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Call for Donation
Based on GPS System

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Abstract

Mobile phones have been used in all real-world fields and activates today. It offers many features Such as speed and flexibility, saving time and delivery.

Therefore, these features can be directed to help in the process of requesting blood or money donations to needy patients through a flexible, fast and authentic process.

Notifications are sent to users based on their geographical location using GPS to ensure prompt response from persons close to the hospital responsible for sending the request.

Users have the option to share the message via social media to ensure the greatest possible benefit of the system and the greatest amount of assistance to those who request donations.

System has been provided with a web app as a control panel to manage and monitor the system and receive users' complaints.

Acknowledgement

*In the name of Allah, the Most Gracious and the Most Merciful,
all praises to Allah for the strengths and His blessing during our life and specially in completing this project.*

Also, we would like to thank our families for giving us their supporting and carefulness to accomplish this project.

We would like also to thank our supervisors:
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Eng. Mahmoud Mahdi
They were step by step with us to finish that work with their guidance, valuable suggestions and help given through this project.

We would like also to thank everyone helped us through our gradual education through the four years in FCI-ZU

Finally, we hope that our project obtains your attention and specification

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Chapter

Introduction

1.1: Call for donation

There are many types of donations, including donations of blood or money … etc.

There are many people in need of permanent donations and there are also many people willing to always help them.

The problem not lies in how these donations are requested but in the speed of response from the intended people and protect these people from tricks with provide the credibility so as not to be subjected to false calls.

So, we need a system that makes the process faster, safer and more honest.

The system will be used for just send a blood or money request to help patients in the hospitals.

1.1.1: Problem definition

thanks to modern technology and advanced methods that enable us to use mobile devices for making donations requests from people by sending notifications to specific people based on their current location using the built-in GPS systems in their mobile devices.
So, we need and android app to enable only hospitals to send messages and notifications to users to ensure the seriousness and validity of the request.

People close to the hospital site will receive a notice containing the text of the message as well as the name and address of the hospital and they can also use Google Maps to find out the location of the hospital.

Users have the option to share this message on social media sites to take advantage of the many features that these sites offer from the spread of the message and provide the most assistance and more donations.

The system must be managed through the control Panel that enable admins to receive user complaints and approve sign up requests from the hospital to check their data so that they do not abuse the application and provide credibility.

Hospitals can also benefit from the program to apply for donations in case of lack of medical equipment or to provides more health care facilities.

1.1.2: Current systems and their drawbacks

People used to use traditional systems to ask for donations like advertisements on TV and newspapers, and this is very expensive and takes a long time. To collect donations and not suitable in many cases which need the speed of donation like lack of blood in hospitals and in blood banks.

Now people can use social media to ask for donations where they can communicate with as many people as possible, but this may still be useless for a lot. of people who live in very distant places and who, for example, cannot donate blood in hospitals for serious injuries that need into blood immediately.

Also, social media is not censored and anyone can send false messages to ask for donations

But we can still take advantage of the good features of communication sites that involve sharing messages with friends to help.

1.1.3: Objectives of our system

Now it becomes clear what are the defects in the previous systems and what are the goals and advantages that this system should offer.

1- Providing a facility that enables the hospital to send messages to all users, also send notifications to specific users based on their locations in order to speed response and quickly save serious cases that need immediate blood donation.

2- Users can view messages that contains information about the patient and the hospital with some options like use Google Maps to view the location of the hospital and share the message on the social networking sites to check the transparency of the information and the benefits of the social media sites.

3- Only hospital will send the notifications Because this ensures reliability and does not abuse the system in sending false messages or contain incorrect information.

4- Enable administrators to control and monitor the system and approve requests for registration from hospitals and receive complaints and suggestions from users and respond to them.

1.2: System administration and control

Like any other system we need to control and monitor it and this will not happen without a control panel.

Control Panel will be a web page because this provides the flexibility and ease of use as the web page will be more effective than the android app in this case.

Only administrators are able to access the control panel based on the verification and authentication process

1.2.1: How to manage and Monitoring the system

The dashboard enables admin to show and manage all user's information as can remove any of their accounts in some situations.

Admins can also make some statistics on blood donation processes and the most blood-seeking hospitals that may help in some later programs to solve the problem of the lack of blood in hospitals and blood banks.

Admins can also follow the system success and how it attracts people to use it.

1.2.2: How to provide system Credibility

As explained earlier, the problems of regular systems are lack of credibility as there are a lot of false calls and requests to donate without much right and wrong information. The user becomes confused about whether he is donating or not.

In this system, only hospitals can send notifications to other users, but donners can't.

This is because hospitals are subject to some control in the registration process and need to be approved by officials after reviewing their information.

1.2.3: Communicate between users and admins

Users can send complaints to the addressee in the event of any error in the system or any complaint from a hospital that misuses the system.

Also, anyone can send some suggestions or queries to the system through the website of the program with the submission of his e-mail until he receives a reply from the administrators.

Administrators can view all of these messages and suggestions and send them a reply through the dashboard.

1.3: Methodologies and Tools

Notice that: our system will be constructed using two different tracks.

1- The android app will be run using android devices that enable users and hospitals to use it.
2- The dashboard will be constructed with web development and design tools.

The objectives of the proposed project will be achieved through the following methodologies:

1: Technology integration

1- Android software development

- Android software development is the process by which new applications are created for devices running the Android operating system. Officially, apps can be written using Java, C++ or Kotlin.
- But in our app will be developed using **java**.
- Java is a programming language enables us to write and build different applications like android and web desktop applications.

2- Xml

- XML stands for eXtensible Markup Language.
- XML was designed to store and transport data also it will enable us to design application interface on android device.

3- MySQL

- MySQL is a database system used on the web and it runs on a server.
- It will be used to manage and use the app's database.

4- Php

- PHP stands for *PHP: Hypertext Preprocessor.*
- PHP is a server scripting language, and a powerful tool for making dynamic and interactive Web pages.
- Using My sql with PHP, you can connect to and manipulate databases.

5- HTML-HTML5

HTML is a markup language for describing web documents (web pages).
- HTML stands for Hyper Text Markup Language.
- HTML documents are described by HTML tags, Each HTML tag describes different document content.

6- CSS-CSS3
- CSS stands for Cascading Style Sheets
- CSS defines how HTML elements are to be displayed
- Enable us to make web page more responsive

7- Javascript
- JavaScript is the programming language of HTML and the Web.
- It used to program the behavior of web pages

8- JQuery
- JQuery is JavaScript library that makes it easier for designers to control HTML events, animations, and other interactions on a web page by adding and removing style sheet handlers.

2: development, environment, platform tools

1- Android studio

 - Android Studio is Android's official integrated development_environment (IDE). It is purpose built for Android to accelerate your development and help you build the highest-quality apps for every Android device.

2- MySQL Workbench

 - MySQL Workbench is a visual database design tool that integrates SQL development, administration, database design, creation and maintenance into a single integrated development environment for the MySQL database system.

3- XAMPP

 -xampp is a free and open source cross-platform web server solution stack package , consisting mainly of the HTTP server, MariaDB database, and interpreters for scripts written in the PHP Programming Languages.

- it extremely easy for developers to create a local web server for testing and deployment purposes.

4- NetBeans

NetBeans is an open-source integrated development environment (IDE) for developing with Java, PHP, C++, and other programming languages.

5- Google Maps

- Google Maps is a Web-based service that provides detailed information about geographical regions and sites around the world.
- Google Maps provides a route planner, allowing users to find available directions through driving, public transportation, walking, or biking.

6- Microsoft Visio

- is a diagramming and vector graphics application and is part of the Microsoft office family, is used to draw Data Flow Diagram, Use Case, context diagram and Flow Chart.

End of chapter 1

2

Chapter

System Development Life Cycle and Work Plan

2.1: System development life cycle (SDLC).

A system development life cycle (SDLC): is a conceptual model, used in project management, to describe the stages and tasks involved in each step of a project to write and deploy software.

It helps in producing a software with the highest quality and lowest cost in the shortest time. SDLC includes a detailed plan for how to develop, alter, maintain, and replace a software system.
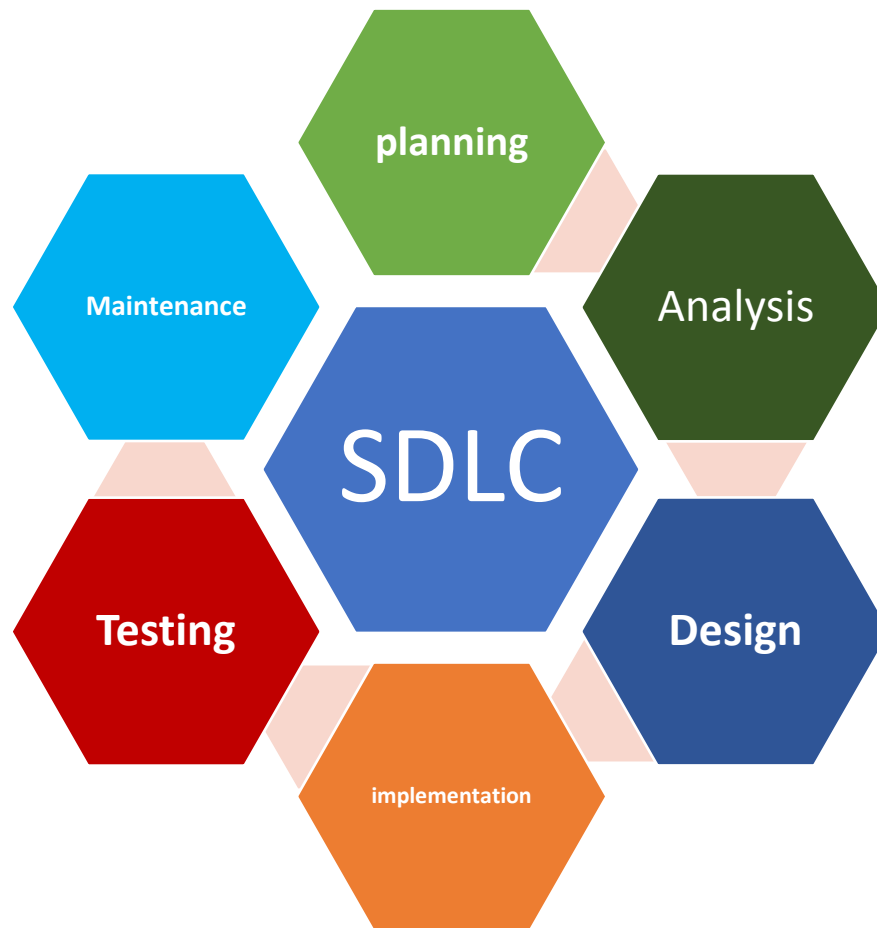
Figure 2-1 SDLC

Suggest that the SDLC phases proceed in a logical path from start to finish. in some projects, this is true.

In many projects, however, the project team moves through the steps consecutively, incrementally, iteratively, or in other patterns.

Different projects may emphasize different parts of the SDLC or approach the SDLC phases in different ways.

But all projects have the following Four phases in their Software development life cycle model:

1) System Planning.

2) System Analysis.

3) System Design.

4) Implementation.
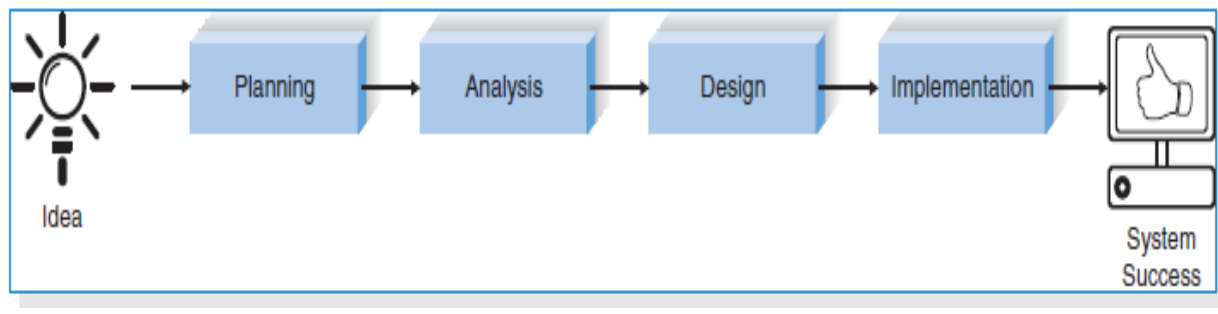
Figure 2-2 main phases in SDLC

Each phase of them will be explained later as part of our system development steps.

2.2: Project Methodology Options.

A **methodology** is a formalized approach to implementing the SDLC (it is a list of steps and deliverables).

There are many different systems development methodologies, such as:

- *Waterfall Development*
- *parallel development*
- *V-model*
- *Rapid Application Development (RAD)*
- *Iterative Development*
- *Agile Development*

They vary in terms of the progression that is followed through the phases of the SDLC..

Waterfall Development model

In our project we will use the waterfall development model to implement the SDLC and develop our project.

With **Waterfall development**, analysts and programmer proceed sequentially from one phase to the next.
Once the work produced in one phase is approved, the phase ends and the next phase begins. As the project progresses from phase to phase, it moves forward in the same manner as a waterfall.
 While it is possible to go backward through the phases (e.g., from design back to analysis).

Waterfall development methodologies have the advantages of identifying requirements long before programming begins and limiting changes to the requirements as the project proceeds.
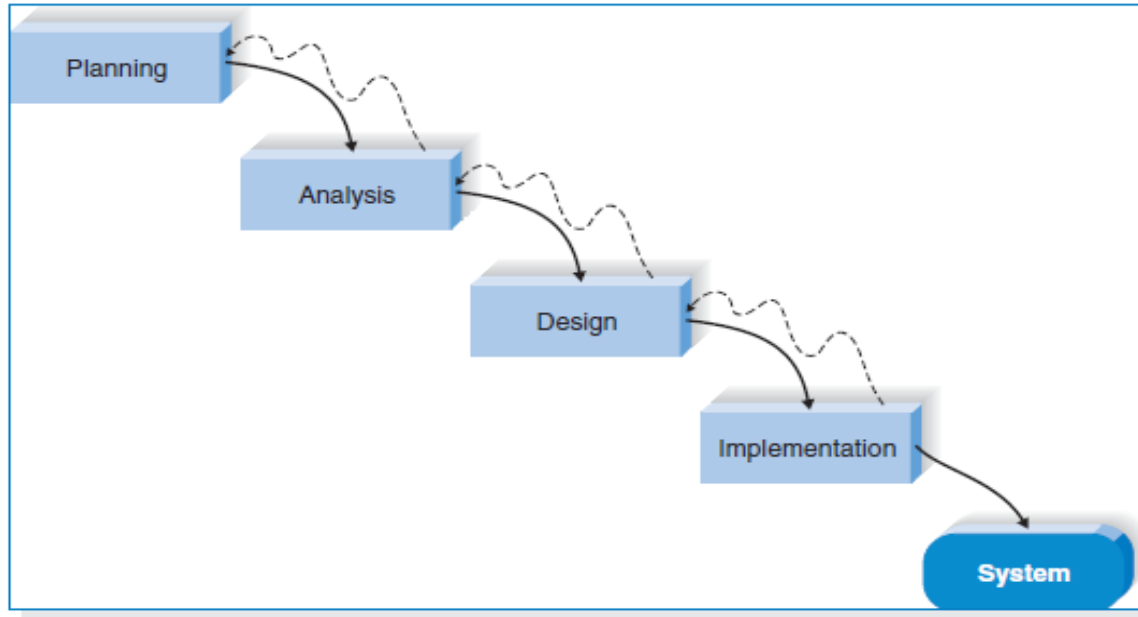
Figure 2-3 Waterfall development

This will be helpful in our project, as it is possible to modify some of the previous steps in the project as a result of some errors or modifications. Especially as some members of the team are still working on the development of their skills in the field of android programming. and It is possible that good ideas come in the late step.

2.3: Planning Phase.

The planning phase is the fundamental process of understanding why an information system should be built and determining how the project team will go about building it. It has two steps:

1- project initiation
- the system's business value is identified
- how will it lower costs or increase revenues?
- feasibility analysis of the project
2- project management
- creates a work plan
- staffs the project
- puts techniques in place to help the project team control and direct the project through the entire SDLC.

The deliverable for project management is a project plan that describes how the project team will go about developing the project.

2.3.1: project initiation

In chapter 1, we have discussed the value and of the project and the and reasons that pushed us to build this project.

Let us quickly remember the value of the project.
- The project will make the donation process easy by sending a notifications and posts to all users.
- Nearby people receive immediate alerts because they are the closest people to the hospital and can help in case of blood donation, this will be very useful in the case of serious injuries that require many blood and in a short time.
- The program contains a control panel that enables administrators to control and monitor the system and receive complaints from users

After feasibility study of the system, we can say that

"the system will be very helpful for many of people, we have the technology and techniques that enable us to build this project, we just need to learn more about using these technics, but no problem we have much time to learn more, and to fix later problems, the system will be used by any adult user that can donate with blood or money and by any hospital. so, we can help poor people that can't pay hospital expenses and treatment price.

Admins will also use the dashboard to manage and monitor the system "

2.3.2: project management

Once the project is approved, it enters project management. During project management, the project manager creates a work plan, staffs the project, and puts techniques in place to help the project team control and direct the project through SDLC.

We can divide our application's main work into:

1- Learning more skills:
- Before developing our application, we needed to read about android because knowledge about android developing was not sufficient enough to start developing the project.
- We also needed to learn about web hosting and how to connect the android app with web-based dashboard.

2- Collect more information about donation process and how hospitals deal with it.

The work was divided among the members of the team according to the skills possessed by each member.

All skills that needed to build a system was available in team members.
Some members have skills in web developing the and some others have skills in android applications development and others analyze the system and gather the information needed.
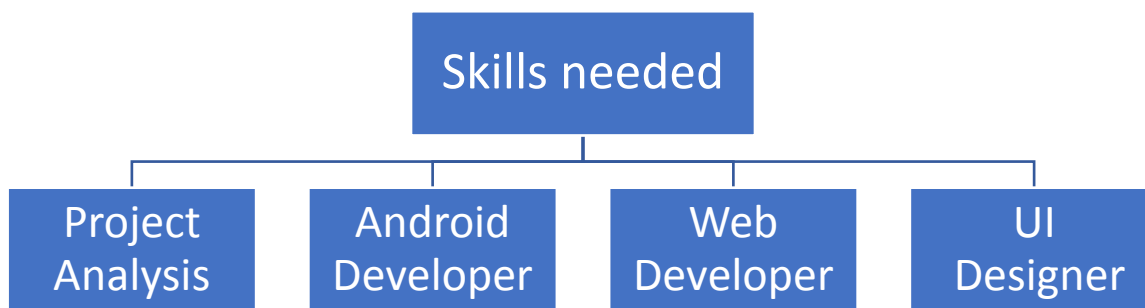
Figure 3-4 Skills needed to build the project

2.4: Business Requirements.

Business Requirements are the business capabilities that the system will provide.

The system consists of two parts android app and web page. Each one designed to a specific user that allow him to do specific actions that will be explained later in analysis phase.

Hospitals and donors will use the android app that enable them to send and receive notifications and reports in orders to handle blood and money donations requests.

Admins will use the dashboard that enable them to handle and manage and monitor the system.

2.5: Special Issues and Constraints.

Special Issues and Constraints are the issues that are relevant to the implementation of the system.
The system may fail to solve these problems, but it is possible to reduce the problem.

- It's hard for admins to make sure the hospital data is correct before the registration is approved. But they can make sure the location is true through Google Maps and then get the data and match them with the actual information before you approve the registration.
- The location of people may not be accurate because it depends on the built-in GPS systems in their android devices.

End of chapter 2

3

Chapter

Project Analysis

3.1: Analysis phase

The analysis phase is so named because the term analysis refers to breaking a whole into its parts with the intent of understanding the parts' nature, function, and interrelationships.

The work performed in the analysis phase involves expanding the vision described in the system request into a thorough, detailed understanding of exactly what the new system needs to do. As the detailed understanding of what the new system must do evolves, those details will be expressed and documented in several ways, including a detailed requirements definition statement, use cases, process models, and data model (All in this chapter).

The basic process of analysis involves three steps:
- Understand the existing situation (the as-is system).
- Identify improvements.
- Define requirements for the new system (the to-be system).

Sometimes the first step (i.e., understanding the as-is system) is skipped because there is no current system exists, except using social media sites to post a donation requests message, although they may be useful it only has a lot of disadvantages.

These disadvantages have been discussed and how this program fixes these disadvantages in chapter 1.
Now we will move to requirements determination.

3.2: Requirements Analysis and Determination

A requirement is simply a statement of what the system must do or what characteristics it needs to have.
Requirements determination is performed to transform the system request's high-level statement of business requirements into a more detailed, precise list of what
the new system must do to provide the needed value to the business

3.2.1: Requirements Elicitation Techniques

The proposed focus on five data requirements elicitation techniques:

- interviews
- JAD sessions
- questionnaires
- document analysis
- Observation.

We will use interview and observation in this project:

Interviewing:

Interviewing is an important method for collecting data on information system requirements.

Important Steps in the interview planning phase:

1- Selecting interviewees:

Blood donors who continually donate and people who might have needed a blood donation before are the most important items of our system that will identify the information requirements in accuracy way.

2- An interview schedule was created on our Project:

- Listing who will be interviewed:
    1- Mo'men shaheen (project member)
    2- Hani mousa (student in FCI-ZU)
- The purpose of the interview:
    Is to understand and collect required data which will help us in building our system

3- Designing Interview Questions:

We 'v used two types of interview questions
1) Open-ended questions.

2) Closed-ended questions (require a specific answer).

- What are the most frequently repeated problems when someone asks for blood donation?
- How to ensure that your blood donation request will reach a lot of people?
- How to make sure you donate money to someone who is worth?
- In the case of dangerous parents and urgent blood demands what happens and how to act quickly?
- How many times have you received a false message on the communication sites asking you to donate?

And other more question to each member in the interview.

4- **Preparing for the Interview:**

1- In this step we Lists the questions that will ask to donor(mo'men) and a person who had need blood donation before (Hani).
2- Confirm the areas in which the donor and Patient have knowledge.

5- **Conducting the interview:**

6- **Post-interview follow-up**
After finishing the interview, we have to prepare a report that describes all the information and write all the Requirements of our system.

Observation

Observation, the act of watching processes being performed, is a powerful tool to gain insight into the as-is system. Observation enables the analyst to see the reality of a situation.

3.2.2: Requirements Definition

During a systems development project, requirements will be created that describe what the business needs (business requirements) (discussed in chapter 1), what the users need to do (user requirements), what the software should do (functional requirements) and characteristics the system should have (nonfunctional requirements).

Throughout all of these activities, the project team collected information and tried to identify the system requirements for the system from the information. As the project progressed, requirements were added to the requirements definition and grouped by their type.

3.2.2.1: User Requirements

User Requirements describe what the different users need to do.

The proposed project will allow hospitals to:

1. Send messages to all donors, and notifications to specific donors based on their locations.
2. Edit and delete the old messages that have been sent.
3. Send a blood examination report to each donor after a sample blood sample donated by the previous time.

The proposed project will allow donors to:

1- Show messages that contains information about the patient and the hospital and type of message if it is asking for money or blood donation.
2- Receive a notification if he is near from the hospital location.
3- Use Google Maps to view the location of the hospital that have sent the message.
4- Share the message on the social media sites.
5- Receive blood analysis report from hospitals.

The proposed project will allow administrators to:

1- Manage the database and show all users information.
2- Approve hospitals registration requests after validating its data.
3- do some statistics to follow the system's progress as well as the most blood-seeking hospitals.

3.2.2.2: Functional Requirements

It describes what the software or the system should do.

It has two types:

1- **process oriented:** A process the system must perform.
   - The system must allow hospitals to review their own old posts and reports.
   - The users can filter the donation posts according their types (blood or money or other).
   - Users can check and change app settings.

2- **Information oriented:** Information the system must contain.
   - The system must contain all users and admins data.
   - The system must contain all old posts and notifications.
   - The system must contain old message and complains.

3.2.2.3: Non-Functional Requirements

It describes the characteristics the system should have.

It has four types:

1- **Operational:** The physical and technical environments
   - The user application can run on the android devices.
   - The dashboard can run on any web browser.

2- **Performance:**
   - **Speed**: All transactions (insert, update, delete) should take no longer time.
   - **Capacity**: Automated system should perform large number of transaction and Perform operations quickly.
   - **Reliability**: Automated system should be available for use 24 hours per day and 365 days per year.

3- **Security:**
   - Only software manager can do the operational tasks in the system.
   - All users have different account and password.

4- **Cultural and Political:** Cultural and political factors and legal requirements that affect the system
   - Personal information is protected in compliance with the Data Protection Act.
   - The system is designed in two different languages, Arabic and English.

3.3: Technology Analysis

Technology analysis therefore starts by having the analysts and managers develop a list of important and interesting technologies. Then the group systematically identifies how each and every technology could be applied to the business process and identifies how the business would benefit.

In this project we use some of technologies for Example:

1- Web hosting:
- Web hosting is a service that allows organizations and individuals to post a website or web page and store the database onto the Internet.
- Websites and Database are hosted, or stored, on special computers called servers.

2- PhpMyAdmin:
- phpMyAdmin is a free web application that provides a convenient GUI for working with the MySQL database management system.

3- GPS Technology:
- GPS, or the Global Positioning System, is a global avigation satellite system that uses at least 24 satellites, a receiver and algorithms to provide location of donor and hospitals.

3.4: Use Case Analysis

Use cases are used to explain and document the interaction that is required between the user and the system to accomplish the user's task.

Use cases are created to help the development team understand more fully the steps that are involved in accomplishing the user's goals. Once created, use cases often can be used to derive more detailed functional requirements for the new system.

Use case diagram

Use case diagrams overview the usage requirements for a system.

It has three main components: -

1- **Use Case:** describes a sequence of actions that provide something of measurable value to an actor and is drawn as a horizontal ellipse.
2- **Actors:** is a person, organization, or external system interact with your system.
3- **Association:** associations between actors and use cases are indicated in use case diagrams by solid lines. An association exists whenever an actor is involved with an interaction described by a use case.

our system has a lot of use cases and three Actors:
- Donor
- Hospital
- Administrators
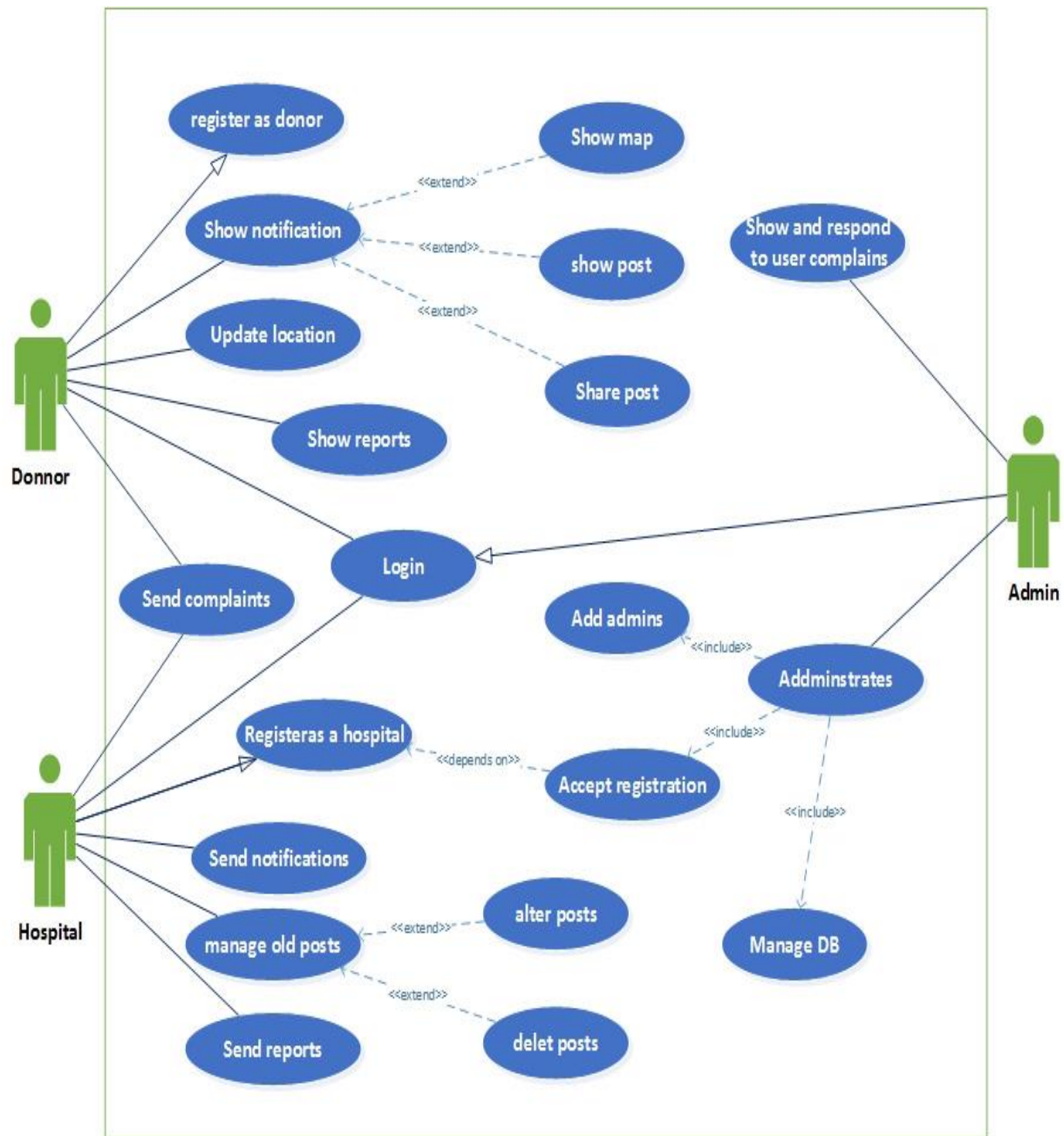
Figure 3-1 use case diagram

3.5: Activity diagram

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams are intended to model both computational and organizational processes (i.e., workflows).

Activity diagrams are helpful in the following phases of a project:

- Before starting a project, you can create activity diagrams to model the most important workflows.
- During the requirements phase, you can create activity diagrams to illustrate the flow of events that the use cases describe.
- During the analysis and design phases, you can use activity diagrams to help define the behavior of operations.
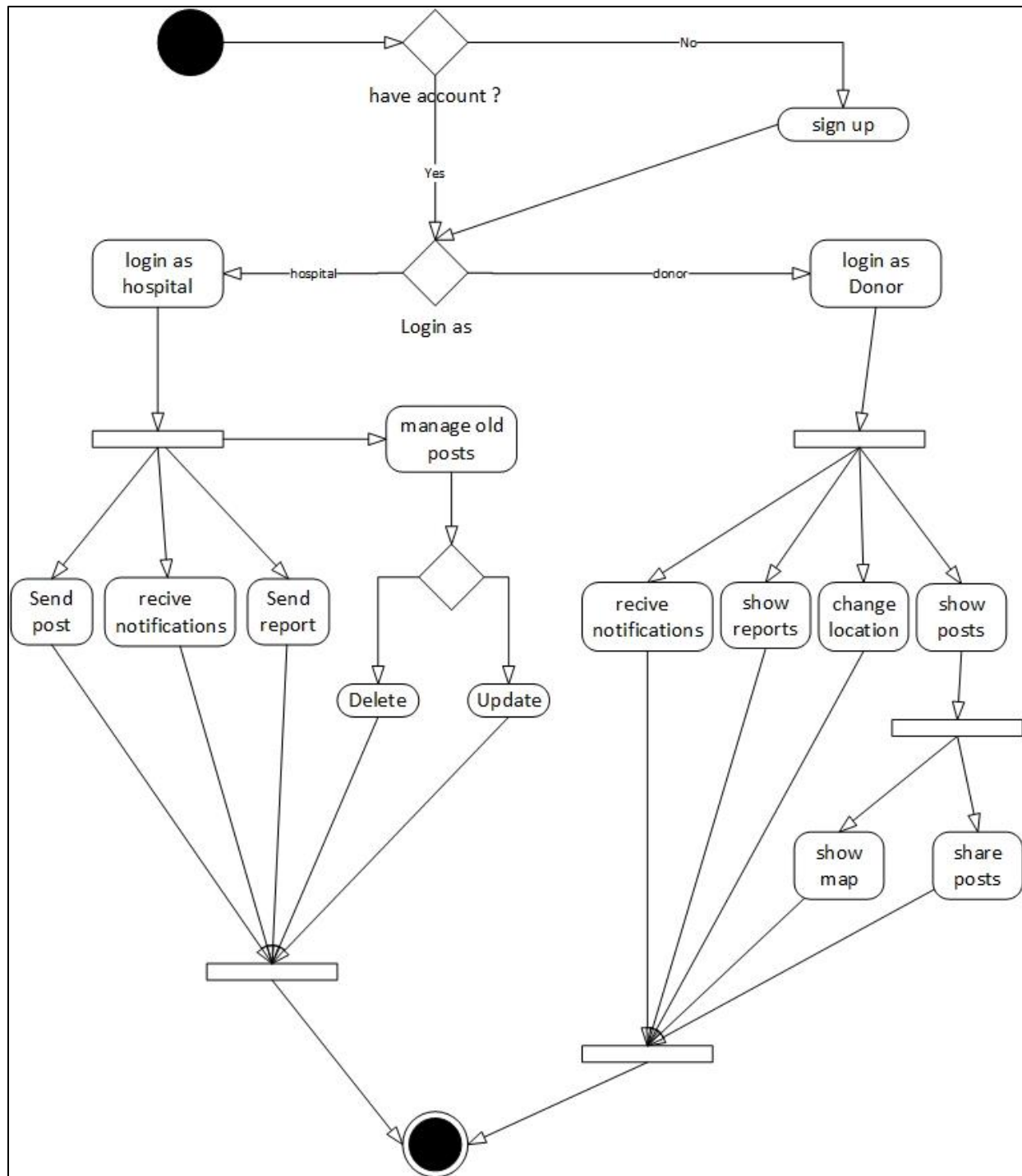
Figure 3-2 Activity diagram

3.6: Data Flow diagram (DFD)

A data flow diagram (DFD) illustrates how data is processed by a system in terms of inputs and outputs. As its name indicates its focus is on the flow of information, where data comes from, where it goes and how it gets stored.

3.6.1: Elements of Data Flow Diagrams

1- **Process**: A process is an activity or a function that is performed for some specific business reason.

2- **Data Flow:** A data flow is a single piece of data (sometimes called a data element), or a logical collection of several pieces of information.

3- **Data store:** A data store is a collection of data that is stored in some way.

4- **External Entity:** An external entity is a person, organization, organization unit, or system that is external to the system, but interacts with it .

Most business processes are too complex to be explained in one DFD. Most process models are therefore composed of a set of DFDs.
- Context diagram.
- Level 0 diagram.
- Level1 diagram.

3.6.2: Context diagram

The Context diagram is the first DFD in every business process model provides a summary of the overall system.
It shows the entire system in context with its environment. All process models have one context diagram. It also shows the overall business process as just one process (the system itself) and shows the data flows to and from external entities.
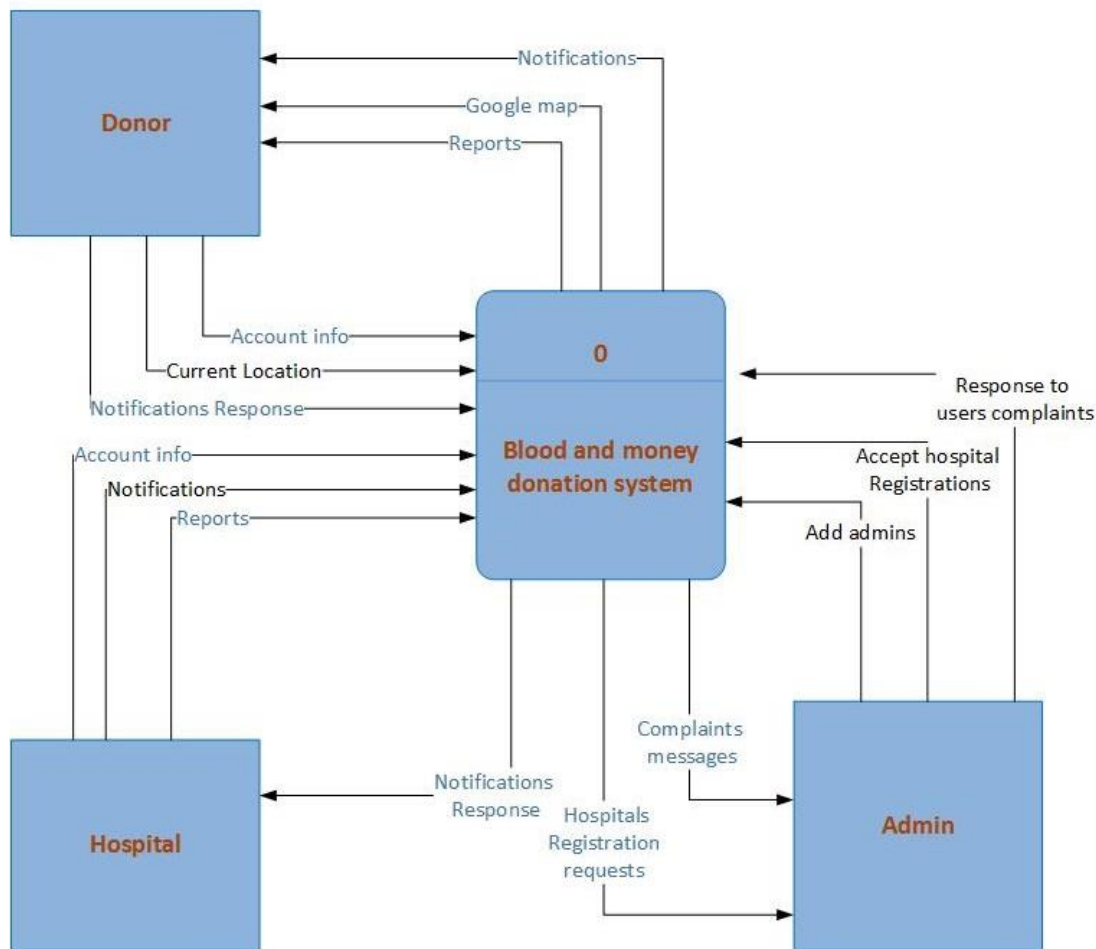
Figure 3-3 context diagram

3.6.3: Level 0 Data Flow diagram

The level 0 diagram shows all the processes at the first level, the data stores, external entities, and data flows among them. The purpose of the level 0 DFD is to show all the processes of the system and how they are interrelated.

The process for creating the level 1 DFDs is to take the steps as written on the use cases and convert them into a DFD in much the same way as for the level 0 DFD.

But for this project, we just draw a level 0 DFD and other details will be shown in design phase.

We have three external entity's (users) donor, hospital and administrators. each one will enter a data to system and interact with it.

The system either stores these or processes this data and outputs the output to the users.

See level 0 DFD in figure 3-3.
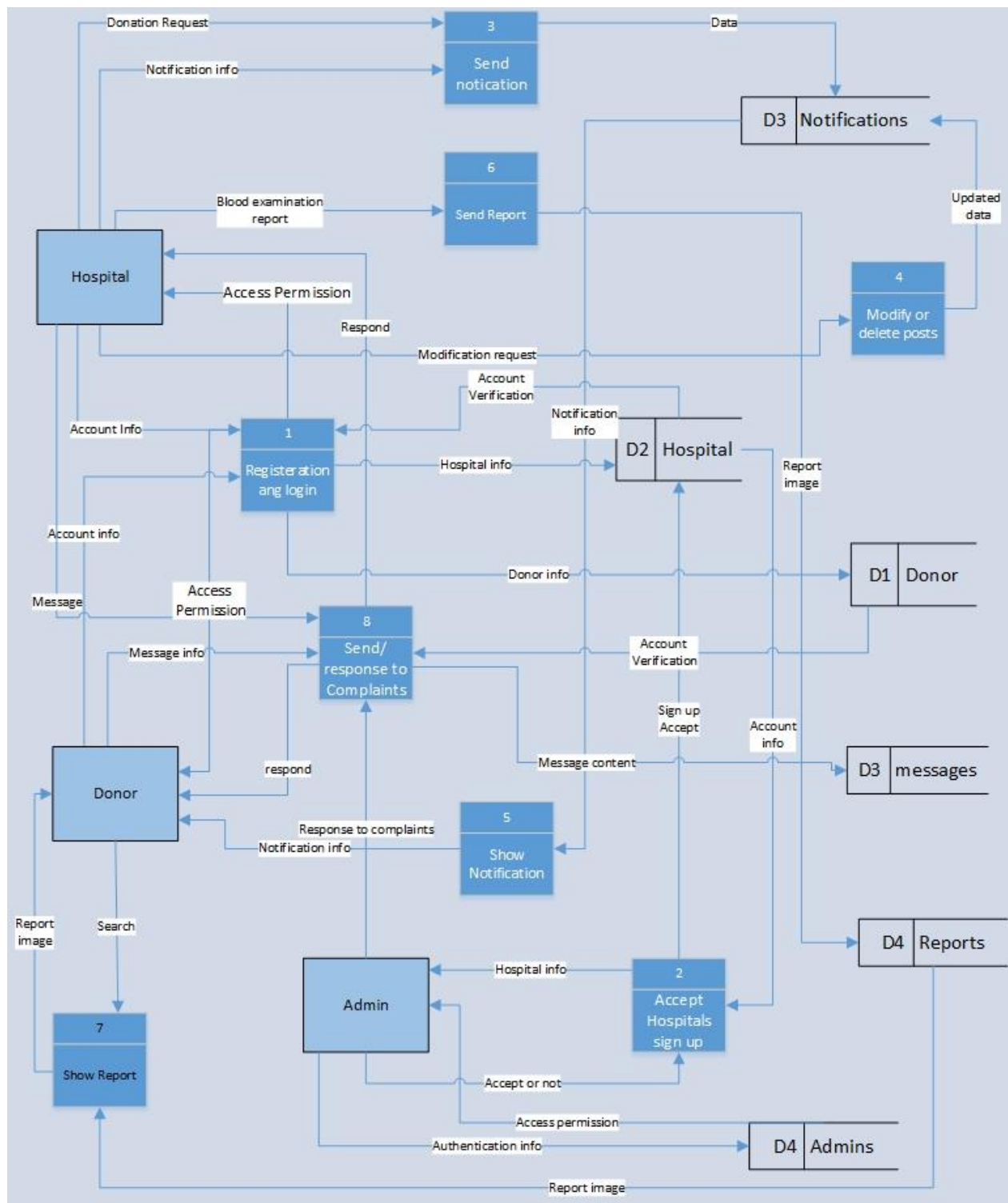
Figure 3-4 DFD diagram

3.7: Data Modeling and logical ERD

A data model describes the data that flow through the business processes in the system. During the analysis phase, the data model presents the logical organization of data without indicating how the data are stored, created, or manipulated so we will focus on the business without being distracted by technical details.

3.7.1: Logical ERD

In this phase we obtained the diagram that represents the collection of entities and their relationships in a familiar form which is **Entity-Relationship diagram (ERD)**.
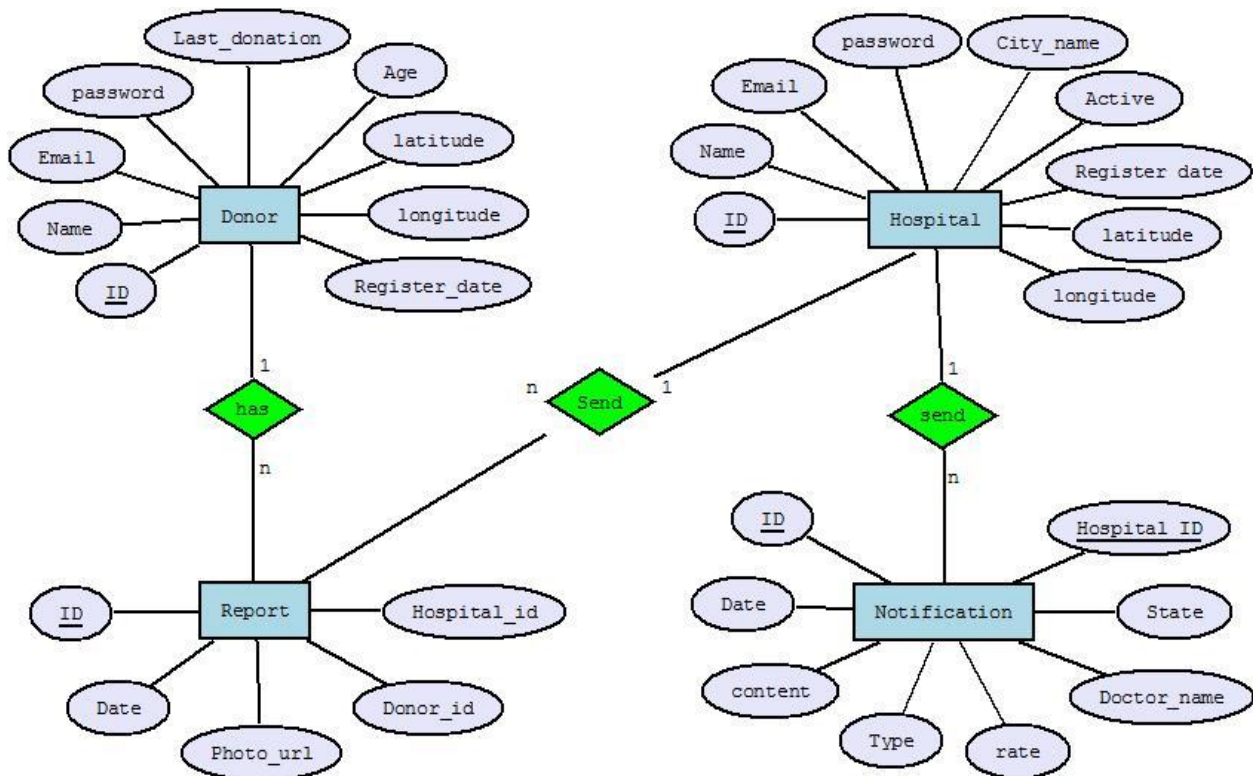
Figure 3-5 Logical ERD
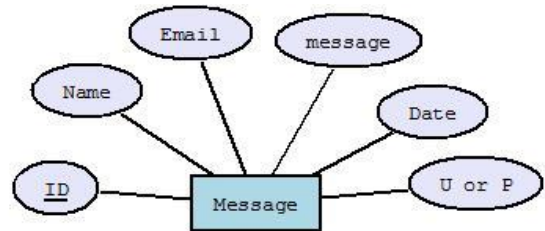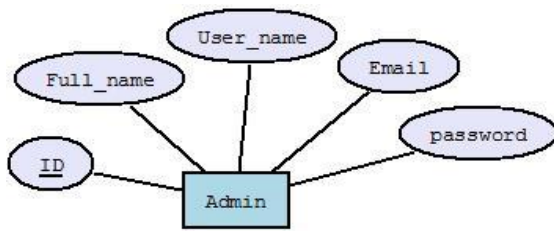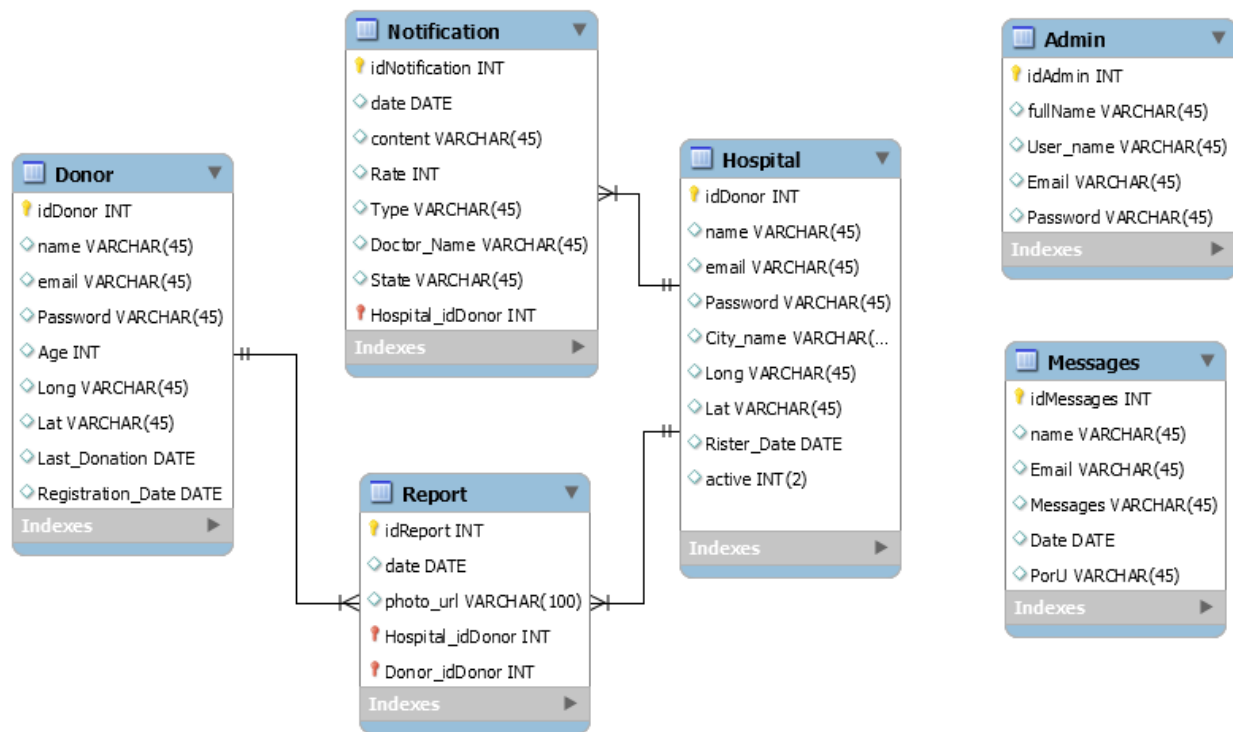
Note that:
- Messages sent to the admin are separated in a table that has no relations with the users although the users can send messages, but also anyone else can send a message via the Web site, it is not required to be a user so we 'll just use "Poru" field to differentiate user messages from public messages.
- Also, Admin has no relationships with other entities

3.7.1: Database Normalization

Database Normalization is a technique of organizing the data in the database

- Normalization: The process of decomposing unsatisfactory "bad" relations by breaking up their attributes into smaller relations.

Normalization is used for mainly two purposes,

- Eliminating redundant(useless) data.
- Ensuring data dependencies make sense data is logically stored.

Stages of normalization:

1. First Normal Form.
2. Second Normal Form.
3. Third Normal Form.
4. Boyce Code Normal form.
5. Fourth Normal Form.
6. Fifth Normal Form.

For a table to be in the First Normal Form(2NF):

- It should only have single(atomic) valued attributes/columns by disallowed Composite attributes, Multivalued attributes.
- Values stored in a column should be of the same domain

For a table to be in the Second Normal Form(2NF):

- It should be in the First Normal form.
- it should not have Partial Dependency.

For a table to be in the Third Normal Form(3NF):

- It is in the Second Normal form.
- it doesn't have Transitive Dependency (non-PK -> non-PK).

For a table to be in Boyce-Codd Normal Form (BCNF):

- R must be in 3rd Normal Form
- for each functional dependency (X → Y), X should be a super Key.

In the project Data Biz is a simple thing and relationships are uncomplicated, we may not have to implement all the steps of Normalization.

End of chapter 3

4

Chapter

Design phase

The design phase decides how the new system will operate. Many activities will be involved as the development team develops the system requirements. This chapter provides an outline of those design phase activities, which culminates in the creation of the system specification.

4.1: Architecture design

We will use the client–server architectures, which attempt to balance the processing between client devices (hospitals and donors and admin) and server devices
See figure 4-1.

the server is responsible for the data access logic and data storage that enables all users to access the data easily.
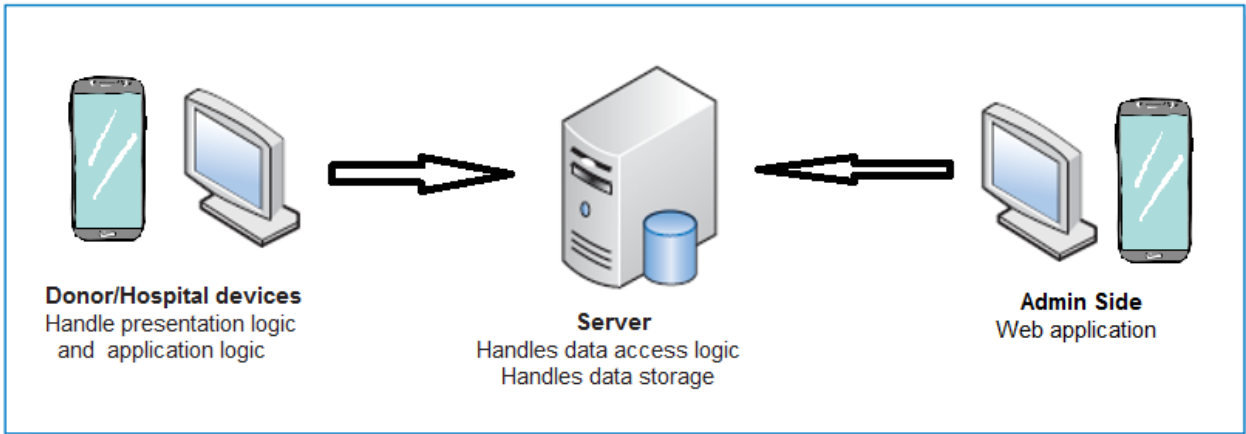
Figure 4-1 Client–Server Architecture

Donors and hospital, can you run the app on any android devices with no special requirements.

Admins can access the dashboard onto any web browser.

We will use online hosting server which called web hosting, it is a service that allows organizations and individuals to post a website or web page and store the database on special computers called servers that can be accessed onto the internet.

Client-server architectures have four important benefits.
- Scalable
- Can support different types of clients and servers through middleware.
- The presentation logic, the application logic, and the data processing logic can be independent.
- If a server fails, only the applications requiring that sever are affected.

4.2: Interface design

The goal is to make the interface pleasing to the eye and simple to use, while minimizing the effort users expend to accomplish their work.

Some fundamental interface design principles Which should be applied in our project.

1- **Layout**

The interface should be a series of areas on the screen that are used consistently for different purposes.

2- Content awareness

Users should always be aware of where they are in the system and what information is being displayed.

3- **Aesthetics**

careful use of white space, colors, and fonts.

4- User experience

ease of use and ease of learning how to use the application.

5- **Consistency**

Consistency in interface design and fonts and colors.

6- Minimize user effort

The interface should be simple to use.

All android app screens and web pages will be Will be displayed in the next chapter.

4.3: Implementation decisions

Another important activity of the design phase is designing the programs that will perform the system's application logic.

Various implementation decisions will be made about the new system, such as what programming language(s) will be used, such as:

- Java and XML language to build the android application.
- Php, HTML and java Script to build administrators web dashboard.
- MySQL and php to access and manage data base.

Note that: the data flow diagrams created during analysis are modified to show these implementation decisions, resulting in a set of physical data flow diagrams, resulting in a set of physical data flow diagrams.
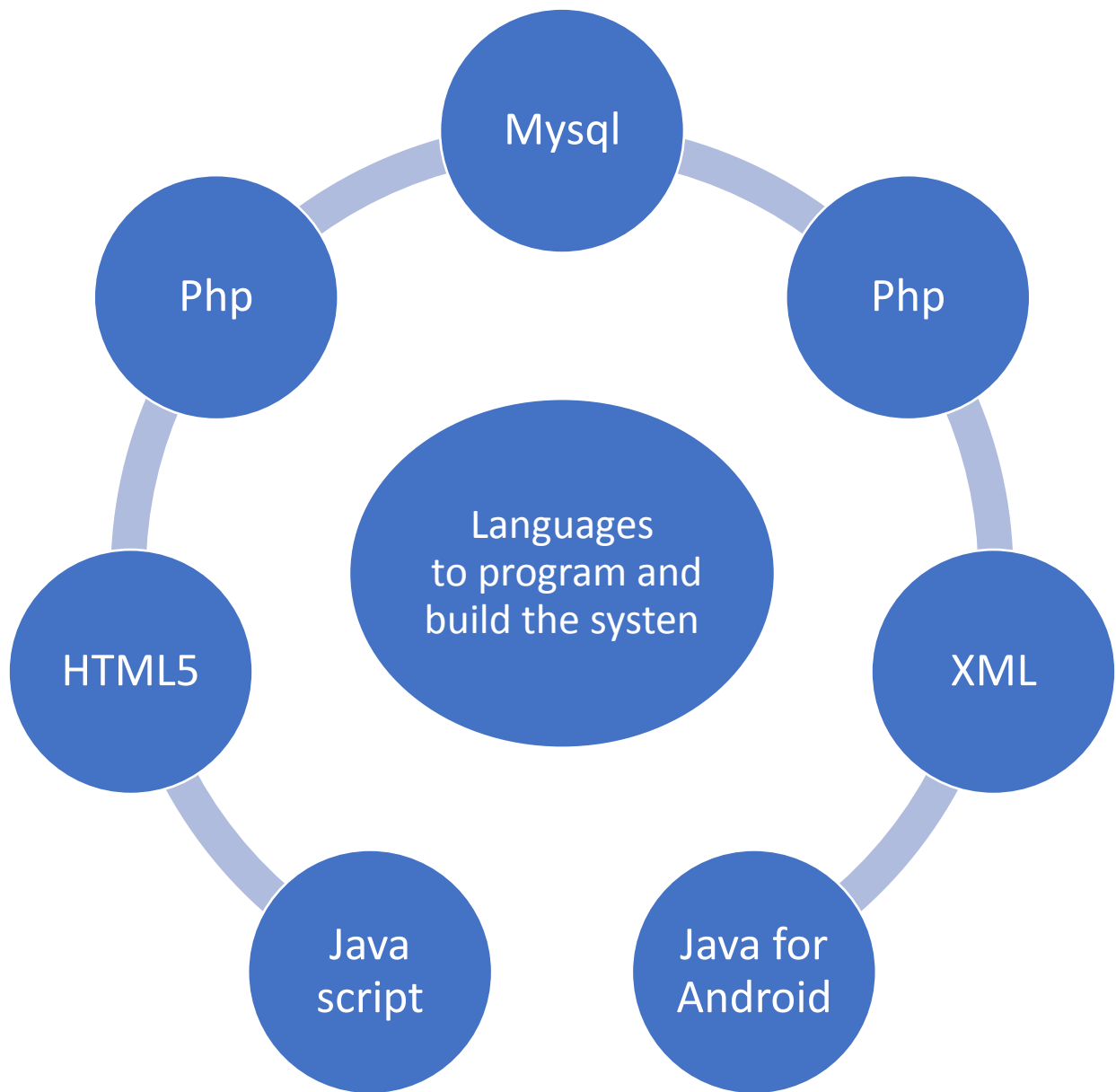
Figure 4-2 Applications languages and API's used

4.4: Data storage design

Another important activity of the design phase is designing the data storage component of the system.

The data storage function is concerned with how data is stored and handled by the programs that run the system.

4.4.1: Data storage formats

There are two main types of data storage formats: files and databases.

- **Files** are electronic lists of data that have been optimized to perform a particular transaction.
- A **database** is a collection of groupings of information that are related to each other in some way (e.g., through common fields).

There are many types of databases:
- Legacy database
- Relational database
- Object database
- Multidimensional database

The **relational database** is the most suitable kind of database for our application development.

- A relational database is based on collections of tables, each of which has a primary key.
- The tables are related to each other by foreign keys.

4.4.2: Physical entity relationship diagrams (ERD)

physical ERDs contain references to exactly how data will be stored in a file or database table (see figure 4-3).

Figure 4-3 Physical ERD

Note that:
Messages sent to the admin are separated in a table that has no relations with the users although the users can send messages,
But also anyone else can send a message via the Web site, it is not required to be a user so we 'll just use "Poru" field to differentiate user messages from public messages.

End of chapter 4

5

Chapter

Implementation phase

- As the implementation phase begins, foremost on people's minds is construction of the new system.
- The implementation phase consists of developing and testing the system's software, documentation, and new operating procedures.
- A major component of building the system is writing programs.
- All programming codes are in the attached CD with the book.

5.1: Algorithms that we need

1- The Haversine Formula

The haversine formula determines the distance between two points on a sphere given their longitudes and latitudes.

Why we need it?
As we explained earlier that hospitals will send notices to request help from nearby people, so we must measure the distance first between the hospital and donors.

The Haversine Formula:

For two points on a sphere (of radius R) with latitudes $\phi 1$ and $\phi 2$, latitude separation $\Delta\phi = \phi 1 - \phi 2$, and longitude separation $\Delta\lambda$ the distance d between the two points:

$$\mathrm{haversin}\left(\frac{d}{R}\right) = \mathrm{haversin}(\Delta\phi) + \cos(\phi_1)\cos(\phi_2)\,\mathrm{haversin}(\Delta\lambda)$$

$$\mathrm{haversin}(\theta) = \frac{\mathrm{versin}(\theta)}{2} = \sin^2\left(\frac{\theta}{2}\right)$$

$$\mathrm{versin}(\theta) = 1 - \cos(\theta) = 2\sin^2\left(\frac{\theta}{2}\right)$$

The Haversine Formula in MySQL:

R = earth's radius

Δ lat = lat2 − lat1;

Δ long = long2 − long1;

a = sin^2(Δ lat/2) + cos(lat1) * cos(lat2) * sin^2(Δ long/2);

c = 2*atan2($\sqrt{}$ a, $\sqrt{}$ (1−a));

d = R*c;

the query used to retrieve recent notifications from nearby hospitals :

```
 8
 9  $query=" SELECT *, 3956 * 2 *
10  ASIN( SQRT( POWER( SIN(( $orig_lat - abs(hospital.Lat))* pi()/180 / 2), 2)
11  + COS($orig_lat * pi()/180) * COS(abs(hospital.Lat) *  pi()/180)
12  * POWER( SIN(($orig_lon - hospital.Lang)*  pi()/180 / 2), 2) ))
13  as distance FROM notification INNER JOIN hospital ON
14  notification.Hospital_IdHospital = hospital.IdHospital having distance <= '$dist'
15  AND IdNotification > '".$_POST['last_num_rows']."';";
16
```
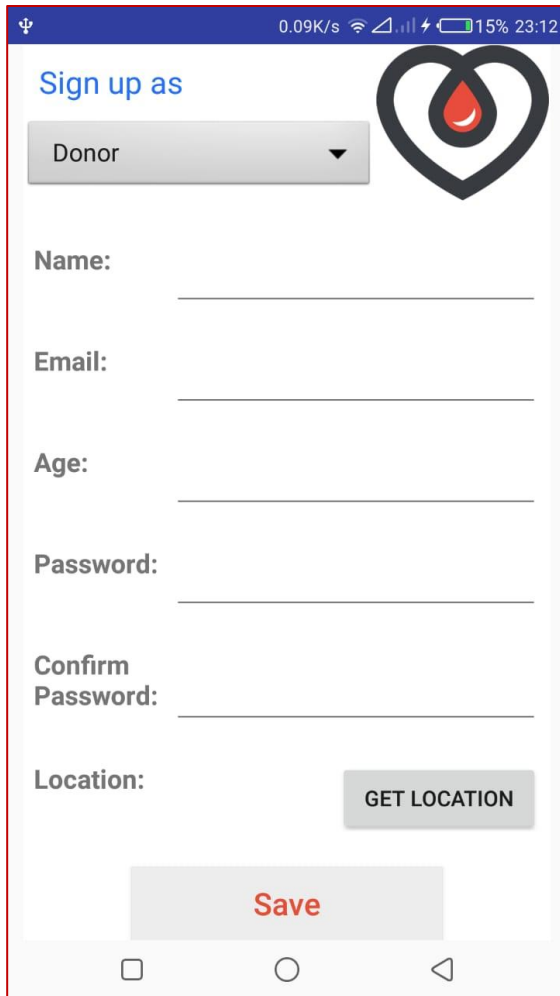
5.3: Android Application

1- **login activity**: enables the system to identify and authenticate the users and You must determine if you are a donor or a hospital because as you know each of them has own features that available to use.
Also, you have the choice to make the project remember you so you don't have to login each time to use the program.
If you do not have an account, you can create a new account by clicking on signup
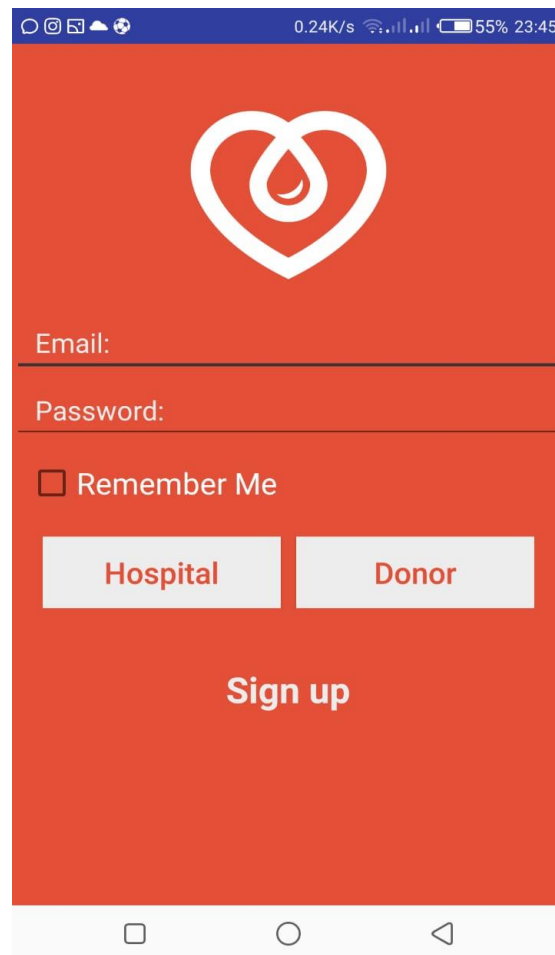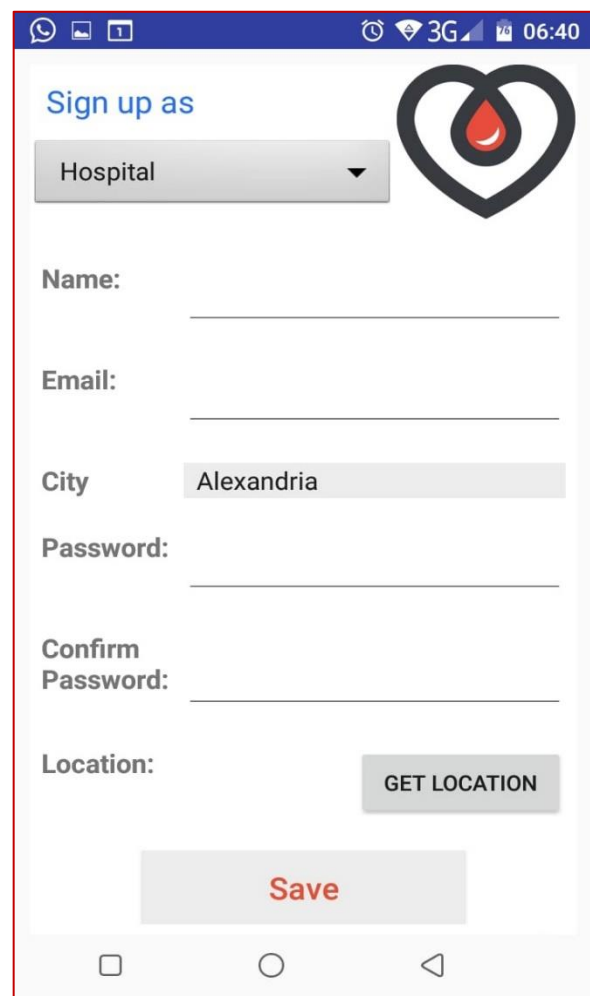
2- **Sign up activity:** enables users to register a new account.
First, user should choose if this account for a donor or a hospital, this will determine the data required to be entered

3- **Home page**: contains only 3 buttons to show map if you looking for a hospital map and know some important instructions before using the program or send a complain message to system admin.

4-**The navigation drawer** is a UI panel that shows the app's main navigation menu. Items may have a different task based on the type of account (donor or hospital).
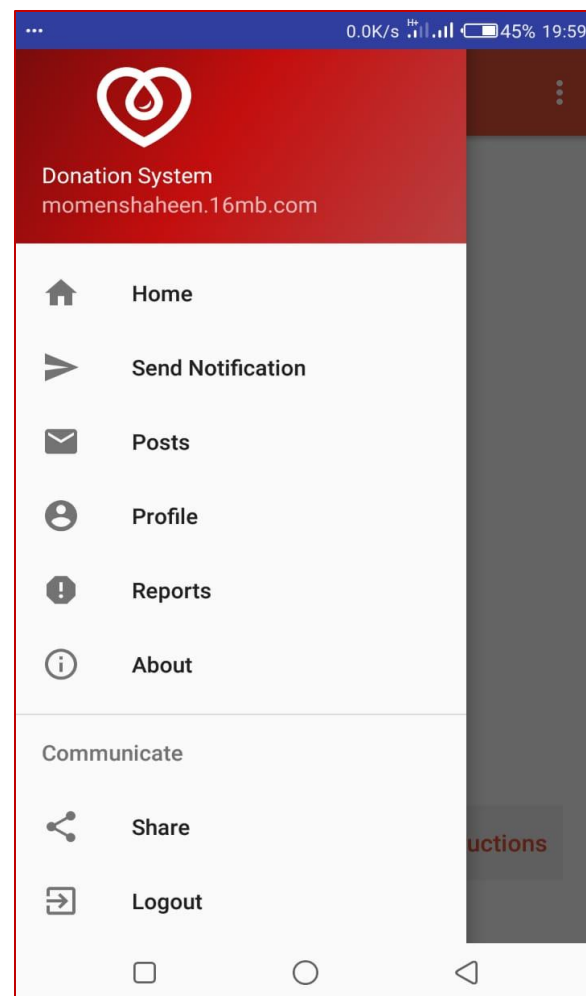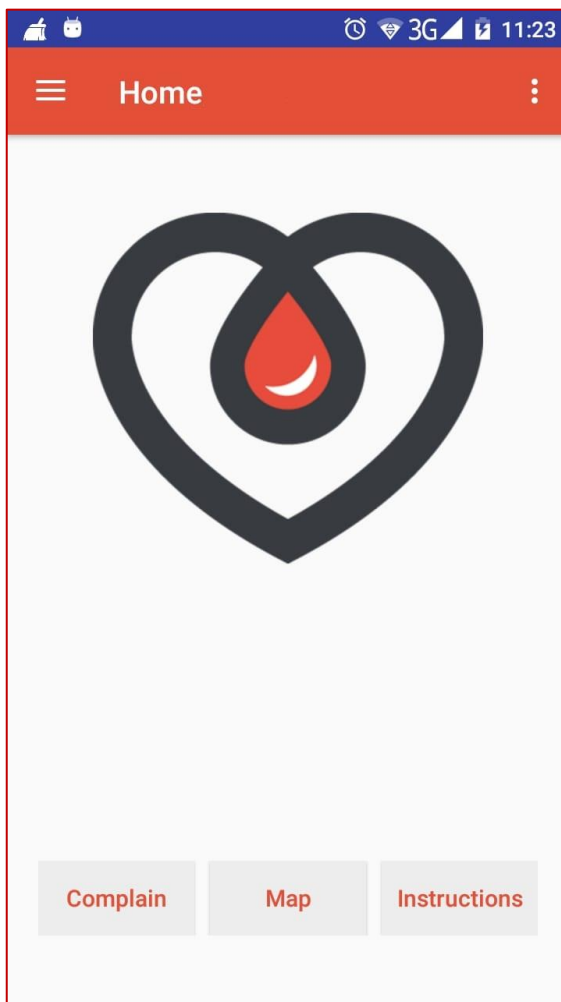
5- **Send notifications:** hospital can send notification and choose the type if it wants a blood or money donation or other!
And enter all data needed.
6- **send reports:** also, hospitals can send a blood test report to users who had   donated last time.

7- Hospital can **show its old posts** categorized by Post type

Also, can **delete or update** old posts

Number below posts points to number of donors who care about this post and tend to donate.
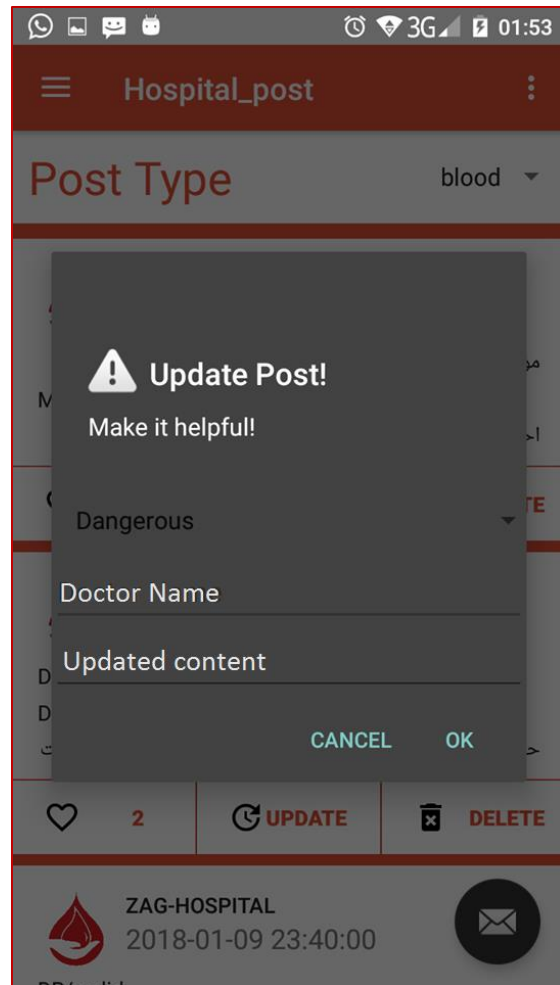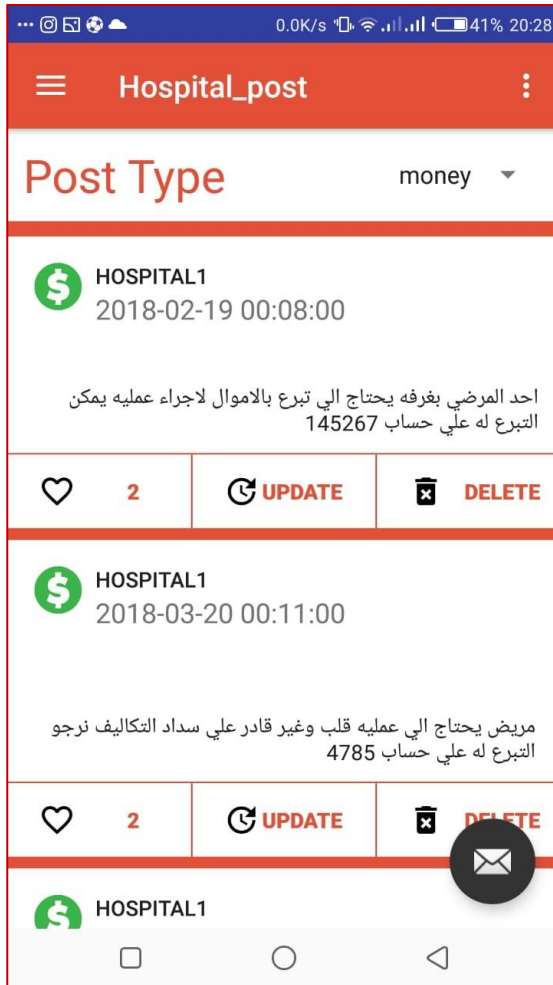
8- Donors also can **Show posts** categorized by its type and can chose if they care about this post and will go to donate, they also may share post on social media like Facebook and What's app.

9- **Show map**: it will display hospital location on google map that help user to find the way to hospital.
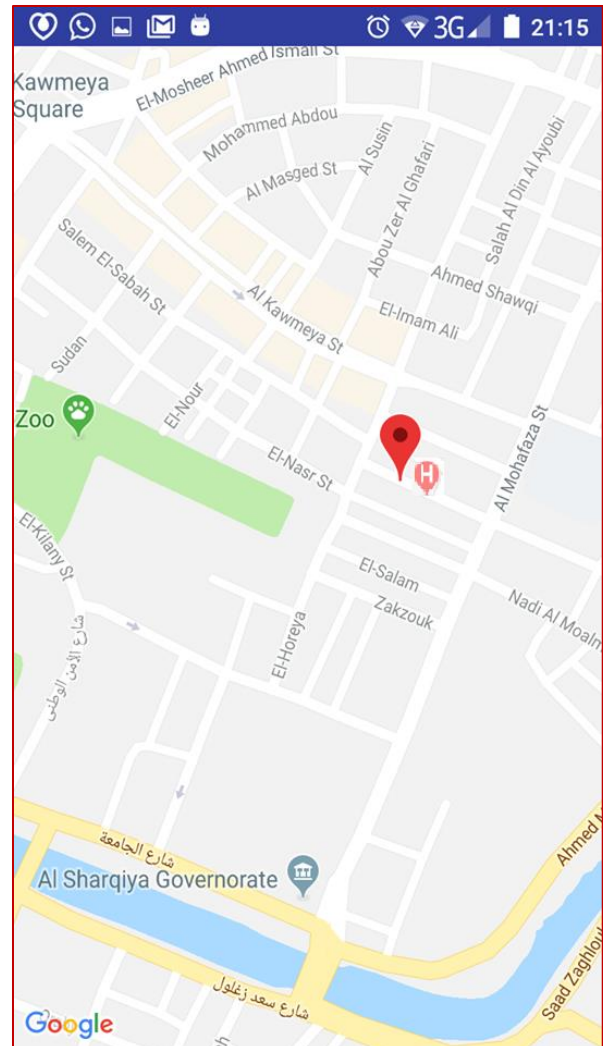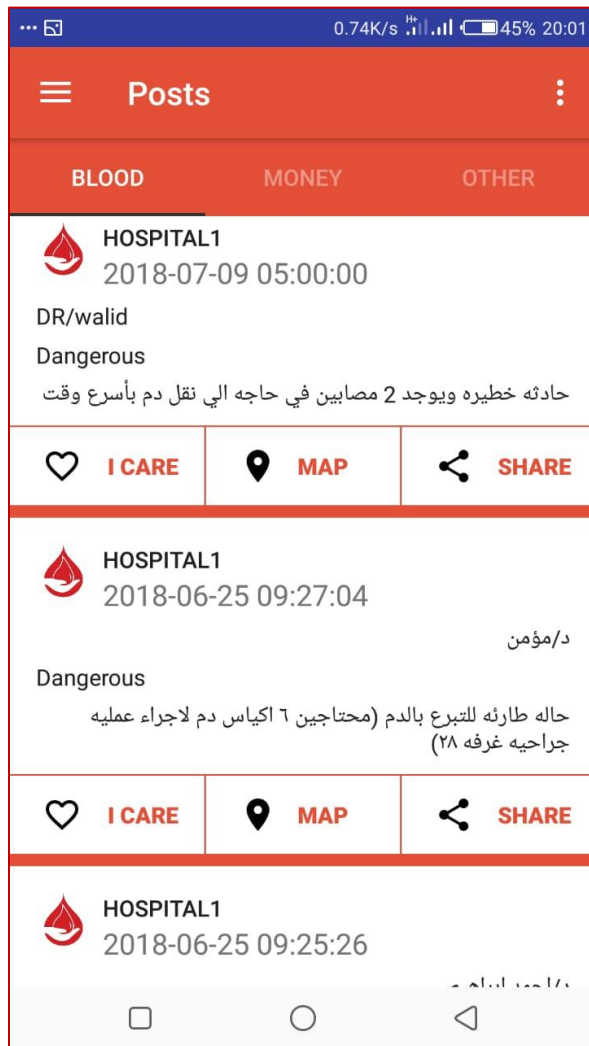
10- **Reports page**: Donors can show and download blood test reports sent by the hospital to them after they have donated blood earlier in this hospital.
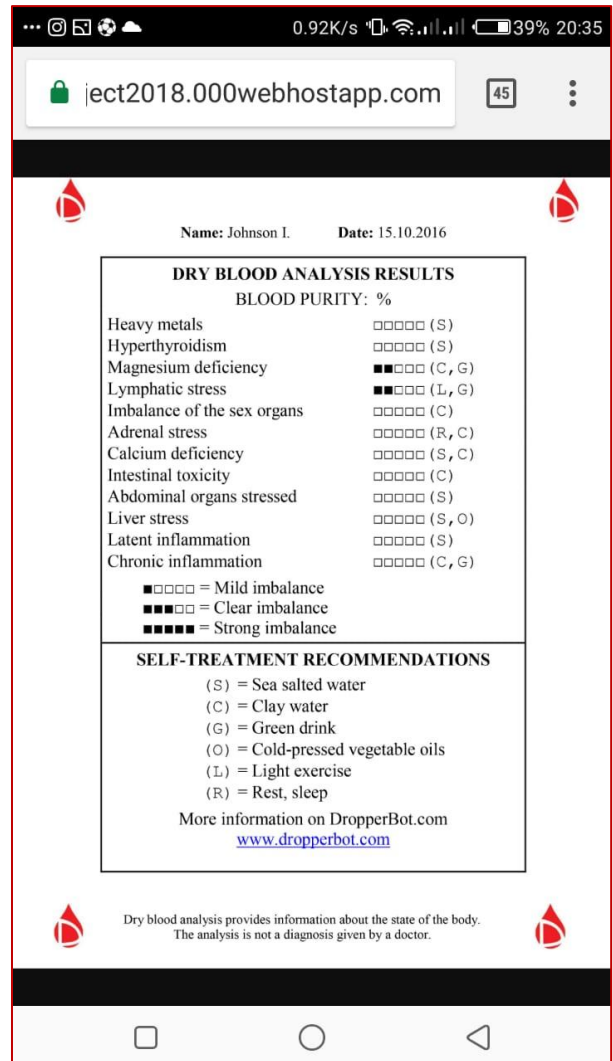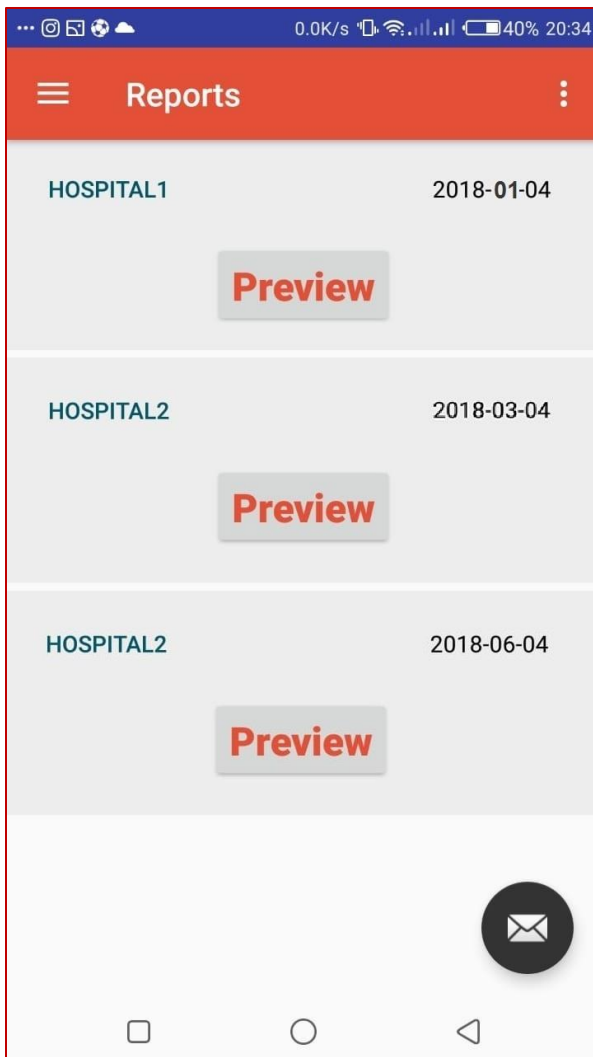
11- **Notifications**: People who are in the vicinity of the hospital receive immediate notifications in the case of the hospital's request for donations

12-**Settings**: user can disable notifications or change the specified distance to receive notifications from the settings page
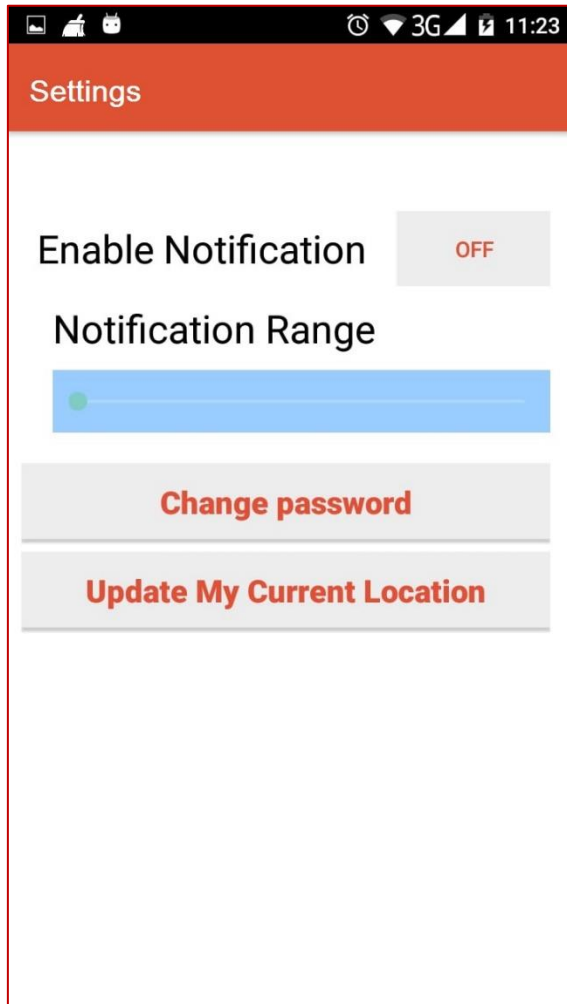
13- **Send Complaint or message to admin**:

A good way to communicate between users and admins of the system enables users to report any problem or defect that reduces the efficiency of the system or provide any idea any new proposal can lead to the development of the program.

14- there are other pages: such as:
- profile that contains user data.
- instruction that contains some instruction about donations process.
- About us page that display some information about the programs.

Note that:

The program is designed to translate also Arabic language. The language of the program automatically changes as the language changes in the phone settings.

:Login and signup pages as a sample.
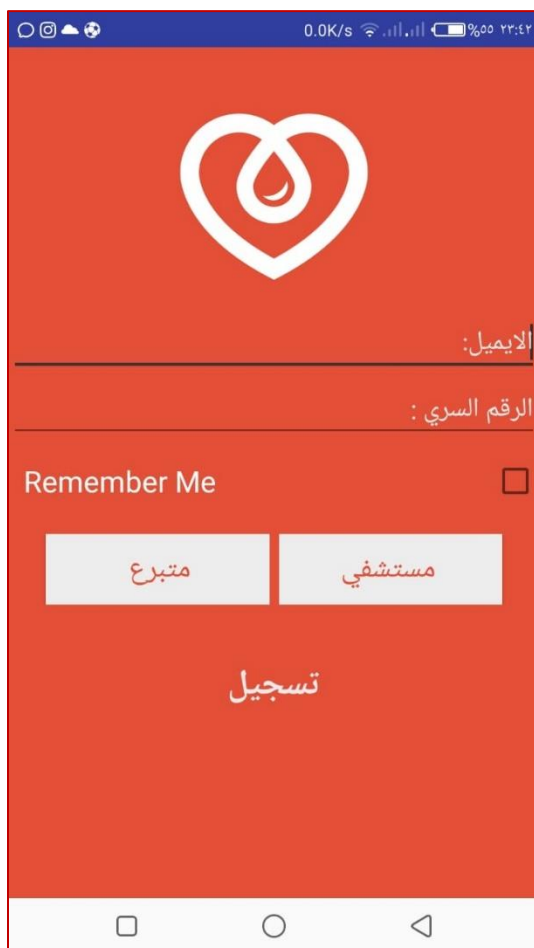
5.3: Website and dashboard

1- **Web site** that help people know about the program and how to use it and also through which they can send inquiries system administrators.
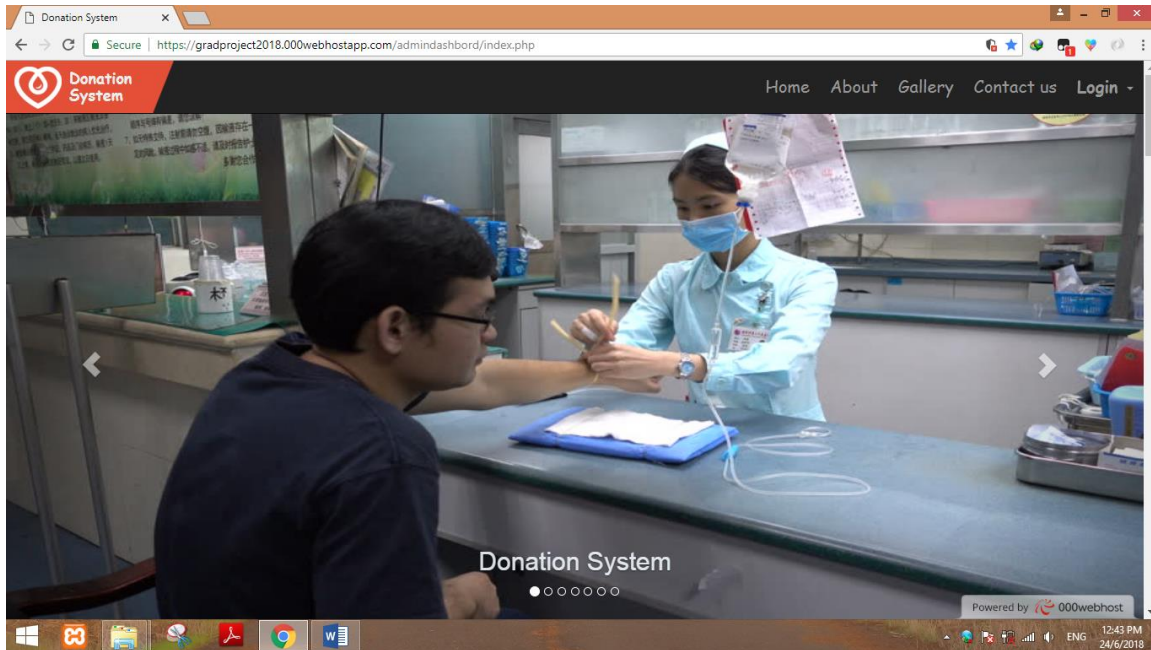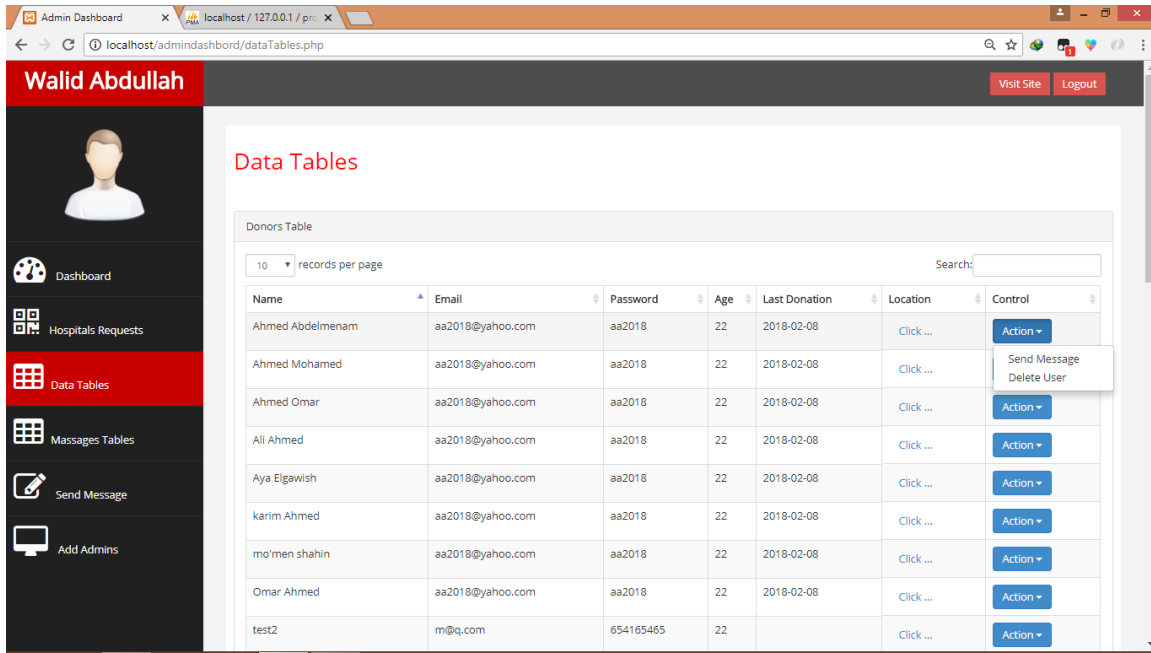
2- **login pages:** only admins can use web page to login the system to use the dashboard.
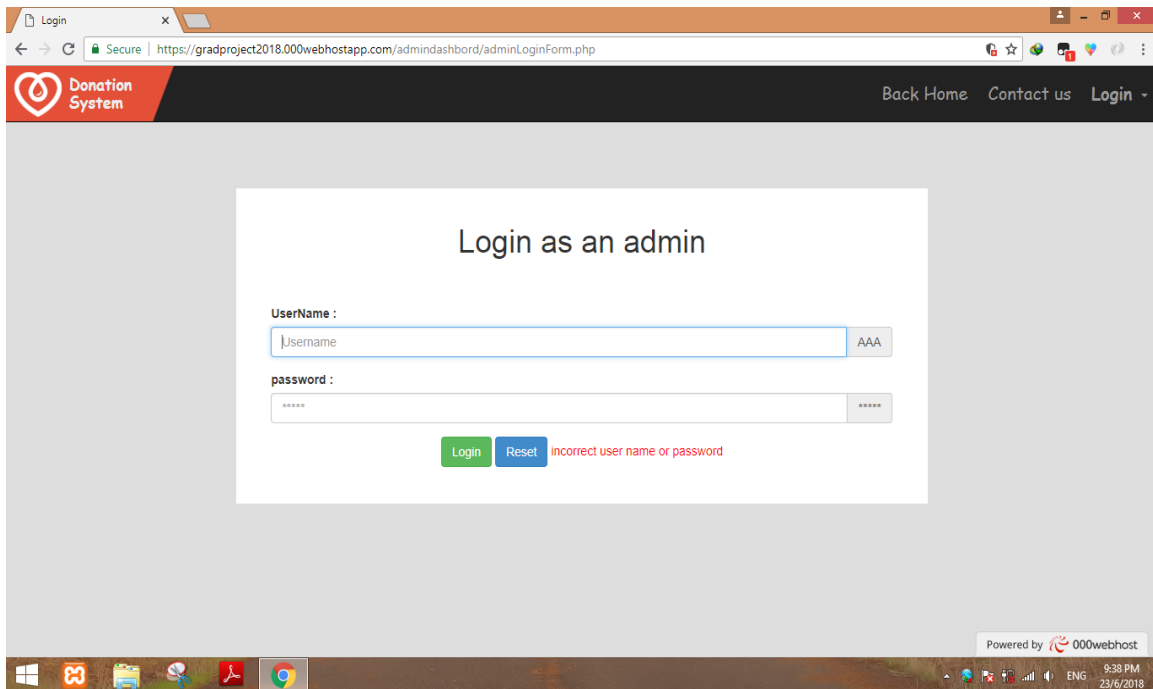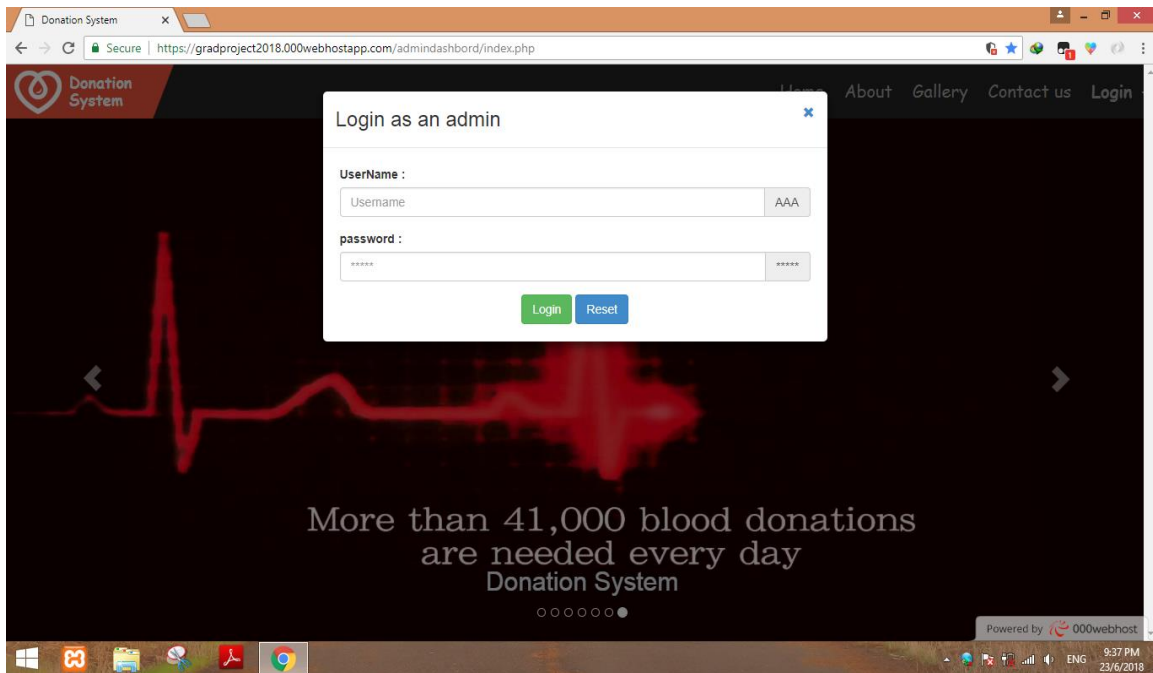
3- Admin dashboard: it enables administrators to control all aspects of the system and monitor the success of the system and the number of users and the work of statistics for the requests requested by hospitals and also the most hospitals that suffer from lack of blood.
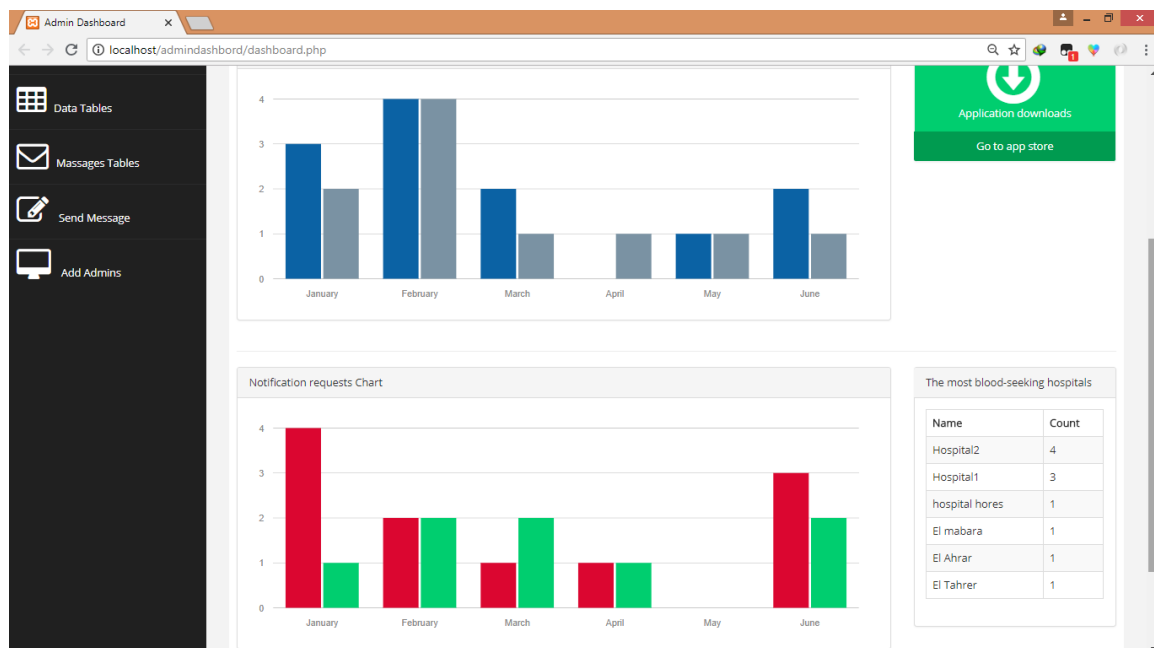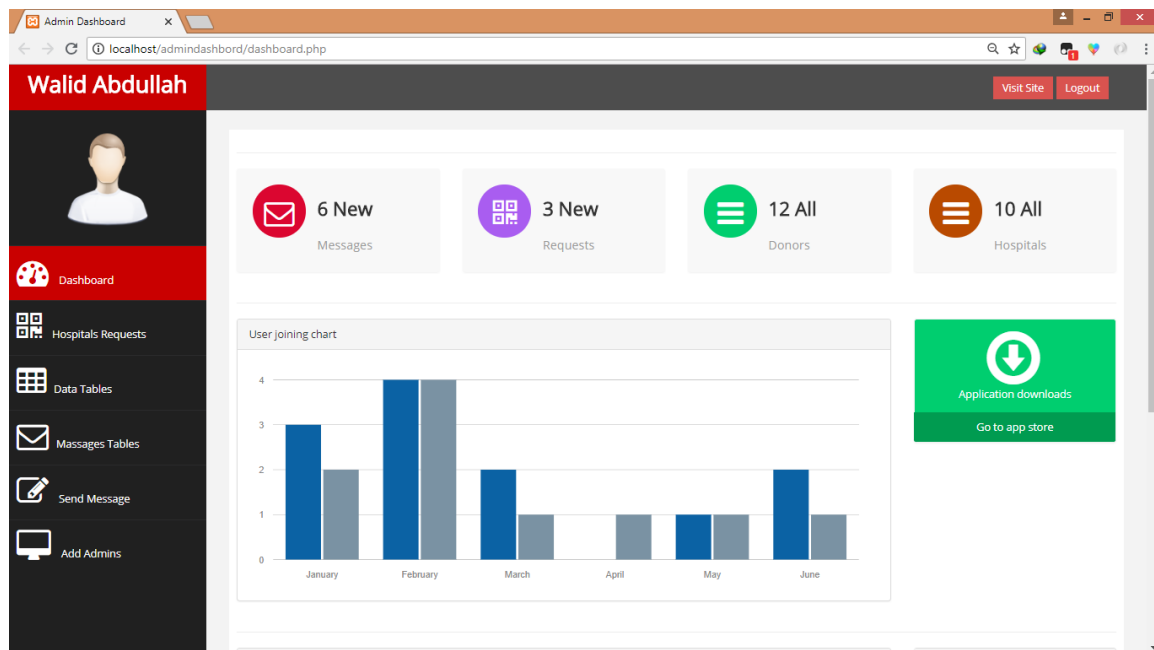
4- **Users data tables page**: it enables admins to view user data and take actions such as sending messages, deleting account or show the current location through Google Maps.

5- Hospitals requests page: it enables admins to review the data entered before allowing the hospital to complete the registration like it's location and send an e-mail in case of acceptance the registration.

6- **messages and send message pages:** enables admins to receive messages ad complaints from users and replay with an e-mail.
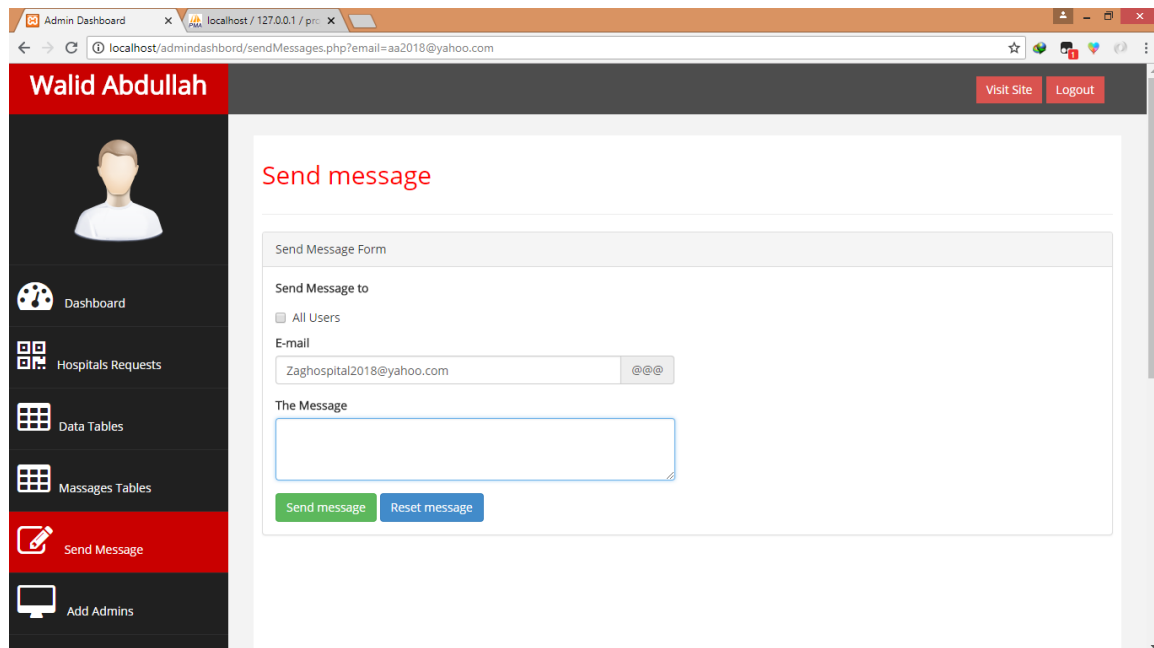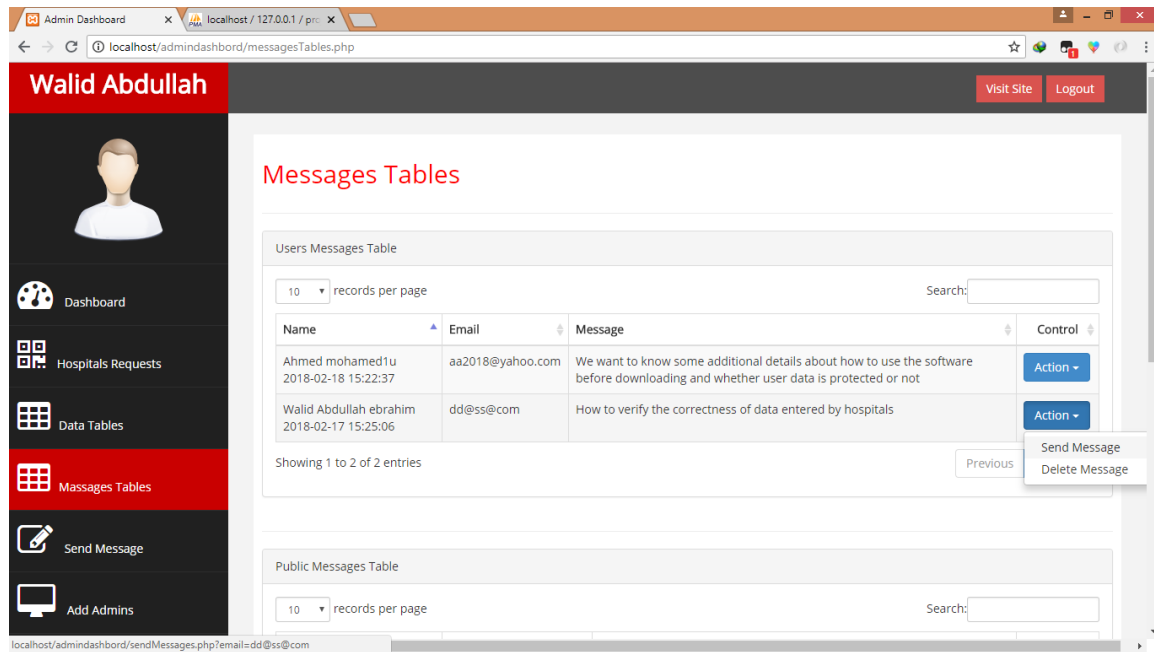
End of chapter 5

6 Chapter

Conclusion and future work

6.1: Conclusion

- Technology every day is constantly evolving and we must use this technology to help us solve our daily problems.
- We have tried to use new technologies to help people who have been exposed to road accidents or garage operations and in need of people to donate blood to them.
- The program ensures the delivery of their call to all users as well as ensures the speed of responding process by send notifications to people close to the hospital after locating them using the GPS technology.
- The program also allows other types of donations such as donating money to pay for the hospital and to buy the needed treatments.
- Donors receive some benefits, such as receiving a blood examination report after each time they donate blood.

6.2: Future work

This section will present different direction for future work, for those who decided to continue working in this point of work to add some features to it and make it work more efficiently.

1- Building a web application for Hospitals to use it, this will give more flexible use of system because many hospitals deal with desktop computers rather than android devices.
2- Improve the efficiency of the program by reducing the consumption of system resources such as RAM.
3- The possibility of using the program in many other languages to be used in a wide range around the world.
4- Allow administrators to make more statistics and participate with the competent government agencies, especially in cases of lack of blood donation to try to find final solutions to the problem.
5- The program will not only donate blood but will include emergency situations where the user will be able to send him a notice of the request for help or assistance from people near to him

End of chapter 6

References:

1- **Systems analysis** and **design /Alan Dennis**, **Barbara Haley Wixom**, **Roberta M**. **Roth**. –**5th ed**. **p**. **cm**.
2- **Allen Holub's UML Quick Reference.**
3- **Geo/Spatial Search with MySQL, Alexander Rubin, Senior Consultant, MySQL AB**

The end
Thanks