E-BLOOD BANKING INFORMATION SYSTEM (EBBIS)

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E-BLOOD BANKING INFORMATION SYSTEM (EBBIS)

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ABSTRACT

Blood is one of the important element in our body and it occupy around seven percent out of our body weight. It plays important role in our body like carry the oxygen to our whole body, giving protection in inflammation and regulation in our body PH level. For those who lack of blood will facing healthy problem. Thus, we need to donate our blood to the people who need it. E-Blood Banking Information System (EBBIS) is an online management system which will run in the website to manage the blood bank information, blood donor information, blood donation appointment and blood request facility. The purpose of this study is to create online blood bank system and appropriate method of applying EBBIS. All the related information regarding the system is studied. RAD is the development methodology that being used for the development of the system. This method will act as a guide for me when developing this system. This methodology is chosen because it allows me to create this system in a limited time. Functionality of the system is done using the sample test detail. User Acceptance Test have been applied in ensuring the acceptance of user to the system. The system have been accepted by the user where in general they are satisfied with the functionality and benefit derived from the system. Last but not least, the output of this study is e-Blood Banking Information System (EBBIS).

ABSTRAK

Darah merupakan salah satu element penting yang terdapat dalam tubuh badan kita dan tubuh badan kita terdapat sebanyak tujuh peratus daripada keberatan tubuh badan kita. Darah memainkan peranan yang penting dalam tubuh badan kita seperti darah akan membawa oksigen dalam tubuh badan kita, memberi perlindungan daripada keradangan dan mengimbangkan PH level tubuh badan kita. Orang yang kekurangan darah akan menghadapi masalah kesihatan. Jadi, Kita perlu menderma kepada orang yang memerlukan darah. E-Blood Banking Information System (EBBIS) ialah satu sistem pengurusan dalam talian yang akan dilaksanakan di website untuk menguruskan pusat darah informasi, penderma darah informasi, darah simpanan dan faciliti permintaan darah. Tujuan penyelidikan ini adalah mencipta satu system darah dalam talian dan memilih cara yang sesuai untuk menjalankan EBBIS. Semua maklumat yang berkaitan dengan sistem saya akan dikaji. Selepas itu, saya akan mengunakan cara yang sesuai dalam menjalankan sistem ini. Cara yang sesuai untuk membangunkan sistem ini akan dipilih. Akhirnya, EBBIS akan membuat penambahan baik mengikut keperluan fungsi dan keperluan bukan fungsi. Metodologi yang terpilih untuk membangunkan sistem ini ialah Rapid Application Development (RAD). Metodologi ini akan memainkan peranan sebagai panduan kepada saya apabila sistem ini dibangunkan. Metodologi ini dipilih kerana ia akan membantu saya membangunkan sistem ini dalam masa yang singkat. Dalam tahap pengujian sistem, sistem ini akan diuji berdasarkan perisian pengujian template. Dokumen ini akan membantu saya dalam tahap pengujian sistem. Sebagai konklusi, E-Blood Banking Information System (EBBIS) akan dihasilkan.

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INTRODUCTION

1.1 INTRODUCTION

E-Blood Banking Information System is an online blood bank management system designed for Hospital Tunku Ampuan Afzan to enhance the manual management system that has been used. The manual management system used has led to several critical issues regarding work performance of the staffs, information gathering, efficiency, control and services since everything is paper based management. Thus, this system will computerize the manual way of management that has been used to overcome those issues.

This web based database application system is use by the hospital to advertise the nationwide blood donation camp and the latest news about the hospital program to the public in order to increase the public awareness on the event. Through this application also, any public who are interested in donating the blood can register themselves and at the same time register as the blood donor and make online reservation on their leisure session. Besides, if there are any consumers that want to request blood online, they also can make it on this site. They can check the blood storage that will be manage and update by the blood bank administrator. Blood bank

administrator is the main authority who can do addition, deletion and modification if required.

This system also provide function for the administrator to manage an appointments made by a donor, blood stock and the request of the donation camp from any organization. It has the database that can keep the record of donor's donation information and the blood stock in the blood bank. Importantly, this system will make all the process become faster and more effective. This system saves time of user and administrator because everything is being recorded directly into the system at that particular time. Plus, donor's record management will become more secure and precise. Therefore, E-Blood Banking Information System is the supporting system for Hospital Tunku Ampuan Afzan.

1.2 PROBLEM STATEMENT

Blood banking system in the hospital is still using the manual system. Manual management system used in the hospital is totally a paper based where everything is written and recorded on paper. The main problem by using this method is to manage the donor's record. The record might not be kept safely and the missing information because of human mistakes, and disaster such as fire and flood may occur. Since it is paper based management system, a lot of paper is used. Thus, the management uses up a lot of space in the blood centres to store all donors and activity record.

Too many files to handle will lessen work efficiency and performance in the hospital. The process time duration to retrieve an information is slow since searching is difficult because it needs to be done one by one manually.

Other than that, the public can only know about the donation camp or event through conventional media such as television advertisement, radio and newspaper.

There is no nationwide information regarding the blood donation drive available in any websites.

Without an automated management system, there are also problems in keeping track about the actual amount of blood type in the blood bank. People have tendency forgetting to record the usage and input of the blood. Thus, this will cause inaccuracy of the exact blood amount in the blood bank.

1.3 OBJECTIVES

This project has three main objectives, which are:

i. To investigate the requirements, process and core functions of E-Blood Banking Information System.
ii. To develop a web based application of E-Blood Banking Information System.
iii. To test the functionality of the system

1.4 SCOPE

The scope of this project are:

a) User:

The users for this system are the public who can view the donation event and make online reservation and blood bank administrator of the hospital.

b) Functions Available (explain function):

i. Donor registration management
ii. Blood donation appointment management
iii. Donation camp management
iv. Blood availability management
v. Blood request management
vi. Inspiring Stories

c) Development tools used:

Software:

The system is developed using HTML and CSS for the graphic user interface (GUI), phpMyAdmin for data storage and php for functions. The development of the function is done by using php and MySQL.

Hardware:

The hardware limitation for this is a printer and computer.

d) Data storage:

The system is using SQL server database of phpmyadmin for data storage function.

1.5 REPORT ORGANIZATION

This report consists of five chapters. Chapter 1 shall discuss on the introduction of the project. The introduction includes the introduction, problem statement, objective, report organization and scope.

Chapter 2 shall discuss on the literature review done for the project. Literature review includes the introduction which contains information about the study of the project in general, techniques/method or technologies which are suitable to be adapted into the project and the sources of references.

Chapter 3 shall discuss on the methodology of the project. This chapter includes the introduction, methodology, hardware and software and Gantt chart to be used in the project in detail.

Chapter 4 shall discuss on the implementation, testing and result discussion. This chapter explains on how the data/model/process/hardware been implemented into selected algorithm and discuss the test and result by using statistical tools.

Chapter 5 shall discuss on the conclusion of the project. This chapter includes the introduction which concludes the project that has been done and research constraints which includes the clarification on the constraints throughout the project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction of Literature Review

This chapter will review about the three existing systems which offer similar services with my topic in current market which are Blood Bank Information System from Health Information Standard Ministry of Health, Blood Bank Information System from KBase Life and Blood Bank Information System from Centium. Those three systems are offering almost similar services. The analysis and comparison on the three existing systems is discussed after the background of these systems are explained in brief.

The different system development approaches are then discussed and compared on their features and limitations .Based on the analysis of those system development methodology, one chosen approach is selected based on its relevancy and compatibility to the proposed project.

2.2 Type of Web Based Application

Web Based Application also known as Web Apps is a program that access over a network connection using HTTP. This application is run inside the web browser. It is created in a browser supported programming language such as combination of Javascript, HTML, CSS and relies on a web browser to render the application. . However, Web-based applications also may be client-based, where a small part of the program is downloaded to a user's desktop, but the processing is done over the Internet in an external server. Web-based applications are also known as Web apps. There are three types of web based.

2.2.1 Browser-based

In a browser-based Web application, JavaScript instructions are contained within the Web page that is retrieved from a Web site. Combined with the HTML code that determines the visual layout and the CSS style sheet, the HTML, JavaScript and CSS are executed via the browser. In addition, processing at the server side is often widely performed to access databases and other networks. The data for a Web application may be stored locally or on the Web, or in both locations (Ziff Davis, n.d.).

2.2.2 Client Based – Current System

Web applications may also run without the browser. A client program, which is either installed in the user's computer or mobile device or is downloaded each session, interacts with a server on the Web using standard Web protocols. This is similar to the "client/server" architecture that prevailed in companies before the Internet exploded, except that today the server is often on the Internet rather than the local network. Just

like browser-based applications, the data may be stored remotely or locally (Ziff Davis, n.d.).

2.2.3 Mobile Web App

There are a lot of mobile apps that use the Web for additional information. For example, the iOS and Android versions of this encyclopedia install all the text locally on the devices but retrieve all the images from a server via Web (HTTP) protocols.

2.3 Advantages of Web Based

Web Based application has a list of advantages. This advantage information shows that this application is the best tools that I can use in developing my system.

i. Cost saving

By using web based application, it requires no investment to buy software for a number of individual desktop. There is no software to download or install on the site.

ii. Accessibility

Web based can be accessed from any major web browser, providing you have an internet connection. Customer can access to all information in the web page, from anywhere in the world.

iii. No installation required

Web based software requires no installation. You just simply enter the system's web address and login credential. Compare with desktop software which require installation on each device you would like to use it on.

iv. No need IT staff to maintain the web.

The software is maintained, update and back up by the service provider. So, no need to hire or engaged IT people to take care of this aspect of running the software.

2.4 Existing System From The Internet

There are some existing system that offers similar services. The system that I chose are the Blood Bank Information System for Health Information Standards Ministry of Health, Blood Bank Information from KBase Life and Blood Bank Information System from Centium. In this section I will make a comparison about the system features and technology used from these three systems.

2.4.1 Blood Bank Information System from Health Information Standards Ministry of Health.

This system provides services for production and distribution of blood and blood products. This system also will function as a regional center for certain selected hospitals, which will provide services for donor recruitment, blood procurement and management and the production of blood and blood products.(Ministry of Health Malaysia.2006). The Blood Bank Information System offers the following functionality:

i. Blood Donation Management

ii. Blood Procurement

iii. Blood Safety

iv. Blood and Blood Component Production

v. Blood and Blood Component Storage and distribution

vi. Blood Transfusion Management

2.4.2 Blood Bank Information System from KBase Life

"KBASE life" is a web based system to control, manage and monitor every aspect of a Knowledge Base's Blood Bank Information System. "KBASE life" cover core blood bank activities, services for Laboratories, Clinics, Back Office and Health Education.

This system caters all the functional domains of a blood bank, to conduct and manage their daily activities effectively and accurately. It helps in managing and tracking information right from Donor Recruitment to the Components Final Transfusion. Besides all production steps, latest lab activities, in order to address all blood bank's objectives.

It is fully scalable, modular and incorporates a high level of security. Besides, this system also user friendly and come with international guidelines. This solution allows a common platform for a central site, remote user and mobile units to successfully complete their daily tasks. Blood Bank Information System from KBase Life offer 8 modules:

i. Registration and Management

ii. Donor Management

iii. Mobile Management

iv. Blood Storage Management

v. Blood Component Production Management

vi. Blood Transfusion Management

vii. Clinical Management

viii. Lab Interface Management

2.4.3 Blood Bank Information System from Centium

Centium BBIS V2.0 is a blood bank information system that is authenticate by the Malaysia Ministry of Health available from Centium software. Centium is developed according to the government regulation and international standard. It is fully automating data and information in a blood bank from end to end. With a host of features which consist of but not limited to Blood Camp scheduling, worklist generation, Serology and Grouping result interpretation as well as the real time component status monitoring, Centium BBIS have an efficient and secure blood bank management system since it have large blood bank operation. Centium BBIS V2.0 among others provides the following to optimize any blood bank operation:

i. Donor Management

ii. Lab Test Management

iii. Component Management

iv. Transfusion Management

v. Inventory Management

vi. Report

2.5 The Comparison of Existing System

This 2.1 table will compare some modules in the existing system.

Table 2.1 : Comparison of Three Existing System

Modules	**Blood Bank Information system from Health Informatics Standards Ministry of Health (System 1)**	**Blood Bank Information System from KBase Life (System 2)**	**Blood Bank Information System from Centium (System 3)**
Donor Registration Modules	Donor/Recipient Management	Registration and Management	Blood Bank Registration
Donor Appointment Modules	-	Donor Appoinment Scheduling	-
Blood Stock Management Modules	Blood Stock Movement	Blood Storage Management	Inventory Management
Donation Camp Registration Modules	-	-	Blood Donation Camp Organization
Blood Donation Campaign Modules	-	-	-
Record/Report Modules	Management Report	-	Records Maintenance
Extra Modules			
Blood Transfusion Modules	Blood Transfusion Management	Blood Transfusion Management	Blood Transfusion and Monitoring apply
Transfusion Reaction Modules	Investigation of Transfusion Reaction	-	Transfusion Reaction Monitoring
Blood Component Modules	Blood and Blood Component Handling	Blood Component Production Management	Blood Component Inventory

Based on the comparison (Table 2.1), there are some modules that are not used by the Blood Information System. Blood Bank Information System from Health Informatics Standard Ministry of Health and the system from Centium does not have Donor Appoinment Modules. Blood Bank Information System from KBase Life just have this module. This is very important facilities for those who are realy busy and yet enthusiastic people to know and be sure when they can make blood donation rather than trying to figure out when they can make blood donation. However, this KBase Life system does not provide report or record modules. Donor or patient cannot print out their save information as reference.

For Donation Camp Registration Modules, only supported by Blood Information from KBase Life. E-Blood Banking Information System have this module as one of the system module. This is important modules especially for an organization who want to make donation camp cooperate with the hospital. They just have to send the required information and proposal online and the hospital administrator will make a decision to approve or reject the proposal. Then, the blood donation camp news will be published on the website. This task will be included in Blood Donation Campaign Modules and this modules will be implement in E-Blood Banking Information System.

2.6 Comparing Hardware/ Technology/ Tools

Hardware and the technology are the important thing use to run the system. In hardware details, computer is a digital tool used to manage all the operations of the system such as generating report, create record and update the record. Data centre is a centralized repository or data server to perform function storage, management and dissemination of data and information of the business (Rouse, n.d.).

In technology, Web based system has been explained in section 2.2. For the application program, there are some of computer program that use to perform a specific function directly for the user. Example are development tools, notepad, paint, communication program and the others (Rouse, n.d.) Table 2.2 shows the comparison hardware and technology of three existing systems.

Table 2.2 : Comparison hardware and technology of three existing systems

Aspect	**Blood Bank Information System from Health Informatics Standards Ministry of Health**	**Blood-bank Information System from KBase Life**	**Blood Bank Information System from Centium**
Hardware	Computers, data centre	Computers, data centre	Computers, data centre
Type of system	Web based system	Web based system	Application program
Size of data	Large data involve	Large data involve	Large data involve

2.7 System Development Approach

System Development Approach is important in developing a system. It is use to improving the management and control of the system development process and technique to be used. We choose three System Development Methodologies and compare each of it to find the best suitable method that can be used in my E-Blood Banking Information System (EBBIS).

2.7.1 RAD (Rapid Application Development)

RAD model is one of the SDLC model which uses a prototyping approach in the software development. The key objective of this model is for fast development and delivery of high quality system at relatively low cost-investment. This technique aims to produce a high quality system quickly. This model is attempting to reduce inherit project risk by breaking a project into smaller segment and at the same time providing more ease-of-change during development process. By following RAD model, the team can deliver a prototype at a much early stage and end user can examine this live system instead of working with document. Besides, the client can approach some of the modules and quickly detect the mistake in the system development. There are 4 phases in RAD model.

i. Requirement Planning Phase

   In this phase users, manager and IT staff members will discuss on business needs, system requirement and project scope. Requirement of client will be identify, then, the context diagram and data flow will be produce in this stage. It will decide who will generate the software and it tells what the software can do.

ii. User Design Phase

Also known as Modeling Phases. During this phase, users will interact with software model. They will help in designing the interface and the system model. It will allow user to understand and modify the system. It approves a working model that meets their needs.

iii. Construction Phase

This phase focuses on program and application development task. The focus tasks include programming and application development, coding, user integration and system testing. The programming language used, and the database software also will be decide in this phase.

iv. Cutover Phase

This is the final task in System Development Life Cycle (SDLC). The tasks that will be complete are Data Conversion. Full Scale Testing, System Change Over and User Training. In this phase new system is built and delivered.

2.7.1.1 Advantages of RAD Model

This section will be discussed about the advantages of RAD Model. Some of the advantages are:

i. Reduces the development time. The time required in developing software will be reduce because of reduced in Requirement Analysis Business, Requirement Documentation and Software Requirement Documentation including Planning Stage.

ii. Increases reusability of the component

All the software prototype produce can be kept for future use. The reusability also enhances the speediness of the software development process.

iii. Cost Saving

It is big cost saver in term of project budget as well as project time and cost because of the reusability of the prototype.

2.7.1.2 Disadvantages of RAD Model

This section will be discussed about the advantages of RAD Model. Some of the advantages are:

i. Require highly skilled developer/designer

Success depend on the skills of the developer.

ii. Can use for small project

This method not be useful for large, unique and highly complex project.

RAD will be the best methodology used, when we are developing a system which is being built based on an existing prototype. The reason being the key part of this methodology is the re-use of prototypes. Because of this concept, it reduces both of processes of software development and required testing time.

2.7.2 PROTOTYPING

A prototype is a small implementation of the real system. This method shows limited and functional capabilities of the proposed system. The prototype is not a complete system and many of the details are not built on the prototype. The goal of this approach is just to provide a system with overall functionality. But the function is not fully implemented. The customer provides suggestion and improvement of the prototype. This model help customer to determine how the features will function in the final software and this is a very useful technique to obtain accurate requirement of the system. There are two types of prototypes which is Throwaway Prototype and Evolutionary Prototype.

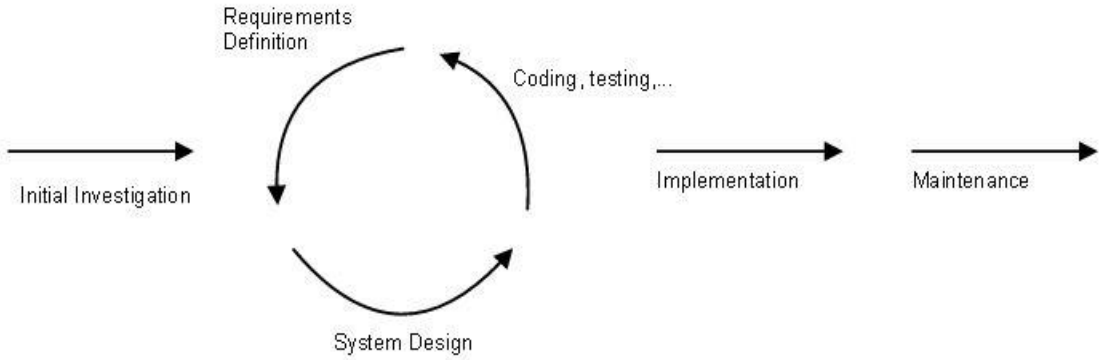
i. Throwaway Prototype

The prototype is developed as a part of a throw-away approach. This prototype will not be a part of the final solution. But this is a useful way of generating ideas and getting feedback from user.

ii. Evolutionary Process

This is an initial prototype that presented to the user. They provide the feedback and suggestion for improvement. Each stages of this prototype evolve toward the final system.

Figure 2.1 Prototyping Model



2.7.2.1 Advantages Of Prototype Model

This section will be discussed about the advantages of Prototype Model. Some of the advantages are:

i. Reduce time and cost

Prototyping can improve the quality of requirement and specification provided to developer. The early determination of what the user really wants can result in faster and less experience software.

ii. Functionality can be changed and modify.

When prototyping is shown to the user, they get a proper clarify and understand the functionality of the software. Then, they also can suggest for changes and modification.

iii. It minimizes risk of failure.

Potential risk can be early identify and mitigation step can be taken.

2.7.2.2 Disadvantages Of Prototype Model

This section will be discussed about the advantages of Prototype Model. Some of the disadvantages are:

i. It is a slow process

Prototyping can be a slow process when features and goals are not clear defined from the outset.

ii. User confusion of prototype and finished system

User can begin to think that a prototype that intended to be temporary is actually the final system that realy needs to be polished and finished.

iii. It is a time consuming model

Prototype model does not have their fix development times. If there are too many changes in the system development, it will require so much time to finish it.

2.7.3 Spiral Model

Spiral model is combination features of prototyping model and waterfall model. Spiral model is suitable for large, complicated and expensive project. There are 4 phases in this model.

i. Planning Phase

All the requirement will be gathered during this phase. Requirement like Business Requirement Specification (BRS) and System Requirement Specification (SRS).

ii. Risk Analysis

In this phase, the process is undertaken to identify risk and alternate solution. The prototype will produce after the Risk Analysis Phase. If any risk is detected during the risk analysis then the alternate solution will be used to solve the problem.

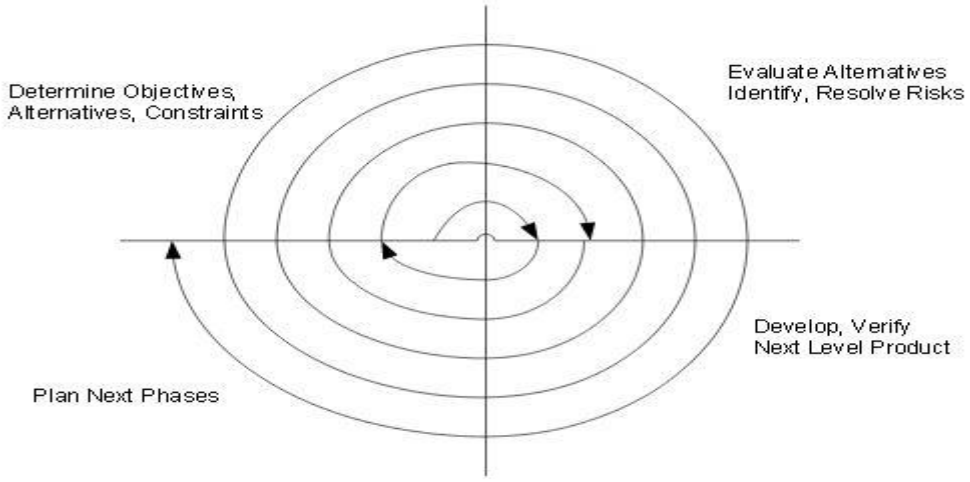
iii. Engineering Phase

Software is developed during this phase along with testing at the end of this phase.

iv. Evaluation Phase

This phase will allow the customer to evaluate the output of the project to date before the project continue with the next spiral.

Figure 2.2 Spiral Model



2.7.3.1 Advantages of Spiral Model

This section will be discussed about the advantages of Spiral model. Some of the advantages are:

i. More realistic

Project estimates in term of schedule and cost become more realistic since the project more forward and loops in spiral get complete.

ii. Strong documentation control.

Project monitoring is very easy and effective , each phase require a review from concern and expert people.

iii. Suitable for high risk project

Spiral model is suitable for project that require monitoring from expert about the system development and have large documentation.

2.7.3.2 Disadvantages of Spiral Model

This section will be discussed about the disadvantages of Spiral model. Some of the disadvantages are:

i. Can be costly model to use.

Cost involved in this model is usually high.

ii. Risk analysis requires highly specific expertise.

Only need the expertise to analysis the system risk.

iii. Through-out the span of project is tough

Rules and protocols should be followed properly to effectively implement this model.

Spiral Model require high cost involved and only need the expert developer to analyze the system risk. This system must fully follow the rules and protocol properly to avoid the failure of the system. This model does not suitable for small project development.

2.8 Comparison Of System Development Approach

This 2.3 table will explain about the comparison in some aspect of this three System Development Approach.

Table 2.3: Comparison of System Development Approach

Aspect	Rapid Application Development	Prototyping	Spiral
Framework Type	Iterative	Iterative	Combination linear and iterative.
Development Scale	Fast development and delivery of high quality system at low cost investment.	Suitable for small development scale only.	suitable for large, complicated and expensive project
Skills required	Need skill team member	Need skill team member	Project manager are highly skilled and experienced.
Requirement	Requirement of the system are unknown or uncertain	-	Requirement exist for strong approval and documentation control
Phase	1.Requirement planning phase 2.User design phase 3.Construction phase 4.Cutover phase	-	1.Planning phase 2.Risk analysis phase 3.Engineering phase 4.Evaluation phase

Table 2.3 explained about the comparison of three System Development Approach. From table, we can see that RAD have can be used in fast development and high quality system at a low cost of investment and it also suitable in developing small scale project. E-Blood Banking Information System is not suitable in using spiral model since this model require high investment because it suitable for big development project.

2.9 Comparison Of Strength And Weakness Of System Development Approach

This 2.4 table will compare the strength and weakness of three chosen System Development Approach that are RAD, Prototyping and Spiral.

Table 2.4. Comparison of strength and weakness of System Development Approach

Aspect	Rapid Application Development	Prototyping	Spiral
Strength	1. Produces system more quickly, this approach tend to produce lower cost system. 2. Provide the ability to rapidly change system design as demanded by user. 3. Produce dramatic saving in money, time and human effort.	1. Useful in resolving unclear objectives. 2. Easy to identify confusing or difficult function and missing functionality. 3. Error can be detected.	1. Good for large mission critical project. 2. Strong approval and documentation control. 3. Can added additional function at later date.
Weakness	1. May lead to lower overall system quality due to more speed and lower cost. 2. Project may end up with more requirement than needed. 3. Potential for features creep where more and more features are added to the system over the course of development.	1. Approval process and control is not strict. 2. Requirement may frequently change. 3. Incomplete and inadequate problem analysis may occur whereby only the most obvious need will be address. 4. It is a slow process.	1. Highly customized to each project, thus quite complex. 2. Required skilled and experienced project manager to apply to any given project. 3. No firm deadline since cycle continue with no clear termination condition.

Table 2.4 explained about the comparison of strength and weakness of choosing System Develop Approach. Rapid Application Development produces system more quickly and this approach also allows changes of system design requested by the user. Even though prototyping approach easily helps in detecting missing functionality and function, but it is a slow process compared to RAD. Spiral Model is good for large and critical project only and definitely this approach not suitable in implementing E-Blood Banking Information System since this system is only a small system.

2.10 Chapter Summary

This chapter briefly explained the result from the review of E-Blood Banking Information System. It includes the concept and meaning of web-based, the concept and meaning of three system development approach that are RAD, prototyping and spiral. The advantages and disadvantages of this three system development. After the result of the comparison in system features and system development, it proves that Rapid Application Development (RAD) is the best system development method that I can use in my system. This approach produces system quickly and it suitable for EBBIS development since EBBIS just have a few months to be developed. Besides,it also offer the ability to rapidly change system design as required by users. Existing system in Blood Bank Information System from KBase Life Blood, Bank Information System from Health Informatic Standard Ministry Of Health and Blood Bank Information System from Centium is a web based application. E-Blood Banking Information System also will used web based as a platform.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter will discuss on suitable methodology that will used in developing E-Blood Banking Information System (EBBIS) Methodology is the systematic, theoretical analysis of the method applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. The selected methodology will guide to complete this project starting from beginning until it has fully finished. Methodology has many types with different criteria that could help in developing cycle and in order to accomplish a perfect result, Rapid Application Development is the most suitable methodology.

3.2 Methodology

3.2.1 Discussion on Rapid Application Development

Rapid Application development has a lot in common with other iterative development process model. Its emphasizes user involvement, prototyping, reuse, the use of automated tools and small development teams. In addition to that, it employs the notation of a time box, a fix time frame within which activities is done.

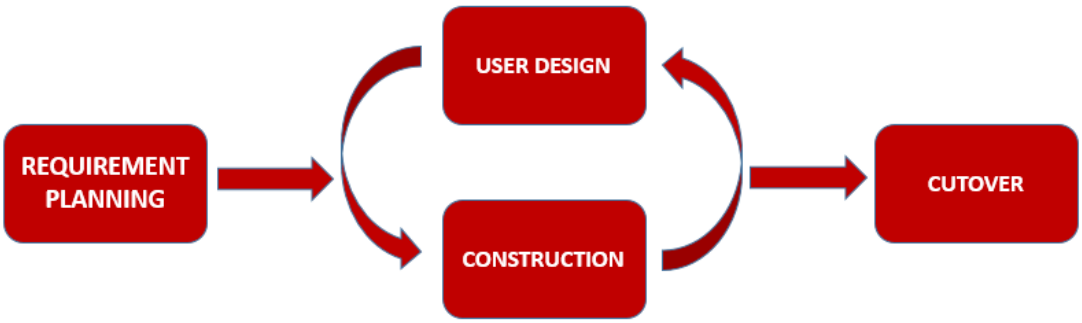
By using RAD the time frame is decided upon first and then the project tries to realize the requested functionality within the time frame.

Since there is no detailed preplanning, it makes it easier to incorporate the changes within the development process. RAD projects follow iterative and incremental model and have small teams comprising of developers, domain experts, customer representatives and other IT resources working progressively on their component or prototype. The most important aspect for this model to be successful is to make sure that the prototypes developed are reusable.

3.3 Rapid Application Development Phases

Rapid Application Development has own phases to guide me while use this methodology to complete my system. Figure 3.1 shows the model of Rapid Application Development Phases.

Figure 3.1 Model of Rapid Application Development phase



This is illustrated graphically in Figure 3.1, which composed of the following stage which are Requirement Planning, User Design, Construction and Cutover. There are some step in every phases that need to follow to complete this system. The step are:

i. Requirement Planning
ii. User Design
iii. Construction
iv. Cutover

In this phase, the requirement for the users are being investigated and analyzed by gathering the information gave by HTAA information Technology Staff. Then, define the requirement. The work process oh HTAA regarding blood banking was investigated. From the given form, we analyze the entire process and produce the requirement design (refer to Use Case diagram in figure 3.3 and Context Diagram in figure 3.4).

General task performed in this phase are:

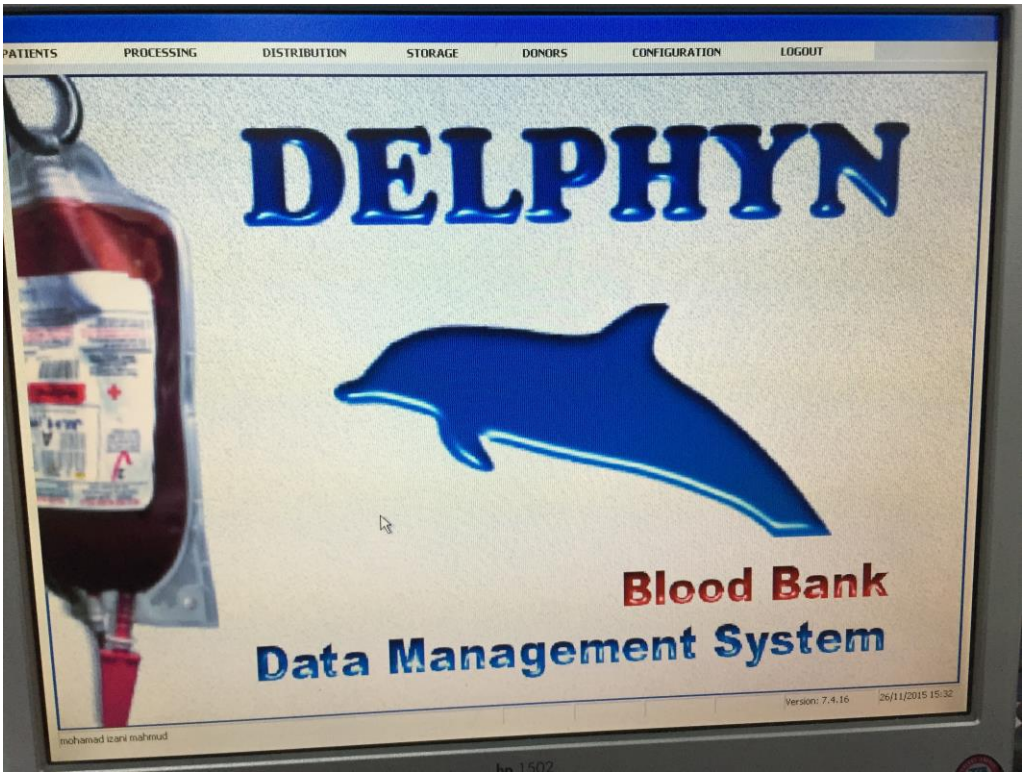
- Meet online blood bank system client to interview government blood bank user to identify their requirements and problem. The interview is the Head IT of Blood Bank Department En.Mohd Izani Bin Mahmud.
- Gathering all the related information about the blood donor form, the condition of the donor when they want to make a blood donation, the flow of the donation and others.
- After gathering all the information, all the scope and objective of my project has been confirmed. G.C 1.2 until figure G.C 1.5 shows the blood donation form from HTAA.
- View the real existing system of online blood bank information from HTAA.

ii. User Design Phase

In user design phase the detail design will be developed. Afterward, the outline system design is developed. System design has been refined and implement strategies has been prepared.

In order to complete all the above task, there are several interaction between developer and blood bank staff to develop models and prototypes that represent related system processes including input and outputs. The real existing system of the online blood bank information system is from HTAA will be used as a guideline when developing it. Some additional information regarding the improvement of the existing system also have been discussed and will be considered. The existing system called "DELPHYN" from HTAA also will be guided to design the interface. Figure 3.2 shows the main interface of HTAA "DELPHYN" system.

Figure 3.2 : Main interface of the HTAA "DELPHYN" system.



iii. Construction Phase

This phase focuses on program and application development. Blood bank staff is required to continue to participate and suggest improvements as actual screens or reports are developed. This task consists of programming and application development, coding, integration of the system and system testing.

General tasks performed during this phase are:

- PHP and HTML is selected as a language when developing this program. For the user design, all the related coding for user design is followed based on the planning made in user design phase. The visual studio will be used as a tool in developing this system. The coding pattern will be managed and designed with Model-View-Controller (MVC) pattern and object-oriented design.
- Testing: When the coding is complete, testing will take place to determine whether the system meet the objectives and user requirement. There are various types of testing technique such as component testing, integration testing and user acceptance testing. This task is done by the testing team.
- Debugging: The Visual Studio will be used to debug the EBBIS and publish to the web . A testing report will be provided to list out which area is affected. This responsibility is carried by developers. Developers must fix the defect as long as the corrections are not changing the actual flow. The testing template will be provided as a guide.

iv. Cutover Phase

Cutover phase resembles the final tasks in the SDLC implementation phase, including data conversion, testing, changeover to the new system, and user training. The related existing system will be changed to this new EBBIS. As a result, the new system will be easy to manage if compared to the existing system.

The last tasks performed during this phase are delivering. After correcting and completing all the defects by using the testing template provided, the system will be delivered and placed to the real user which is a blood bank staff.

3.4 Hardware and Software

This section explained about hardware and software used during develop this system.

3.4.1 Hardware Requirement

Table 3.1 shows the hardware requirement used while developing the system.

Table 3.1 : Hardware Requirement

Hardware	Specification	Purpose	Quantity
Internet connected devices • Laptop • Desktop	• Windows 7 and above • Intel Core i3 • 1GB RAM memory • Hard Disk 5GB	• As a hardware to run the operating system. • Prepare proposal and documentation. • Design and develop the system.	1
Internet connected devices • Smartphone • LAN Network	• 1GB RAM • Qualcomm MSM8974AC Snapdragon 801 • Quad-core 2.5 GHz Krait 400	• Connect the internet and run the system.	1
USB Storage	• Kingstone 32GB	• To store data, documentation and system. • To store journal and articles that related to help in making documentation.	1
Printer	• Canon Pixma E510	• Print proposal and documentation	1

3.4.2 Software Requirement

Table 3.2 shows the software requirement needed while developing the system.

Table 3.2 : Software Requirement

Software	**Purpose**
Microsoft Windows Operating System	• As a platform to run the system.
Microsoft office 2007 • Microsoft Words • Microsoft PowerPoint • Microsoft Project	• To prepare documentation. • To prepare a presentation slide. • To create a schedule and Gantt chart.
IBM Rational Software Architect	• To Create UML diagram.
Visual Studio 2010 Enterprise	• To develop, generate code, debug and design the system.
SQL 2014	• As a platform to create a database.
Browser	• To view the interface of the system.

3.5 Gant Chart

The total days that needs to implements is 218 days for this system. There are 4 phases in developing EBBIS system. Please refer to appendix GC 1.1 for the gant chart.

3.6 Product Information

E-Blood Banking Information System (EBBIS) consists of 4 actors, blood donor, blood finder, client and blood bank staff. In this system, blood donor and blood finder are able to use Blood Request Facility and Manage Blood User Details.For client, they are able to Manage Blood User Detail and Manage Blood Donation Camp. For blood bank staff, Manage Blood Bank Staff Details, Manage Blood Bank Information and Manage Report is allowed to use. Figure 3.3 shows the use case diagram.

Figure 3.3 : Use case of the E-Blood Banking Information System

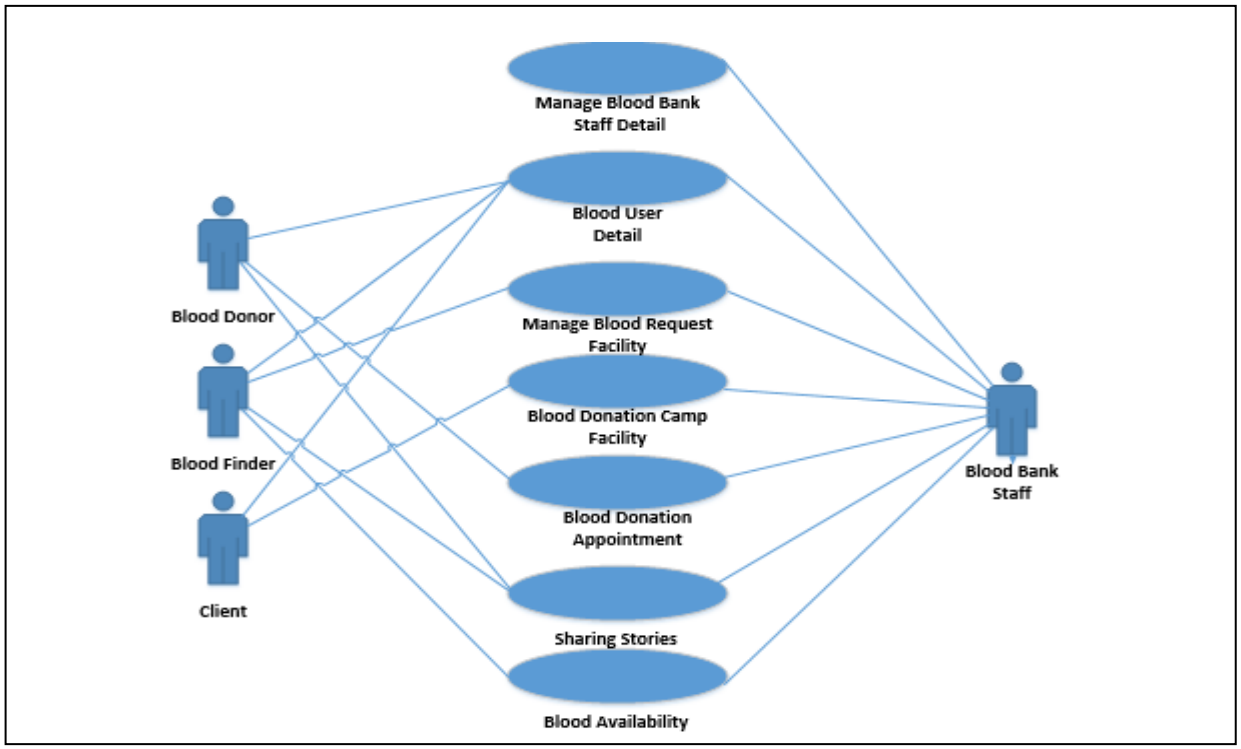


Figure 3.4 shows the Context diagram of the EBBIS. It shows how the data and context flow between actors and the system is.

Figure 3.4: Context Diagram for E-Blood Banking Information System

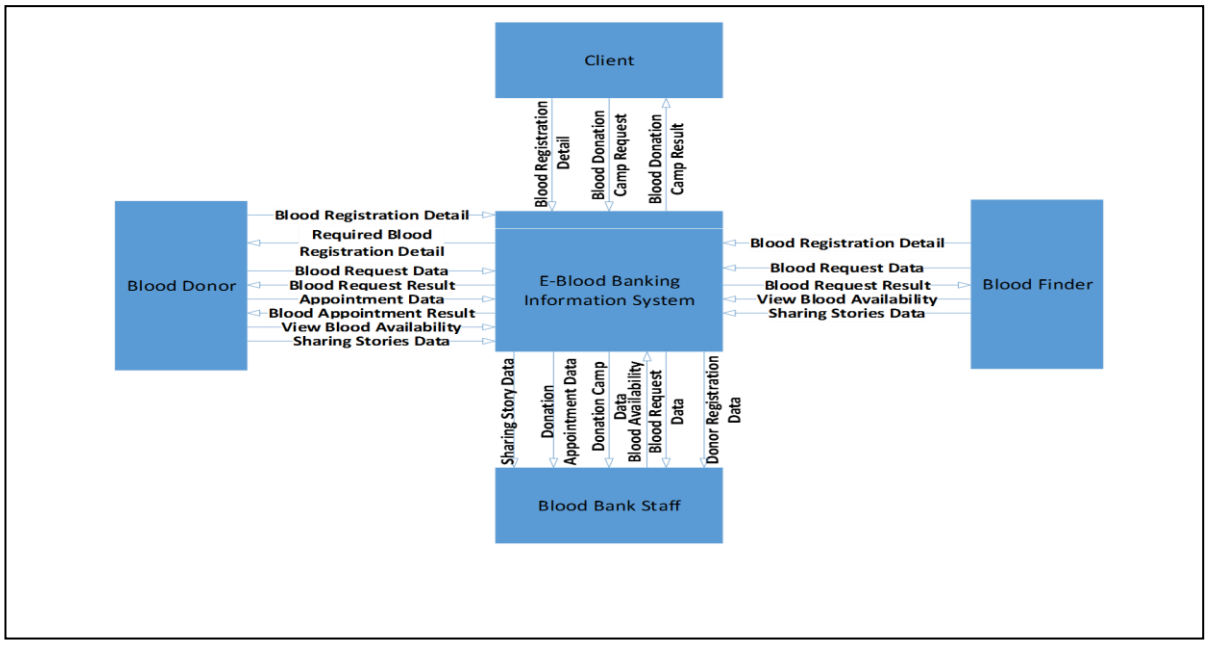
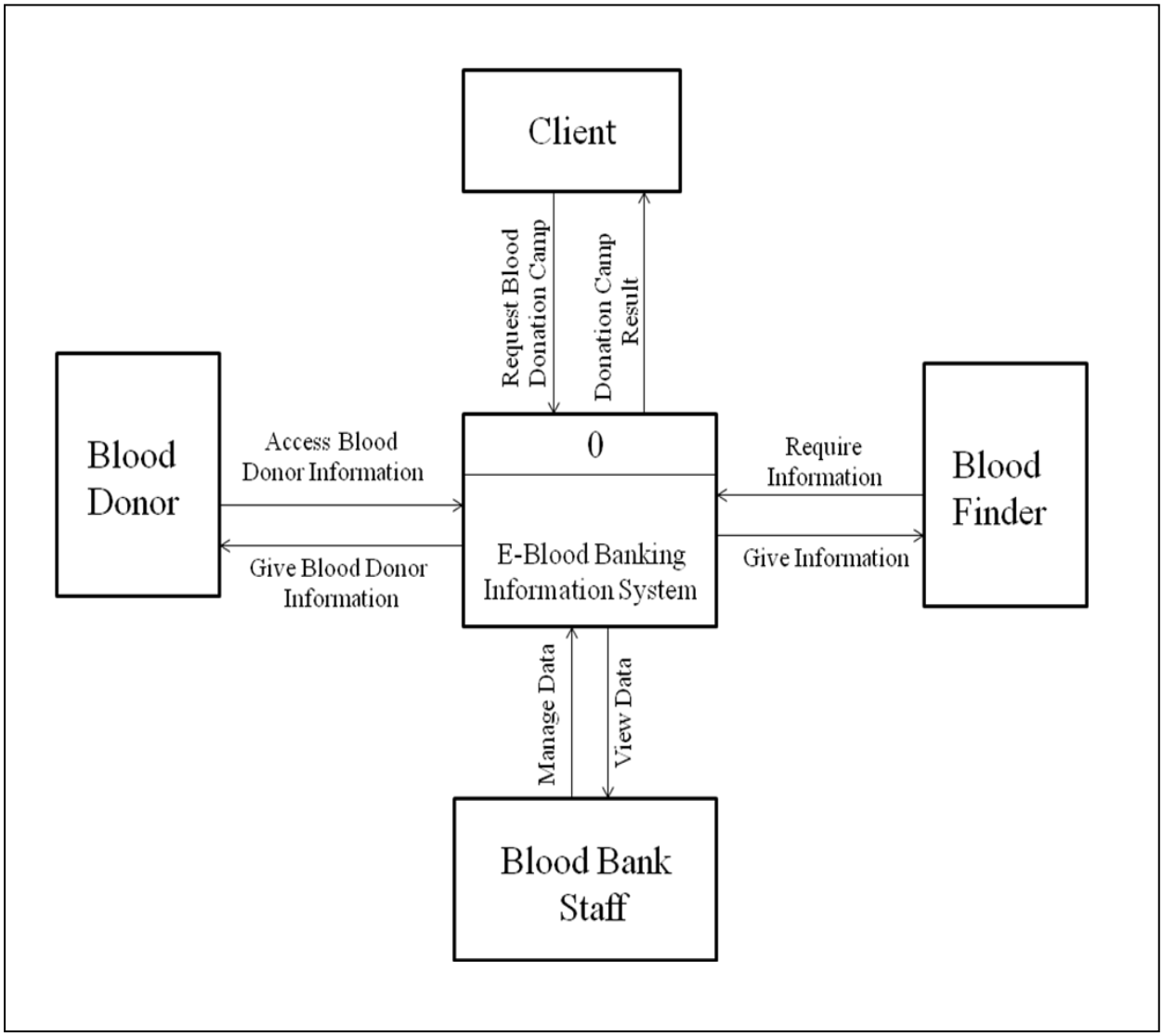


Figure 3.5 shows the Data Flow Diagram of E-Blood Banking Information System. This figure explain about the function of blood donor, blood finder, client and blood bank staff.

Figure 3.5 : Data Flow Diagram Level 0 of E-Blood Banking Information System

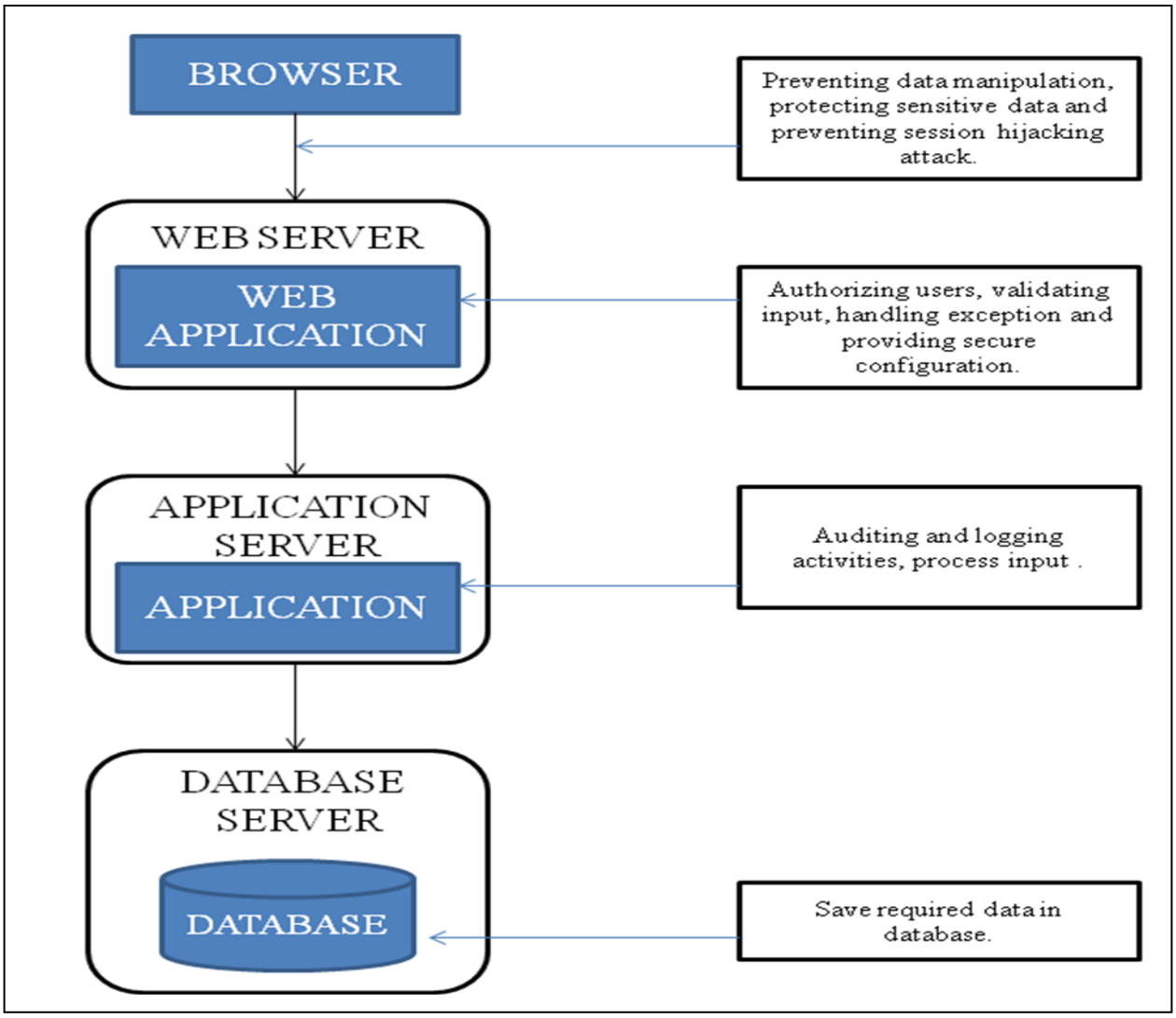


3.7 General Architecture and Package Module

3.7.1 General Architecture

Figure 3.6 shows how this E-Blood Banking Information System (EBBIS) works, browser interact with the web server authorizing the user and validating input to send to the application server. The application server processes the input from the user and save the required data in the database. All the data will be saved by administrator.

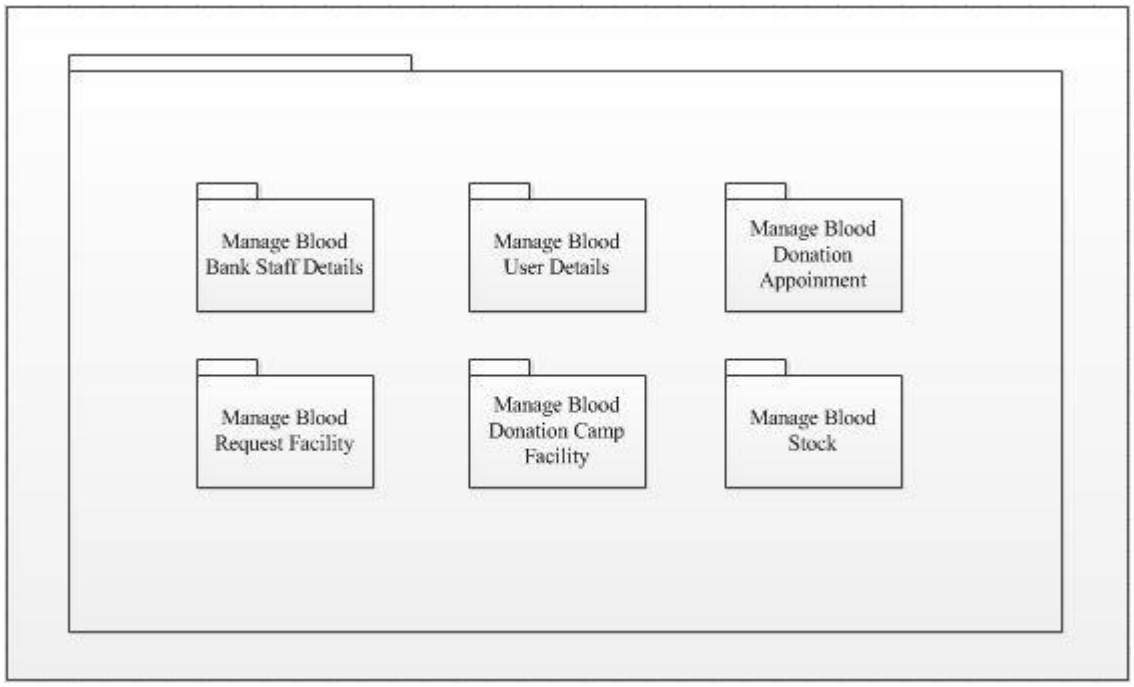
Figure 3.6 : General Architecture for E-Blood Banking Information System (EBBIS)



3.7.2 Package Module

Figure 3.7 shows the packet module in the E-Blood Banking Information System (EBBIS).

Figure 3.7 : Package Module for E-Blood Banking Information System (EBBIS)



3.7.2.1 Manage Blood Bank Staff Details

This package is allows the blood bank staff to manage the report, blood bank information and manage staff account such as update blood bank information and create a staff account.

3.7.2.2 Manage Blood User Details

This package is used to allow the blood donor and the blood finder to manage their own account information up-to-date such as update and view personal information record.

3.7.2.3 Blood Request Facility

This package allows the blood donor and the blood finder to request, require blood from EBBIS.

3.7.2.4 Blood Donation Camp Facility

This package allows the client to request a blood donation camp collaborate with the HTAA.

3.7.2.5 Manage Blood Donation Appointment

This package is used to manage an appointment from the client.

3.8 Chapter Summary

This Chapter briefly explained the methodology used for my system which is rapid application development, the methodology work will guide me when developing this system. With the four processes start from the requirement planning, iteration process of user design and construction and the last one is cutover. The related information regarding the blood bank information system, basic procedure from the blood donation until the blood is donated to the other required people from HTAA is gathered, existing interface system is captured and the others information by interviewing the HTAA staff. The required hardware and software is going to use to support either documentation and system development is used like visual studio, Microsoft Word, Microsoft PowerPoint, Microsoft Visio, and the others as stated as the content of this chapter. The purpose for each is explained as well in the content. The Gantt chart is planned for my system. The details of the flow task for each phases are listed out as shown as this chapter. There are four iterations in this Gantt chart which will going to be developing in this system. The Use case, context diagram, flow chart for the six modules are drawn also. The six package module are managing blood bank staff details, managing blood user details, managing report, managing blood bank information, managing blood storage record, blood donation Camp and blood request facility. The architecture of this system is discussed as well.

CHAPTER 4

IMPLEMENTATION, TESTING AND RESULT DISCUSSION

4.1 Introduction

In this chapter, implementation plan for E-Blood Banking Information System is developed. The implementation plan is listing all task must be done to develop E-Blood Banking Information System. After the implementation has been done, generate test data for the system. The test is applied to this system to verify the function and to find out any error that will be in the system. Using Rapid Application Development methodologies, testing is produced during the rapid construction phase.

4.2 Implementation

This section describes the specific implementation requirements and procedures. Record all the process involved in the project development and then describes how the project was constructed. The first part of this system is development environment, setup the computer to become localhost for the project and the second part is system functionality.

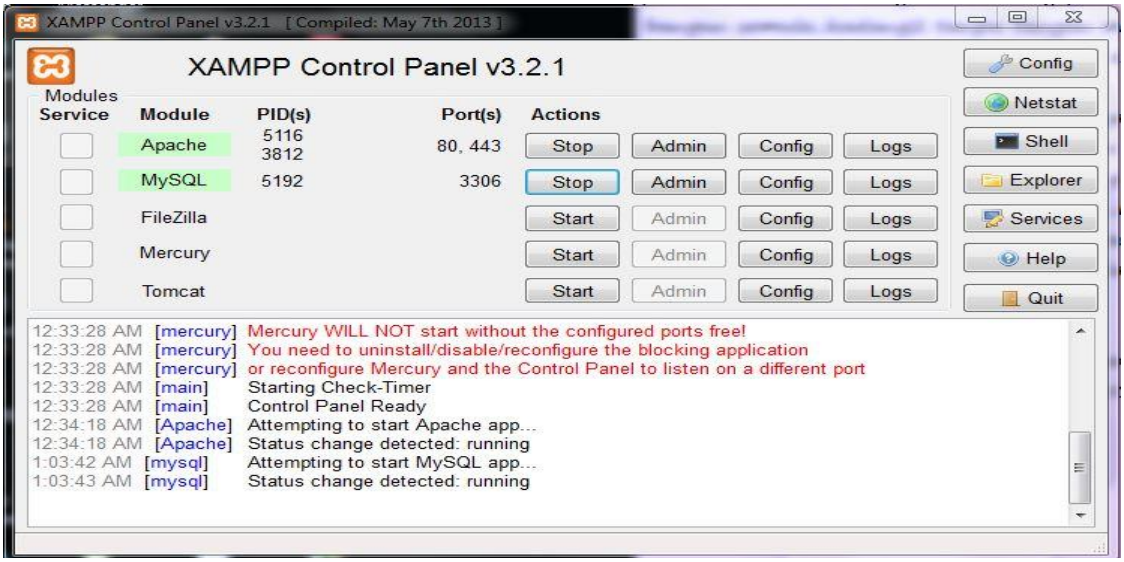
4.2.1 Development Environment

The first thing that we have to do is to set up computer to become the localhost server for the E-Blood Banking Information System. There are many localhost provided over the internet, but for this project, XAMPP localhost is selected as a platform and web server because it is completely free, easy to install an Apache distribution. The XAMPP open source package has been established to be incredibly easy to install developed by Apache friends. XAMPP stand for Cross-Platform (X) that is simple and lightweight Apache distribution that make it extremely easy for this project to create a local web server. Most of the actual web server deployments use the same components as XAMPP, so it makes transitioning this E-Blood Banking Information System from a local server to the live server easy. XAMPP comes with a number of modules including OpenSSL, phpMyAdmin, MediaWiki, Joomla, Wordpress and more. For development of EBBIS system, I choose phpMyAdmin because it is the most suitable one to become as the database server for the system.(Dvorski,2007)

For the first set up, this EBBIS system have to move to the htdocs folders in XAMPP folders. The htdocs file act like a server, the system must be in this folder to run it through web browser. To run the file in the server, the address must look like localhost:6666/ following the name of the file that need to be run. There must be one configuration that need to be set. XAMPP localhost must be running while the system running. Press the start button in XAMPP to run the server. The figure below shows the XAMPP control panel interface.

Figure 4.1 shows the XAMPP Control Panel interface, Apache tab and MySQL tab must be start in order to make the system run. MySQL become the database for this system where it requires Apache service to start to run the system. This two services must be switch on before the system start.

Figure 4.1 XAMPP Control Panel



Function of database is to store all the data from EBBIS system. It is the most important phase in this system. phpMyAdmin is the database server for the system and the figure 4.2 below shows the database working environment.

Figure 4.2 phpMyAdmin working environment.

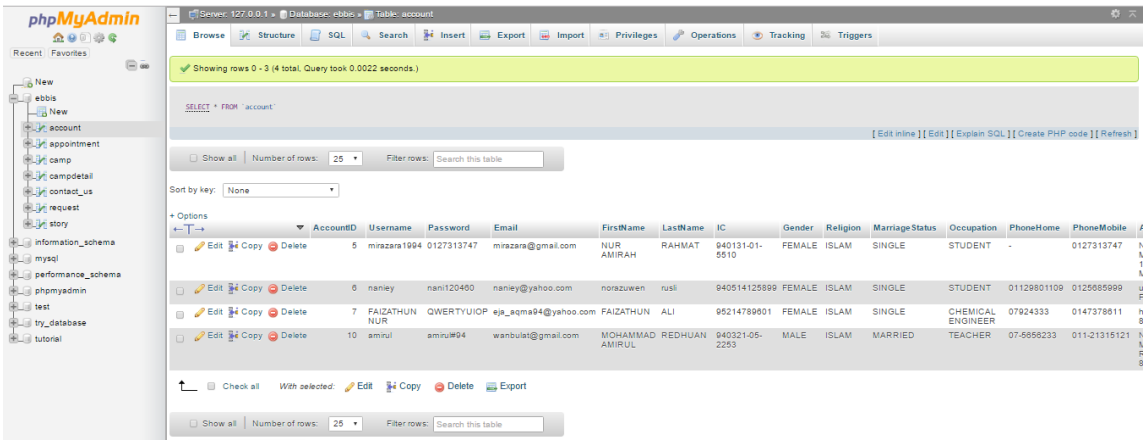
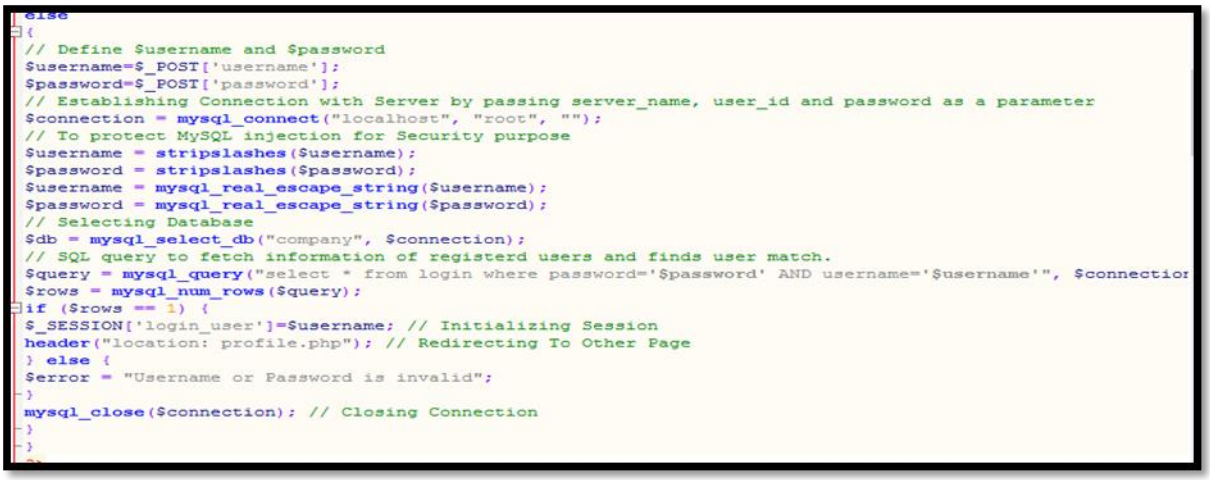


Figure 4.2 shows the phpMyAdmin working environment, the database name and table need to be set up here to create a database connection. The database can be set to any names and set as many table for the system to use. Database query has to be run to insert the data and information in the database table. The example of database query is showing the figure below.

Figure 4.3 shows the Database Query in Notepad++



```
else
{
// Define $username and $password
$username=$_POST['username'];
$password=$_POST['password'];
// Establishing Connection with Server by passing server_name, user_id and password as a parameter
$connection = mysql_connect("localhost", "root", "");
// To protect MySQL injection for Security purpose
$username = stripslashes($username);
$password = stripslashes($password);
$username = mysql_real_escape_string($username);
$password = mysql_real_escape_string($password);
// Selecting Database
$db = mysql_select_db("company", $connection);
// SQL query to fetch information of registerd users and finds user match.
$query = mysql_query("select * from login where password='$password' AND username='$username'", $connectior
$rows = mysql_num_rows($query);
if ($rows == 1) {
$_SESSION['login_user']=$username; // Initializing Session
header("location: profile.php"); // Redirecting To Other Page
} else {
$error = "Username or Password is invalid";
}
mysql_close($connection); // Closing Connection
}
}
```

Figure 4.3 shows the database query to insert data into database table. Database query is the important part in development of project. Without the database connection the system cannot be run. First step is define the database host, user and password to create a connection between the database and the EBBIS system. After the connection was succeeded, create an INSERT query to store the information from system into the database. The SELECT query can be used to call back the database.

Other development tools that used in this Project is notepad++. Notepad++ is the text editor and source code editor in Microsoft windows. Since the project is run on Microsoft Windows, Notepad++ is the most suitable application for EBBIS development. It is a free software tools which supports syntax and highlighting and code folding for over 50 programming language, scripting and mark-up languages.

Figure 4.4 shows the Notepad++ Environment Interface

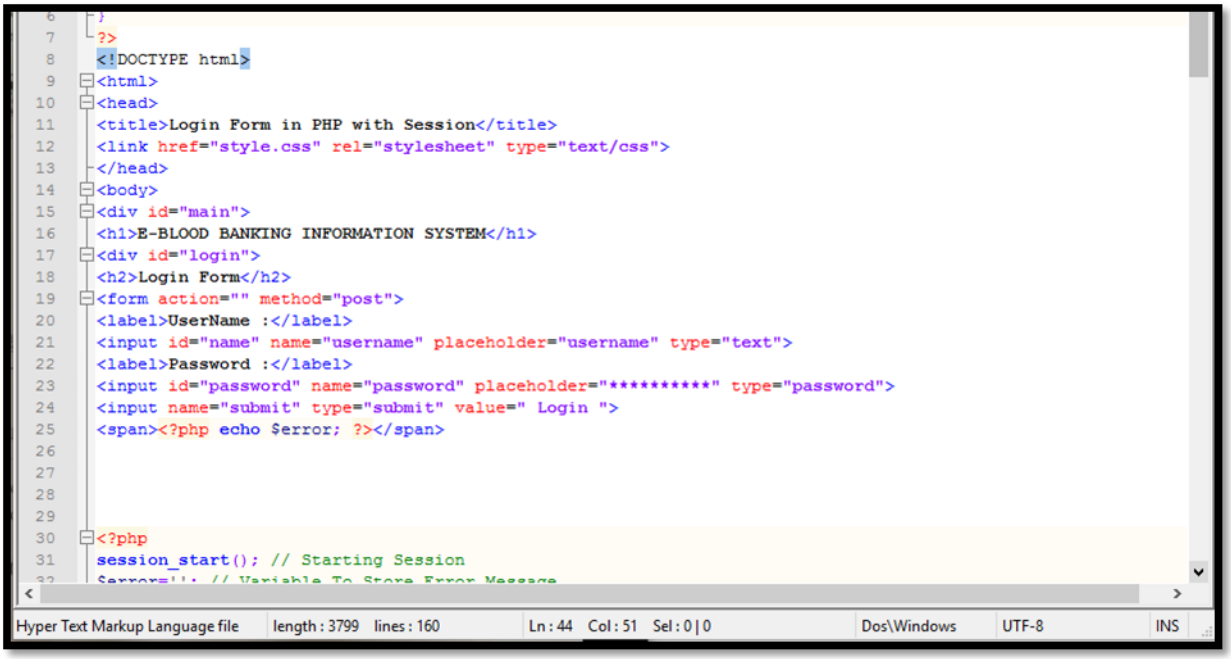


Figure 4.4 shows the notepad++ environment interfaces. In this interfaces, it include the number of line for easy to detect error, and below the interface shows the type of file, the number of lines and length of the code. The code also set with variety of colour to differentiate the function.

The system is developed by using PHP languages. PHP is a server-side scripting language that designed for web development. This language also used as general-purpose programming language. PHP actually stood for Personal Home Page, it now stand for the recursive backronym PHP Hypertext Processor.

The interface of EBBIS system is developed by using HTML and CSS code. The code is developed by using the object-oriented approach in php. The user will enter the data to be process from the interface of the system. After user enter data, the data is processed using php code and submit it to the database layer to save all the key in data.

HTML is referred to Hypertext Markup Language. It is the standard code used to create interface for the web pages. Web browsers read the HTML files and deliver them into interfaces of the web

Figure 4.5 HTML code for EBBIS

```
<!DOCTYPE HTML>
<!-- Website template by freewebsitetemplates.com -->
<html>
<head>
    <meta charset="UTF-8">
    <title>E-BLOOD BANKING INFORMATION SYSTEM</title>
    <link rel="stylesheet" href="cssStaff/staff.css" type="text/css">
</head>
<body>
    <div id="header">
        <div class="clearfix">
            <div class="logo">
                <a href="index.html"><img src="images/logo.png" alt="LOGO" height="52" width="362"></a>
            </div>
            <ul class="navigation">
                <li class="active">
                    <a href="index.html">Home</a>
                </li>
                <li>
                    <a href="about.html">About</a>
                </li>


                <li>
                    <a href="news.html">News</a>
                    <div>
                        <a href="singlepost.html">News Single Post</a>
                    </div>
                </li>

                <li>
                    <a href="login.html">Logout</a>
                </li>

            </ul>
```

Figure 4.5 shows the HTML code for E-Blood Banking Information System. The HTML code start with <html> tags and end with </html> tags, basically the HTML code just makes the user interface of the system. To make the interface look more interesting and user friendly, it must apply CSS code in the HTML file to design the user interface.

CSS stand for Cascading Style Sheets language. CSS is a cornerstone technology used by most websites to create visually engaging websites. The CSS code can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics.(Data,2015)

Figure 4.6 shows the example of CSS code to beautify the pages in HTML, the tags in CSS code must be same as in the HTML code, and otherwise the code will not work.

Figure 4.6 shows the CSS code for E-Blood Banking Information System

```
#main {
width:960px;
margin:50px auto;
font-family:raleway
}
span {
color:red
}
h2 {
background-color:#FEFFED;
text-align:center;
border-radius:10px 10px 0 0;
margin:-10px -40px;
padding:15px
}
hr {
border:0;
border-bottom:1px solid #ccc;
margin:10px -40px;
margin-bottom:30px
}
#login {
width:300px;
float:left;
border-radius:10px;
font-family:raleway;
border:2px solid #ccc;
padding:10px 40px 25px;
margin-top:70px
```

The last thing that this system needs to make the interface user-friendly is JavaScript language. JavaScript is a high level, dynamic and interpreted programming language. It is supported by all modern web browsers without plugins. The JavaScript code will apply in this project to make the validation of the user input and to add more action in the system. For the user input, it help to validate whether user input is correct data or not. So, this help the system to become more efficient in handling the data from user.

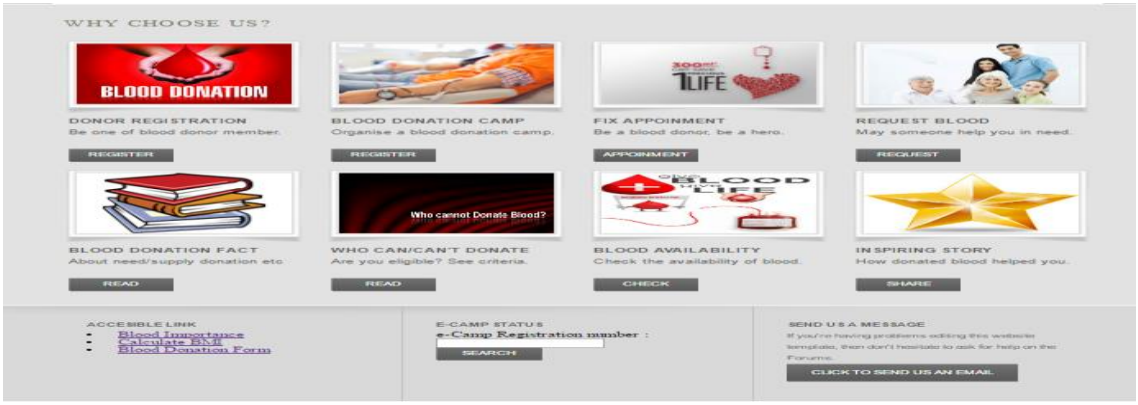
4.2.2 System Functionality

This section describe about system functionality, how the system work to interact with the user. The first important thing is user interface of the system, user interface should be nice and clean to ensure the understandability of the user. From the interface the user will know the function of the websites. The figure below will show the interface of E-Blood Banking Information System.

Figure 4.7(i) and figure 4.7(ii) is the home interface for this system. This system have 8 section. Each of this section will be explain later in this section.

Figure 4.7(i) E-Blood Banking Information System home page

Figure 4.7(ii) E-Blood Banking Information System home page.



Based on figure 4.8, user have to login to access to another section. If the user doesn't register yet they have to register first.

Figure 4.8 E-Blood Banking Information System Login Page

Figure 4.9(i) and 4.9(ii) shows the EBBIS Registration Page. All new donor or member have to key in their required information before they make any process later.

Figure 4.9(i) E-Blood Banking Information System Registration Page

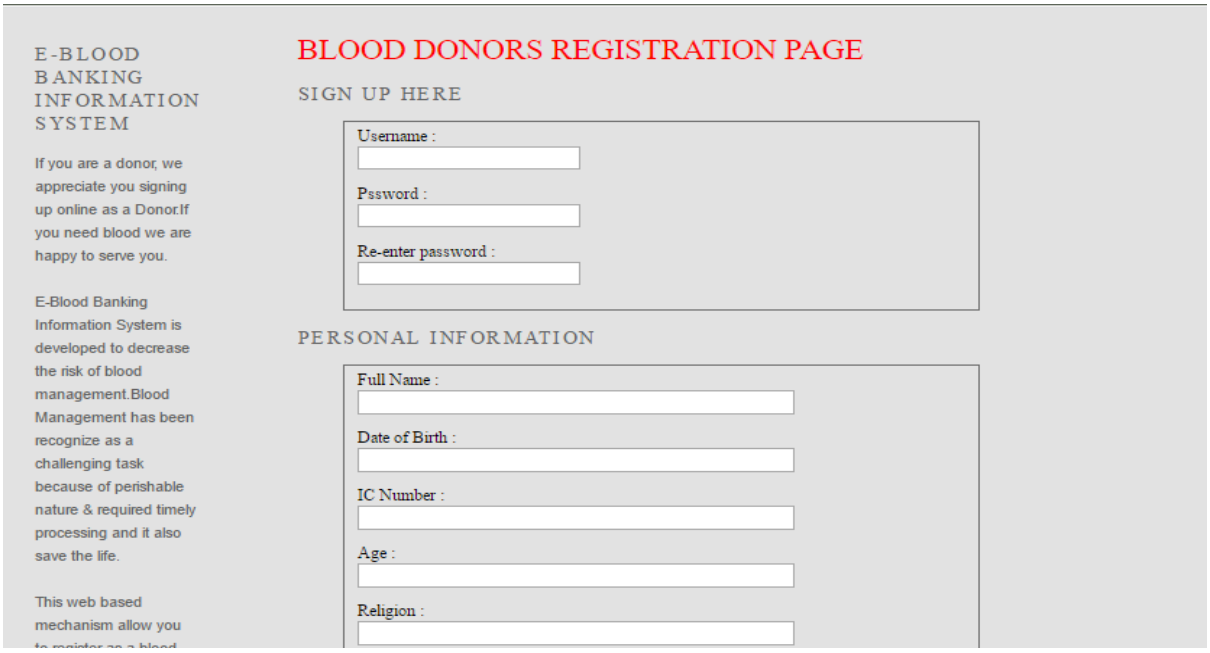


Figure 4.9(ii) E-Blood Banking Information System Registration Page

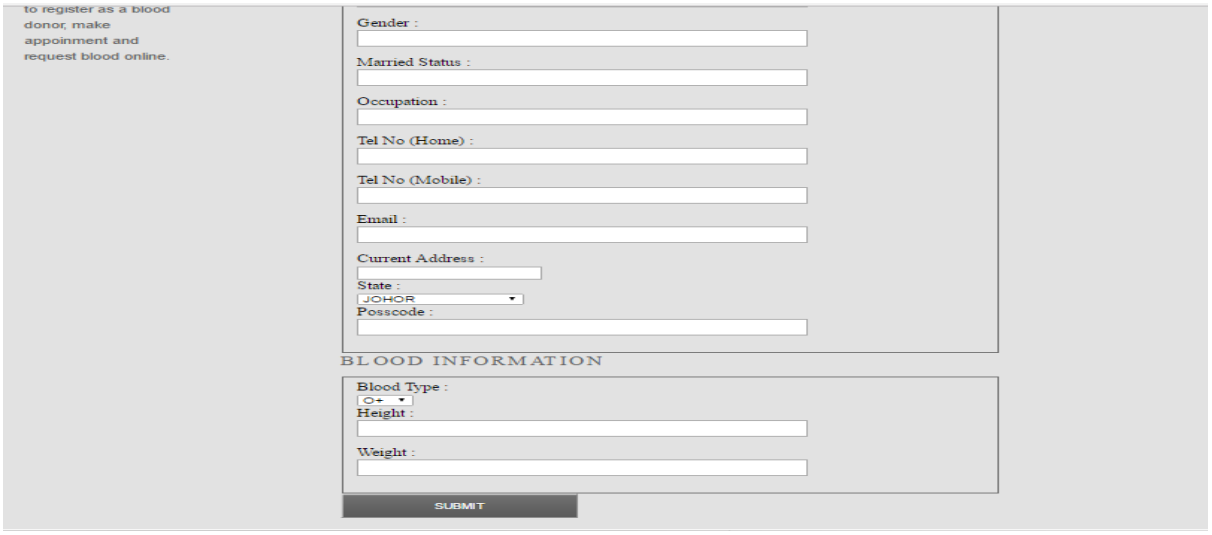


Figure 4.10(i) shows EBBIS Donation Camp Page. This page allow any organization or individual who want to collaborate with the hospital. They can send the request information in this page. Before that, they also have to create account before make a request. Besides, they have to follow all stated rules regarding location suitability and number of crowds.

Figure 4.10(i) E-Blood Banking Information System Donation Camp Page

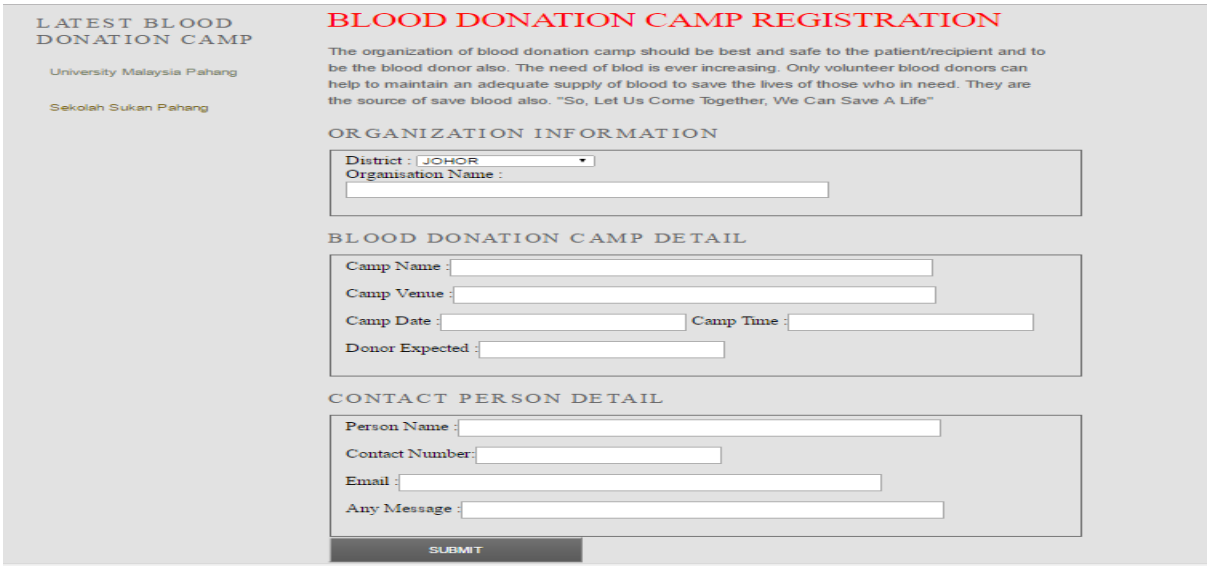


Figure 4.11(i) and figure 4.11(ii) shows EBBIS Appointment Request Form page for the donor who want to make an appointment for blood donation, they need to answer all the required information in this page and booking their own available date.

Figure 4.11(i) E-Blood Banking Information System Appointment Request Form

Figure 4.11(ii) E-Blood Banking Information System Appointment Request Form

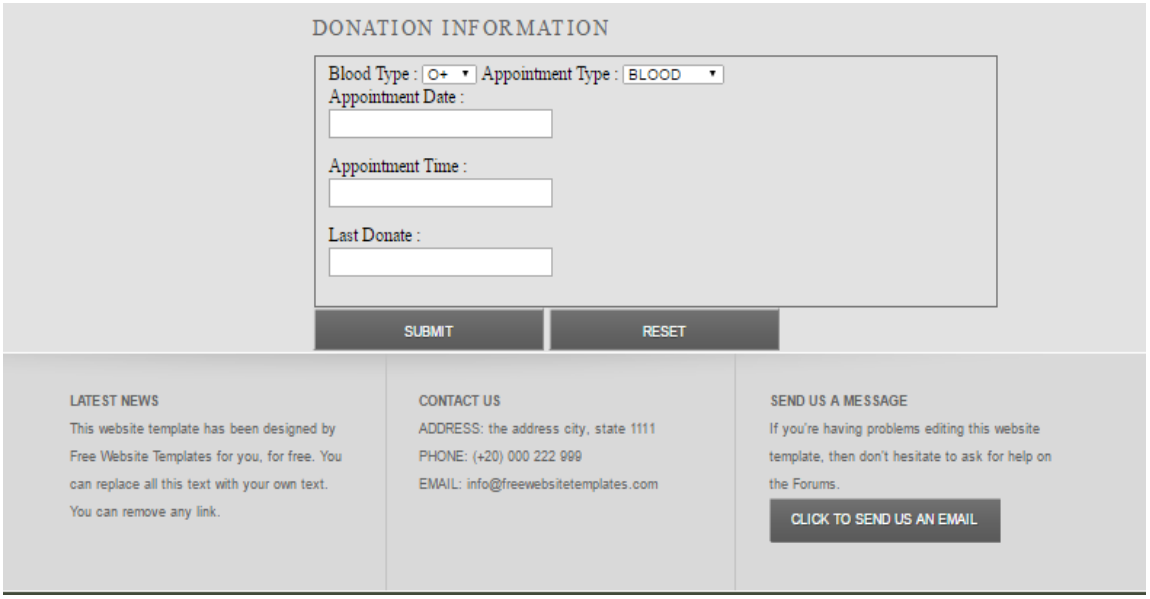


Figure 4.12(i) to figure 4.12(iv) shows the 'Soal Selidik" form for donors who want to make a blood donation. This form is compulsory to all donor. Donor have to complete the form and submit. Then, this form will generate automatically the result whether he/she can be a blood donor or not.

Figure 4.12(i) E-Blood Banking Information System "Soal Selidik" Form

BORANG PERKHIDMATAN PENDERMA DARAH PERKHIDMATAN TRANSFUSI DARAH KEMENTERIAN KESHATAN MALAYSIA

PERHATIAN: ADAKAH DARAH ANDA SELAMAT UNTUK DIGUNAKAN

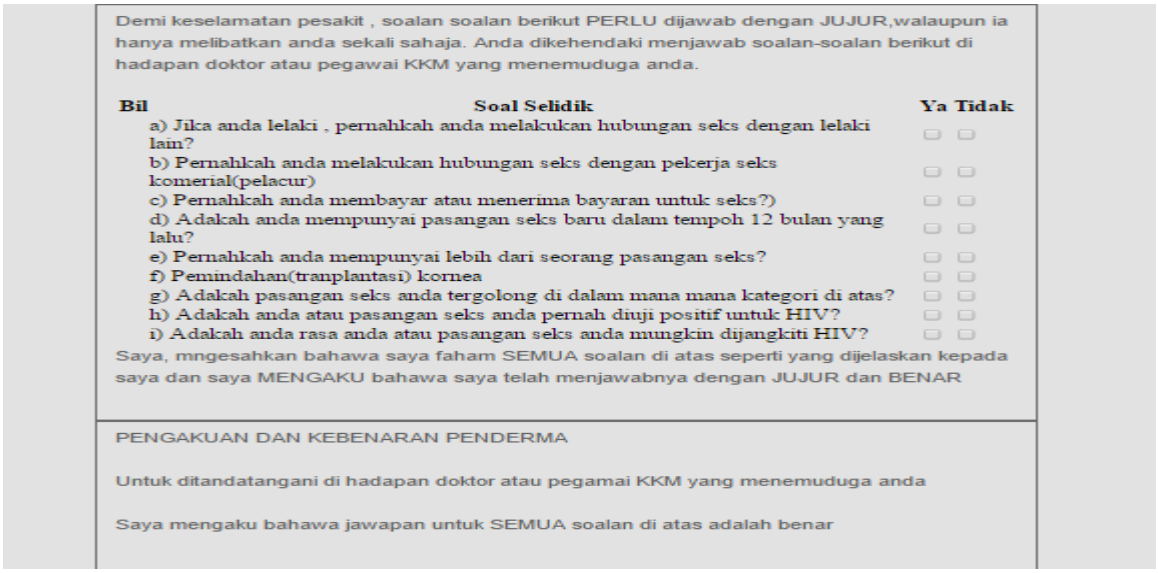
Terima kasih kerana dengan sukarela tampil untuk menderma darah anda. Darah yang anda dermakan dapat membantu menyelamatkan nyawa. Kami sentiasa berusaha memastikan darah yang diberi kepada pesakit adalah selamat. Untuk itu semua darah yang didermakan akan diuji untuk mengesan jangkitan Hepatitis B dan C, HIV dan Siflis. Walau bagaimanapun ada kalanya ujian-ujian ini gagal mengesan darah yang baru sahaja dijangkiti. Akibatnya darah yang dijangkiti mungkin akan diberi kepada pesakit tanpa disedari. Oleh itu, bagi membantu kami memasstikan darah yang didermakan adalah selamat untuk digunakan , anda diminta untuk membaca dengan teliti kenyataan di bawah sebelum anda menderma darah.

ANDA DIMINTA UNTUK TIDAK MENDERMA DARAH JIKA anda

- tahu atau syak diri anda dihidapi HIV, penghidap pembawa Hepatitis B atau Hepatitis C atau dijangkiti Sifilis atau Penyakit Kelamin yang lain
- mengamal atau pernah mengamalkan gaya hidup BERTUKAR TUKAR PASANGAN SEKS
- pernah membayar atau menerima bayaran untuk hubungan seks
- pernah melakukan hubungan seks dengan lelaki lain (HOMOSEKSUAL/BISEKSUAL)
- pernah mengambil dadah terlarang secara suntikan
- pernah melakukan hubungan seks dengan sesiapa daripada mana- mana golongan di atas

Anda juga diminta supaya JANGAN menderma darah dengan tujuan untuk mengambil darah anda. Ujian darah boleh dilakukan di aman mana klinik kesihatan yang berhampiran. Jika anda mempunyai sebarang soalan, sila bertemu dengan pegamai perubatan bertugas untuk bantuan.

Figure 4.12(ii) E-Blood Banking Information System "Soal Selidik" Form



Demi keselamatan pesakit , soalan soalan berikut PERLU dijawab dengan JUJUR,walaupun ia hanya melibatkan anda sekali sahaja. Anda dikehendaki menjawab soalan-soalan berikut di hadapan doktor atau pegawai KKM yang menemuduga anda.

Bil	Soal Selidik	Ya	Tidak
a)	Jika anda lelaki , pernahkah anda melakukan hubungan seks dengan lelaki lain?	☐	☐
b)	Pernahkah anda melakukan hubungan seks dengan pekerja seks komerial(pelacur)	☐	☐
c)	Pernahkah anda membayar atau menerima bayaran untuk seks?)	☐	☐
d)	Adakah anda mempunyai pasangan seks baru dalam tempoh 12 bulan yang lalu?	☐	☐
e)	Pernahkah anda mempunyai lebih dari seorang pasangan seks?	☐	☐
f)	Pemindahan(tranplantasi) kornea	☐	☐
g)	Adakah pasangan seks anda tergolong di dalam mana mana kategori di atas?	☐	☐
h)	Adakah anda atau pasangan seks anda pernah diuji positif untuk HIV?	☐	☐
i)	Adakah anda rasa anda atau pasangan seks anda mungkin dijangkiti HIV?	☐	☐

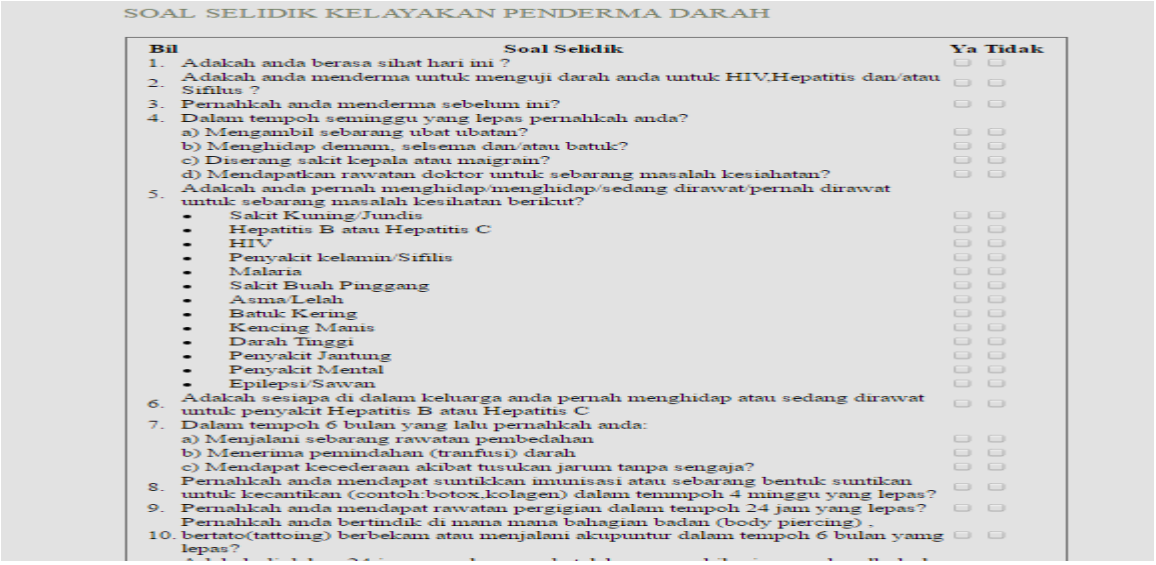
Saya, mngesahkan bahawa saya faham SEMUA soalan di atas seperti yang dijelaskan kepada saya dan saya MENGAKU bahawa saya telah menjawabnya dengan JUJUR dan BENAR

PENGAKUAN DAN KEBENARAN PENDERMA

Untuk ditandatangani di hadapan doktor atau pegamai KKM yang menemuduga anda

Saya mengaku bahawa jawapan untuk SEMUA soalan di atas adalah benar

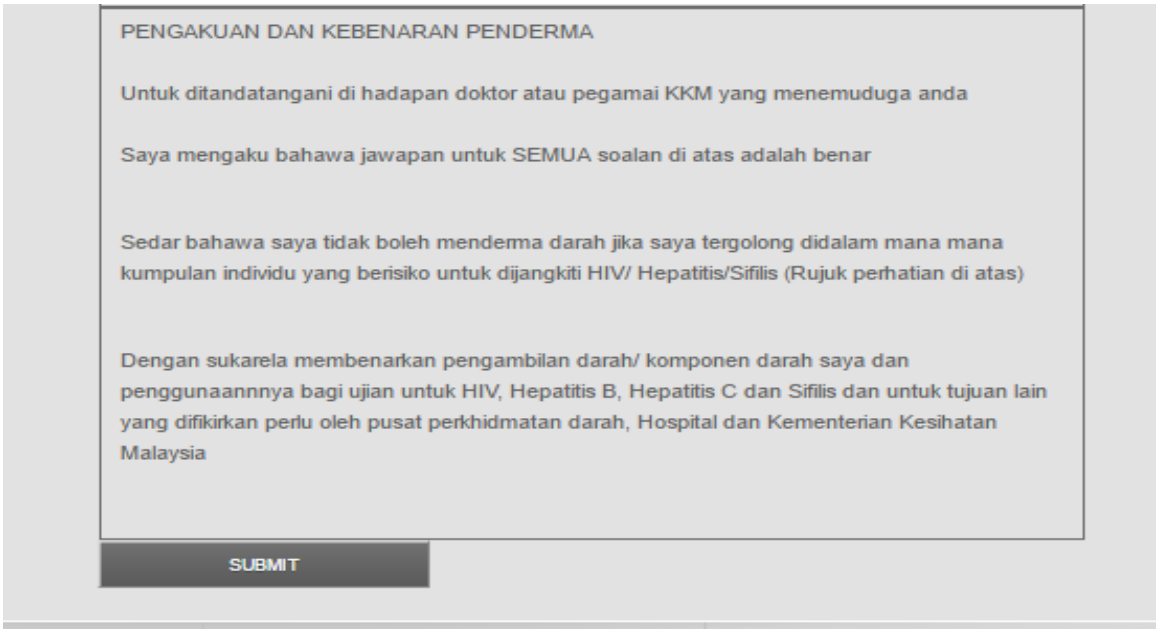
Figure 4.12(iii) E-Blood Banking Information System "Soal Selidik" Form



SOAL SELIDIK KELAYAKAN PENDERMA DARAH

Bil	Soal Selidik	Ya	Tidak
1.	Adakah anda berasa sihat hari ini ?	☐	☐
2.	Adakah anda menderma untuk menguji darah anda untuk HIV,Hepatitis dan/atau Sifilus ?	☐	☐
3.	Pernahkah anda menderma sebelum ini?	☐	☐
4.	Dalam tempoh seminggu yang lepas pernahkah anda?		
	a) Mengambil sebarang ubat ubatan?	☐	☐
	b) Menghidap demam, selsema dan/atau batuk?	☐	☐
	c) Diserang sakit kepala atau maigrain?	☐	☐
	d) Mendapatkan rawatan doktor untuk sebarang masalah kesiahatan?	☐	☐
5.	Adakah anda pernah menghidap/menghidap/sedang dirawat/pernah dirawat untuk sebarang masalah kesihatan berikut?		
	• Sakit Kuning/Jundis	☐	☐
	• Hepatitis B atau Hepatitis C	☐	☐
	• HIV	☐	☐
	• Penyakit kelamin/Sifilis	☐	☐
	• Malaria	☐	☐
	• Sakit Buah Pinggang	☐	☐
	• Asma/Lelah	☐	☐
	• Batuk Kering	☐	☐
	• Kencing Manis	☐	☐
	• Darah Tinggi	☐	☐
	• Penyakit Jantung	☐	☐
	• Penyakit Mental	☐	☐
	• Epilepsi/Sawan	☐	☐
6.	Adakah sesiapa di dalam keluarga anda pernah menghidap atau sedang dirawat untuk penyakit Hepatitis B atau Hepatitis C	☐	☐
7.	Dalam tempoh 6 bulan yang lalu pernahkah anda:		
	a) Menjalani sebarang rawatan pembedahan	☐	☐
	b) Menerima pemindahan (tranfusi) darah	☐	☐
	c) Mendapat kecederaan akibat tusukan jarum tanpa sengaja?	☐	☐
8.	Pernahkah anda mendapat suntikkan imunisasi atau sebarang bentuk suntikan untuk kecantikan (contoh:botox,kolagen) dalam tempoh 4 minggu yang lepas?	☐	☐
9.	Pernahkah anda mendapat rawatan pergigian dalam tempoh 24 jam yang lepas?	☐	☐
10.	Pernahkah anda bertindik di mana mana bahagian badan (body piercing) , bertato(tattoing) berbekam atau menjalani akupuntur dalam tempoh 6 bulan yang lepas?	☐	☐

Figure 4.12(iv) E-Blood Banking Information System "Soal Selidik" Form



PENGAKUAN DAN KEBENARAN PENDERMA

Untuk ditandatangani di hadapan doktor atau pegamai KKM yang menemuduga anda

Saya mengaku bahawa jawapan untuk SEMUA soalan di atas adalah benar

Sedar bahawa saya tidak boleh menderma darah jika saya tergolong didalam mana mana kumpulan individu yang berisiko untuk dijangkiti HIV/ Hepatitis/Sifilis (Rujuk perhatian di atas)

Dengan sukarela membenarkan pengambilan darah/ komponen darah saya dan penggunaannnya bagi ujian untuk HIV, Hepatitis B, Hepatitis C dan Sifilis dan untuk tujuan lain yang difikirkan perlu oleh pusat perkhidmatan darah, Hospital dan Kementerian Kesihatan Malaysia

SUBMIT

Figure 4.13 shows EBBIS Blood Request Form. The patient or individual who want to request a blood have to fill the form and send request to admin. This page

function is to help patient or individual who need blood for their operation or treatment. Later, admin will reply the request via email.

Figure 4.13 E-Blood Banking Information System Blood Request Form

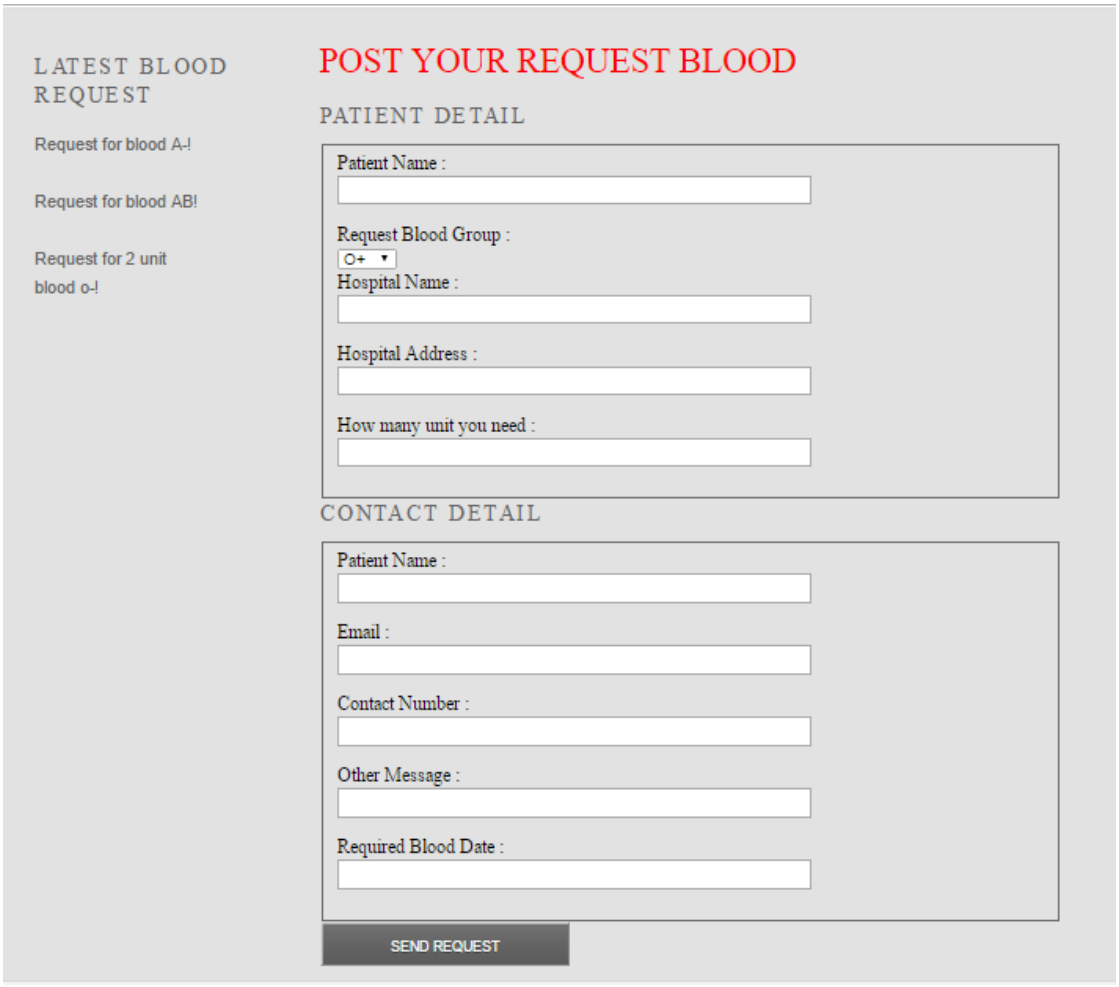


Figure 4.14 shows the EBBIS Inspiring Stories Page. Community who want to share their stories, experience and thank the volunteer blood donor can post their stories here and we will publish it at this home website.

Figure 4.14 E-Blood Banking Information System Inspiring Stories page.

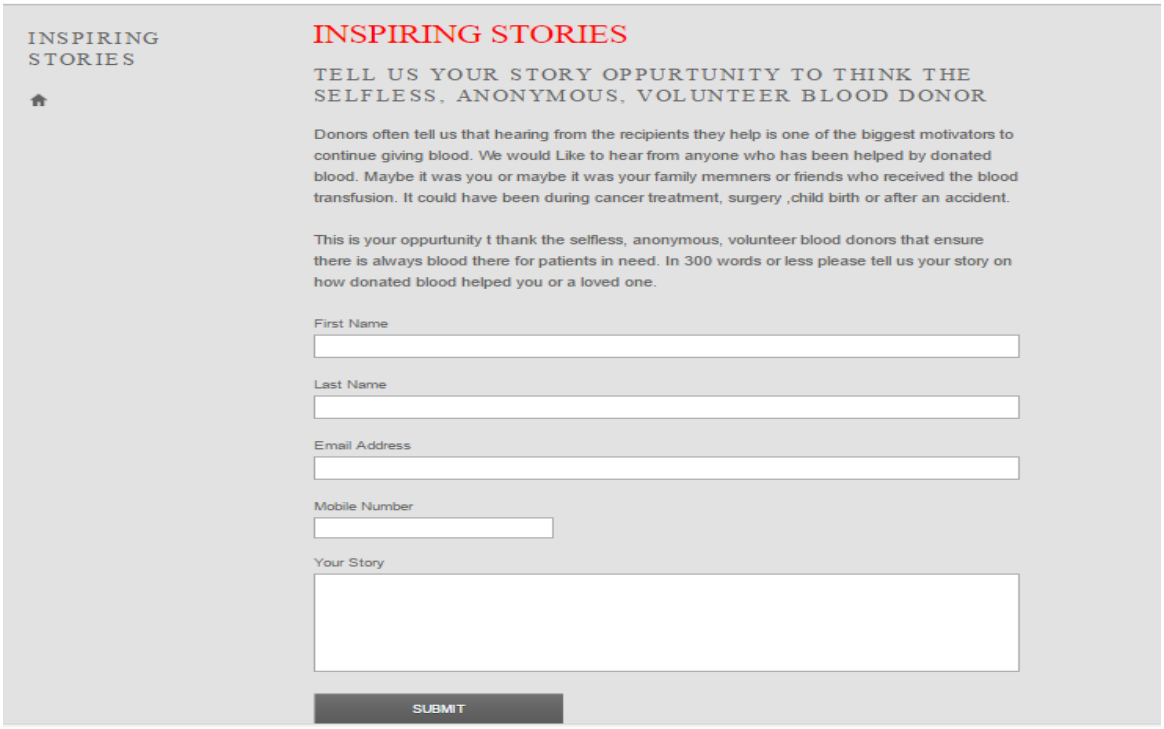


Figure 4.15 shows EBBIS Contact Form. For the visitor or donors who have question to ask, they have to send email or contact us directly.

Figure 4.15 E-Blood Banking Information System Contact Form

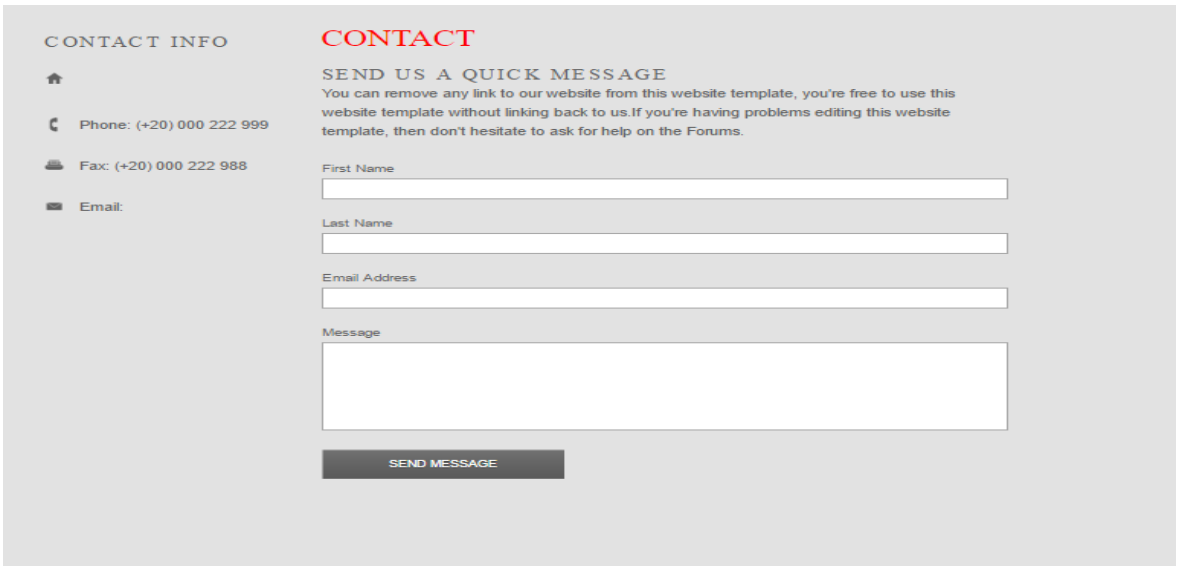


Figure 4.16(i) and figure 4.16(ii) shows the Blood Donation Rules that donor must follow. This page tell about who can/can't donate blood and the condition that do not allow them to become a blood donor.

Figure 4.16(i) E-Blood Banking Information System Blood Donation Rules

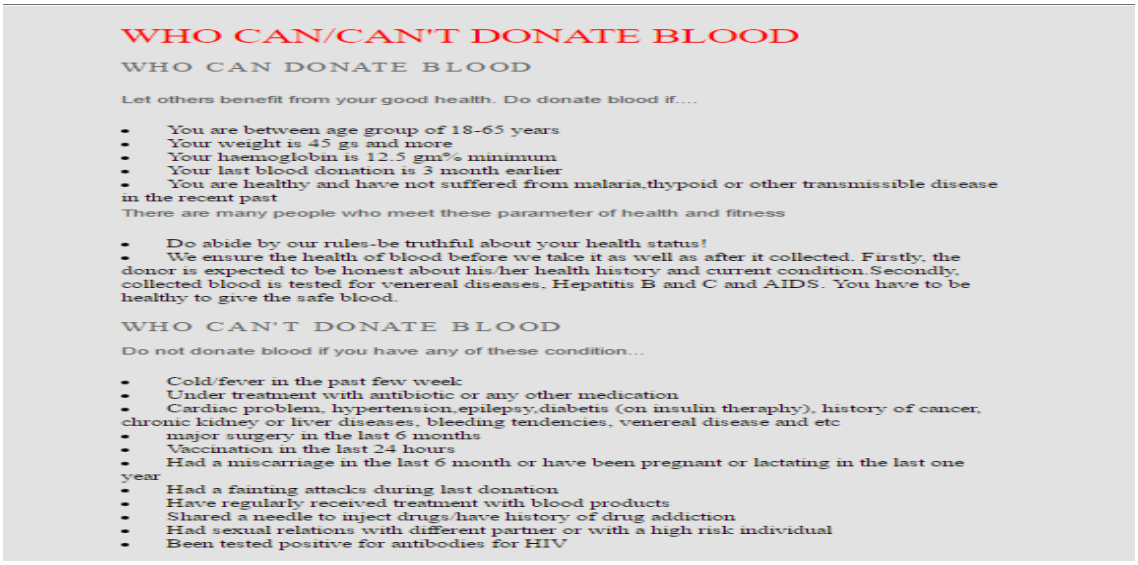


Figure 4.16(ii) E-Blood Banking Information System Blood Donation Rules

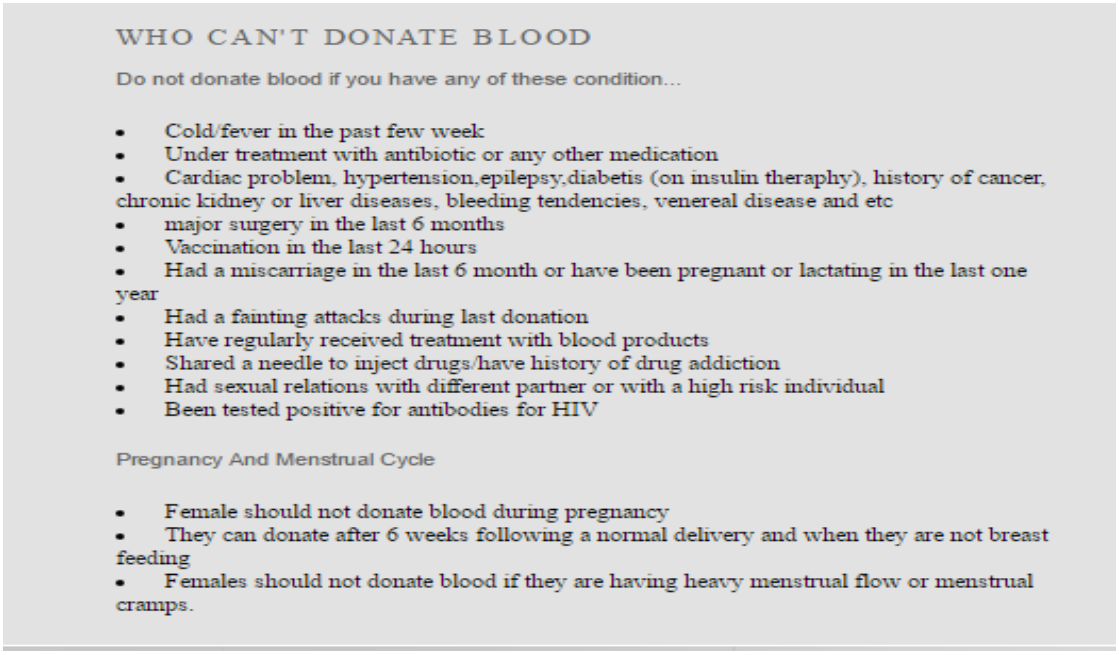


Figure 4.17 shows the home page of staff. Staff need to enter their username and password to access to the database .

Figure 4.17 Staff Login Home Page

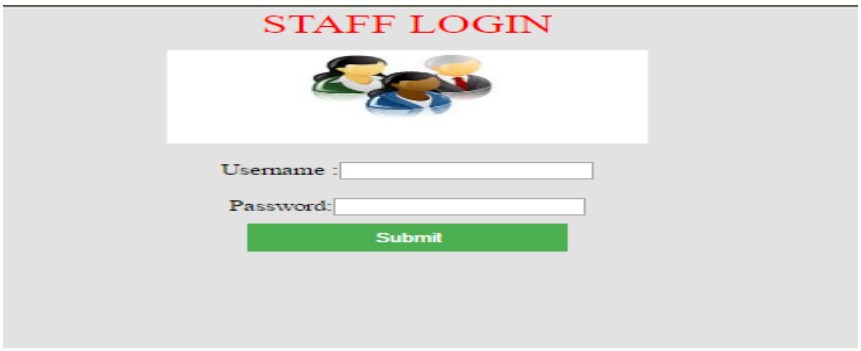


Figure 4.18 shows the staff menu that can be use by the staff to view, search or update the detail of donor and appointment that have been made.

Figure 4.18 Staff chosen management menu

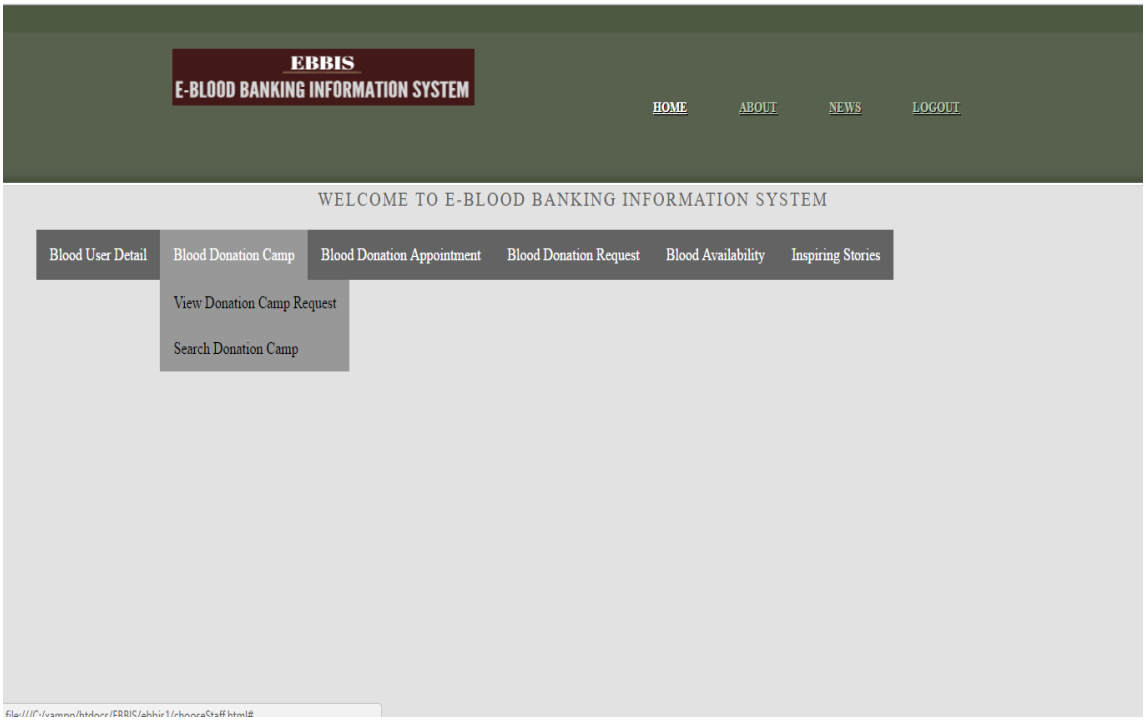
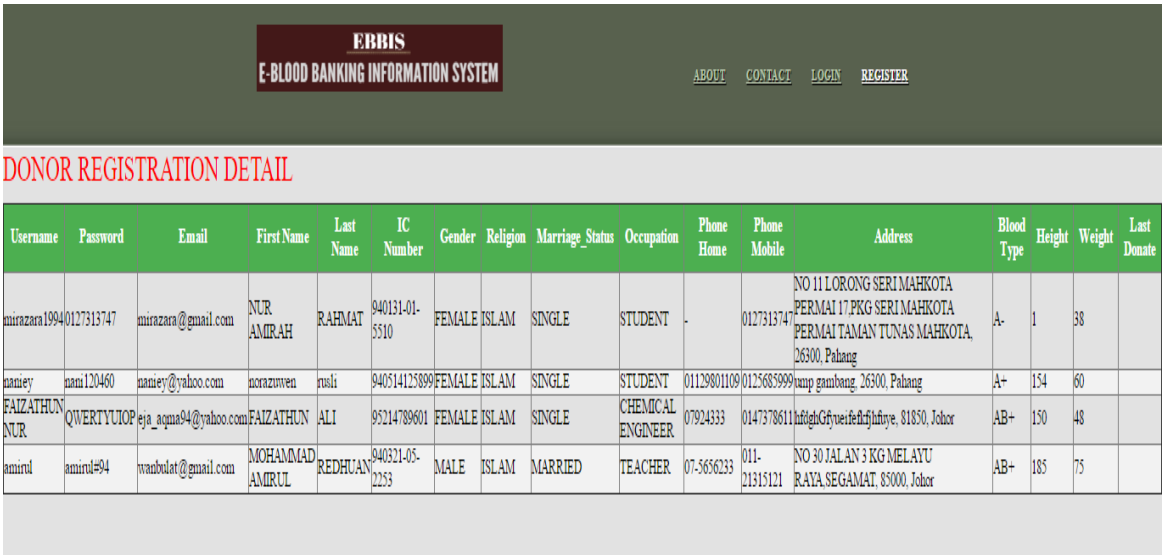


Figure 4.19 shows the database or donor that have successfully registered.

Figure 4.19 The database of donor registration detail



Username	Password	Email	First Name	Last Name	IC Number	Gender	Religion	Marriage_Status	Occupation	Phone Home	Phone Mobile	Address	Blood Type	Height	Weight	Last Donate
mirazara1994	0127313747	mirazara@gmail.com	NUR AMIRAH	RAHMAT	940131-01-5510	FEMALE	ISLAM	SINGLE	STUDENT	-	0127313747	NO 11 LORONG SERI MAHKOTA PERMAI 17,PKG SERI MAHKOTA PERMAI TAMAN TUNAS MAHKOTA, 26300, Pahang	A-	1	38	
naniey	nani120460	naniey@yahoo.com	norazuwen	rusli	940514125899	FEMALE	ISLAM	SINGLE	STUDENT	01129801109	0125685999	kmp gambang, 26300, Pahang	A+	154	60	
FAIZATHUN NUR	QWERTYUIOP	eja_aqma94@yahoo.com	FAIZATHUN	ALI	95214789601	FEMALE	ISLAM	SINGLE	CHEMICAL ENGINEER	07924333	0147378611	hfdghGfyueifefkfjhfiye, 81850, Johor	AB+	150	48	
amirul	amirul94	wanbulat@gmail.com	MOHAMMAD AMIRUL	REDHUAN	940321-05-2253	MALE	ISLAM	MARRIED	TEACHER	07-5656233	011-21315121	NO 30 JALAN 3 KG MELAYU RAYA,SEGAMAT, 85000, Johor	AB+	185	75	

4.2.3 Advantages and Disadvantages of E-Blood Banking Information System

Figure 4.2.3 explain about the advantages and disadvantages of E-Blood Banking Information System.

Table 4.1 Advantages and Disadvantages of EBBIS

Advantages	Disadvantages
Login-more secure to the system and prevent from unauthorized user from access the system and database.	Use in English language because it is requirement from client

Appointment online-User just need to fill in the form and set the donation date online.	Require internet to make the system run.
Blood Donation Camp online.	User who do not have computer cannot run this system. Cannot open by using mobile.

4.2.4 Problem faced during system development

In development of E-Blood Banking Information System, some problem occurs during the process. XAMPP platform and software cannot run in Windows 2010 which is the latest windows of Microsoft. There are some error happen when I run the coding. The error shows that " the database cannot find the root of the program" and " the database cannot connect with the localhost". I try to find the solution for this problem and at last I found that to make easier try not to use windows 10 as your platform. However, XAMPP still can be run in Windows 10 but it need different way of installation. The main problem when I develop my system is I have to deal with the database itself. Different software have different code for database. Since I need huge database, I have to make it more flexible and easy to manage. Because when something happened, I can find and fix the problem in a short time without need to find the cause of problem from the root.

4.3 TESTING AND RESULT DISCUSSION

E-Blood Banking System developed by using PHP, HTML, JavaScript and CSS language and interact with MySQL server. In this process, testing is one of the crucial part and it will keep running during development process. Testing will be done after implementation stage complete, depends on update or upgrade that have been made.

4.3.1 Functional Testing

The functional testing part of the testing methodology is typically broken down into four components that are Unit Testing, Integration Testing, System Testing and Acceptance Testing. Usually executed in this order. Each of them is described below:

I. Unit Testing

The Unit Testing part of a testing methodology is the testing of individual software modules or components that make up an application or system. In this testing, the developers of E-Blood Banking Information System will test each of the module available in this system, if any error occurred, the error is correct by the developers and run the test again.

II. Integration Testing

After the past of Unit Testing, the Integration Testing is run to the E-Blood Banking Information System to ensure there is no error between each of the module when this module integrated together. These test prove that all the module can communicate among other module.

III. System Testing

The whole E-Blood Banking Information System is tested for its functionality, interdependency and communication. System Testing verifies that functional and non-functional requirements in E-Blood Banking Information System has been made.

IV. User Acceptance Testing

The E-Blood Banking Information System is presented to the client which is Hospital Tunku Ampuan Afzan (HTAA) to make sure it operates as expected and meets all the defined requirement. UAT verifies that delivered system meets user's requirement and system is ready for use in real time.

CHAPTER 5

CONCLUSION AND FUTURE WORK

5.1 INTRODUCTION

The E-Blood Banking Information System (EBBIS) for Hospital Tunku Ampuan Afzan is developed to improve the hospital's manual donor management system by computerizing the manual form management. The system is developed to overcome the several critical issue in manual management system which one of the issue is less work efficiency and performance due to mass number of form and file to handle manually. Thus, with this system, it will ease the administrator to manage their work. The user of EBBIS are the public who can register as a member and administrator of blood department to handle all the user information. Function available in EBBIS generally are Donor Registration Management, Blood Donation Appointment, Blood Request Management, Blood Availability Management and Blood Donation Camp Management. By using this system, patient's record can be stored even up to 5 years.

5.2 RESEARCH CONSTRAINT

5.2.1 Development Constraint

Constraints that is faced along the system development are:

I. Time Constraint

More time is needed in order to build and make the system more complete and robust.

II. Internet Connection

The system must be running with internet connection, otherwise the system cannot be run without internet.

III. Platform

The system only run in browser in computer not in mobile application.

IV. Money Constraint

To build big and complex system, the budget also must be bigger.

V. Language

The system run in English language, other user who do not understand English need some help from others otherwise there will be problem to run this system.

5.3 FUTURE WORK

A future work for the system need to be done in order to make the system more complete since the system is not yet perfect. From the system constraint, to build the big and complex system, time have to be longer than before. . The system has to be improve to have send appointment reminder to the patients through SMS a day before appointment day. Besides, this system also have to make additional modules such as Blood Inventory Modules and make a graph for percentage of blood donation by month. For the future work the system can be run with the chosen language to make it easy to understand and a further study about how the mobile application works have to be conducted. So, as result E-Blood Banking Information System 2.0 will be develop in mobile application to make the use of the system faster and easier.

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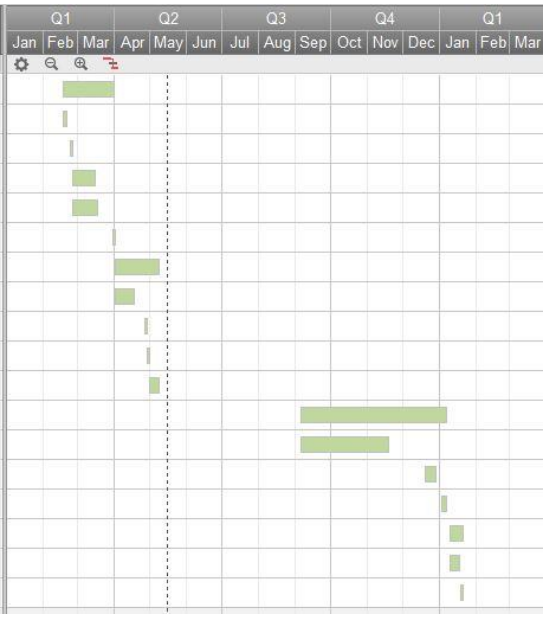
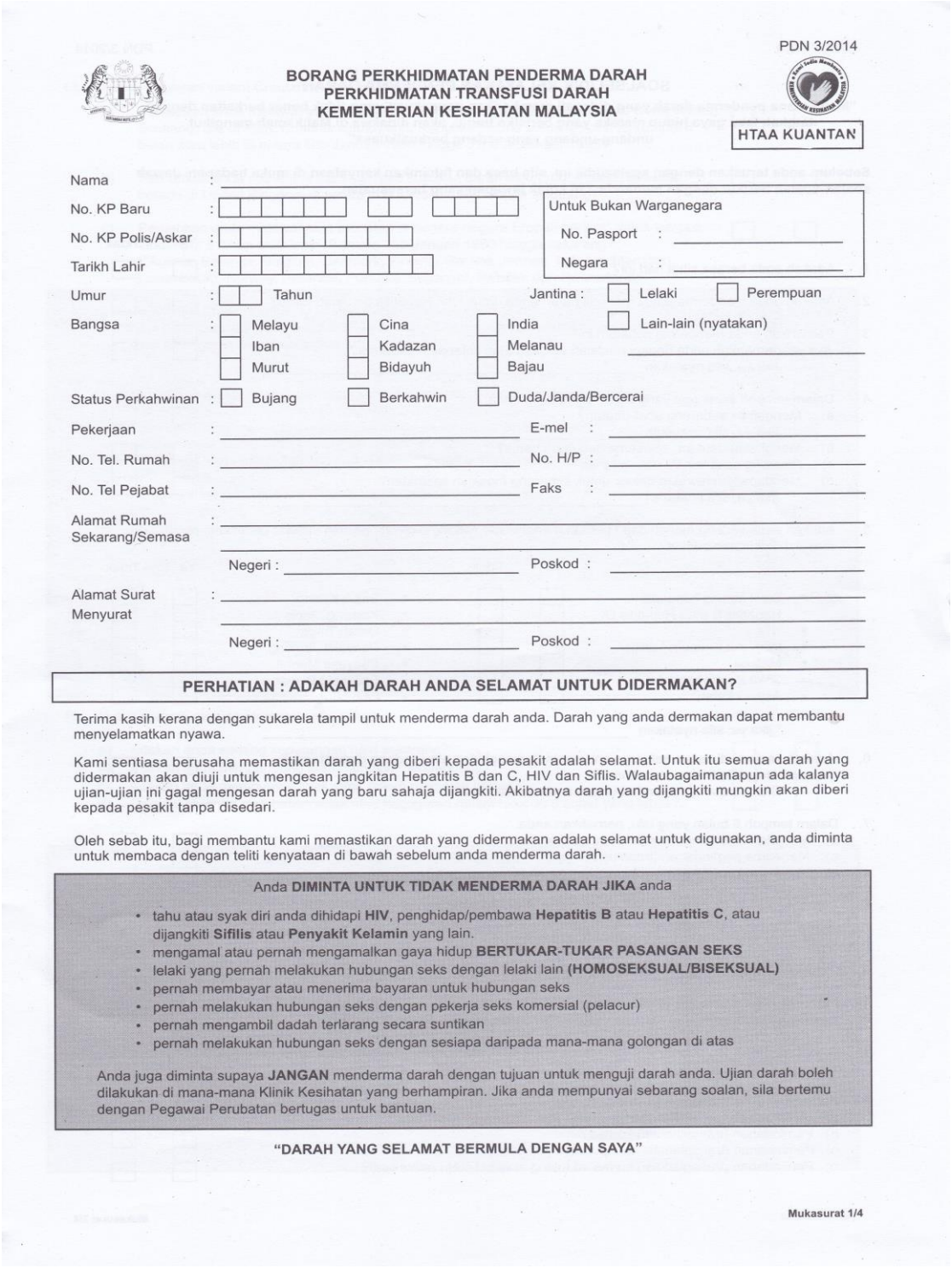
Appendix

Task Name	Duration	Start	Finish
Requirement Planning(Chapter1 & 2)	44d	02/17/16	03/31/16
Identify Problem	4d	02/17/16	02/20/16
Define Project Objective & Scope	2d	02/23/16	02/24/16
Identify & Define Requirement	20d	02/25/16	03/15/16
Gather Requirements	22d	02/25/16	03/17/16
Finalize Requirements	2d	03/30/16	03/31/16
Application Design(Chapter 3)	38d	04/01/16	05/08/16
Plan Design	17d	04/01/16	04/17/16
Redefine Requirements	2d	04/26/16	04/27/16
Review Requirements	2d	04/28/16	04/29/16
Design Session	9d	04/30/16	05/08/16
Construction (Chapter 4 & 5)	124d	09/05/16	01/06/17
Develop Prototype	75d	09/05/16	11/18/16
Test System	10d	12/19/16	12/28/16
Generate Test Data	5d	01/02/17	01/06/17
Cutover	12d	01/09/17	01/20/17
Final Testing	9d	01/09/17	01/17/17
Installation	3d	01/18/17	01/20/17



APPENDIX A: Overall Gant Chart for the project



PDN 3/2014

BORANG PERKHIDMATAN PENDERMA DARAH
PERKHIDMATAN TRANSFUSI DARAH
KEMENTERIAN KESIHATAN MALAYSIA

HTAA KUANTAN

Nama :

No. KP Baru :

No. KP Polis/Askar :

Tarikh Lahir :

Untuk Bukan Warganegara
No. Pasport :
Negara :

Umur : Tahun

Jantina : Lelaki Perempuan

Bangsa : Melayu Cina India Lain-lain (nyatakan)
Iban Kadazan Melanau
Murut Bidayuh Bajau

Status Perkahwinan : Bujang Berkahwin Duda/Janda/Bercerai

Pekerjaan : E-mel :

No. Tel. Rumah : No. H/P :

No. Tel Pejabat : Faks :

Alamat Rumah Sekarang/Semasa :

Negeri : Poskod :

Alamat Surat Menyurat :

Negeri : Poskod :

PERHATIAN : ADAKAH DARAH ANDA SELAMAT UNTUK DIDERMAKAN?

Terima kasih kerana dengan sukarela tampil untuk menderma darah anda. Darah yang anda dermakan dapat membantu menyelamatkan nyawa.

Kami sentiasa berusaha memastikan darah yang diberi kepada pesakit adalah selamat. Untuk itu semua darah yang didermakan akan diuji untuk mengesan jangkitan Hepatitis B dan C, HIV dan Sifilis. Walaubagaimanapun ada kalanya ujian-ujian ini gagal mengesan darah yang baru sahaja dijangkiti. Akibatnya darah yang dijangkiti mungkin akan diberi kepada pesakit tanpa disedari.

Oleh sebab itu, bagi membantu kami memastikan darah yang didermakan adalah selamat untuk digunakan, anda diminta untuk membaca dengan teliti kenyataan di bawah sebelum anda menderma darah.

Anda **DIMINTA UNTUK TIDAK MENDERMA DARAH JIKA** anda

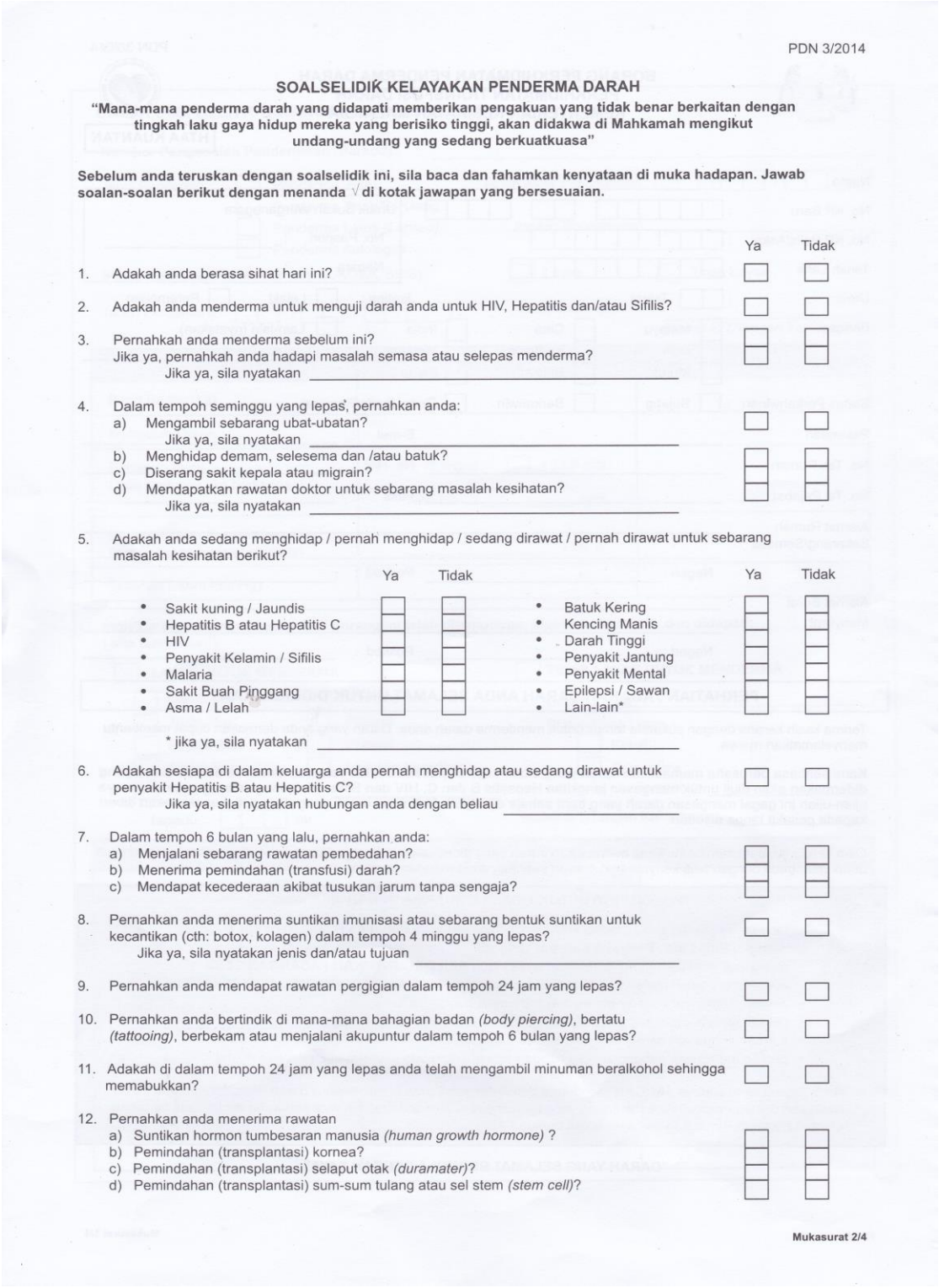
- tahu atau syak diri anda dihidapi **HIV**, penghidap/pembawa **Hepatitis B** atau **Hepatitis C**, atau dijangkiti **Sifilis** atau **Penyakit Kelamin** yang lain.
- mengamal atau pernah mengamalkan gaya hidup **BERTUKAR-TUKAR PASANGAN SEKS**
- lelaki yang pernah melakukan hubungan seks dengan lelaki lain **(HOMOSEKSUAL/BISEKSUAL)**
- pernah membayar atau menerima bayaran untuk hubungan seks
- pernah melakukan hubungan seks dengan pekerja seks komersial (pelacur)
- pernah mengambil dadah terlarang secara suntikan
- pernah melakukan hubungan seks dengan sesiapa daripada mana-mana golongan di atas

Anda juga diminta supaya **JANGAN** menderma darah dengan tujuan untuk menguji darah anda. Ujian darah boleh dilakukan di mana-mana Klinik Kesihatan yang berhampiran. Jika anda mempunyai sebarang soalan, sila bertemu dengan Pegawai Perubatan bertugas untuk bantuan.

"DARAH YANG SELAMAT BERMULA DENGAN SAYA"

Mukasurat 1/4

APPENDIX B 1.1 : First page of blood donation form.



PDN 3/2014

SOALSELIDIK KELAYAKAN PENDERMA DARAH

"Mana-mana penderma darah yang didapati memberikan pengakuan yang tidak benar berkaitan dengan tingkah laku gaya hidup mereka yang berisiko tinggi, akan didakwa di Mahkamah mengikut undang-undang yang sedang berkuatkuasa"

Sebelum anda teruskan dengan soalselidik ini, sila baca dan fahamkan kenyataan di muka hadapan. Jawab soalan-soalan berikut dengan menanda √ di kotak jawapan yang bersesuaian.

		Ya	Tidak
1.	Adakah anda berasa sihat hari ini?	☐	☐
2.	Adakah anda menderma untuk menguji darah anda untuk HIV, Hepatitis dan/atau Sifilis?	☐	☐
3.	Pernahkah anda menderma sebelum ini?	☐	☐
	Jika ya, pernahkah anda hadapi masalah semasa atau selepas menderma?	☐	☐
	Jika ya, sila nyatakan _____		
4.	Dalam tempoh seminggu yang lepas, pernahkan anda:		
	a) Mengambil sebarang ubat-ubatan?	☐	☐
	Jika ya, sila nyatakan _____		
	b) Menghidap demam, selesema dan /atau batuk?	☐	☐
	c) Diserang sakit kepala atau migrain?	☐	☐
	d) Mendapatkan rawatan doktor untuk sebarang masalah kesihatan?	☐	☐
	Jika ya, sila nyatakan _____		

5. Adakah anda sedang menghidap / pernah menghidap / sedang dirawat / pernah dirawat untuk sebarang masalah kesihatan berikut?

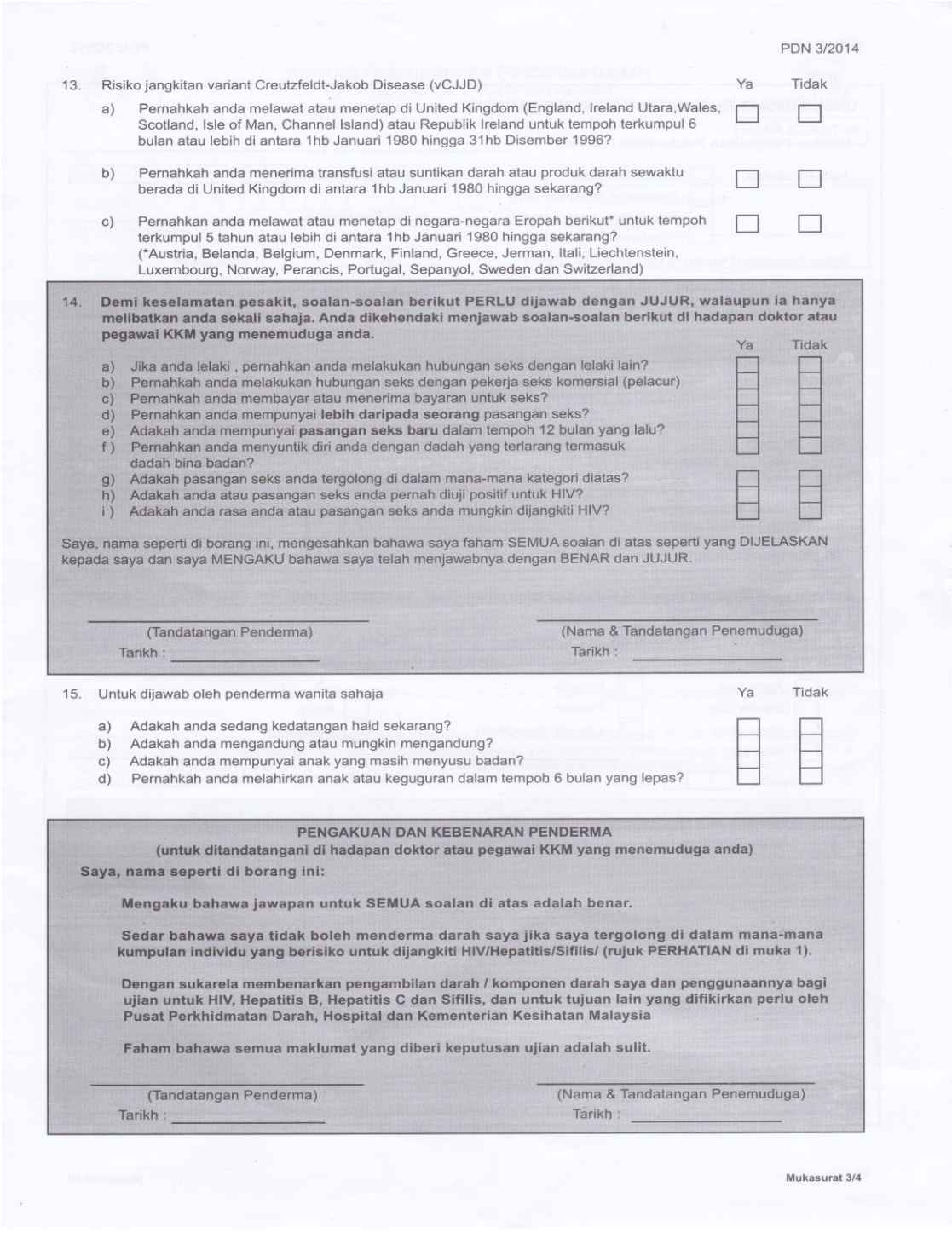
	Ya	Tidak		Ya	Tidak
• Sakit kuning / Jaundis	☐	☐	• Batuk Kering	☐	☐
• Hepatitis B atau Hepatitis C	☐	☐	• Kencing Manis	☐	☐
• HIV	☐	☐	• Darah Tinggi	☐	☐
• Penyakit Kelamin / Sifilis	☐	☐	• Penyakit Jantung	☐	☐
• Malaria	☐	☐	• Penyakit Mental	☐	☐
• Sakit Buah Pinggang	☐	☐	• Epilepsi / Sawan	☐	☐
• Asma / Lelah	☐	☐	• Lain-lain*	☐	☐

* jika ya, sila nyatakan _____

6.	Adakah sesiapa di dalam keluarga anda pernah menghidap atau sedang dirawat untuk penyakit Hepatitis B atau Hepatitis C?	☐	☐
	Jika ya, sila nyatakan hubungan anda dengan beliau _____		
7.	Dalam tempoh 6 bulan yang lalu, pernahkan anda:		
	a) Menjalani sebarang rawatan pembedahan?	☐	☐
	b) Menerima pemindahan (transfusi) darah?	☐	☐
	c) Mendapat kecederaan akibat tusukan jarum tanpa sengaja?	☐	☐
8.	Pernahkan anda menerima suntikan imunisasi atau sebarang bentuk suntikan untuk kecantikan (cth: botox, kolagen) dalam tempoh 4 minggu yang lepas?	☐	☐
	Jika ya, sila nyatakan jenis dan/atau tujuan _____		
9.	Pernahkan anda mendapat rawatan pergigian dalam tempoh 24 jam yang lepas?	☐	☐
10.	Pernahkan anda bertindik di mana-mana bahagian badan *(body piercing)*, bertatu *(tattooing)*, berbekam atau menjalani akupuntur dalam tempoh 6 bulan yang lepas?	☐	☐
11.	Adakah di dalam tempoh 24 jam yang lepas anda telah mengambil minuman beralkohol sehingga memabukkan?	☐	☐
12.	Pernahkan anda menerima rawatan		
	a) Suntikan hormon tumbesaran manusia *(human growth hormone)* ?	☐	☐
	b) Pemindahan (transplantasi) kornea?	☐	☐
	c) Pemindahan (transplantasi) selaput otak *(duramater)*?	☐	☐
	d) Pemindahan (transplantasi) sum-sum tulang atau sel stem *(stem cell)*?	☐	☐

Mukasurat 2/4

APPENDIX B 1.2 : Second page of blood donation form



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13. Risiko jangkitan variant Creutzfeldt-Jakob Disease (vCJJD) — Ya / Tidak

a) Pernahkah anda melawat atau menetap di United Kingdom (England, Ireland Utara,Wales, Scotland, Isle of Man, Channel Island) atau Republik Ireland untuk tempoh terkumpul 6 bulan atau lebih di antara 1hb Januari 1980 hingga 31hb Disember 1996?

b) Pernahkah anda menerima transfusi atau suntikan darah atau produk darah sewaktu berada di United Kingdom di antara 1hb Januari 1980 hingga sekarang?

c) Pernahkan anda melawat atau menetap di negara-negara Eropah berikut* untuk tempoh terkumpul 5 tahun atau lebih di antara 1hb Januari 1980 hingga sekarang?
(*Austria, Belanda, Belgium, Denmark, Finland, Greece, Jerman, Itali, Liechtenstein, Luxembourg, Norway, Perancis, Portugal, Sepanyol, Sweden dan Switzerland)

14. **Demi keselamatan pesakit, soalan-soalan berikut PERLU dijawab dengan JUJUR, walaupun ia hanya melibatkan anda sekali sahaja. Anda dikehendaki menjawab soalan-soalan berikut di hadapan doktor atau pegawai KKM yang menemuduga anda.**

Ya / Tidak

a) Jika anda lelaki , pernahkan anda melakukan hubungan seks dengan lelaki lain?
b) Pernahkah anda melakukan hubungan seks dengan pekerja seks komersial (pelacur)
c) Pernahkah anda membayar atau menerima bayaran untuk seks?
d) Pernahkan anda mempunyai **lebih daripada seorang** pasangan seks?
e) Adakah anda mempunyai **pasangan seks baru** dalam tempoh 12 bulan yang lalu?
f) Pernahkan anda menyuntik diri anda dengan dadah yang terlarang termasuk dadah bina badan?
g) Adakah pasangan seks anda tergolong di dalam mana-mana kategori diatas?
h) Adakah anda atau pasangan seks anda pernah diuji positif untuk HIV?
i) Adakah anda rasa anda atau pasangan seks anda mungkin dijangkiti HIV?

Saya, nama seperti di borang ini, mengesahkan bahawa saya faham SEMUA soalan di atas seperti yang DIJELASKAN kepada saya dan saya MENGAKU bahawa saya telah menjawabnya dengan BENAR dan JUJUR.

(Tandatangan Penderma) Tarikh : _____

(Nama & Tandatangan Penemuduga) Tarikh : _____

15. Untuk dijawab oleh penderma wanita sahaja — Ya / Tidak

a) Adakah anda sedang kedatangan haid sekarang?
b) Adakah anda mengandung atau mungkin mengandung?
c) Adakah anda mempunyai anak yang masih menyusu badan?
d) Pernahkah anda melahirkan anak atau keguguran dalam tempoh 6 bulan yang lepas?

PENGAKUAN DAN KEBENARAN PENDERMA
(untuk ditandatangani di hadapan doktor atau pegawai KKM yang menemuduga anda)

Saya, nama seperti di borang ini:

Mengaku bahawa jawapan untuk SEMUA soalan di atas adalah benar.

Sedar bahawa saya tidak boleh menderma darah saya jika saya tergolong di dalam mana-mana kumpulan individu yang berisiko untuk dijangkiti HIV/Hepatitis/Sifilis/ (rujuk PERHATIAN di muka 1).

Dengan sukarela membenarkan pengambilan darah / komponen darah saya dan penggunaannya bagi ujian untuk HIV, Hepatitis B, Hepatitis C dan Sifilis, dan untuk tujuan lain yang difikirkan perlu oleh Pusat Perkhidmatan Darah, Hospital dan Kementerian Kesihatan Malaysia

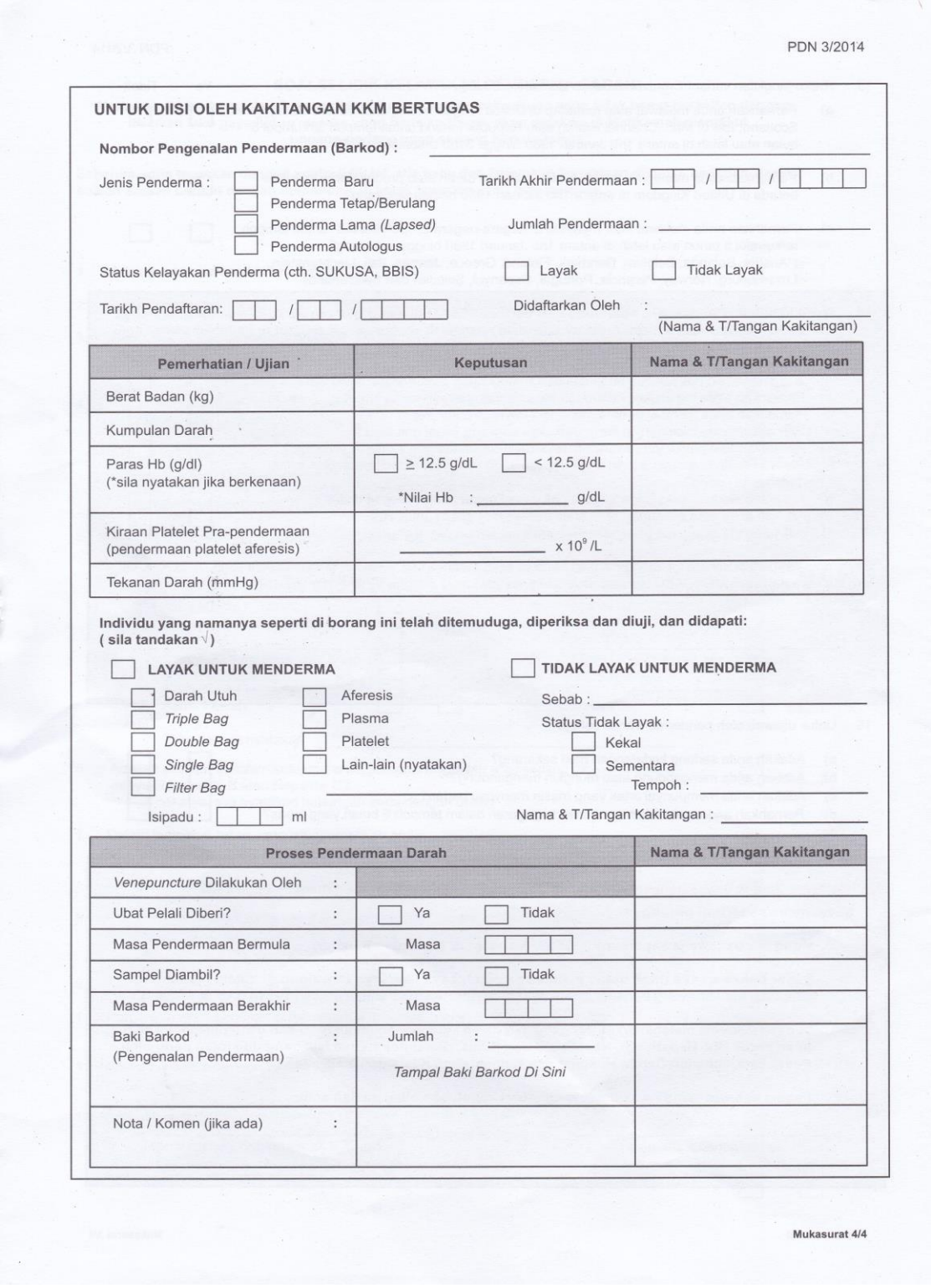
Faham bahawa semua maklumat yang diberi keputusan ujian adalah sulit.

(Tandatangan Penderma) Tarikh : _____

(Nama & Tandatangan Penemuduga) Tarikh : _____

Mukasurat 3/4

APPENDIX B 1.3: Third page of blood donation form.



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UNTUK DIISI OLEH KAKITANGAN KKM BERTUGAS

Nombor Pengenalan Pendermaan (Barkod) : _____

Jenis Penderma : ☐ Penderma Baru ☐ Penderma Tetap/Berulang ☐ Penderma Lama *(Lapsed)* ☐ Penderma Autologus

Tarikh Akhir Pendermaan : ☐☐ / ☐☐ / ☐☐☐☐

Jumlah Pendermaan : _____

Status Kelayakan Penderma (cth. SUKUSA, BBIS) ☐ Layak ☐ Tidak Layak

Tarikh Pendaftaran: ☐☐ / ☐☐ / ☐☐☐☐

Didaftarkan Oleh : _____ (Nama & T/Tangan Kakitangan)

Pemerhatian / Ujian	Keputusan	Nama & T/Tangan Kakitangan
Berat Badan (kg)		
Kumpulan Darah		
Paras Hb (g/dl) (*sila nyatakan jika berkenaan)	☐ ≥ 12.5 g/dL ☐ < 12.5 g/dL *Nilai Hb : _____ g/dL	
Kiraan Platelet Pra-pendermaan (pendermaan platelet aferesis)	_____ x 10^9 /L	
Tekanan Darah (mmHg)		

Individu yang namanya seperti di borang ini telah ditemuduga, diperiksa dan diuji, dan didapati:
(sila tandakan √)

☐ **LAYAK UNTUK MENDERMA**

☐ Darah Utuh ☐ *Triple Bag* ☐ *Double Bag* ☐ *Single Bag* ☐ *Filter Bag*

☐ Aferesis ☐ Plasma ☐ Platelet ☐ Lain-lain (nyatakan) _____

Isipadu : ☐☐☐ ml

☐ **TIDAK LAYAK UNTUK MENDERMA**

Sebab : _____

Status Tidak Layak : ☐ Kekal ☐ Sementara

Tempoh : _____

Nama & T/Tangan Kakitangan : _____

Proses Pendermaan Darah		Nama & T/Tangan Kakitangan
Venepuncture Dilakukan Oleh :		
Ubat Pelali Diberi? :	☐ Ya ☐ Tidak	
Masa Pendermaan Bermula :	Masa ☐☐☐☐	
Sampel Diambil? :	☐ Ya ☐ Tidak	
Masa Pendermaan Berakhir :	Masa ☐☐☐☐	
Baki Barkod (Pengenalan Pendermaan) :	Jumlah : _____ *Tampal Baki Barkod Di Sini*	
Nota / Komen (jika ada) :		

Mukasurat 4/4

APPENDIX B 1.4: Last page of blood donation form.