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TITLE:

PREGNANCY RECORD & GUIDELINES SYSTEM

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Name   : WONG ZHIE PIENG

Matric No.   : B031410022

Course   : 3 BITS

PREPARED FOR: PROF. MADYA. DR. AZAH KAMILAH BINTI MUDA

DECLARATION

I hereby declare that this project report entitled

PREGNANCY RECORD & GUIDELINES SYSTEM

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT: _____ Date: _____

(WONG ZHIE PIENG)

I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of Computer Science (Software Development) with Honours.
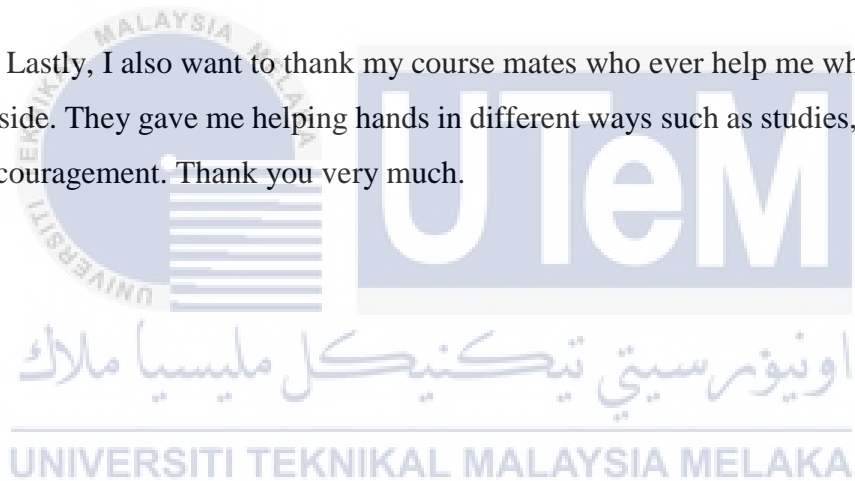
SUPERVISOR: _____ Date: _____

DEDICATION

I would like to dedicate this report to my family who always fully support me either through mentally or financially. Whenever I faced difficult situation, I will think that they are having high hopes on me. My family is the source of energy to help me get over all the obstacles.

Lastly, I also want to thank my course mates who ever help me when I need them by my side. They gave me helping hands in different ways such as studies, transportation, and encouragement. Thank you very much.

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First of all, I would like to say thank you to my supervisor of this project, Dr. Azah Kamilah Binti Muda who guide me all along on the development of this project. She let me know the weakness of the project and provide suggestions on how to improve the system so I can build it successfully.

Besides, I would also like to say thank you to all my friends and family who gave me mental support whenever I feeling stress and want to give up. Finally I have overcome all the problems and come to the end of project. Thank you for being by my side.
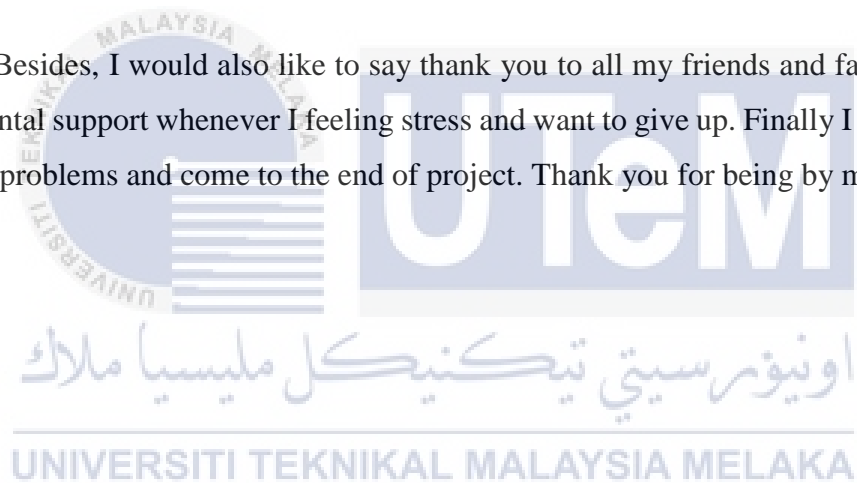
ABSTRACT

Pregnancy Record & Guidelines System is a web-based system that designed to manage the pregnancy records and provides pregnancy knowledge. Nowadays, pregnant mother have to bring the pink book everywhere they are going at any time. The record can be lost or read by others if the book is missing accidentally. In order to protect the record, it is good to digitalize the book into system. Furthermore, it is much more convenience. Others than that, mostly people lack of pregnancy knowledge especially teenager. It is good to be prepared before we need it. Waterfall model is the suitable methodology that will be used to build PRG System due to this system has the clear and fixed requirements. A phase is starting only when the previous phase is end. Thus, there is no overlapping among all the phases. This model is easy to manage because each phase has specific deliverables. This project will develop a system which manage the records of pregnant women. The doctors and nurses are the main users for this part of system. No more paper work is needed as everything can be done by using this system. Nurses can make an appointment with the pregnant women and noted down in the system. Other than that, for those who has no experience about pregnancy especially pregnant women, they can surf through the other website which provided pregnancy guides. The pregnancy guides included healthy food guide, exercise guide and etc. All those information about pregnancy which hope to improve the knowledge of the mothers. Of course, gentlemen and non-pregnant women are encouraged to study these useful life knowledge through this website. Lastly, pregnant women are able to log into the system to view their information, health records and coming appointment.

ABSTRAK

Sistem Rekod & Garis Panduan Kehamilan adalah sistem web yang direka untuk menguruskan rekod kehamilan dan membekalkan pengetahuan kehamilan. Kini, ibu hamil perlu membawa buku merah jambu ke mana mereka pergi pada bila-bila masa. Rekod itu boleh hilang atau dibaca oleh orang lain jika buku itu hilang secara tidak sengaja. Sistem adalah lebih baik bagi melindungi rekod tersebut. Selain daripada itu, kebanyakannya orang kurang pengetahuan kehamilan terutamanya remaja. Waterfall model adalah metodologi yang sesuai yang akan digunakan untuk membina Sistem PRG kerana sistem ini mempunyai keperluan yang jelas dan tetap. Fasa bermula hanya apabila fasa sebelumnya berakhir. Oleh itu, tidak ada pertindihan di antara semua fasa. Model ini mudah dikendalikan kerana setiap fasa mempunyai hasil yang spesifik. Projek ini akan memhasilkan sistem yang menguruskan rekod wanita hamil. Doktor dan jururawat adalah pengguna utama untuk bahagian sistem ini. Tiada kerja kertas lagi diperlukan kerana segala-galanya boleh dilakukan dengan menggunakan sistem ini. Jururawat boleh membuat temu janji dengan wanita hamil dan diperhatikan dalam sistem. Selain itu, bagi mereka yang tidak mempunyai pengalaman mengenai kehamilan terutamanya wanita hamil, mereka boleh melayari laman web lain yang menyediakan panduan kehamilan. Panduan kehamilan termasuk panduan makanan yang sihat, panduan latihan dan lain-lain. Semua maklumat tentang kehamilan yang diharapkan dapat meningkatkan pengetahuan ibu. Sudah tentu, lelaki dan wanita yang tidak hamil digalakkan untuk mempelajari pengetahuan hayat berguna ini melalui laman web ini. Akhir sekali, wanita hamil dapat log masuk ke sistem untuk melihat maklumat, rekod kesihatan dan temu janji yang akan datang.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This project proposes a web-based system named Pregnancy Record & Guidelines (PRG) System focusing in pregnant women and medical staff. Nowadays, pregnancy record for every single pregnant woman will be written in a pink book which is medical health record of pregnancy mother book. Pregnant mother have to bring the pink book to everywhere and every time and the record can be lost and read by everyone if the pink book is missing accidentally. In order to protect the data from lost and improve the confidential and security, it is good to digitalize the pink book into a system.

With this system, there have an authentication module to ensure the confidential and a database that contain all the records. Sometimes, pregnant women might forgot their coming appointment, they will be a SMS reminder in this system. Besides that, pregnant women can also get some guidelines about pregnancy knowledge and how to taking good care on herself through the websites. To fulfill the requirement of this system, research about pregnancy is needed. Other than that, an interview with pregnant women to obtain more information about the inconvenience part of this pink book.

After gather all the information, system planning and design will conduct. The system will implements and testing afterward. This system is built for trying to help both pregnant woman and hospital to make the flow of medical check-up run smoothly. PRG system will separated in three parts, one part will be used by medical staff who are doctors and registrar nurses. The others part is built for public and last part is for pregnant women.

Registrar nurses can register pregnant woman, arrange their appointment with doctors and send reminder to pregnant women. The doctors can insert the health information of mother and baby through PRG after the medical check-up. For pregnant woman, they can log into the system to view their information, health records and appointment. Some guidelines can be study through the website to improve their knowledge on how to take care of themselves. This project consists of eight modules which includes authentication module, registration module, mother personal details module, appointment module, mother health records module, baby health records module, SMS reminder module and health care module.

1.2 Problem Statement

i. Pregnant mother have to bring the pink book everywhere and anytime

- The pink book is like a note book for a pregnant woman. It recorded the health status of a pregnant women and it is so important for them to bring them everywhere. But, it can be inconvenience to carry a big book into the hand beg, because they have to bring many things in their hand bag such the card, their purse, their make ups, their smartphones or even car and home keys. Somehow, they might also forget to bring the book out

ii. The record can be lost and read by everyone.

- This problem happen when the book is lost, the pink book does not have a lock on it, and any person can read through if someone found the book. The personal detail of the pregnant woman such as handphone number and address can be know which is not secure.

iii. Mother might forgot their appointment.

- They do not have any reminder to remind them about their appointment and they have to remember it themselves. The appointment is important for them to get the health status about their babies.

iv. Users lack of knowledges on healthcare for the first time

- For those who do not have experiences about pregnancy especially pregnant women, they may go through this website and learn some knowledge on how to take care of herself.

1.3 Objective

1. To digitalize the existed pink book into a system.
2. To improve the confidentiality and security of pregnant mother record.
3. To remind mother to attend the appointment.
4. To provide some pregnancy knowledge for public.

1.4 Scope

This project consists of eight modules which included

i. **Authentication module**

Users: Doctor, Nurse, Mother

Function: To differentiate the identity of user to get the right for different modules.

ii. **Registration module**

Users: Nurse

Function: To register new medical staff and new pregnant woman.

iii. **Mother personal details module**

Users: Nurse, Mother

Function: To view the personal details of each pregnant woman. Mother can only view the personal detail without modify.

iv. **Appointment module**

Users: Doctor, Nurse, Mother

Function: To make new appointment and view the coming appointment date and time. Mother can only view the appointment without modify.

v.   Mother health records module

Users: Nurse, Mother

Function: To record the mother health information by nurse after the medical checkup. Mother can only view the health record without modify.

vi.   Baby health records module

Users: Doctor, Mother

Function: To record the baby health information by doctor after the medical checkup. Mother can only view the health record without modify.

vii.   SMS reminder module

Users: Nurse

Function: To send a SMS reminder to pregnant woman.

viii.   Health care module

Users: Public

Function: To study some knowledge about pregnancy and learn how to take care of baby.

1.5 Project Significance

This project will develop a system which manage the records of pregnant women. The doctors and nurses are the main users for this part of system. No more paper work is needed as everything can be done by using this system. Nurses can make an appointment with the pregnant women and noted down in the system. Doctors can view the coming appointment without asking

the nurse. Nurses are able to send a SMS reminder to pregnant women to remind them the coming appointment. Nurses can record the medical check-up report of the pregnant women via the system, no hand-write recording is necessary.

Other than that, for those who has no experience about pregnancy especially pregnant women, they can surf through the other website which provided pregnancy guides. The pregnancy guides included "How Your Baby Develop", "Your Health In Pregnancy", "Antenatal Care", "Feeding Your Baby", "What You Need For Your Baby" and "The Early Week". All those information about pregnancy which hope to improve the knowledge of the mothers. Of course, gentlemen and non-pregnant women are encouraged to study these useful life knowledge through this website. Lastly, pregnant women are able to log into the system to view their information, health records and coming appointment.

1.6 Expected Output

Every medical staffs must log into the system to verify their identity for ensure the security of records. For nurses, they are able to register for new medical staff and a new pregnant mother. They also make appointment with pregnant mother and send SMS reminder to mother for medical check-up by using the system. Besides, they are able to record the mothers and babies health information into the system. For doctors, they can view the health record of the mother and baby and the coming appointment.

There is also a website design for public especially for the pregnant women. Pregnancy guides can be found to improve their knowledge about pregnancy. They can learn about how to take care of herself and baby. Lastly, pregnant women are able to log into the system to view their information, health records and coming appointment.

This project is designed to digitalize the existing pink book to save paper used and also provide a website for mother to learn more about pregnancy knowledge.

1.7 Conclusion

In conclusion, the PRG can provide an effective way to record the healthy status of mother and baby compared to record on the pink book in term of security, confidentiality, accessibility and functionality. Besides, the environment of learning the pregnancy guide should be easy to understand and interesting which can lead them to keep on surfing the website to know more about pregnancy.

CHAPTER 2

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

In the previous chapter, an overall explanation on the problem statements and objectives of the project has been given. This project will develop a system that is able to register new pregnant woman, making new appointment, store health record of mother and baby, SMS reminder and some simple pregnancy guide.

In this chapter, some research is went through literature review is done. Other than that, the analysis on existing system from the aspect of strength and weakness will be done in this chapter. Finally methodology will be stated.

2.2 Facts and Findings

For this project, some researches are ongoing to study more about pregnancy. In additional, this sections will divided into 3 parts which is the definition and evolution of website, html as shown in section 2.2.1, section 2.2.2 is about the existing websites and 2.2.3 is study on pregnancy.

2.2.1   HTML and SGML

HTML stands for Hyper-Text Markup Language which is one type of coding language. HTML uses markups method to create hyper-text. HTML is also a subset of the more general simplified markup language called SGML (Standard Generalized

Markup Language). There is some evolution of HTML, these changes have their reasons.

Figure 2.2.1.1 Tim Berner-Lee, the Director of World Wide Web

Time Berner-Lee worked in CERN (Centre European pore la Recherche Nucleaire) in 1989. He recommended a system that allow scientists to share their work with each other's by using electronic networking methods (World Wide Web). Here are a few quotes that Berners-Lee wrote:
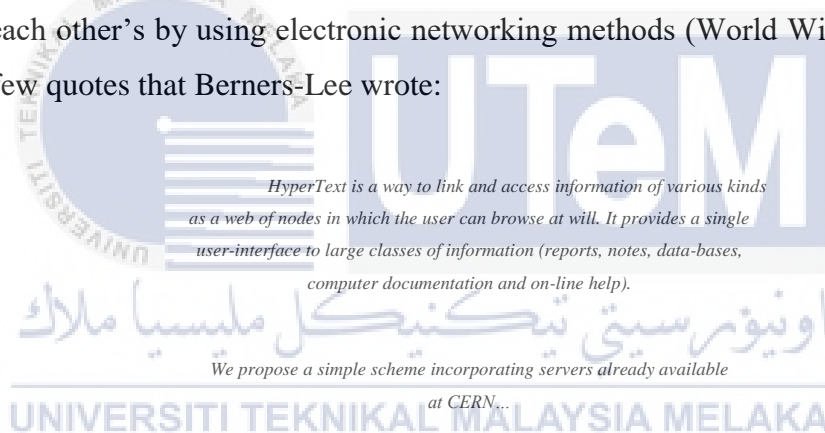
HyperText is a way to link and access information of various kinds as a web of nodes in which the user can browse at will. It provides a single user-interface to large classes of information (reports, notes, data-bases, computer documentation and on-line help).

We propose a simple scheme incorporating servers already available at CERN…

A program which provides access to the hypertext world we call a browser…

It would be inappropriate for us (rather than those responsible) to suggest specific areas, but experiment online help, accelerator online help, assistance for computer center operators, and the dissemination of information by central services such as the user office and CN [Computing & Networks] and ECP [Electronics & Computing for Physics] divisions are obvious candidates.

WorldWideWeb (or W3) intends to cater for these services across the HEP [High Energy Physics] community.

2.2.2 Existing Record System

Figure 2.2.2.1 Pregnancy Record Book

The current pink book is in the book form that the mother needs to carry with. The pink book is like a note book for a pregnant woman. It recorded the health status of a pregnant women and it is so important for them to bring them everywhere. But, it can be inconvenience to carry a big book into the hand beg, because they have to bring many things in their hand bag such the card, their purse, their make ups, their smartphones or even car and home keys. Somehow, they might also forget to bring the book out.

The pink book does not have a lock on it, and any person can read through if someone found the book. The personal detail of the pregnant woman such as handphone number and address can be know which is not secure.

They do not have any reminder to remind them about their appointment and they have to remember it themselves. The appointment is important for them to get the health status about their babies.

2.2.3 Existing Website

The websites www.mypregnancyguide.com and www.thebump.com is a website that contains pregnancy guide. There have a lot of information can be found in both website.

Figure 2.2.3.1 The homepage of www.mypregnancyguide.com

Figure 2.2.3.2 The homepage of www.thebump.com

2.2.3.1 The Modules in Existing Website

There have 7 modules in MyPregnancyGuide which are My Preconception, My Pregnancy, My Baby Names, My MotherHood, Tool & Stuff, Shopping and Other Resources. Inside these modules contained several sub modules as shown in the figures 2.2.3.1.1 until 2.2.32.1.7.
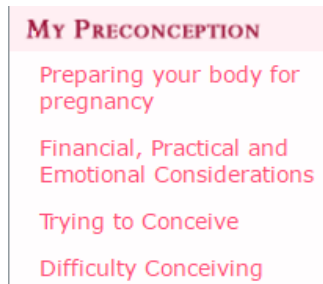
Figure 2.2.3.1.1 My Preconception Module
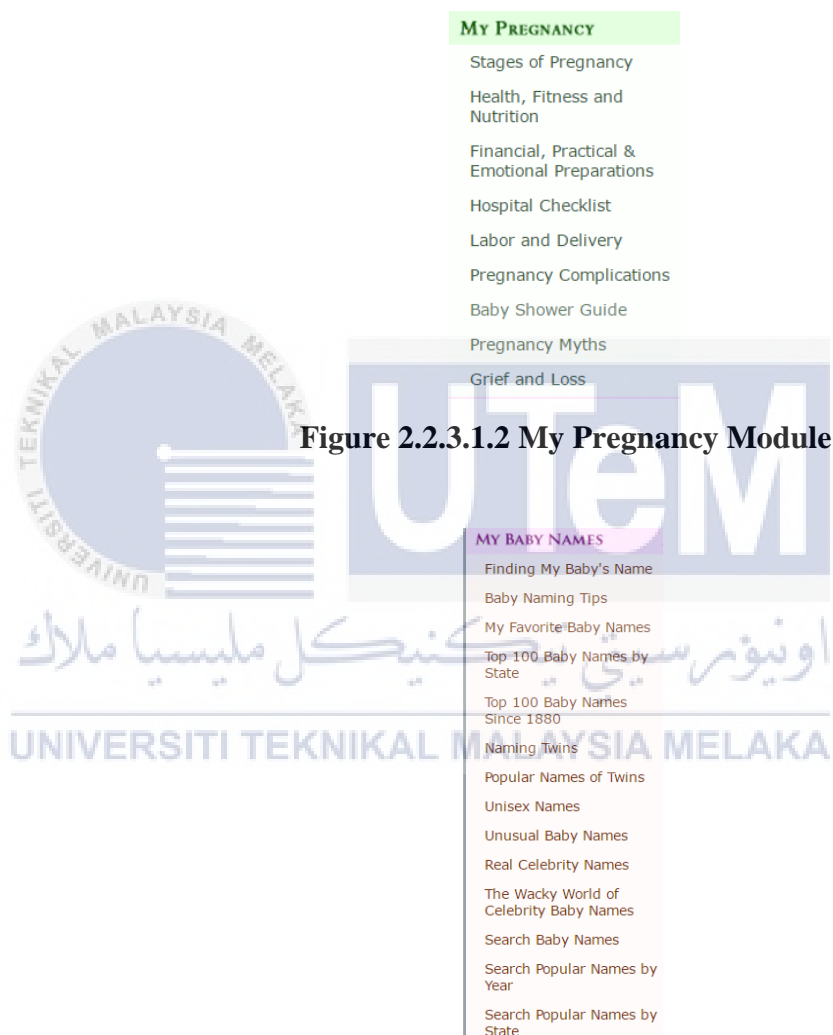
Figure 2.2.3.1.2 My Pregnancy Module

Figure 2.2.3.1.3 My Baby Names Module
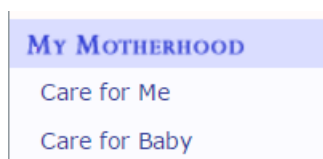
Figure 2.2.3.1.4 My Motherhood Module

Figure 2.2.3.1.5 Tools & Stuff Module

Figure 2.2.3.1.6 Shopping Module

Figure 2.2.3.1.7 Other Resources Module

For TheBump, there have 3 modules which are Getting Pregnant, Pregnancy and Newborn & Baby. The sub-modules of these 3 modules is as in the figure 2.2.3.1.8 until 2.2.3.1.10.
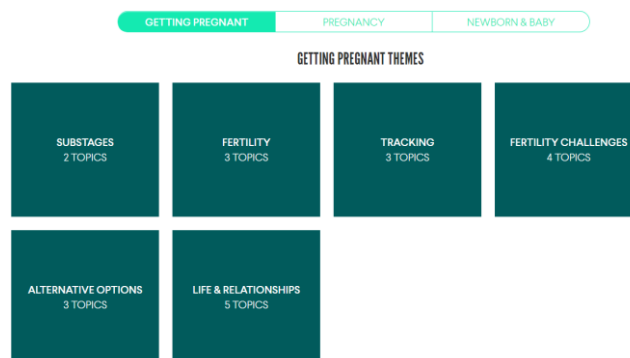
Figure 2.2.3.1.8 Getting Pregnant Module
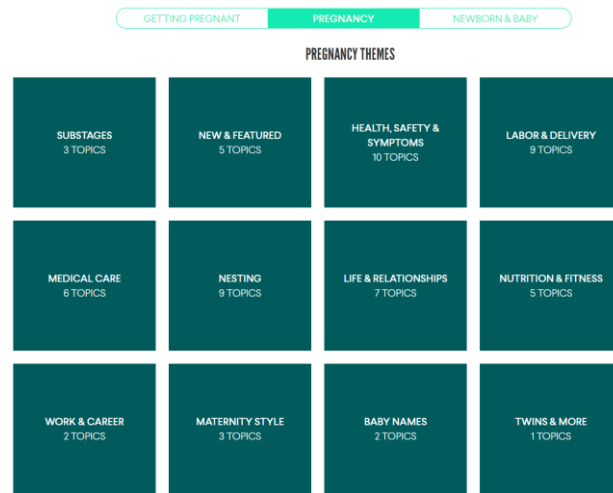
Figure 2.2.3.1.9 Pregnancy Module
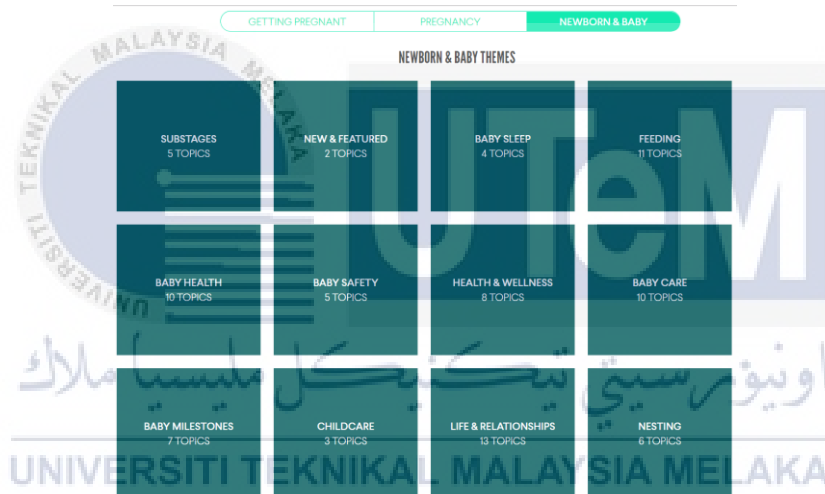
Figure 2.2.3.1.10 Newborn & Baby Module

2.2.3.2 Comparison of Existing Websites

	MyPregnancyGuide.com	TheBump.com
Main Modules	7	3
Sub-Modules	40	30
Sub-Topics	-	166
Easy to surf	Yes	Moderate
Information Gain	Many	Much More
Interesting	Too many words to read	Too many words to read

Attractive	No	No
Image	Less	Less

Table 2.2.3.2.1 Comparison between Two Existing Websites

The table 2.2.3.2.1 shows a few points of compared between these two websites. As we can see, TheBump.com provided much more information than MyPrenancyGuide.com. But there is also some disadvantages which is the level of attractive of both websites is low. There are too many words to read through in paragraph and less image to explain.

For the PRG System, it will simplify the guidelines and only the important modules is provided. Other than that, the paragraph will be replaced in point form and image is inserted so that the reader can easy to understand and will not get bored easily while surfing the website.

2.2.4   Study on Pregnancy

"The Pregnancy Book" is produced by COI for the Department of Health in 2009. There have many pregnancy guides inside this book.

2.2.4.1 How Your Baby Develops

Weeks	Descriptions
0 – 8	- Take pregnancy test when you started miss your period. - Some pregnant women will start feeling unwell for few weeks.
8 – 12	- Doctor will offered various tests on you, one of the test is an ultrasound scan to check for abnormalities of your baby. - The baby is fully formed after 12 weeks. Baby has all organs, muscles, limbs and bones, and sex organs are well developed.

	• The baby is already moving but you cannot feel the movements yet.
12 – 16	• Make sure you are wearing a supportive bra. Your breasts might increase in size during pregnancy. • If you have been feeling unwell, you might start to feel better around this time. • Your baby's heartbeat is strong and can be heard using an ultrasound detector at week 14.
16 – 20	• You may started to feel your baby movement. • Your tummy will begin to get bigger and you need looser clothes. • Do your pregnancy exercises regularly. • Your baby is now growing quickly and their face becomes much more defined. Their hair are beginning to grow. • You may ask your doctor to let you hear your baby's heartbeat.
20 – 25	• Your uterus will begin become bigger more quickly. • You may feel hungrier than before. • You will begin to feel the baby moving.
25	• Your baby is now moving around energetic and responds to touch and sound.
28	• Your baby will be perfectly formed but still small. • You might getting more tired. • It's good to talk to your kids about the new baby. • Make sure your shoes are comfortable.
34	• Make arrangements for the birth. • Always get your bag ready. • Your uterus tightening from time to time. These are mild contractions called Braxton Hicks contractions. • You may feel quite tired and ensure you get plenty of rest.

36	• You might starting insomnia.
38	• Call your doctor at any time if you worries about your baby and birth.
40	• Get information from doctor about what happens if your pregnancy over 41 weeks.
41	• If your pregnancy lasts longer than 41 weeks, you may be induced. Your doctor will explain what this means and what the risks are. • Call your doctor at any time if you worries about your baby and birth.

2.3 Project Methodology

Waterfall model is the suitable methodology that will be used to build PRG System due to this system has the clear and fixed requirements. A phase is starting only when the previous phase is end. Thus, there is no overlapping among all the phases. This model is easy to manage because each phase has specific deliverables.
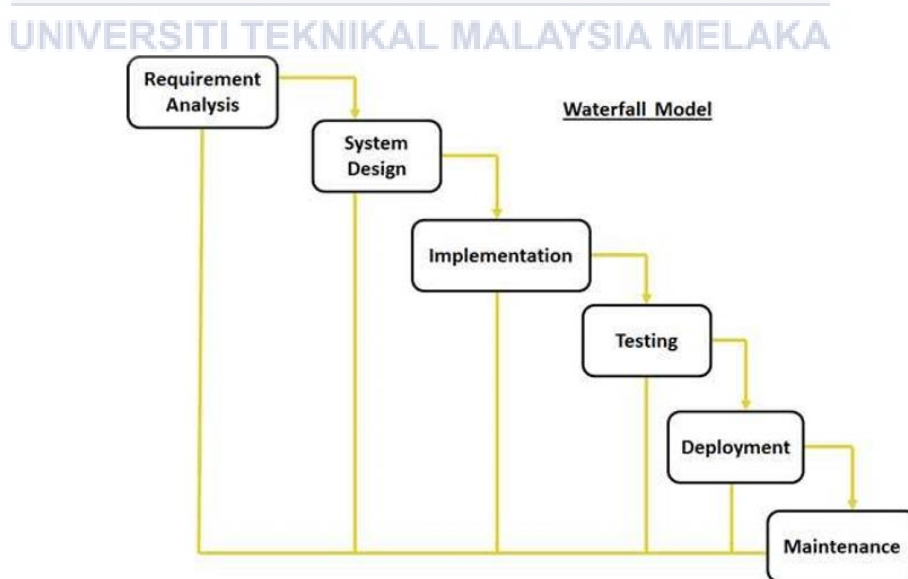
Figure 2.3.1 Waterfall Model Methodology

With waterfall model, PRG System will undergo 6 phases, which are requirement analysis, system design, implementation, testing, deployment and maintenance. All the phases have the different tasks, but the outcome of one phase is the input for the next phase sequentially. The next phase could not begin if the previous phase do not process or complete.

2.3.1 Requirement Analysis

Analysis is the first phase of waterfall model. In this phase, all the requirements and specifications activities are included. The title is defined as well as the objectives and problem statements in Chapter 1. The existing systems which has the similar functionality with the proposed system is analysed. The list of software and hardware requirements need to be identified. Besides, the project schedule and milestone which explain the action plan from the beginning to the end of the project is needed. This is to make sure the activities of the project are keeping on track and thus bring the project to the success point. The analysis of all the requirements which including data requirements, functional requirements, and non-functional requirements are done.

2.3.2 System Design

The design phase is initiated after the deliverables of analysis phase are reviewed and accepted. The deliverables of this phase include high level design and detailed design. System architecture, user interface, database design, software design, and physical database design will be presented in Chapter 4.

2.3.3 Implementation

After the design phase is completed, activities of the implementation phase is begin. All the high level design will be transformed into an executable code during the implementation phase. The source code is develop for every module. Besides, the implementation of the database design will be integrated with the developed code. The details of the activities of implementation will be stated in Chapter 5.

2.3.4 Testing

Testing phase is started once the implementation phase is finished. The test cases is develop in this phase. All the test cases must be develop according to the requirements that define in the earlier stages. After test cases is designed, the developed system which is PRG System will be tested according it. The test plan, test strategy, test design, test results and analysis of the system will be explained and described in Chapter 6.

2.3.5 Deployment

The fifth phase of developing this system is deployment phase. The PRG System is ready to go live after it successfully passes all the test cases in previous phase.

2.3.6 Maintenance

The final phase of waterfall model is maintenance. If there is any problems found in the system, it has to be fixed it as soon as possible. This system are able to improve from time to time according to the requirement needed.

2.4 Project Requirements

In order to begin the development of the project, some preparation has to be done to fulfil the requirements of the project in both hardware and software.

2.4.1 Software Requirement

Software	Description
Atom 1.16.0	A text editor for the 21st Century. Used for every coding implementation.
MySQL	An open source relational database management system.
Microsoft Word 2013	A word-processing program designed to create professional quality documents. Used for report documentation.
Microsoft Visio 2013	To create custom diagrams that simplify complex information. Used to draw analysis diagrams (Flow Chart, ERD).
WampServer64	A windows web development environment to create web application.

Table 2.4.1.1 Software Requirement

2.4.2 Hardware Requirement

Hardware	Specification
Processor	Intel® Core ™ i5-7200U CPU @ 3.1GHz
RAM	8GB
Hard Disk	1TB
Windows	Windows 10
Others	Stable internet connection

* Server's Specifications can be upgraded from time to time according to needs.

Table 2.4.2.1 Hardware Requirement

2.5 Project Schedule & Milestones

Activity/Date	Duration (days)	Start Date	End Date
i. List Requirement	7	13-2-2017	20-2-2017
-Authentication	1	13-2-2017	14-2-2017
-Registration	1	14-2-2017	15-2-2017
-Appointment	1	15-2-2017	16-2-2017
-Mother Info	1	16-2-2017	17-2-2017
-Health Record	1	17-2-2017	18-2-2017
-SMS reminder	1	18-2-2017	19-2-2017
-Others	1	19-2-2017	20-2-2017
ii. Research and information	14	20-2-2017	6-3-2017
-Checkup Process investigation	2	20-2-2017	22-2-2017
-Interview with mothers	3	22-2-2017	25-2-2017
-Data arrange	2	25-2-2017	27-2-2017
-Questionaire with medical	1	27-2-2017	28-2-2017
-Data arrange	2	28-2-2017	2-3-2017
-Internet Research	1	2-3-2017	3-3-2017
-Coding Language Learning	3	3-3-2017	6-3-2017
iii. System Planning and design	7	6-3-2017	13-3-2017
-System interface	7	6-3-2017	13-3-2017
iv. Implementation	56	13-3-2017	8-5-2017
-Authentication	4	13-3-2017	17-3-2017
-Registration	4	17-3-2017	21-3-2017
-Appointment	21	21-3-2017	11-4-2017
-Mother Info	4	11-4-2017	15-4-2017
-Health Record	10	15-4-2017	25-4-2017
-SMS reminder	7	25-4-2017	2-5-2017
-Others	6	2-5-2017	8-5-2017

v. System testing and maintainance	14	8-5-2017	22-5-2017
-Authentication	2	8-5-2017	8-5-2017
-Registration	2	10-5-2017	12-5-2017
-Appointment	2	12-5-2017	14-5-2017
-Mother Info	2	14-5-2017	16-5-2017
-Health Record	2	16-5-2017	18-5-2017
-SMS reminder	2	18-5-2017	20-5-2017
-Others	2	20-5-2017	22-5-2017
vi. Presentation	1	22-5-2017	23-5-2017

2.6 Conclusion

This chapter discuss about the literature review on HTML and pregnancy guide. It also compared two existing system to differentiate the strength and weakness. At the end also discuss on the software and hardware used in the development process.

The next chapter will analyse the problems to investigate the functional and non-functional requirements of this project. Each of these requirements will be explained in details.

CHAPTER III

ANALYSIS

3.1. Introduction

In the previous chapter describe about literature review for this system, the comparison of the existing system and the project methodology used to develop the system. It also briefly describe the hardware and software requirements that will be used in this system.

In this chapter will describe on the analysis of the project and the requirement analysis in term of data requirement, functional requirement and non-functional requirement.

3.2. Problem Analysis

In order to provide a better record system for pregnancy, there have several problems. First, pregnant women have to bring the pink book along with them every day and every time, it cannot ensure that the book is protected very well. The record can be lost if the pink book is lost.

Secondly, certain pregnant women might forgot their coming appointment and they will missed out the medical check-up. As result, the medical staff have to visit the pregnant woman's house to proceed the medical checking which is burden the medical staff. A reminder can help on this problem.

Lastly, the pregnancy knowledge of public is limited. They do not learn these knowledge until one day they really need it, it is good to provide the pregnancy guidelines for them.

3.3. Requirement analysis

This requirements of this system is listed in the previous chapter. This section is write about how to implement those requirements. This section will separated into three parts which is date requirement (3.3.1), functional requirement (3.3.2) and non-functional requirement (3.3.3).

3.3.1. Data Requirement

There have a total of 7 tables implemented in the database which included staff, doctor, nurse, personaldetail, appointment, motherrecord and babyrecord. The below tables is the data dictionary of these database's tables.

3.3.1.1 Staff

Table Name: staff

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
StaffNo	Staff personal number	varchar (10)	Primary Key
Password	Password to log in system	varchar (8)	
Level	Staff position	char (2)	

Table 3.3.1.1.1 Data Dictionary of Staff

3.3.1.2 Doctor

Table Name: doctor

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
Doctor_ID	Doctor personal ID	varchar (8)	Primary Key

Name	Full name of doctor	varchar (30)	
NName	Short name of doctor	varchar (20)	
StaffNo	Staff personal number	varchar (8)	Foreign Key (staff)

Table 3.3.1.2.1 Data Dictionary of Doctor

3.3.1.3 Nurse

Table Name: nurse

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
Nurse_ID	Nurse personal ID	varchar (8)	Primary Key
Name	Full name of nurse	varchar (30)	
StaffNo	Staff personal number	varchar (10)	Foreign Key (staff)

Table 3.3.1.3.1 Data Dictionary of Nurse

3.3.1.4 Personal Detail

Table Name: personaldetail

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
Mother_IC	Pregnant woman IC number	varchar (20)	Primary Key
Name	Full Name	varchar (50)	
Race	Race	varchar (10)	
Address	Address	varchar (100)	
DOB	Date of birth	date	
HP	Phone number	text	
LMP	Last menstrual period date	date	
EDD	Estimate date delivery	date	
Password	Password to log in system	varchar (20)	

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
Doctor_ID	Doctor personal ID	varchar (8)	Foreign Key (doctor)

Table 3.3.1.4.1 Data Dictionary of Personal Detail

3.3.1.5 Appointment

Table Name: appointment

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
AppointID	Unique number for appointment	varchar (10)	Primary Key
AppointDate	Appointment Date	Date	
AppointTime	Appointment Time	time	
Mother_IC	Pregnant woman IC no	varchar (20)	Foreign Key (personaldetail)
Doctor_ID	Doctor personal ID	varchar (8)	Foreign Key(doctor)
Nurse_ID	Nurse personal ID	varchar (8)	Foreign Key (Nurse)

Table 3.3.1.5.1 Data Dictionary of Appointment

3.3.1.6 Mother Record

Table Name: motherrecord

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
MR_ID	Unique number of mother record	varchar (10)	Primary Key
weight	Pregnant woman weight	double (6,2)	
sBloodPressure	Systolic blood pressure	int (3)	
dBloodPressure	Diastolic blood pressure	int (3)	
fundalHeight	The height of fundal	int (3)	
albumin	Presence of albumin in urine	char (3)	
sugar	Presence of sugar in urine	char (3)	
HB	Haemoglobin level	double (6,2)	

date	Record Date	date	
Nurse_ID	Nurse personal ID	varchar (8)	Foreign Key (nurse)
Mother_IC	Pregnant woman IC number	varchar (20)	Foreign Key (personaldetail)

Table 3.3.1.6.1 Data Dictionary of Mother Record

3.3.1.7 Baby Record

Table Name: babyrecord

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
BR_ID	Unique number for baby record	varchar (10)	Primary Key
uterusHeight	The height of uterus	int (3)	
fetalPosition	The position of fetal	varchar (30)	
fetalHeartRate	The heart rate of fetal	int (3)	
MR_ID	Unique number for mother record	varchar (10)	Foreign Key (motherrecord)

Table 3.3.1.7.1 Data Dictionary of Baby Record

3.3.2. Functional Requirement

This section will defines the functionality of PRG and its subsystem. The user(s) involved in each functions will be clearly stated. The methods that used to describe the functional requirements are Use Case diagram (3.3.2.1) and Data Flow Diagram (3.3.2.2).

3.3.2.1 Use Case Diagram

In PRG system, there have total of 4 actors who are nurse, doctor, mother (pregnant woman) and public. Nurse' responsibilities are help to register medical staff, register new pregnant woman, manage appointment with pregnant woman and manage the health records. Besides, they also have to confirm the coming appointment and send a SMS to pregnant woman. Doctor and mother can view the appointment and health record. Mother can also view their own personal details. All these functions is require authentication from nurse, doctor and mother. Lastly, everyone can study the pregnancy guidelines that provided.
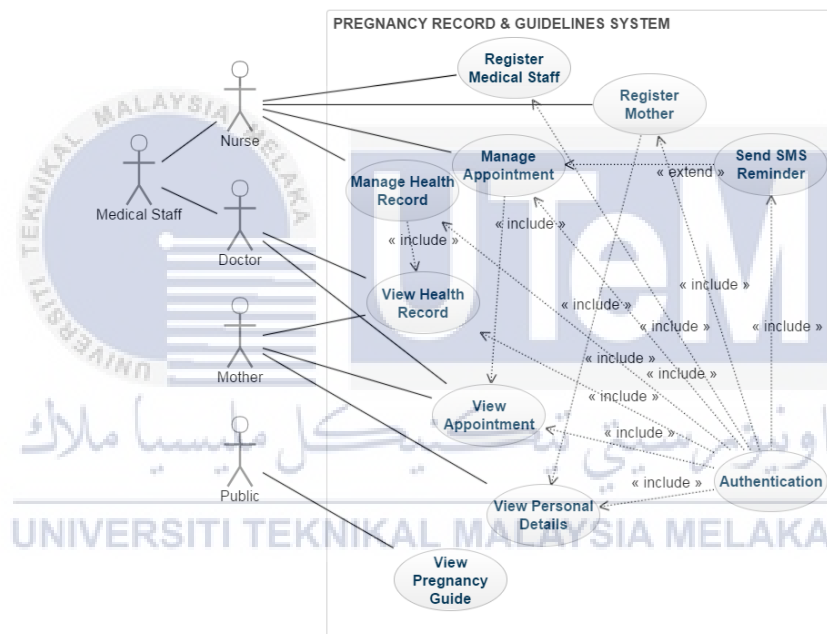
Figure 3.3.2.1.1 Use Case Diagram of PRG system

3.3.2.2 Data Flow Diagram

Data Flow Diagram (DFD) is designed to provide a visual representation of the flow of data of PRG system.

3.3.2.2.1 Overall Data Flow Diagram

The figure 3.3.2.2.1.1 below shows the Data Flow Diagram of PRG system. The processes included are staff information, mother personal details, appointment, mother health record and baby health record.
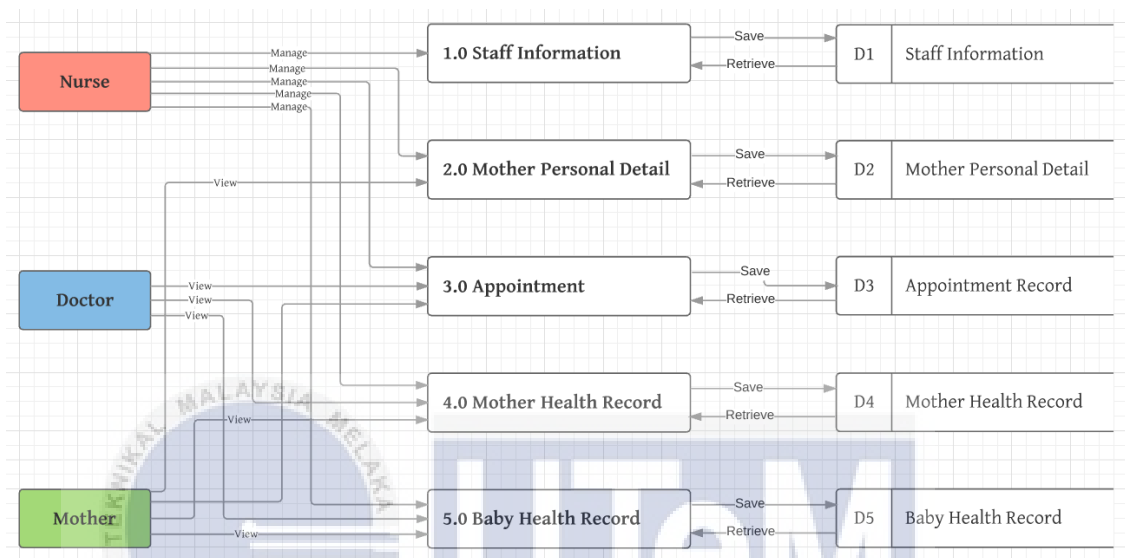
Figure 3.3.2.2.1.1 Data Flow Diagram (Level 0) of PRG

3.3.2.2.2 Staff Information

The figure 3.3.2.2.2 below shows the Data Flow Diagram of Staff Information. Nurse can insert new medical staff into staff table.

Figure 3.3.2.2.2.1 Data Flow Diagram (Level 1) of Staff Information

3.3.2.2.3 Mother Personal Detail

The figure 3.3.2.2.3.1 below shows the Data Flow Diagram of Mother Personal Detail. Nurse can register a new pregnant woman by insert her personal details into

personaldetail table. Nurse are able to update the mother personal detail. Lastly, the mother can view their own personal detail.
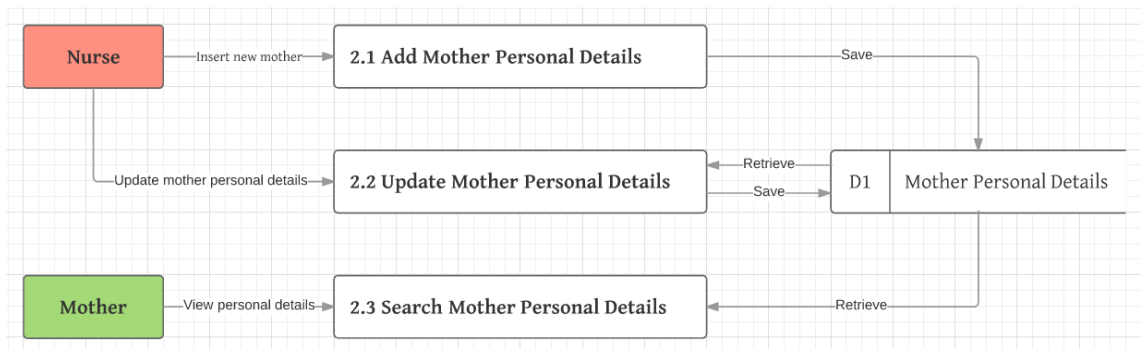
Figure 3.3.2.2.3.1 Data Flow Diagram (Level 1) of Mother Personal Details

3.3.2.2.4 Appointment

Figure 3.3.2.2.4.1 is the Data Flow Diagram of Appointment. Nurse will make an appointment with mother after the registration. The appointment will save into appointment record table. Nurse, doctor and mother can retrieve the appointment record from database if they want to view the appointment detail.
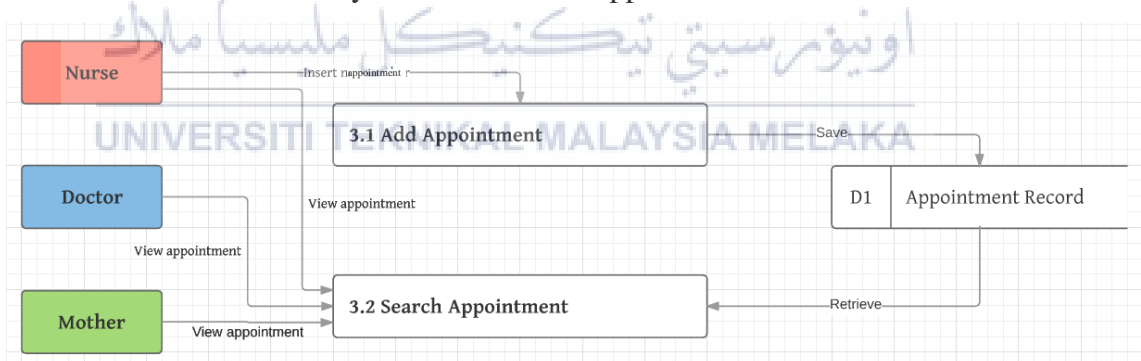
Figure 3.3.2.2.4.1 Data Flow Diagram (Level 1) of Appointment

3.3.2.2.5 Mother Health Record

Figure 3.3.2.2.5.1 is the Data Flow Diagram of Mother Health Record. Nurse will insert the mother health record into database after mother medical check-

up. Nurse, doctor and mother can retrieve the health record from database if they want to view the record.
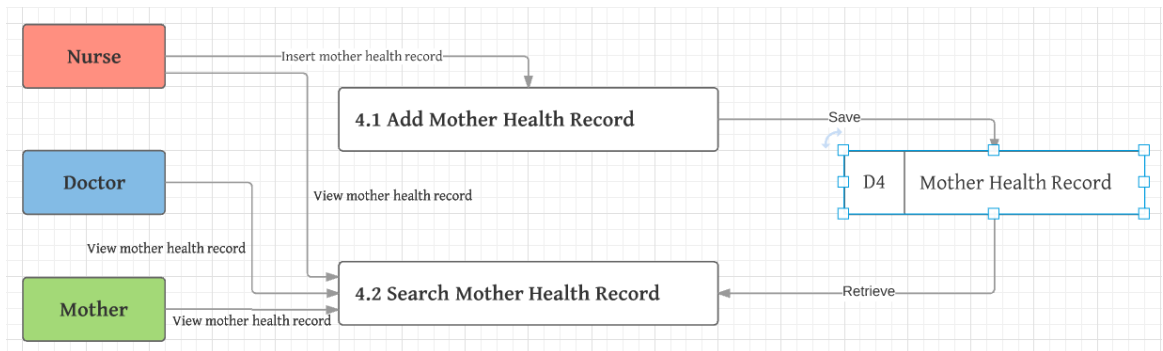
Figure 3.3.2.2.5.1 Data Flow Diagram (Level 1) of Mother Health Record

3.3.2.2.4 Baby Health Record

Figure 3.3.2.2.6.1 is the Data Flow Diagram of Baby Health Record. Nurse will insert the baby health record into database after mother medical check-up. Nurse, doctor and mother can retrieve the health record from database if they want to view the record.

Figure 3.3.2.2.6.1 Data Flow Diagram (Level 1) of Baby Health Record

3.3.3. Non-functional Requirement

This section will defines the non-functionality of PRG system. Non-functionality of system is describe how the system work. The term that used to describe the non-functional requirements are security (3.3.3.1), response time (3.3.3.2) and reliability (3.3.3.3).

3.3.3.1 Security

The pregnancy record system requires users to log in by using staff no and password. The mother module requires users to log in by IC and password.

3.3.3.2 Response Time

All data can be saved in or retrieve from database within one second.

3.3.3.3 Reliability

There have a SMS appointment reminder implemented in PRG which can remind mother to attend the coming appointment.

3.3.4. Others Requirement

There have two others requirement which are software requirement and hardware requirement. The details of each requirement is describe in the table below.

3.3.4.1 Software Requirement

Software	Description
Atom 1.16.0	A text editor for the 21st Century. Used for every coding implementation.
MySQL	An open source relational database management system.
Microsoft Word 2013	A word-processing program designed to create professional quality documents. Used for report documentation.
Microsoft Visio 2013	To create custom diagrams that simplify complex information. Used to draw analysis diagrams (Flow Chart, ERD).
WampServer64	A windows web development environment to create web application.

Table 3.3.4.1.1 Software Requirement

3.3.4.2 Hardware Requirement

Hardware	Specification
Hardware	Specification
Processor	Intel® Core ™ i5-7200U CPU @ 3.1GHz
RAM	8GB
Hard Disk	1TB
Windows	Windows 10
Others	Stable internet connection

* Server's Specifications can be upgraded from time to time according to needs.

Table 3.3.4.2.1 Hardware Requirement

3.4. Conclusion

This analysis chapter analysed the problems and requirements in details. These requirements are important to help in develop the system. The developer now clearly know what they need to do. The design of PRG will describe in the next chapter which included high-level design and detailed design.

CHAPTER IV

DESIGN

4.1. Introduction

After the analysis chapter, the following chapter is design of the system. This chapter defines the results of the high-level design and the result of the detailed design. The subchapters have system architecture, user interface design, database design and software design following by physical database design.

4.2. High-Level Design

High-Level Design (HLD) describe the overall system design which covering the system architecture and database design. It shows the relation between modules and functions of the PRG system.

4.2.1. System Architecture

A system architecture is a conceptual model that describe the structure, behavior, and the views of PRG system.

4.2.1.1 Overall Structure of PRG System
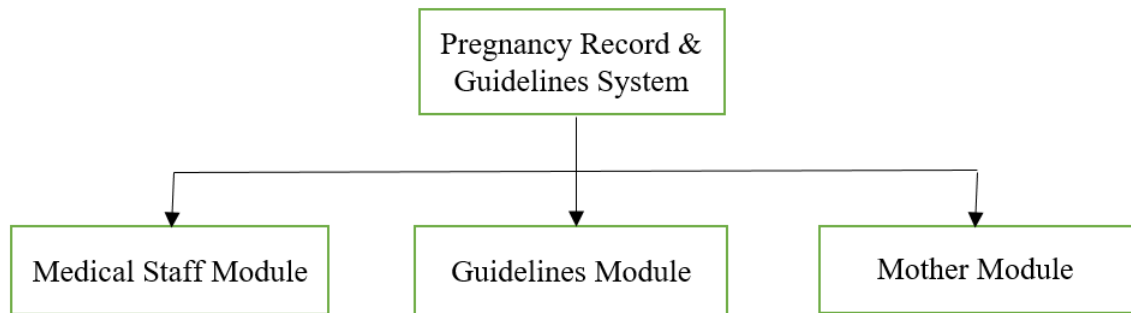
There is only three modules in PRG system which is medical staff module, guidelines module and mother module. The main users for medical staff module are doctors and nurses. The guidelines module is designed for public to improve their pregnancy knowledge. Lastly, the users for mother module is pregnant women.

4.2.1.1.1 Medical Staff Module
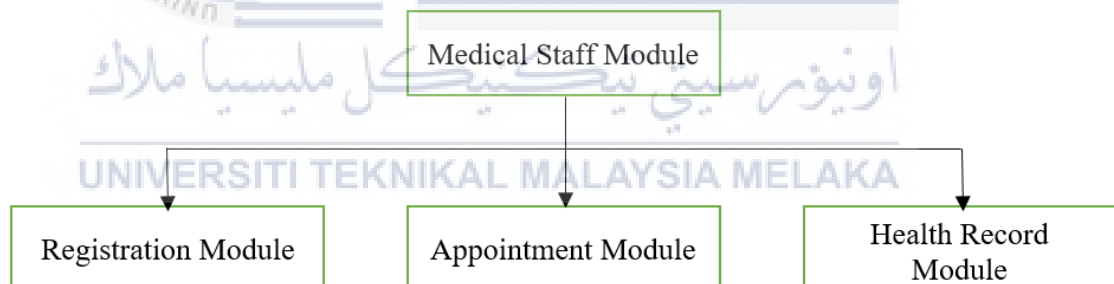
The medical staff module is divided into three parts which is registration module, appointment module and health records module. Nurses are the only user who manage the data of these modules. They helps to register a new pregnant woman by insert their personal detail into database. Personal detail update is available. After that, nurses will manage the appointment. They are making appointment with pregnant women and add the appointment record which included date and time. When the appointment is approach, nurses will send a SMS reminder to pregnant woman after confirm the appointment is able to proceed. Lastly, the health record included the

mother health record and baby health record. Nurses will insert the health record into database once the medical check-up is done.

4.2.1.1.2 Guidelines Module

```
                        ┌─────────────────────┐
                        │  Guidelines Module  │
                        └─────────────────────┘
                    ┌───────────┴───────────────┐
                    ▼                            ▼
          ┌───────────────────┐        ┌───────────────────┐
          │  Chapters Module   │        │   Mother Login     │
          │                    │        │     Module         │
          └───────────────────┘        └───────────────────┘
```
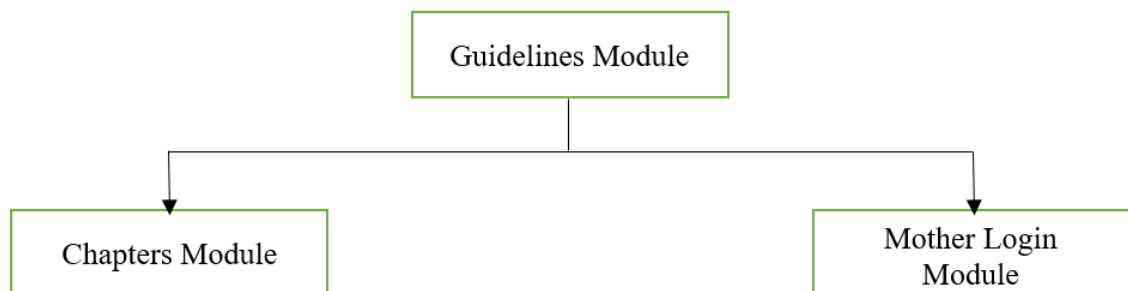
The guidelines module is separated in two parts which is chapter module and mother login module. There have a total of 6 chapters in PRG system which included How Your Baby Develop, Your Health In Pregnancy, Antenatal Care, Feeding Your Baby, What You Need For Your Baby and The Early Week. These are some of the important knowledge of pregnancy. If the user would like to learn more, a download link for pregnancy book is prepared for them. The mother login module is create for pregnant women to login to mother module.

4.2.1.1.3 Mother Module

```
                        ┌─────────────────────┐
                        │   Mother Module     │
                        └─────────────────────┘
          ┌─────────────────────┼─────────────────────┐
          ▼                     ▼                     ▼
  ┌───────────────┐    ┌───────────────┐    ┌───────────────────┐
  │ Personal Detail│    │ Health Record │    │ Appointment Module │
  │    Module      │    │    Module     │    │                    │
  └───────────────┘    └───────────────┘    └───────────────────┘
```
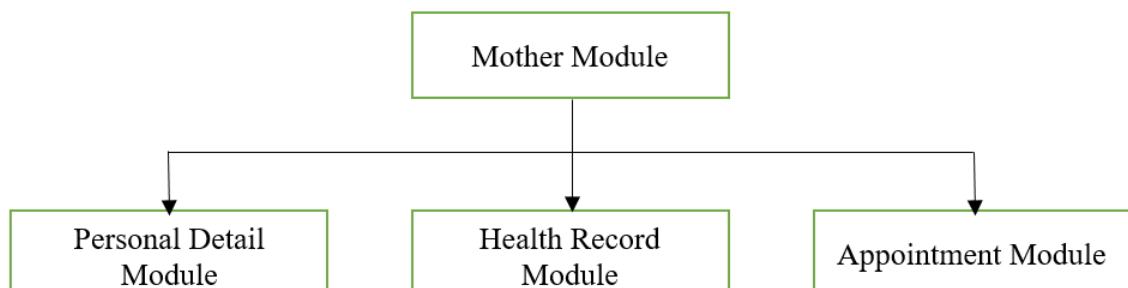
After the mother login to the PRG system, they are able to view their personal details, the health record of herself and the baby and the coming appointment.

4.2.2. User Interface Design

(i)   Navigation Design

Figure 4.2.2.1 Login Page of Medical Staff

Figure 4.2.2.1 is the login page of doctor and nurse. By verified the staff number, doctor and nurse will redirecting to different page which is doctor module and nurse module respectively.
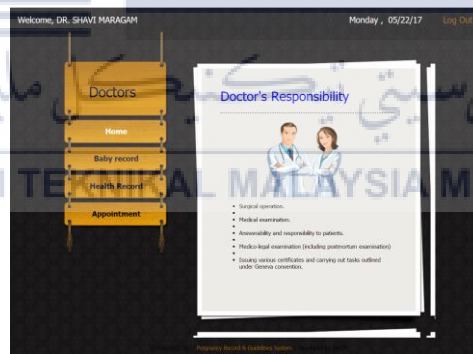
Figure 4.2.2.2 Doctor Module Interface

Figure 4.2.2.2 above is the interface of doctor module. As we can see, there have 3 sub modules which is baby record (Figure 4.2.2.3), health record (Figure 4.2.2.4) and appointment (Figure 4.2.2.5). The doctors can search for baby record, health record and appointment record through these sub modules.
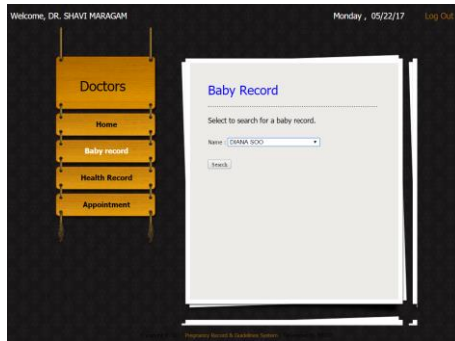
Figure 4.2.2.3 Baby Record Interface
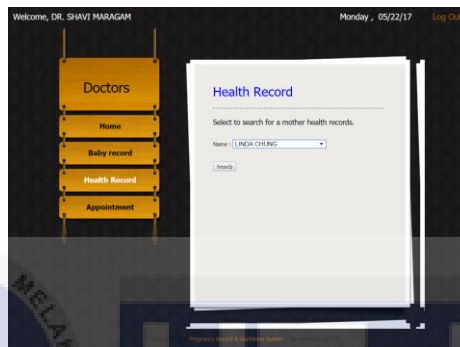
Figure 4.2.2.4 Health Record Interface
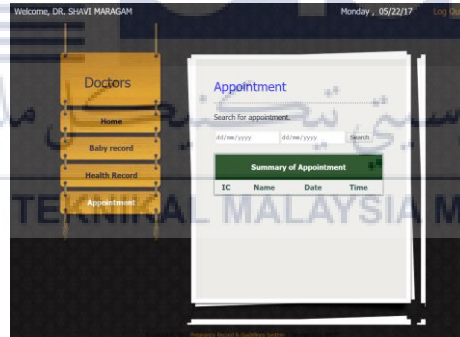
Figure 4.2.2.5 Appointment Interface
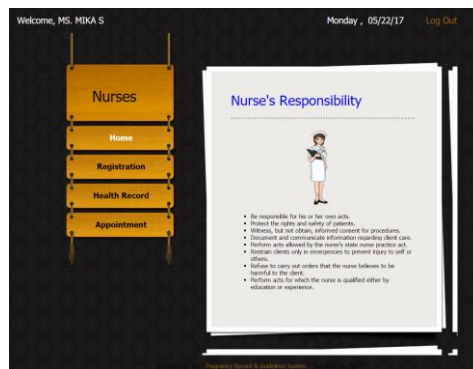
Figure 4.2.2.6 Nurse Module Interface

Figure 4.2.2.6 above is the nurse module, it has slightly different with doctor module. The nurse have a function of registration (Figure 4.2.2.7). It is used to register new pregnant woman and medical staff.
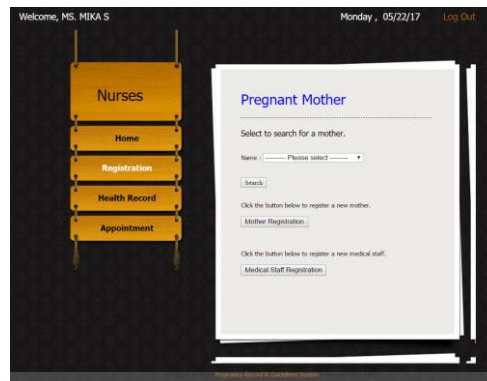
Figure 4.2.2.7 Registration Interface

Figure 4.2.2.8 Pregnancy Guidelines Interface

Figure 4.2.2.8 is a webpage design for public to improve their pregnancy knowledge. There have 6 chapters can study:

Topic	Description
How Your Baby Develop	Describe the growth of baby from week to week
Your Health In Pregnancy	The food guides, healthy lifestyle, medicines guides
Antenatal Care	The appointment, blood test, medical checking
Feeding Your Baby	Describe how to feed on baby
What You Need For Your Baby	Nappies, bathing, sleeping, clothes

| The Early Week | Crying reason, step of changing, washing and bathing |

Table 4.2.2.8.1 Pregnancy Guide
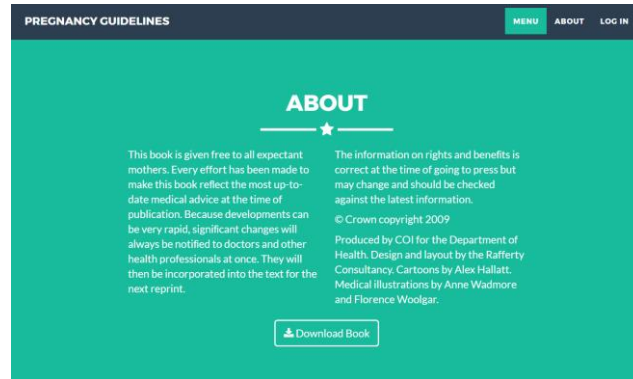
Figure 4.2.2.9 Pregnancy Book Download

Figure 4.2.2.9 is a button to download a pregnancy book if someone would like to learn more of pregnancy knowledge.

Figure 4.2.2.10 Mother Login Interface

Figure 4.2.2.10 is the login module for mother to enter the mother module. They can view their own personal details (Figure 4.2.2.11), health record (Figure 4.2.2.12) and appointment (Figure 4.2.2.13).

Figure 4.2.2.11 Personal Details Interface

Figure 4.2.2.12 Health Record Interface

Figure 4.2.2.13 Appointment Interface

(ii)   Input Design

Figure 4.2.2.14 New Medical Staff Registration

Figure 4.2.2.15 New Pregnant Woman Registration

Figure 4.2.2.16 Update Mother Personal Detail

Figure 4.2.2.17 New Health Record

Figure 4.2.2.18 New Appointment Booking

(iii)   Output Design

Figure 4.2.2.19 Retrieve Mother Personal Detail from Database

Figure 4.2.2.20 Retrieve Health Record from Database

Figure 4.2.2.21 Retrieve Appointment Record from Database

Figure 4.2.2.22 Retrieve Appointment Details from Database

4.2.3. Database Design

4.2.3.1. Conceptual and Logical Database Design

There have 7 tables in the database which is staff table, doctor table, nurse table, appointment table, personaldetail table, motherrecord table and babyrecord table as shown as the Figure 4.2.3.1.1 below. Next, Figure 4.2.3.1.2 is the Logical Database Design which included the attributes, relationship, primary key and foreign key.
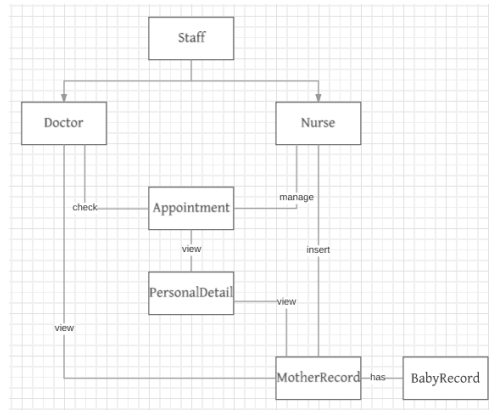
Figure 4.2.3.1.1 Conceptual Database Design
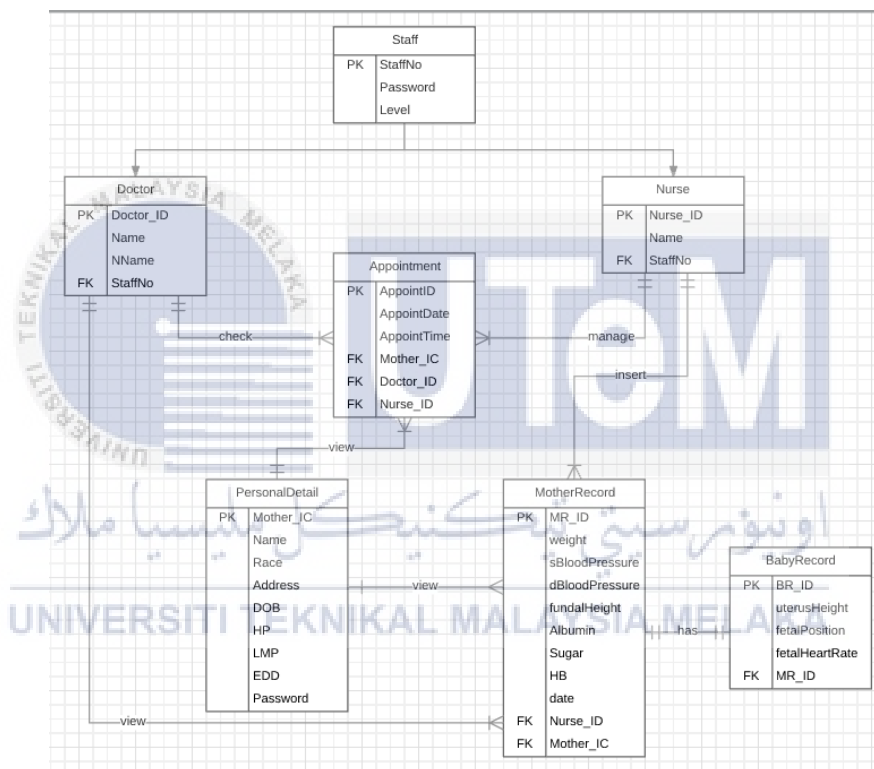
Figure 4.2.3.1.2 Logical Database Design

4.2.3.2 Business Rule

- Staff is the person who involve doctor and nurse.
- Doctor is the person who proceed the medical checking.
- Nurse is the person who manage the database record.
- Personal detail is the information of mother.
- Mother record is the health record of pregnant woman.
- Baby record is the health record of baby.

1. A doctor can check one or more appointment. An appointment can be checked by exactly one doctor who own it.

2. A doctor can view one or more mother record. A mother record can be viewed by exactly one doctor.

3. A nurse can insert one or more mother record. A mother record can be inserted by exactly one nurse.

4. A nurse can manage one or more appointment. An appointment can be managed by exactly one nurse.

5. A personal detail (mother) can view one or more appointment. An appointment can be viewed by exactly one mother.

6. A personal detail (mother) can view one or more mother record. A mother record can be viewed by exactly one mother.

7. A mother record has exactly one baby record. A baby record has exactly one mother record.

4.2.3.3 Data Dictionary

4.2.3.3.1 Staff

Table Name: staff

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
StaffNo	Staff personal number	varchar (10)	Primary Key
Password	Password to log in system	varchar (8)	
Level	Staff position	char (2)	

Table 4.2.3.3.1.1 Data Dictionary of Staff

4.2.3.3.2 Doctor

Table Name: doctor

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
Doctor_ID	Doctor personal ID	varchar (8)	Primary Key
Name	Full name of doctor	varchar (30)	
NName	Short name of doctor	varchar (20)	
StaffNo	Staff personal number	varchar (8)	Foreign Key (staff)

Table 4.2.3.3.2.1 Data Dictionary of Doctor

4.2.3.3.3 Nurse

Table Name: nurse

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
Nurse_ID	Nurse personal ID	varchar (8)	Primary Key
Name	Full name of nurse	varchar (30)	
StaffNo	Staff personal number	varchar (10)	Foreign Key (staff)

Table 4.2.3.3.3.1 Data Dictionary of Nurse

4.2.3.3.4 Personaldetail

Table Name: personaldetail

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
Mother_IC	Pregnant woman IC number	varchar (20)	Primary Key
Name	Full Name	varchar (50)	
Race	Race	varchar (10)	

Address	Address	varchar (100)	
DOB	Date of birth	date	
HP	Phone number	text	
LMP	Last menstrual period date	date	
EDD	Estimate date delivery	date	
Password	Password to log in system	varchar (20)	
Doctor_ID	Doctor personal ID	varchar (8)	Foreign Key (doctor)

Table 4.2.3.3.4.1 Data Dictionary of Personal Detail

4.2.3.3.5 Appointment

Table Name: appointment

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
AppointID	Unique number for appointment	varchar (10)	Primary Key
AppointDate	Appointment Date	Date	
AppointTime	Appointment Time	time	
Mother_IC	Pregnant woman IC no	varchar (20)	Foreign Key (personaldetail)
Doctor_ID	Doctor personal ID	varchar (8)	Foreign Key(doctor)
Nurse_ID	Nurse personal ID	varchar (8)	Foreign Key (Nurse)

Table 4.2.3.3.5.1 Data Dictionary of Appointment

4.2.3.3.6 MOTHER RECORD

Table Name: motherrecord

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
MR_ID	Unique number of mother record	varchar (10)	Primary Key
weight	Pregnant woman weight	double (6,2)	

sBloodPressure	Systolic blood pressure	int (3)	
dBloodPressure	Diastolic blood pressure	int (3)	
fundalHeight	The height of fundal	int (3)	
albumin	Presence of albumin in urine	char (3)	
sugar	Presence of sugar in urine	char (3)	
HB	Haemoglobin level	double (6,2)	
date	Record Date	date	
Nurse_ID	Nurse personal ID	varchar (8)	Foreign Key (nurse)
Mother_IC	Pregnant woman IC number	varchar (20)	Foreign Key (personaldetail)

Table 4.2.3.3.6.1 Data Dictionary of Mother Record

4.2.3.3.7 BABY RECORD

Table Name: babyrecord

ATTRIBUTES	DESCRIPTION	TYPE(SIZE)	KEY
BR_ID	Unique number for baby record	varchar (10)	Primary Key
uterusHeight	The height of uterus	int (3)	
fetalPosition	The position of fetal	varchar (30)	
fetalHeartRate	The heart rate of fetal	int (3)	
MR_ID	Unique number for mother record	varchar (10)	Foreign Key (motherrecord)

Table 4.2.3.3.7.1 Data Dictionary of Baby Record

4.3. Detailed Design

4.3.1. Software Design

```
if(count($_POST)>0 && $captcha == true) {
    $result = $mysqli->query("SELECT * FROM staff WHERE StaffNo='" . $_POST["SNo"] . "'");
    $rows = $result->fetch_assoc();
    $result->free();
    if($rows!==0) {
        $id = $rows['StaffNo'];
        $pass = $rows['Password'];
        $Spost = $rows['Level'];
    }
    if($id==$_POST['SNo'] &&$pass==$_POST['SPass']&&$Spost=="D") {
        $mysqli->query("DELETE FROM failed_login WHERE ip_address = '$ip'");
        $_SESSION["id"]=$id;
        // echo $_SESSION["id"];
        header("Location:Doctor.php");
    }
    else if($id==$_POST['SNo'] &&$pass==$_POST['SPass']&&$Spost=="N") {
        $mysqli->query("DELETE FROM failed_login WHERE ip_address = '$ip'");
        $_SESSION["id"] = $id;
        header("Location:Nurse.php");
    }
    else {
    $message = "Invalid Username or Password!";
    if ($failed_login_attempt < 3) {
        $mysqli->query("INSERT INTO failed_login (ip_address,date) VALUES ('$ip', NOW())");
    } else {
        $message = "You have tried more than 3 invalid attempts. Enter captcha code.";
    }
    }
}
```

Figure 4.3.1.1 Login Session

Figure 4.3.1.1 is login session. Its function is to navigate which page is going after the staff login, the system is verified from 3 parts (Staff ID, Password and Level). If three of these are valid, staff will login successfully into Doctor Module or Nurse Module. Else, they will not access the system.

```
<select name="MIC" onclick="mICVal(this.value)">
    <option value=""><?php echo '--------- Please select ----------'; ?></option>
    <?php
    while ($row = mysqli_fetch_array($result))
    {
        echo "<option value=".$row['Mother_IC'].">".$row['Name']."</option>";
    }
    ?>
</select>
<input type="hidden" class="mIC" name="info" value="">

<script>
    function mICVal(str)
    {
        $(".mIC").val(str);
    }
</script><br><br><br>
```

Figure 4.3.1.2 Data Retrieve with looping

Figure 4.3.1.2 is how the data retrieve from database by using loop. If the sql is valid, the system will get all the record from database.

```
if(isset($_GET['search'])){
    $d1 = $_GET['d1'];
    $d2 = $_GET['d2'];

$query="SELECT appointment.AppointDate,appointment.AppointTime, appointment.Mother_IC, personaldetail.Name
        FROM `appointment` INNER JOIN personaldetail ON appointment.Mother_IC = personaldetail.Mother_IC
        WHERE AppointDate BETWEEN '$d1' and '$d2' && personaldetail.Doctor_ID='$did' ORDER BY AppointDate";
$result=mysqli_query($con, $query);
while ($row=mysqli_fetch_array($result)){?>

    <tr align="center" style="height:35px">
        <td style="border-bottom:1px solid #333;"> <?php echo $row['Mother_IC']; ?> </td>
        <td style="border-bottom:1px solid #333;"> <?php echo $row['Name']; ?> </td>
        <td style="border-bottom:1px solid #333;"> <?php echo $row['AppointDate']; ?> </a></td>
        <td style="border-bottom:1px solid #333;"> <?php echo $row['AppointTime']; ?> </td>
    </tr>
```

Figure 4.3.1.3 Appointment Searching

Figure 4.3.1.3 is to search the appointment of certain day, doctor or nurse can insert the date either 1 day, 1 week, 1 month or few months as they are inserted. In this

case, I am using for…loop statement. All appointment between the dates will loop out from the appointment table.

```php
<?php
 while($row = mysqli_fetch_array($result))
 {
?>
<tr>
  <td align="center" height=30><?php echo $row['date']; ?></td>
  <td align="center"><?php echo $row['weight']; ?></td>
  <td align="center"><?php echo $row['sBloodPressure']; ?></td>
  <td align="center"><?php echo $row['dBloodPressure']; ?></td>
  <td align="center"><?php echo $row['fundalHeight']; ?></td>
  <td align="center"><?php echo $row['albumin']; ?></td>
  <td align="center"><?php echo $row['sugar']; ?></td>
  <td align="center"><?php echo $row['HB']; ?></td>
</tr> <?php }} ?>
```

Figure 4.3.1.4 Table Array with Looping

Figure 4.3.1.4.is the function of retrieve multiple attribute from database and show in a website table. All the data will fully get from the table.

```php
public function SendSMS($MsgSender, $DestinationAddress, $Message)
{
    $url = "http://smsc.vianett.no/ActiveServer/MT/?username=%s&password=%s&destinationaddr=%s&message=%s&refno=1";
    $url = sprintf($url, urlencode($this->Username), urlencode($this->Password), urlencode($DestinationAddress), urlencode($Message));

    if (is_numeric($MsgSender))
        $url .= "&sourceAddr=" . $MsgSender;
    else
        $url .= "&fromAlpha=" . $MsgSender;

    $XMLResponse = $this->GetResponseAsXML($url);
    $Result = $this->ParseXMLResponse($XMLResponse);.
    return $Result;
}
```

Figure 4.3.1.5 Send SMS using website

Figure 4.3.1.5 is the function to send SMS to pregnant woman. The message will remind them about the coming appointment date and time.

4.3.2. Physical Database Design

```php
$sql = "SELECT nurse.Nurse_ID, nurse.Name FROM nurse INNER JOIN staff ON nurse.StaffNo = nurse.StaffNo
                    WHERE staff.StaffNo = '$id'";
```

Figure 4.3.2.1 Select data by joining two tables 1

Figure 4.3.2.1 is the query to get data from nurse table by using staff number. It need to join the staff table and nurse table in order to retrieve the data.

```
$query="SELECT appointment.AppointDate,appointment.AppointTime, appointment.Mother_IC, personaldetail.Name
                FROM `appointment` INNER JOIN personaldetail ON appointment.Mother_IC = personaldetail.Mother_IC
                WHERE AppointDate BETWEEN '$d1' and '$d2' && personaldetail.Doctor_ID='$did' ORDER BY AppointDate";
```

Figure 4.3.2.2 Select data by joining two tables 2

Figure 4.3.2.2 is another query that joining two table. It combined appointment table and personaldetail table. The data will get from both table between the dates requested by user.

```
$sql = "SELECT babyrecord.BR_ID, babyrecord.uterusHeight, babyrecord.fetalPosition, babyrecord.fetalHeartRate, motherrecord.date
        FROM babyrecord INNER JOIN motherrecord ON babyrecord.MR_ID = motherrecord.MR_ID
        WHERE motherrecord.Mother_IC = '$info'";
```

Figure 4.3.2.3 Select data by joining two tables 3

Figure 4.3.2.3 is combining motherrecord table and babyrecord table according to mother IC number. The data will be show in a website table.

4.4. Conclusion

In this chapter, the overall design of PRG system is fully explained in term of system architecture, interface design, software design and database design. It is easier to implement the system if the system is design before implement since the developer will get the idea on what to do. The implementation of system will describe in the next chapter.

CHAPTER V

IMPLEMENTATION

5.1 Introduction

In the previous chapter, the designs of PRG system have fully explained from interface until database. The design chapter is very important and useful before implement the system which easier the implementation process.

This chapter will discuss on how to implement the PRG system. Starting from the software development environment setup and software configuration setup. Lastly is the implementation status.

5.2. Software Development Environment Setup

Before the system start to implement, some software is necessary to be installed. Each of them have to cooperate together to make the system works. The software included Atom, Wamp Server64 and Google Chrome.

5.2.1 Installing Necessary Software

Software	Purpose	Requirement	Suggestion
Wamp Server64	To create web application with Apache2, PHP and MySQL database.	Windows 7 64-bit or later	http://www.wampserver.com/en/

Atom	A text editor for coding. It is simple to use, convenient and easy to read compared to notepad or notepad++.	Windows 7 64-bit or later	https://atom.io/
Google Chrome	A safe browsing used to view the built system.	Windows 7 64-bit or later	https://www.google.com/chrome/browser/desktop/

Table 5.2.1.1 Software Installation

5.3 Software Configuration Management

5.3.1. Configuration environment setup

Configuration environment setup is important to ensure the system run smooth. There have several procedures have to do before run the system which describe detailed in 5.3.1.1, 5.3.1.2 and 5.3.1.3.

5.3.1.1 Start-up Procedure with Wamp Server64

After finished installing all the software, run the wamp server64. Note that the icon colour of Wamp Server64 must turn red to green. Red colour represented server offline whie green colour represented server online. If the icon do not turn to green colour, another way to start up is click the red icon and choose "Start All Services". Figure 5.2.2.1 is the steps of start up Wamp Server64.

Figure 5.3.1.1.1 Steps to Start Up Wamp Server64

5.3.1.2 Start-up Procedure with Atom

Atom is a text editor to coding. It is very simple and convenient to use. This software have different kind of word colour compared to others text editor which make the user easy to read the code.

The main thing to concern is the location to save all the coding files. All files have to save in the below location path as shown in figure 5.2.3.1 to run.

> This PC > OS (C:) > wamp > www > PRG

Figure 5.3.1.2.1 Location to save the files

5.3.1.3 Start-up Procedure with Google Chrome

Google Chrome is the browser used to run the system because it can protect from malicious sites. To run the system in the browser, here is the way to write the address link (http://localhost/Folder_Name/File_Name). For example, http://localhost/PRG/Front.php.

5.4. Implementation Status

In this software, there have 3 main modules as shown in Chapter 4.2.2. The 1st module is Record Management module. This module is the biggest module among the main modules. It involved 6 sub modules:

i.   Medical Staff Authentication
ii.   Medical Staff and Mother Registration
iii.   Medical Staff and Mother Personal Detail
iv.   Appointment Management
v.   Health Record Management
vi.   SMS Reminder

This module took around 6 weeks to complete which as shown in the table below:

Activity	Duration (Day)	Description
Medical Staff Authentication	6	- To differentiate the identity of user to login into different interface. The two main users are doctors and nurses. Both of them have different right to proceed some functions - Coding research and investigate - Interface Design - Function Test
Medical Staff and Mother Registration	5	- Create a form to insert mother personal details and save into database - Coding research and investigate - Interface Design - Function Test

Medical Staff and Mother Personal Detail	5	- Create an interface to search and view the mother personal detail - Coding research and investigate - Interface Design - Function Test
Appointment Management	7	- Create a form to make appointment and save into database - Create an interface to search and view the appointment record. - Coding research and investigate - Interface Design - Function Test
Health Record Management	7	- Create a form to insert, search and view health record - Coding research and investigate - Interface Design - Function Test
SMS Reminder	7	- Create an interface to send SMS - Coding research and investigate - Interface Design - Function Testing
Final Interface Design and Testing	2	- Interface design - Function Testing

Table 5.4.1 Record Management Module Milestone

The 2nd module is Pregnancy Guidelines module. This is a module for public user to learn some knowledge about pregnancy. There have 3 sub modules:

i. Pregnancy Knowledge (6 Chapters)

ii.   Pregnancy FAQ

iii.   Mother Login Module

This module took around 3 weeks to complete which as shown in the table below:

Activity	Duration (Day)	Description
Pregnancy Knowledge	10	- Create an interface to study the pregnancy chapters - Pregnancy research and study - Interface Design - Function Testing
Pregnancy FAQ	6	- Create an interface of FAQ - FAQ research and study - Interface Design - Function Testing
Mother Login Module	3	- Create a form for mother to login - Interface Design - Function Testing
Final Interface Design and Testing	2	- Interface design - Function Testing

Table 5.4.2 Pregnancy Guidelines Module Milestone

The 3rd module is Mother Profile module. This module allow mother to view

i.   Personal Detail

ii.   Health Record

iii.   Appointment

This module took around 1 weeks to complete which as shown in the table below:

Activity	Duration (Day)	Description
Personal Detail	1	- Create an interface to view mother personal detail - Interface Design - Function Testing
Health Record	2	- Create an interface to view mother and baby health record - Interface Design - Function Testing
Appointment	1	- Create an interface to view appointment details - Interface Design - Function Testing
Final Interface Design and Testing	2	- Interface design - Function Testing

Table 5.4.3 Mother Profile Module Milestone

5.5. Conclusion

In conclusion, this chapter describe the source of software installation and system implementation duration. From software installation to system implementation, a total of approximately 10 weeks is used to build out PRG system.

Next chapter will be the testing chapter. This chapter will describe the activity involved in testing phase and what is the testing strategy to be adopted in PRG system. The test data and result will be discuss.

CHAPTER VI

TESTING

6.1 Introduction

In the previous chapter, the development environment and methods is described and the three modules of the system also being introduced. The duration to implement each modules also fully described.

In this chapter, it discusses the project's testing phase. This stage is very important for the project because it shows the results of the project to check whether it have achieved the initial objectives and system requirement.

6.2 Test Plan

The test plan is an overall idea of strategy on how to conduct the testing phase. In additional, this plan is divided into 3 sections which are 6.2.1 Test Organization, 6.2.2 Test Environment and 6.2.3 Test Schedule.

6.2.1 Test Organization

The testing phase is black box testing. The black box testing will conduct by developer of this project. The developer will test the system and trying to ensure the system is work as expected. As long as the system have achieved the initial objectives.

6.2.2 Test Environment

For testing environment, the laptop is running Window 10 Home Single Language 64-bit Operating System Intel® Core™ i5-7200U up to 3.1GHz with NVIDIA GeForce 820M graphic card. The laptop is connected to Wamp Server64 for database connection.

6.2.3 Test Schedule

This system testing is started since the system begin to implement. Every sub modules will running a small test after developed and final test will conduct after the system is fully developed. The testing is never stop to make the system getting better and better and span for 5 months starting from April until August.

6.3 Test Strategy

As mentioned in section 6.2.1, the black box testing will be conducted. For the black box testing, it is involved only the developer to carry out.

In advanced test, every sub module will run a small test after implemented to simplify the final test of the system. Final test will check the system functioning well and overall performance is running smooth.

6.3.1 Classes of tests

- Functionality Testing
  - The developer test every sub module functionality, make sure it can connect to database and search/insert/retrieve data successfully.

- Security Testing
  - The developer test every authentication module to ensure only authorised person can log in to the related page/module.

- Unit Testing

  - The developer test all component of the system and checks the lines of code for each function to make sure they are working.

- System Testing

  - The developer and the supervisor test run the system to ensure the system is smooth and return the expected result.

6.4 Test Design

In this section, the test case identification, test cases and expected result for each module are designed and documented. The synthetic data is selected to run the test and analysis of the result.

6.4.1 Test Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Medical Staff Login	User login with correct ID and password		Staff No: S0000001 Password: 123456	1. System display login page. 2. User enter Staff No and password. 3. System validates the Staff No and password. 4. System display staff page.	Login successful	
	User login with correct ID and invalid password		Staff No: S0000001 Password: 12345	1. System display login page. 2. User enter Staff No and password. 3. System validates the Staff No and password. 4. System remain at login page.	Login unsuccessful	
	User login with invalid ID and		Staff No: s0000001 Password: 123456	1. System display login page. 2. User enter Staff No and password.	Login unsuccessful	

correct password			3. System validates the Staff No and password. 4. System remain at login page.		
User login with invalid ID and password		Staff No: s0000001 Password: 12345	1. System display login page. 2. User enter Staff No and password. 3. System validates the Staff No and password. 4. System remain at login page.	Login unsuccessful	
User login with blank ID and password		Staff No: Password:	1. System display login page. 2. User login with blank ID and password 3. System validates the Staff No and password. 4. System remain at login page.	Login unsuccessful	

Table 6.4.1.1 Medical Staff Login Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Medical Staff Registration	Nurse filled the details matched with the format		Staff No: S0000001 Position: Doctor ID: D0000001 Full Name: DR. SHAVI MARAGAM Nick Name: DR. SHAVI	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Medical Staff Registration. 4. Nurse enter Staff No, Position, ID, Full Name, and Nick Name. 5. System validate all details. 6. System display successful message. 7. System display nurse page.	Details saved in staff database	
	Nurse filled the details with the wrong format		Staff No: S000001 Position: Doctor ID: 0000001 Full Name: DR. SHAVI MARAGAM	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Medical Staff Registration. 4. Nurse enter Staff No, Position, ID, Full Name, and Nick Name. 5. System validate all details. 6. System display wrong format message.	System remain at staff register page.	.

			Nick Name: DR. SHAVI	7. System remain at register page.		
	Nurse filled the blank details		Staff No: Position: ID: Full Name: Nick Name:	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Medical Staff Registration. 4. Nurse filled the blank details 5. System validate all details. 6. System display fill field message. 7. System remain at register page.	System remain at staff registration page.	
	Nurse back to staff page by click the back button			1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Medical Staff Registration. 4. Nurse click back button. 5. System display nurse page.	System display staff page.	

Table 6.4.1.2 Medical Staff Registration Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Mother Registration	Nurse filled the details matched with the format		Name: BETTY NG IC: 920805086986 Race: Chinese Phone No: +60165032039 Address: 5, TAMAN RAYA, 31150 MALACCA. DOB: 05/08/1992 LMP: 11/10/2015 EDD: 01/10/2016 Doctor: DR.BEN	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Mother Registration. 4. Nurse enter Name, IC, Race, Phone No, Address, DOB, LMP, EDD, and Doctor. 5. System validate all details. 6. System display successful message. 7. System display nurse page.	Details saved in personaldetail database	
	Nurse filled the details with the wrong format		Name: BETTY NG IC: 92080508 Race: Chinese Phone No: 5032039	1. System display nurse page. 2. Nurse select Registration panel.	System remain at mother register page.	

			Address: 5, TAMAN RAYA, 31150 MALACCA. DOB: 05/08/1992 LMP: 11/10/2015 EDD: 01/10/2016 Doctor: DR.BEN	3. Nurse select Mother Registration. 4. Nurse enter Name, IC, Race, Phone No, Address, DOB, LMP, EDD, and Doctor. 5. System validate all details. 6. System display wrong format message. 7. System remain at mother register page.		
	Nurse filled the blank details		Staff No: Position: ID: Full Name: Nick Name:	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Mother Registration. 4. Nurse filled the blank details 5. System validate all details.	System remain at mother register page.	

				6. System display wrong format message.		
				7. System remain at mother register page.		
	Nurse back to staff page by click the back button			1. System display nurse page.	System display nurse page.	
				2. Nurse select Registration panel.		
				3. Nurse select Mother Registration.		
				4. Staff click back button.		
				5. System display nurse page.		

Table 6.4.1.3 Mother Registration Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Search Mother Personal details	Nurse search the mother details by Name		Name: DIANA SOO	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Name to search 4. System validate Name from database. 5. System display mother details	System display mother details	
	Nurse search the mother with blank detail		Name :	1. System display nurse page. 2. Nurse select Staff panel. 3. Nurse search the mother with blank detail 4. System validate Name from database. 5. System remain at nurse page.	System remain at nurse page.	

Table 6.4.1.4 View Mother Personal Detail Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Search Mother and Baby Health Record	Staff search the health record by Name		Name: DIANA SOO	1. System display staff page. 2. Staff select Health Record panel. 3. Staff select Name to search 4. System validate Name from database. 5. System display mother and baby health record.	System display mother and baby health record	
	Staff search the health record with blank detail		Name :	1. System display staff page. 2. Staff select Health Record panel. 3. Staff search the health record with blank detail 4. System validate Name from database. 5. System remain at staff page.	System remain at staff page.	

Table 6.4.1.5 View Mother and Baby Health Record Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Insert Mother Health Record	Nurse filled the details matched with the format		Date: 05/08/2017 Weight: 55 Systolic B.P: 110 Diastolic B.P: 60 Fundal Height: 28 Albumin: Positive Sugar: Negative Haemoglobin: 11 Uterus Height: 23 Fetal Position: PALPABLE Fetal Heart rate: 150	1. System display nurse page. 2. Nurse select Health Record panel. 3. Nurse select Mother Name. 4. Nurse click New Record. 5. Nurse enter all details. 6. System validate all details. 7. System display successful message. 8. System display nurse page.	Details saved in motherrecord and babyrecord database	
	Nurse filled the details with the wrong format		Date: 05/08/2017 Weight: AA Systolic B.P: C Diastolic B.P: 60 Fundal Height: 28	1. System display nurse page. 2. Nurse select Health Record panel. 3. Nurse select Mother Name. 4. Nurse click New Record.	System remain at new health record page.	

			Albumin: Positive Sugar: Negative Haemoglobin: 11 Uterus Height: 23 Fetal Position: PALPABLE Fetal Heart rate: 150	5. Nurse enter all details. 6. System validate all details. 7. System display wrong format message. 8. System remain at new health record page.	
	Nurse filled the blank details		Date: Weight: Systolic B.P: Diastolic B.P: Fundal Height: Albumin: Sugar: Haemoglobin: Uterus Height: Fetal Position: Fetal Heart rate:	1. System display nurse page. 2. Nurse select Health Record panel. 3. Nurse select Mother Name. 4. Nurse click New Record. 5. Nurse filled the blank details 6. System validate all details. 7. System display fill field message. 8. System remain at new health record page.	System remain at new health record page.

| | Nurse back to nurse page by click the back button | | | 1. System display nurse page.
2. Nurse select Health Record panel.
3. Nurse select Mother Name.
4. Nurse click New Record.
5. Nurse click back button.
6. System display nurse page. | System display nurse page. | |

Table 6.4.1.6 Insert Mother Health Record Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Search Appointment Detail	Staff search the appointment detail by Date		Date begin: 01/12/2016 Date end: 01/12/2016	1. System display staff page. 2. Staff select Appointment panel. 3. Staff select date begin and date end to search 4. System validate date range. 5. System display appointment detail between dates.	System display appointment detail	
	Staff search the appointment detail with blank date		Date begin: Date end:	1. System display staff page. 2. Staff select Appointment panel. 3. Staff enter blank date. 4. System validate date range. 5. System remain at staff page.	System remain at staff page.	

Table 6.4.1.7 View Appointment Detail Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Appointment Booking	Nurse filled the details matched with the format		Mother: DIANA SOO Doctor: DR. BEN Date: 05/08/2017 Time: 12:00 PM	1. System display nurse page. 2. Nurse select Appointment panel. 3. Nurse click Register New. 4. Nurse enter all details. 5. System validate all details. 6. System display successful message. 7. System display nurse page.	Details saved in appointment database	
	Nurse filled the blank details		Mother: Doctor: Date: Time:	1. System display nurse page. 2. Nurse select Appointment panel. 3. Nurse click Register New. 4. Nurse filled the blank details 5. System validate all details.	System remain at new appointment page.	

				6. System display fill field message. 7. System remain at new appointment page.		
	Nurse back to nurse page by click the back button			1. System display nurse page. 2. Nurse select Appointment panel. 3. Nurse click Register New. 4. Nurse click back button. 5. System display nurse page.	System display nurse page.	

Table 6.4.1.8 Appointment Booking Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Send SMS Reminder	Nurse send SMS Reminder		Date begin: 01/12/2016 Date end: 01/12/2016	1. System display staff page. 2. Staff select Appointment panel. 3. Staff select date begin and date end to search 4. System validate date range. 5. System display appointment detail between dates. 6. Nurse check appointment detail accuracy. 7. Nurse click Send Reminder. 8. System display successful message.	System sent SMS	

Table 6.4.1.9 Send SMS Reminder Description

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Mother Login	User login with correct IC No and password		IC No: 910330085872 Password: 0165032039	1. System display login page. 2. User enter IC No and password. 3. System validates the IC No and password. 4. System display mother page.	Login successful	
	User login with correct IC No and invalid password		IC No: 910330085872 Password: 0165032038	1. System display login page. 2. User enter IC No and password. 3. System validates the IC No and password. 4. System remain at login page.	Login unsuccessful	
	User login with invalid ID and correct password		IC No: 910330085873 Password: 0165032039	1. System display login page. 2. User enter IC No and password. 3. System validates the IC No and password. 4. System remain at login page.	Login unsuccessful	

	User login with invalid ID and password		IC No: 910330085874 Password: 0165032003	1. System display login page. 2. User enter IC No and password. 3. System validates the IC No and password. 4. System remain at login page.	Login unsuccessful	
	User login with blank ID and password		IC No: Password:	1. System display login page. 2. User login with blank ID and password 3. System validates the IC No and password. 4. System remain at login page.	Login unsuccessful	

Table 6.4.1.10 Mother Login Description

6.4.1 Test Data

In this test, all data used by developer is synthetic data. The input data is the data from database which is virtual data create by developer. Although it is virtual data but all the data format are referred to the pink book (the antenatal book issued by government facilities).

6.5 Test Results and Analysis

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Medical Staff Login	User login with correct ID and password	Pass	Staff No: S0000001 Password: 123456	1. System display login page. 2. User enter Staff No and password. 3. System validates the Staff No and password. 4. System display staff page.	Login successful	Login successful
	User login with correct ID and invalid password	Pass	Staff No: S0000001 Password: 12345	1. System display login page. 2. User enter Staff No and password. 3. System validates the Staff No and password. 4. System remain at login page.	Login unsuccessful	Login unsuccessful
	User login with invalid ID and correct password	Pass	Staff No: s0000001 Password: 123456	1. System display login page. 2. User enter Staff No and password. 3. System validates the Staff No and password.	Login unsuccessful	Login unsuccessful

				4. System remain at login page.		
	User login with invalid ID and password	Pass	Staff No: s0000001 Password: 12345	1. System display login page. 2. User enter Staff No and password. 3. System validates the Staff No and password. 4. System remain at login page.	Login unsuccessful	Login unsuccessful
	User login with blank ID and password	Pass	Staff No: Password:	1. System display login page. 2. User login with blank ID and password 3. System validates the Staff No and password. 4. System remain at login page.	Login unsuccessful	Login unsuccessful

Table 6.5.1   Medical Staff Login

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Medical Staff Registration	Nurse filled the details matched with the format	Pass	Staff No: S0000001 Position: Doctor ID: D0000001 Full Name: DR. SHAVI MARAGAM Nick Name: DR. SHAVI	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Medical Staff Registration. 4. Nurse enter Staff No, Position, ID, Full Name, and Nick Name. 5. System validate all details. 6. System display successful message. 7. System display nurse page.	Details saved in staff database	Details saved in staff database
	Nurse filled the details with the wrong format	Pass	Staff No: S000001 Position: Doctor ID: 0000001 Full Name: DR. SHAVI MARAGAM	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Medical Staff Registration. 4. Nurse enter Staff No, Position, ID, Full Name, and Nick Name. 5. System validate all details. 6. System display wrong format message.	System remain at staff register page.	System remain at staff registration page.

			Nick Name: DR. SHAVI	7. System remain at register page.		
	Nurse filled the blank details	Pass	Staff No: Position: ID: Full Name: Nick Name:	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Medical Staff Registration. 4. Nurse filled the blank details 5. System validate all details. 6. System display fill field message. 7. System remain at register page.	System remain at staff registration page.	System remain at staff registration page.
	Nurse back to staff page by click the back button	Pass		1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Medical Staff Registration. 4. Nurse click back button. 5. System display nurse page.	System display staff page.	System display staff page.

Table 6.5.2   Medical Staff Registration

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Mother Registration	Nurse filled the details matched with the format	Pass	Name: BETTY NG IC: 920805086986 Race: Chinese Phone No: +60165032039 Address: 5, TAMAN RAYA, 31150 MALACCA. DOB: 05/08/1992 LMP: 11/10/2015 EDD: 01/10/2016 Doctor: DR.BEN	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Mother Registration. 4. Nurse enter Name, IC, Race, Phone No, Address, DOB, LMP, EDD, and Doctor. 5. System validate all details. 6. System display successful message. 7. System display nurse page.	Details saved in personaldetail database	Details saved in personaldetail database
	Nurse filled the details with the wrong format	Pass	Name: BETTY NG IC: 92080508 Race: Chinese Phone No: 5032039	1. System display nurse page. 2. Nurse select Registration panel.	System remain at mother register page.	System remain at mother register page.

			Address: 5, TAMAN RAYA, 31150 MALACCA. DOB: 05/08/1992 LMP: 11/10/2015 EDD: 01/10/2016 Doctor: DR.BEN	3. Nurse select Mother Registration. 4. Nurse enter Name, IC, Race, Phone No, Address, DOB, LMP, EDD, and Doctor. 5. System validate all details. 6. System display wrong format message. 7. System remain at mother register page.		
	Nurse filled the blank details	Pass	Staff No: Position: ID: Full Name: Nick Name:	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Mother Registration. 4. Nurse filled the blank details 5. System validate all details.	System remain at mother register page.	System remain at mother register page.

				6. System display wrong format message. 7. System remain at mother register page.		
	Nurse back to staff page by click the back button	Pass		1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Mother Registration. 4. Staff click back button. 5. System display nurse page.	System display nurse page.	System display nurse page.

Table 6.5.3   Mother Registration

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Search Mother Personal details	Nurse search the mother details by Name	Pass	Name: DIANA SOO	1. System display nurse page. 2. Nurse select Registration panel. 3. Nurse select Name to search 4. System validate Name from database. 5. System display mother details	System display mother details	System display mother details
	Nurse search the mother with blank detail	Pass	Name :	1. System display nurse page. 2. Nurse select Staff panel. 3. Nurse search the mother with blank detail 4. System validate Name from database. 5. System remain at nurse page.	System remain at nurse page.	System remain at nurse page

Table 6.5.4   View Mother Personal Detail

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Search Mother and Baby Health Record	Staff search the health record by Name	Pass	Name: DIANA SOO	1. System display staff page. 2. Staff select Health Record panel. 3. Staff select Name to search 4. System validate Name from database. 5. System display mother and baby health record.	System display mother and baby health record	System display mother and baby health record
	Staff search the health record with blank detail	Pass	Name :	1. System display staff page. 2. Staff select Health Record panel. 3. Staff search the health record with blank detail 4. System validate Name from database. 5. System remain at staff page.	System remain at staff page.	System remain at staff page.

Table 6.5.5   View Mother and Baby Health Record

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Insert Mother Health Record	Nurse filled the details matched with the format	Pass	Date: 05/08/2017 Weight: 55 Systolic B.P: 110 Diastolic B.P: 60 Fundal Height: 28 Albumin: Positive Sugar: Negative Haemoglobin: 11 Uterus Height: 23 Fetal Position: PALPABLE Fetal Heart rate: 150	1. System display nurse page. 2. Nurse select Health Record panel. 3. Nurse select Mother Name. 4. Nurse click New Record. 5. Nurse enter all details. 6. System validate all details. 7. System display successful message. 8. System display nurse page.	Details saved in motherrecord and babyrecord database	Details saved in motherrecord and babyrecord database
	Nurse filled the details with the wrong format	Pass	Date: 05/08/2017 Weight: AA Systolic B.P: C Diastolic B.P: 60 Fundal Height: 28	1. System display nurse page. 2. Nurse select Health Record panel. 3. Nurse select Mother Name. 4. Nurse click New Record.	System remain at new health record page.	System remain at new health record page.

			Albumin: Positive	5. Nurse enter all details.		
			Sugar: Negative	6. System validate all details.		
			Haemoglobin: 11	7. System display wrong		
			Uterus Height: 23	format message.		
			Fetal Position: PALPABLE	8. System remain at new		
			Fetal Heart rate: 150	health record page.		
	Nurse filled the blank details	Pass	Date:	1. System display nurse page.	System remain at new health record page.	System remain at new health record page.
			Weight:	2. Nurse select Health Record panel.		
			Systolic B.P:	3. Nurse select Mother Name.		
			Diastolic B.P:	4. Nurse click New Record.		
			Fundal Height:	5. Nurse filled the blank details		
			Albumin:			
			Sugar:	6. System validate all details.		
			Haemoglobin:	7. System display fill field message.		
			Uterus Height:			
			Fetal Position:	8. System remain at new health record page.		
			Fetal Heart rate:			

| | Nurse back to nurse page by click the back button | Pass | | 1. System display nurse page.
2. Nurse select Health Record panel.
3. Nurse select Mother Name.
4. Nurse click New Record.
5. Nurse click back button.
6. System display nurse page. | System display nurse page. | System display nurse page. |

Table 6.5.6   Insert Mother Health Record

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Search Appointment Detail	Staff search the appointment detail by Date	Pass	Date begin: 01/12/2016 Date end: 01/12/2016	1. System display staff page. 2. Staff select Appointment panel. 3. Staff select date begin and date end to search 4. System validate date range. 5. System display appointment detail between dates.	System display appointment detail	System display appointment detail
	Staff search the appointment detail with blank date	Pass	Date begin: Date end:	1. System display staff page. 2. Staff select Appointment panel. 3. Staff enter blank date. 4. System validate date range. 5. System remain at staff page.	System remain at staff page.	System remain at staff page.

Table 6.5.7   View Appointment Detail

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Appointment Booking	Nurse filled the details matched with the format	Pass	Mother: DIANA SOO Doctor: DR. BEN Date: 05/08/2017 Time: 12:00 PM	1. System display nurse page. 2. Nurse select Appointment panel. 3. Nurse click Register New. 4. Nurse enter all details. 5. System validate all details. 6. System display successful message. 7. System display nurse page.	Details saved in appointment database	Details saved in appointment database
	Nurse filled the blank details	Pass	Mother: Doctor: Date: Time:	1. System display nurse page. 2. Nurse select Appointment panel. 3. Nurse click Register New. 4. Nurse filled the blank details 5. System validate all details.	System remain at new appointment page.	System remain at new appointment page.

				6. System display fill field message. 7. System remain at new appointment page.		
	Nurse back to nurse page by click the back button	Pass		1. System display nurse page. 2. Nurse select Appointment panel. 3. Nurse click Register New. 4. Nurse click back button. 5. System display nurse page.	System display nurse page.	System display nurse page.

Table 6.5.8   Appointment Booking

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Send SMS Reminder	Nurse send SMS Reminder	Pass	Date begin: 01/12/2016 Date end: 01/12/2016	1. System display staff page. 2. Staff select Appointment panel. 3. Staff select date begin and date end to search 4. System validate date range. 5. System display appointment detail between dates. 6. Nurse check appointment detail accuracy. 7. Nurse click Send Reminder. 8. System display successful message.	System sent SMS	System sent SMS

Table 6.5.9   Send SMS Reminder

Functional Requirement	Test Requirement	Test Status	Input Data	Steps	Expected Result	Actual Result
Mother Login	User login with correct IC No and password	Pass	IC No: 910330085872 Password: 0165032039	1. System display login page. 2. User enter IC No and password. 3. System validates the IC No and password. 4. System display mother page.	Login successful	Login successful
	User login with correct IC No and invalid password	Pass	IC No: 910330085872 Password: 0165032038	1. System display login page. 2. User enter IC No and password. 3. System validates the IC No and password. 4. System remain at login page.	Login unsuccessful	Login unsuccessful
	User login with invalid ID and correct password	Pass	IC No: 910330085873 Password: 0165032039	1. System display login page. 2. User enter IC No and password. 3. System validates the IC No and password. 4. System remain at login page.	Login unsuccessful	Login unsuccessful

	User login with invalid ID and password	Pass	IC No: 910330085874 Password: 0165032003	1. System display login page. 2. User enter IC No and password. 3. System validates the IC No and password. 4. System remain at login page.	Login unsuccessful	Login unsuccessful
	User login with blank ID and password	Pass	IC No: Password:	1. System display login page. 2. User login with blank ID and password 3. System validates the IC No and password. 4. System remain at login page.	Login unsuccessful	Login unsuccessful

Table 6.5.10   Mother Login

6.6 Conclusion

In this chapter, every functional modules have been tested with every possibility to ensure the system flow smooth. Testing phase is very important to find out the possible errors and unexpected result. Then the developer is able to have the maintenance of the module.

Next chapter is the last chapter of this report which is conclusion. The overall weakness, strength, improvement and the project distribution will be analysed and discussed.

CHAPTER VII

CONCLUSION

7.1 Observation on Weaknesses and Strengths

The PRG system is built based on the set objectives. Therefore, the strength of this system can identify according to the objectives. The first objective is to digitalize the existed pink book into a system. Every pregnant woman have to bring the pink book along no matter where they go. The book can be lost but not for the system. In order to prevent the pink book from missing, it is good to digitalize it. Besides, it can be inconvenience to carry a big book into the hand beg, because they have to bring many things in their hand bag such the card, their purse, their make ups, their smartphones or even car and home keys. Somehow, they might also forget to bring the book out. With this system, they do not have to worry about this problem by login this system with laptop or smart phone.

Secondly, this system helps to improve the confidentiality and security of pregnant mother record. Every users of this system who trying to access the personal details, health record and appointment have to get through the authentication. The system will identify the identity of user with the user ID and password. Different user have different right to access the modules.

Lastly, this system can remind pregnant woman to attend the appointment. They do not have any reminder to remind them about their appointment and they have to remember it themselves. The appointment is important for them to get the health status about their babies. Normally the medical check-up is carry out once a month except for the last two months will have more check-up. It is normal for a human being to forget the

activity after a month. With this SMS reminder, the pregnant woman can get ready to the medical check-up earlier before missed it.

Of course, nothing is perfect in this world. Everything is comes with weakness. This PRG system is a small system which developed to a clinic or a hospital. But not every pregnant woman will proceed the medical check-up in the same clinic or hospital. Sometimes will have some reason or incident to cause them have the check-up in another places such as travel or accident. So the other medical centres are not able to get the health record of pregnant woman. If want to implement this system to every hospital in Malaysia, it need a huge central database to save all the records. Besides, it also need a communication system so every hospital are able to contact each other.

Another weakness is the design or the system. The developer have a weakness in interface design. The design might not attractive or user friendly for certain people. It is normal if some people have no problem to the design or dislike the interface.

7.2 Propositions for Improvement

The developer wish to suggest three improvements for the future development of similar system. First suggestion is create a mobile application for mother. Other than view their own personal detail, health record and appointment, they are also able to record the baby movement. The baby movement is helps to check the baby is healthy. The mother have to check the baby movement for minimum ten times every day. It is easier for them to record with a mobile application.

Second suggestion is implement a communication system for every medical centre to contact each other. They can exchange knowledge or discuss the mother health status to get a better solution for the mother. Lastly, enhanced the interface design so it is more user friendly.

7.3 Project Contribution

The PRG system is purposely implemented to a medical centre either a small clinic or a hospital. The developer is trying to replace the existed pink book with a system to convenience the pregnant woman and medical staff.

Furthermore, a new function is developed that the pink book does not contain which is sending SMS reminder. This function help to remind pregnant woman for the coming appointment so there will not forget the appointment after a month.

Besides that, this system also tend to improve the pregnancy knowledge of public. There have some pregnancy guidelines that the public can study and gain more knowledge about pregnancy.

7.4   Conclusion

Everything is going systematized in this modern technology world so do with the existed pink book should be systematized too. The developer hope this kind of system can be implemented in every medical center in Malaysia. This can bring convenience to medical staff and pregnant woman. The pregnant woman also can prevent unnecessary problem such as book lost or book leave at home. Besides, this system can save paper from making more of pink book.

Lastly, the developer wish the one who read this report can understand the objectives of having this system and gain some ideas from this report to implement a better one.

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