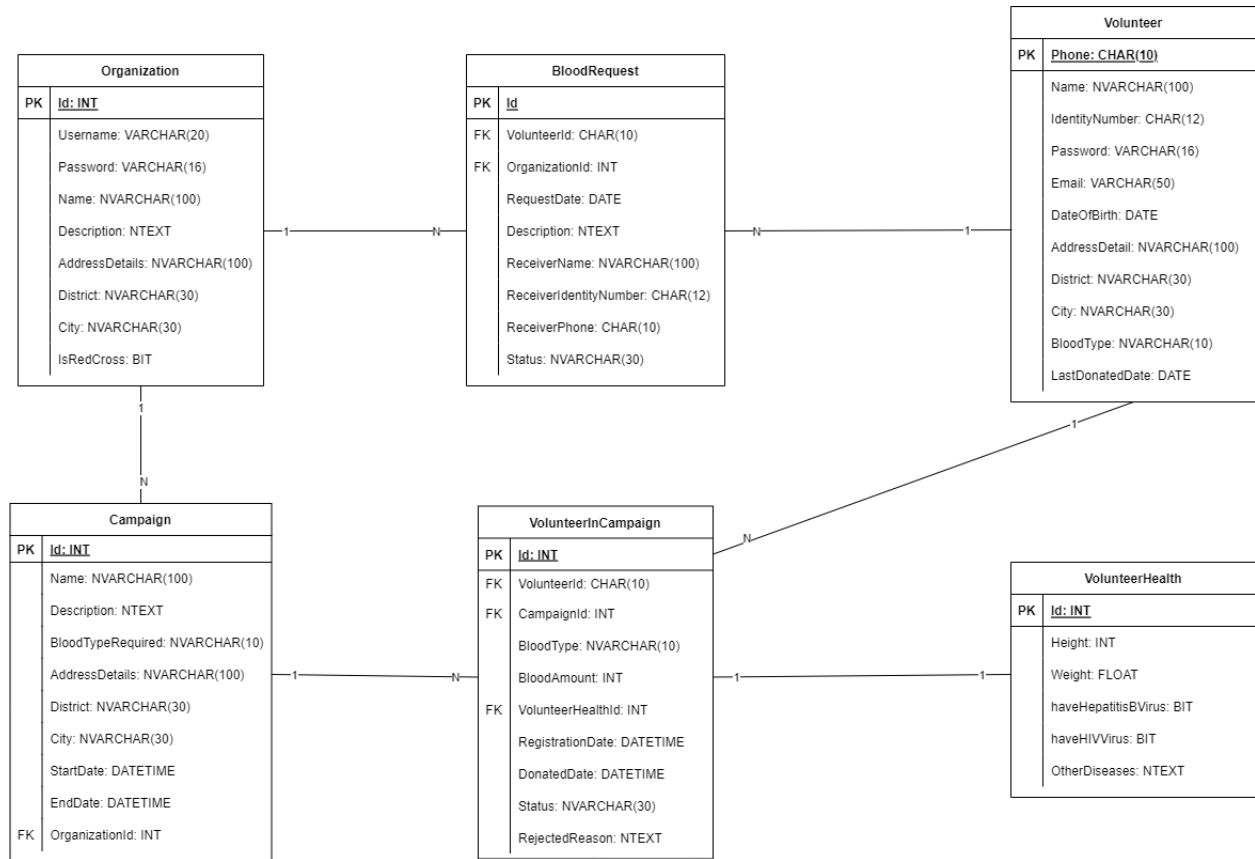


Figure 3. Physical Design Diagram

Entity name	Attribute	Description	Domain	Null
Organization	Id {PK}	Unique identity of each organization.	INT	No
	Username	Unique username of each organization.	VARCHAR(20)	No
	Password	Password belong to username of each organization for login.	VARCHAR(16)	No
	Name	Name of each organization.	NVARCHAR(100)	No
	Description	Description of each organization.	NTEXT	Yes
	AddressDetails	Address details of each organization.	NVARCHAR(100)	Yes
	District	District name of each organization.	NVARCHAR(30)	No
	City	City name of each organization.	NVARCHAR(30)	No
	IsRedCross	Check if organization is Red Cross society or hospital.	BIT	No
Campaign	Id {PK}	Unique identity of each campaign.	INT	No
	Name	Name of each campaign.	NVARCHAR(100)	No

	Description	Description of each campaign.	NTEXT	Yes
	BloodTypeRequired	Type of blood is required in each campaign.	NVARCHAR(10)	No
	AddressDetails	Address details of each campaign.	NVARCHAR(100)	Yes
	District	District name of each campaign.	NVARCHAR(30)	No
	City	City name of each campaign.	NVARCHAR(30)	No
	StartDate	Start date of each campaign.	DATETIME	No
	EndDate	End date of each campaign.	DATETIME	No
	OrganizationId {FK}	ID of organization which organize campaign.	INT	No
Volunteer	Phone {PK}	Unique phone of each volunteer for login.	CHAR(10)	No
	Name	Name of each volunteer.	NVARCHAR(100)	No
	IdentityNumber	Identity number of each volunteer.	CHAR(12)	No
	Password	Password belong to phone of each volunteer for login.	VARCHAR(16)	No
	Email	Email of each volunteer.	VARCHAR(50)	Yes
	DateOfBirth	Date of birth of each volunteer.	DATE	No
	AddressDetails	Address details of each volunteer.	NVARCHAR(100)	Yes
	District	District name of each volunteer.	NVARCHAR(30)	No
	City	City name of each volunteer.	NVARCHAR(30)	No
	BloodType	Blood type of each volunteer.	NVARCHAR(10)	No
	LastDonatedDate	The last blood donated date of each volunteer.	DATE	Yes
VolunteerIn Campaign	Id {PK}	Unique identity of each relationship of volunteer in campaign.	INT	No
	VolunteerId {FK}	Phone of volunteer who join in campaign.	CHAR(10)	No
	CampaignId {FK}	ID of campaign which organize for volunteer to join for blood donation activity.	INT	No
	BloodType	Blood type of volunteer's blood donation.	NVARCHAR(10)	Yes
	BloodAmount	Blood amount of volunteer's blood donation.	INT	Yes
	RegistrationDate	The day when volunteer register to donate blood.	DATETIME	No
	DonatedDate	The day when volunteer join to donate blood.	DATETIME	No
	Status	The status of volunteer's blood donation in each campaign.	NVARCHAR(30)	No
	RejectedReason	The reason for rejecting a volunteer to donate blood in the campaign.	CHAR(3)	Yes

VolunteerHealth	Id {PK}	Unique identity of each volunteer health information in campaign.	INT	No
	Height	Height of each volunteer.	INT	Yes
	Weight	Weight of each volunteer.	FLOAT	Yes
	haveHepatitisBVirus	Check if volunteer has Hepatitis B Virus in blood donation campaign.	BIT	Yes
	haveHIVVirus	Check if volunteer has HIV Virus in blood donation campaign.	BIT	Yes
	OtherDiseases	Other diseases of each volunteer in blood donation campaign.	NTEXT	Yes
BloodRequest	Id {PK}	Unique identity of each blood request information to organization	INT	No
	VolunteerId {FK}	Phone of volunteer who request blood for their relatives.	CHAR(10)	No
	OrganizationId {FK}	ID of organization which receive the request blood information of volunteers.	INT	No
	RequestDate	The day when volunteer request blood for their relatives.	DATE	No
	Description	The description for request blood information.	NTEXT	No
	ReceiverName	The name of receiver who will receive blood from requested blood of volunteer.	NVARCHAR(100)	No
	ReceiverIdentityNumber	The identity number of receiver who will receive blood from requested blood of volunteer.	CHAR(12)	No
	ReceiverPhone	The phone of receiver who will receive blood from requested blood of volunteer.	CHAR(10)	No
	Status	The status of blood request information.	NVARCHAR(20)	No

Table 4 Physical Design Diagram Attribute Data Dictionary

3. System Architecture

3.1. Hardware Requirements

Personal computer for developing with the configuration:

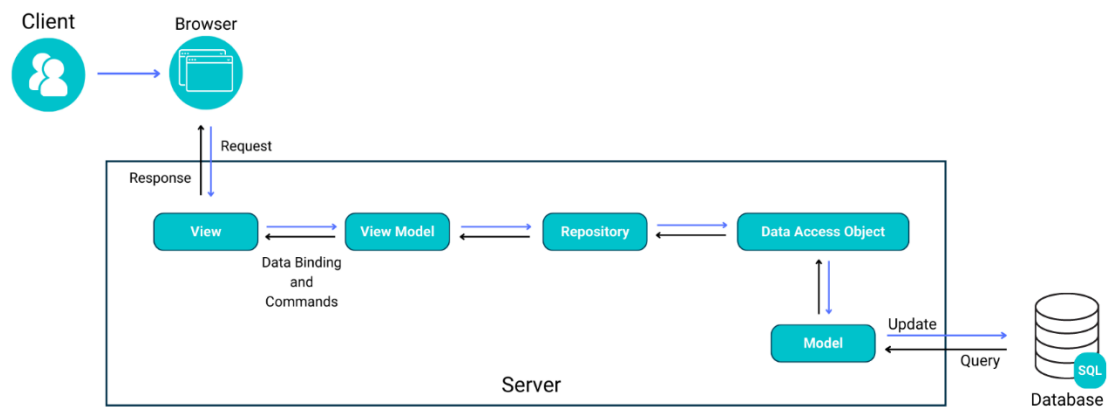
- CPU Intel® Core™ i5-8250U CPU @ 1.60GHz 1.80 GHz, CPU Intel® Core™ i5-11400H @ 2.70GHz 2.69 GHz and CPU Intel® Core™ i7-9750H CPU @ 2.60GHz 2.59 GHz
- 8.00 GB of RAM, 16 GB of RAM

- 256 GB of hard disk

3.2. Software Requirements

- .Net Core 5.0.
- Entity Framework Core .NET Command-line Tools version 6.0.9
- Web Server: Internet Information Services – version 10.0.22621.1
- Microsoft Windows 11 Pro version 22H2 and Windows 10 Home Single Language version 21H2.
- Database management: Microsoft SQL Server 2019 (RTM-GDR) (KB5014356) - 15.0.2095.3.

3.3. System Architecture Design



System Architecture Design - MVVM

Figure 4. System Architecture Design - MVVM

4. Implementation

4.1. Deployment Considerations

- The code is needed to be deployed with libraries, configuration files or resources to function.
- You need to make sure that the database named PRN221_SE1503_GroupProject_BloodDonor_Happy3Friends has been created with the right server name, uid, password.

- If the path where the software folder is located is too long or has space characters, the application could be deployed failed.
- Verify that the host server is correctly configured and running smoothly.

4.2. Screenshots and explanations

4.2.1 Flows:

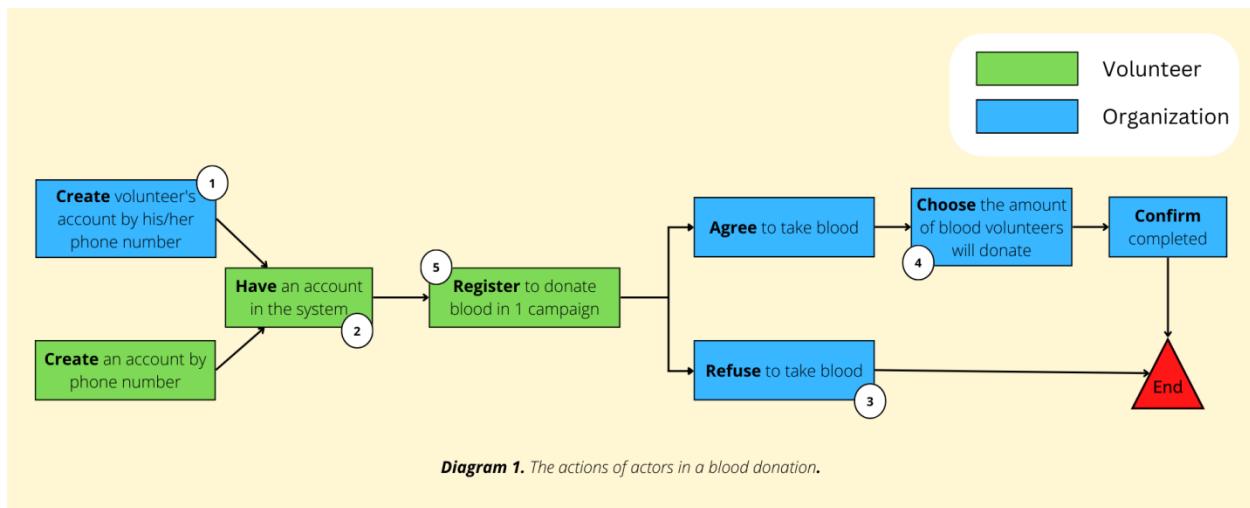


Figure 5. The actions of actors in a blood donation

1. The created accounts will have the default password is the login name (phone number) of the volunteer. The volunteer can change it later.
2. Volunteers are required to have an account to participate in blood donation. Volunteers can create an account at home or go to a blood donation place to ask staff to help create an account with the organization's account.
3. After the health check, in case the volunteer is not eligible to participate in blood donation, the organization calling for blood donation will refuse to receive blood from the volunteer.
4. If the volunteer is healthy enough to donate blood, the organization's staff will ask how much blood the volunteer wants to donate. The staff will then select the option corresponding to that amount of blood on the system. There are 3 levels of blood donation: 250ml, 350ml, 450ml.

5. The interval between 2 blood donations is 12 weeks. Volunteers cannot register to donate blood in 2 events at the same time. To register to donate blood at another event, volunteers need to cancel the registration form of the previous event.

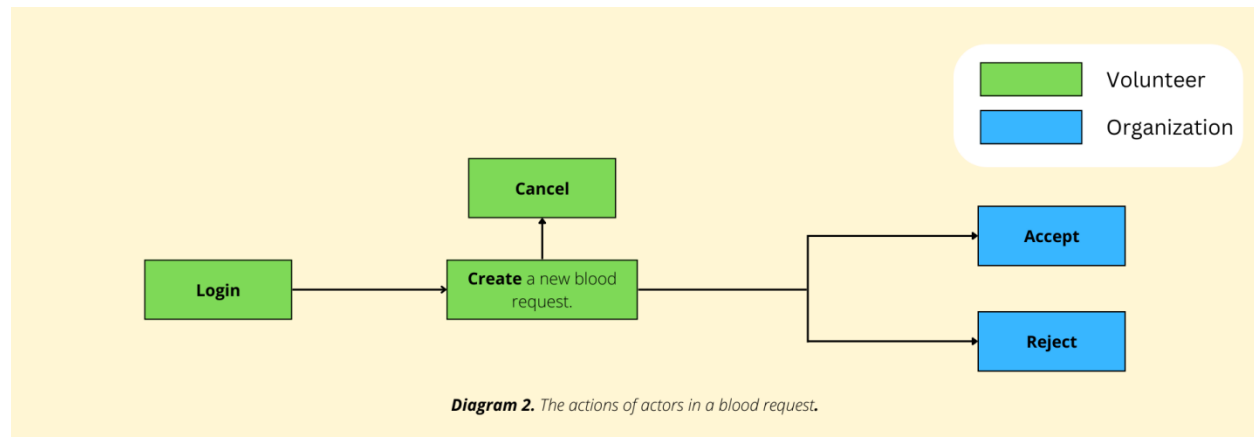


Figure 6. The actions of actors in a blood request

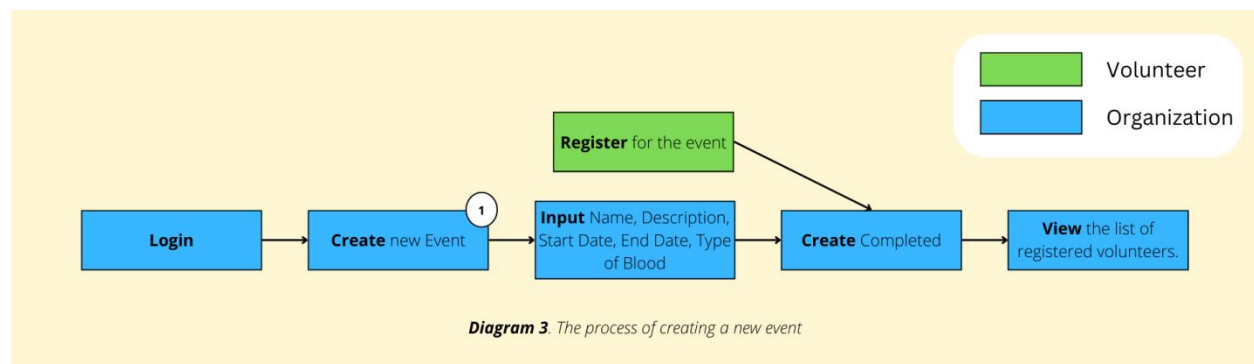


Figure 7. The process of creating a new event

1. A campaign consisting of name, description, start date, end date, blood type, created by an employee of the organization.

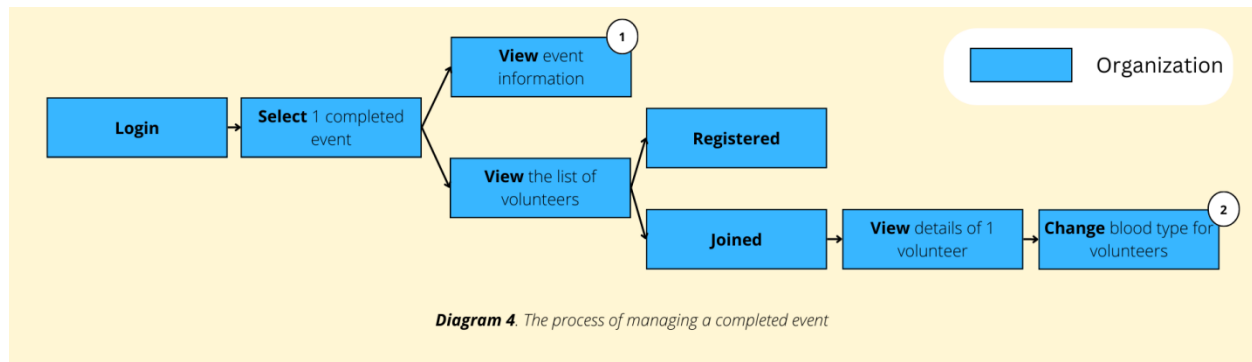
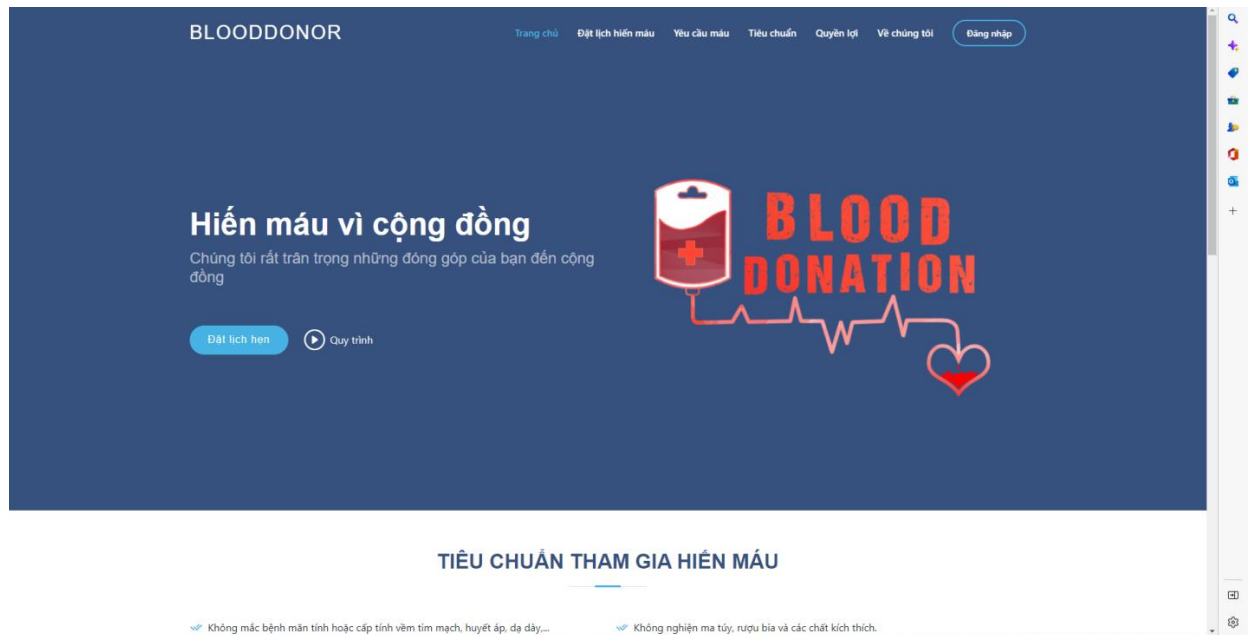


Figure 8. The process of managing a completed event

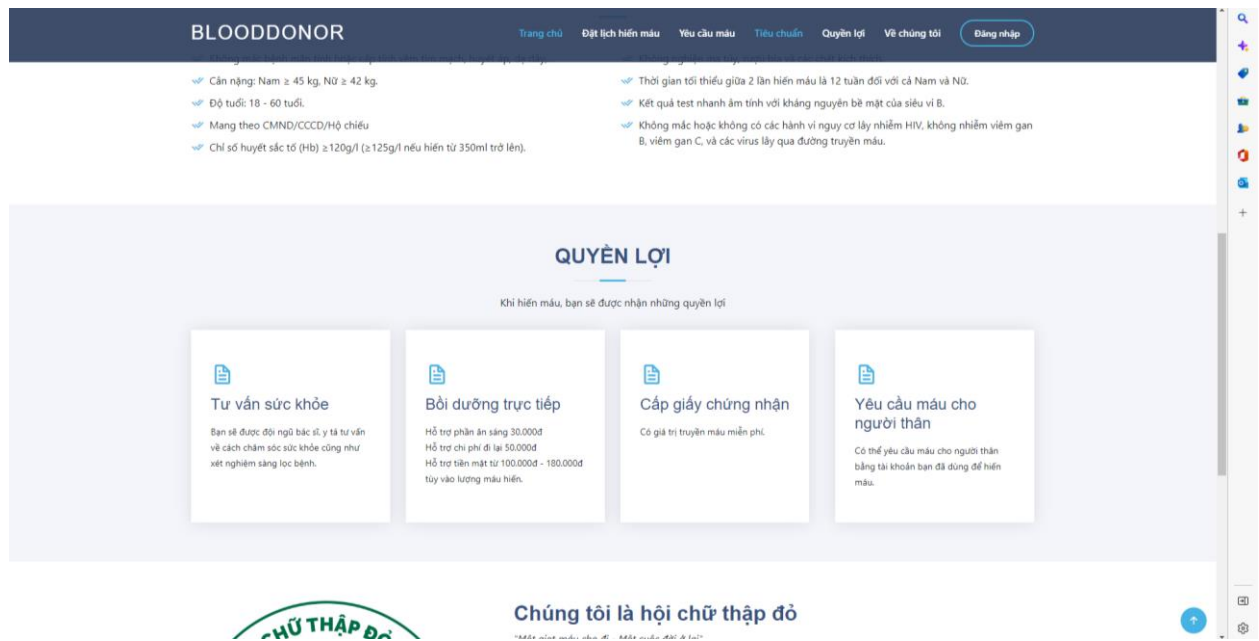
1. Event information includes basic information: Start - end date, name, description, ... and total blood and total amount of blood each type received.
2. Volunteers who do not know their blood type will be assigned to the unspecified blood group. The organization's staff will add blood group information for volunteers after the first blood donation.

4.2.2 Screenshots:

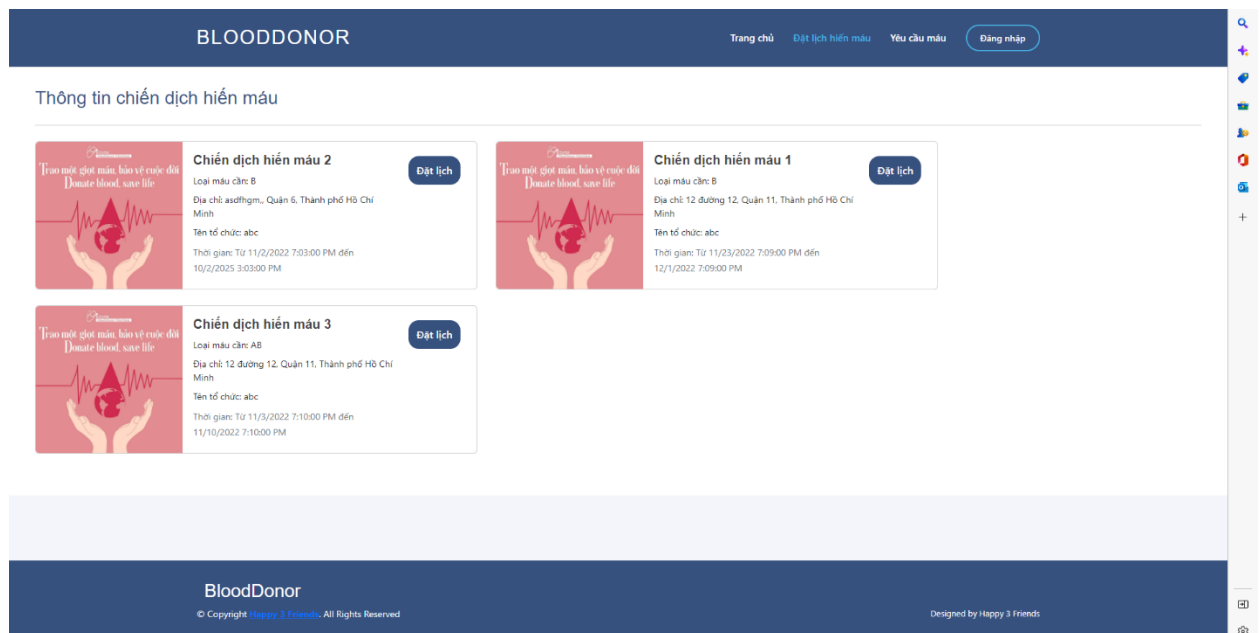
_ Guest Role:



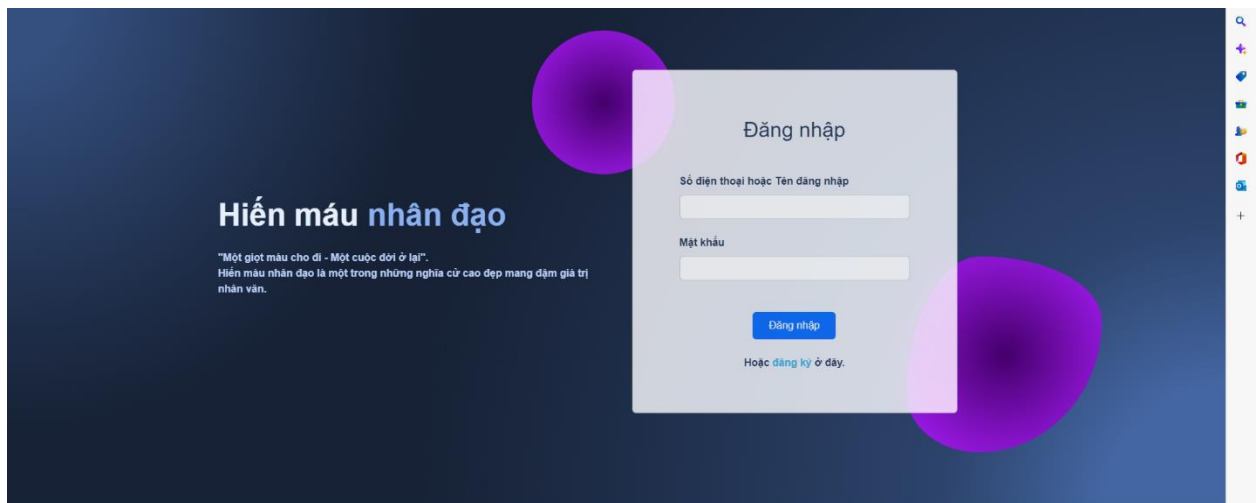
+ When enter into the web, the guest can see the Home page.



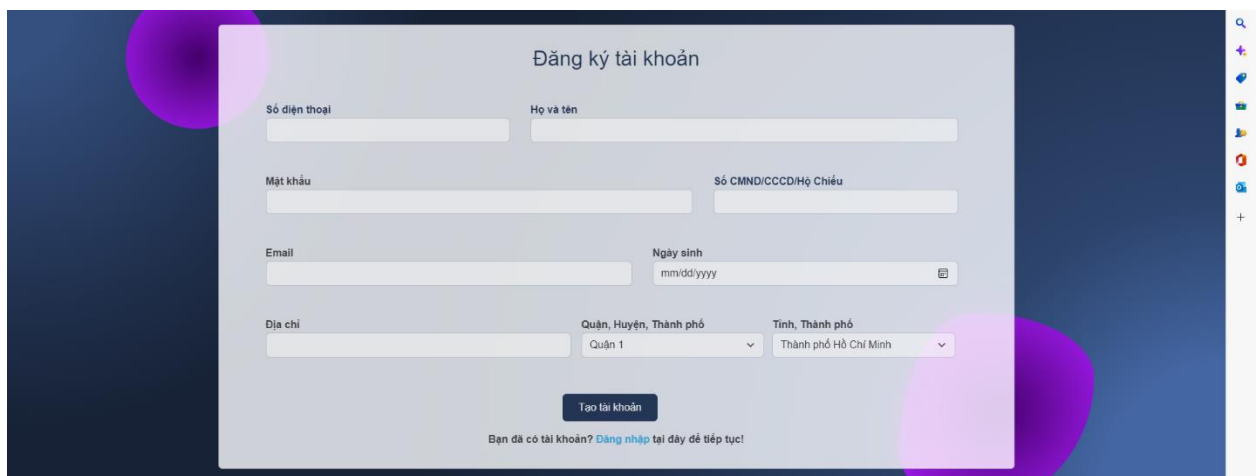
+ Guest can see information about Blood Donation in Home. If Guest want to see the list of Campaign, click on button “Đặt lịch hiến máu”.



+ Button “Yêu cầu máu” require log in.

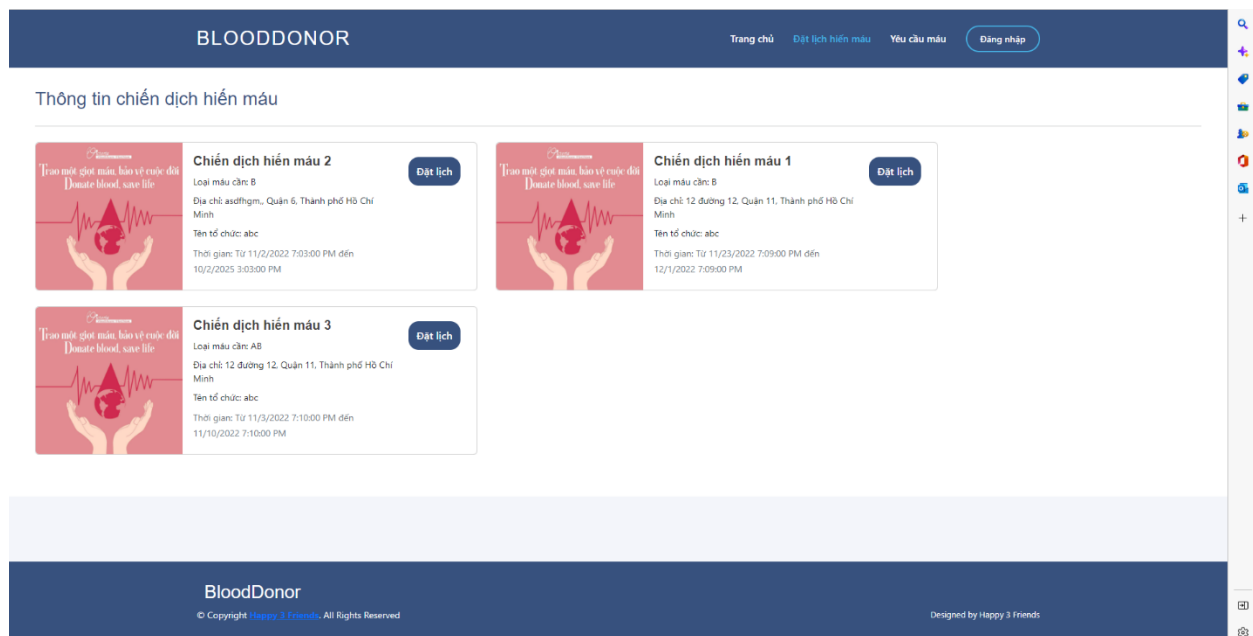


+ Login UI.

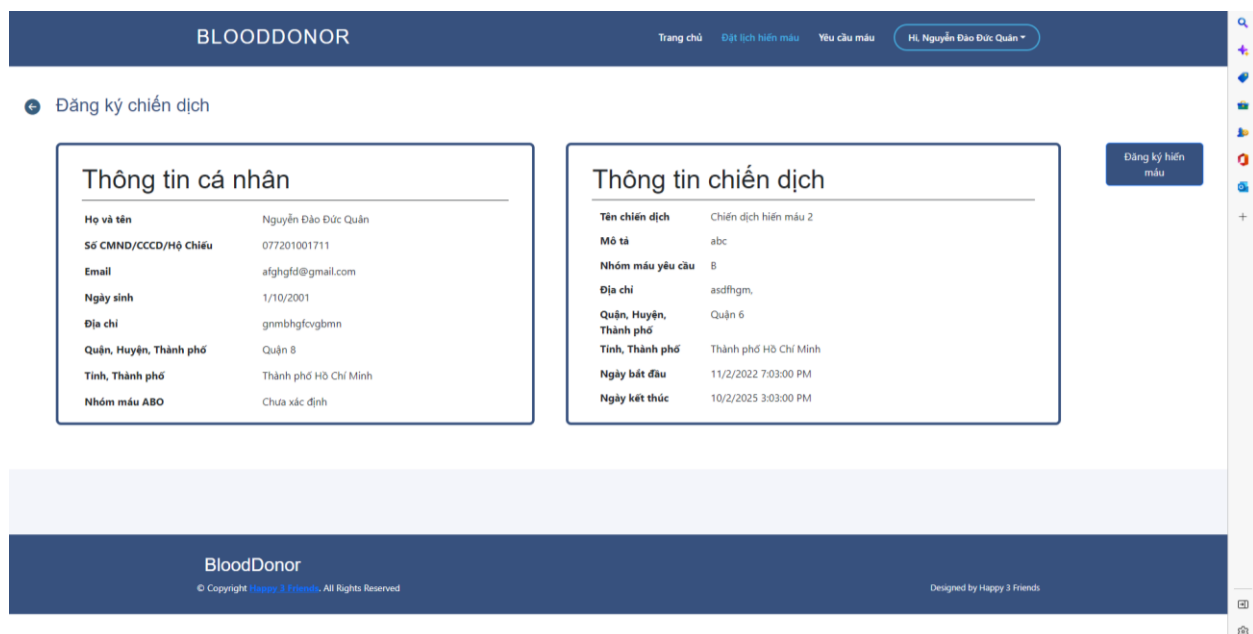


+ Sign up UI.

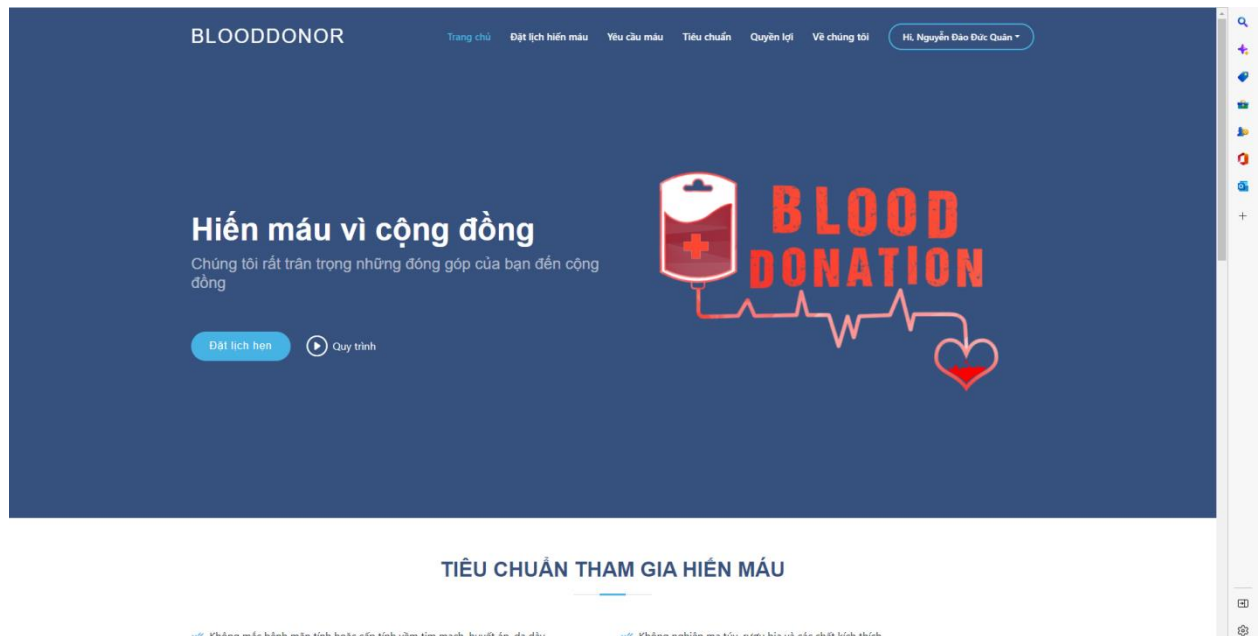
_ **Volunteer Role:**



+ For registering to a campaign, click on the button “Đặt lịch” in each campaign.



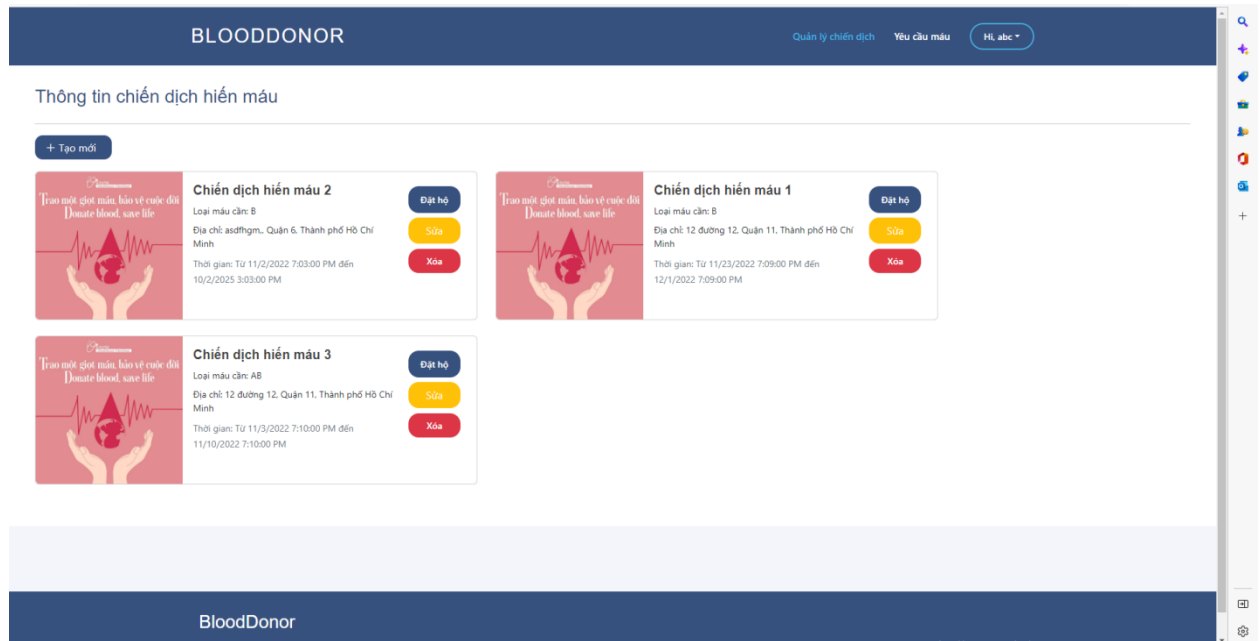
+ After clicking, Volunteer can see informations about herself/himself and information about the campaign. To regist, click on the button “Đăng ký hiến máu”.



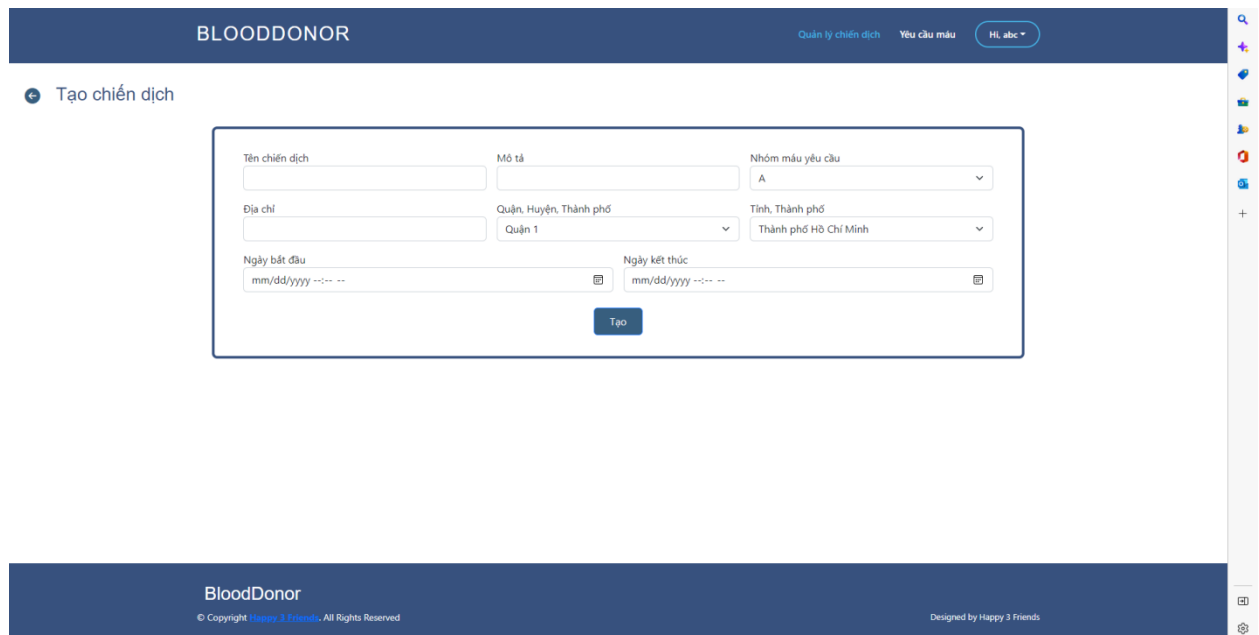
+ Volunteer can click on the button “Yêu cầu máu” to request blood for themselves or for their relatives.

+ Blood request form. Volunteer need fill all the blank and send to a particular hospital/Red Cross.

_ **Hospital/Red Cross Role:**



+ Main screen of Hospital Role. To check the blood request that volunteers have sent, click on the text “Yêu cầu máu”. To create a new campaign, click on the button “Tạo mới”. To create account for volunteer and regist for them to the campaign, click on the button “Đặt hộ”. To edit campaign, click on the button “Sửa”. To delete a campaign, click on the button “Xóa”. You can not delete campaign that has volunteer regist in.



+ Create blood donation campaign Page. Hospital need to fill all the blank to create new campaign.

BLOODDONOR							
Quản lý chiến dịch				Yêu cầu máu		Hi, abc	
Ngày yêu cầu	Mô tả	Họ tên người nhận	Số CMND/CCCD/Hộ chiếu người nhận	Số điện thoại người nhận	Trạng thái	Tổ chức	Tỉnh nguyên viên
2/11/2022 12:00:00	sdcvfgbh	jghgfdghn	23457890-	0933333333	Đã chấp nhận	abc	Quản
Thông tin							

+ Blood request manage Page. To view more information and accept/reject about a particular blood request, click on the button “thông tin”.

Quản lý chiến dịch

Yêu cầu máu

Hi, abc

←

Thông tin yêu cầu máu

Ngày yêu cầu

2/11/2022 12:00:00 AM

Mô tả

sdcvfgbh

Họ tên người nhận

jghgfdghn

Số CMND/CCCD/Hộ chiếu người nhận

23457890-

Số điện thoại người nhận

0933333333

Trạng thái

Đã chấp nhận

Tổ chức

Thành phố Hồ Chí Minh

Tỉnh nguyên viên

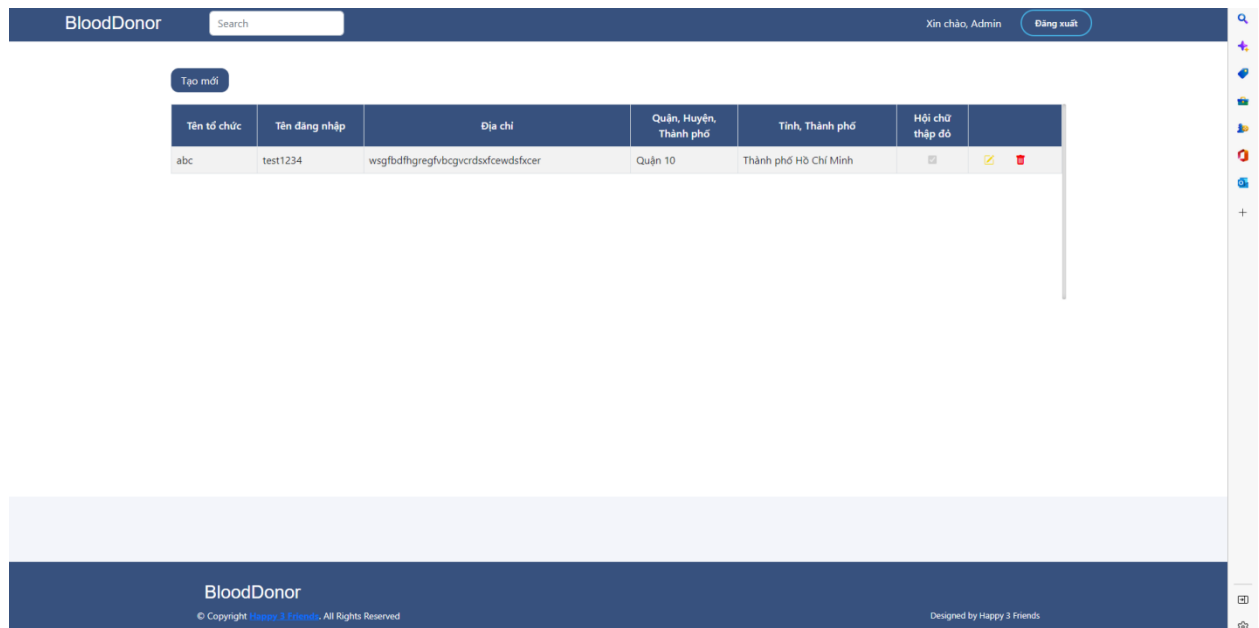
Quần

Chấp nhận

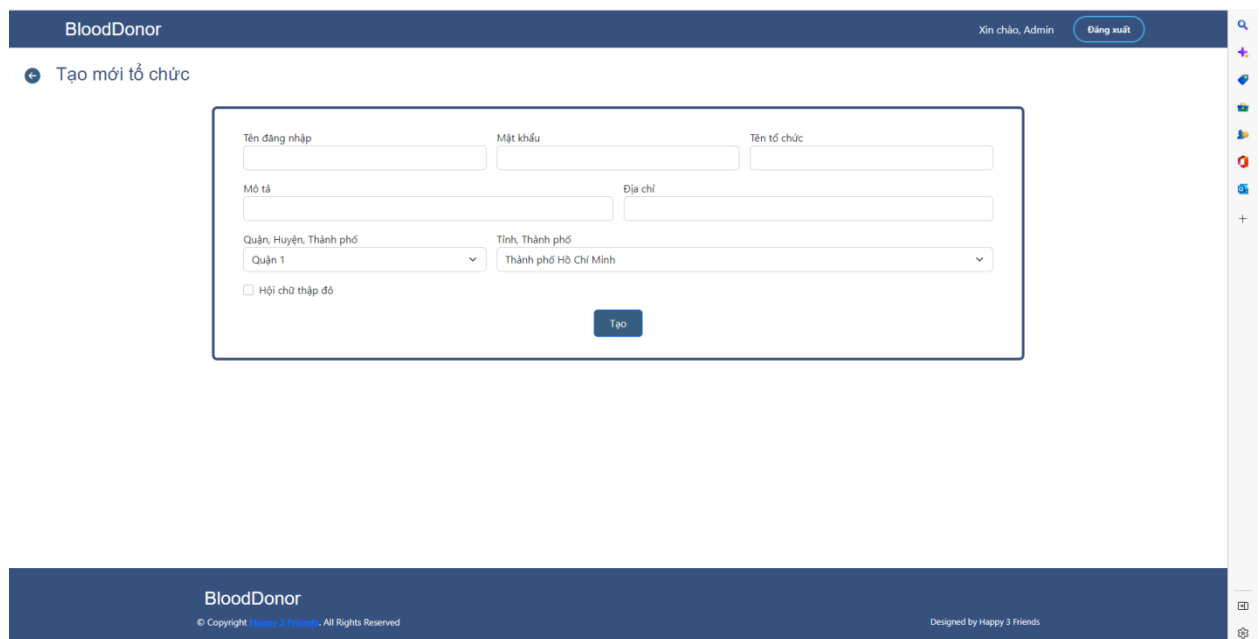
Từ chối

+ Blood request manage detail Page. Hospital can Accept/Reject a request.

_ Admin Role:



+ Main Page of Admin role. Admin can create a new hospital/Red Cross by click on the button “Tạo mới”. To edit or delete a hospital/Red Cross, click on the buttons in each row. Hospital/Red Cross has campaign can not be deleted.



+ Create Hospital/Red Cross Page. Admin need to fill the blank to create new Hospital/Red Cross.