BABY-FRIENDLY PEDIATRIC WARD INFORMATION SYSTEM (BFIS) IN HOSPITAL JASIN, MALACCA

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UNIVERSITI TEKNIKAL MALAYSIA MELAKA

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JUDUL: BABY-FRIENDLY PEDIATRIC WARD INFORMATION SYSTEM (BFIS) IN HOSPITAL JASIN, MALACCA

SESI PENGAJIAN: 2015/2016

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BABY-FRIENDLY PEDIATRIC WARD INFORMATION SYSTEM (BFIS) IN HOSPITAL JASIN, MALACCA

NOOR FARAIN NAQUIAH BINTI RAHMAT

This report is submitted in partial fulfillment of the requirements for the Bachelor of Computer Science (Database Management)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2016

DECLARATION

I hereby declare that this project report entitled

Baby-Friendly Pediatric Ward Information System (BFIS)

In Hospital Jasin, Malacca

is written by me and is my own effort and that no part has been plagiarized

without citations.

STUDENT : _____ Date : 26/08/16

(NOOR FARAIN NAQUIAH BINTI RAHMAT)

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 (Database Management) with Honours.

SUPERVISOR : _____ Date : 26/08/2016

(MADAM HIDAYAH BINTI RAHMALAN)

DEDICATION

I dedicate this report to my beloved parents.
Without their patience, understanding, support, and most of all their love and prayers, the completion of this work would not have been possible.

Besides that, to my PSM supervisor, Madam Hidayah Binti Rahmalan the consultation, advices, comments and support to make sure that this project completed successfully.

I also want to thank to my friends who have always supported me who are directly and indirectly with the PSM.

Thank you.

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First of all, thank to ALLAH for given me a chance and strenght for finishing this Projek Sarjana Muda (PSM) until the end.

I would like to express my deepest gratitude to my supervisor, Madam Hidayah Binti Rahmalan for all the guidance and help throughout this project.

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ABSTRACT

Baby-Friendly Pediatric Ward Information System (BFIS) is a web-based system that helps the users, BFIS's staff to overcome the manual business problems using paper and filling system. In the current system, files containing data relating to the patient will be forfeited if the patient no longer come within more than 5 years. So, the new system, will give the advantages for users and patients in handling warded process. With this information, BFIS will be able to monitor, check, verify and validate the information for each patient. Thus, nurses are no longer required to fill in all the form on the paper. The BFIS uses an Oracle 10g Database Express Edition and is developed using Hypertext Preprocessor (PHP) programming language, JavaScript and Hypertext Markup Language (HTML).

ABSTRAK

Baby-Friendly Pediatric Ward Information System (BFIS) adalah satu sistem berasaskan web yang membantu kakitangan untuk mengatasi pengurusan sedia ada dimana pihak hospital mereka masih menggunakan kertas dan sistem pengisian. Berdasarkan pengurusan sedia ada, fail yang mengandungi data yang berkaitan dengan pesakit akan dilupuskan sekiranya pesakit tidak lagi datang mendapatkan rawatan lebih daripada 5 tahun. Oleh itu, BFIS akan memberi kelebihan untuk kakitangan dalam mengendalikan proses kemasukan pesakit ke dalam wad. Dengan maklumat ini, BFIS akan dapat memantau, menyemak, dan mengesahkan maklumat untuk setiap pesakit yang mendapatkan rawatan di hospital. Oleh hal yang demikian, jururawat tidak lagi perlu mengisi semua borang di atas kertas. BFIS menggunakan Pangkalan Data *Oracle Express Edition* dan dibangunkan menggunakan *Hypertext Preprocessor (PHP)* bahasa pengaturcaraan, *JavaScript* dan *Hypertext Markup Language (HTML)*.

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CHAPTER I

INTRODUCTION

1.1 Project Background

Baby-Friendly Pediatric Ward Information System (BFIS) is developed for Children Pediatric Ward in Hospital Jasin, Malacca. Hospital Jasin, Malacca was built on land covering an area of 34,529 acres. It starts on October 16, 2001 and completed on 20 September 2004. Hospital Jasin new phase has been submitted to the Ministry of Health on 12 January 2005, and so began service on March 1, 2005. In-patient services commenced operations on March 18, 2005. Children's Ward 1A is one of the ward provided in Hospital Jasin, Malacca. In this ward there are 20 beds. This ward is located on the ground floor of the building between the Jasin Hospital Rehabilitation Unit and Unit dish. The hospital received only normal cases such as tonsillitis, viral fever, dengue fever, pneumonia and jaundice. There are two doctors on duty and a nurse who monitors the patient's condition from time to time to make an assessment, diagnostics and treatment, patient care and recovery.

Mission for the children's ward 1A is to provide effective treatment to provide quality, ethics, efficient and professional to infants, children, parents and guardians. Vision for the children's ward 1A is to create an atmosphere of teamwork in providing quality service and ethical. In the Children's Ward 1A, nurses are still using paper based to create a report about the current state of the patient's condition and medication prescribed by doctors to give to patients. Each patient has their own files, which the nurses would write everything he or she does like giving medication, injections and so forth in the following form. Every action must be signed on the forms as a proof. A guardian will be given a form to fill in, which the loss of goods while in the hospital is not the responsibility of the hospital. Guardian will be given a briefing on the steps required when caring for their children. Only one of the guardian were allowed to visit their children at any one time.

First of all, BFIS is a computerized system that are develops to surpass the manual system, where staff are still using paper based. The files which containing data relating to the patient will be forfeited if the patient no longer come within more than 5 years. By using BFIS, the handling warded process will become easier for the users and patients. With this information, BFIS are able to manage patient, staff, schedule and generate a report. Thus, nurses are no longer required to fill in all the form on the paper.

1.2 Problem Statements

The current system has some drawbacks. Therefore, a new system is developed to overcome the deficiency of the current system.The problem is stated below:

1.2.1 Difficulty in maintaining paper-based patient details and warded history

The current system is said to be characterized as non-safe and non-systematic management, where patient records are still kept in paper form and has its own file that requires Mykid patients. The data will be stored in a specific place, based on the Mykid number. This identification number is recognized by the birth certificate of the number and passport for non-Malaysians. Nurse will keep patient information recorded in the report card. Nurses also need to write down again regarding on the patient data if the data need to be changed. Therefore, the Hospital requires a big space to store the patient's card in a Hospital. Thus, these were the reason why some of the record will be removed if the patient never came to the hospital for a few years.

1.2.2 Lack of accessibility control in patient information

By using paper-based system, the data cannot being controlled from being hacked by unknown person who may have bad intentions. Thus, patient privacy and confidentiality were not achieved.

1.2.3 The current practice cannot generate historical reports about patient detained in ward

Staff at Children Pediatric Ward in Hospital Jasin, Malacca need to generate the historical reports about the patients detained in ward manually by their own.

1.3 Objective

This Baby-Friendly Pediatric Ward Information System is developed to archive the objectives and is said to be able to give an advantages to the Children Pediatric Ward management. The objectives of this project are:

1.3. To maintain patient information and warded history in a computerized system

BFIS will be generated in order to record and stored all the data and information in a specific table. This system will contain patient data, patient warded report, and staff schedule to treat patient. Patient need to fill the required form, then the nurse will key in the data in the system.

1.3.2 To manage accessibility control of patient information

This system allow only authorized user to access and manage the information in this system. In order to access this information, system users are provided with a user id and password to increase system security in managing data and to keep their valuable assets and data inside while keeping threats to their security outside.

1.3.3 To generate a historical report about patient detained in ward systematically

This system can help the doctor to generate the historical report about the number of patient detained in ward systematically by the system. Report can be generated in more proper and interesting way to get user attention and understanding effectively.

1.4 Scope

The scope of Baby-Friendly Pediatric Ward Information System (BFIS) for Hospital Jasin, Malacca will be the user and modules. User will use and control the system in Children Pediatric Ward which are doctors and nurses. On the other hand, modules in based on the functionality of the system. The scopes which consist of user and modules are explained as below:

1.4.1 User

This system was develop using:

a. Software
   - Operating system (Microsoft Windows)
   - Web Server (Apache)
   - Programming Language (PHP)
   - Database (Oracle 10g Express Edition)

b. Hardware
   - Computer/Laptop
   - Printer

1.4.1.1 Doctor

The doctors will check or select personal data and medical warded history of patients that receive treatment from Children Pediatric Ward at Hospital Jasin, Malacca. This means that doctor are able to view patient detained in ward and generated historical report of patients in ward. Doctor is able to update their own profile and view their own schedule for visiting patients in ward.

1.4.1.2 Nurse

The nurse is a person who worked at Children Pediatric Ward in Hospital Jasin, Malacca. The nurse are able to view patient who do not reside in the ward and then enter the patient data into the system if the patient should be detained in ward. Besides, nurse are able to assign available doctor to the patient who detained in ward and are able to update the data if the patient is discharge. Next, nurse are also able to register new bed into the system. Next, they are also can view their own schedule in a system.

1.4.2 Module

1.4.2.1 Registration

User must register before they can login to the system. They must have the user id and password to allow them to access the system.

1.4.2.2 Nurse and Doctor Assignation

Nurse and Doctor will be assigned for a specific patient to do a treatment in a ward. Each staff will have their own schedule in order to treat patient who detained in a ward in order to monitor the patient health conditions. Each patient may be assigned to a different nurse and doctor.

1.4.2.3 Patient Warded Record and Reporting

Doctor will compile all patient warded history in warded log table. So that, the doctor and nurse are easy to keep track any patient's information regarding patient

treatment. Besides, users are able to produce daily and monthly report for the number of patients detained in Children Pediatric Ward in Hospital Jasin, Malacca.

1.5 Project Significance

Baby-Friendly Pediatric Ward Information System (BFIS) for Hospital Jasin, Malacca is a system that hopefully will give an impressive impact to the staff who use this system since this system are going to give an advantages to the user. On the other hand, this system will ensure the user security in terms of keeping patient's data history safely in a database. Thus, patient privacy and confidentiality were achieved. This system is also equipped with high manageability of data on the patient's history to be retrieved from the database.

This system enables a user, such as a doctor to check or select personal data and medical treatment history of patients that receive treatment from the Hospital and able to manage medical treatment history of patients. This system also enables a user, such as nurse to manage the patient's information. Last but not least, this system will ease the user because the system is equipped with the features needed in order to manage the patients.

1.6 Expected Output

Output 1:

Multi-dimensional searching results screens which are generated based on join queries and sub-queries results.

Output 2:

Accurate daily and monthly warded report in a graph form which can be printed through the system.

Output 3:

Staff information report in tabular format which can be displayed through the system.

1.7 Conclusion

This chapter describes the introduction of a Baby-Friendly Pediatric Ward Information System (BFIS) that would be developed. Developers are required to achieve the objectives that has been point out in the proposal. In addition, BFIS must develop a web-based and systematic system which has a database system that can accelerate re-normalize the data to users and reduce data duplication. As a result, the activity of the database design and user interface that will be done to clarify the needs of the system.

CHAPTER II

PROJECT METHODOLOGY AND PLANNING

2.1 Introduction

Software Development LifeCycle (SDLC), also called as Software development process is a structured approach to the development of software. According to Connolly and Begg (2010), Software Development Lifecycle was proposed to solve the problem of the failure of software projects which is a lack of a complete requirements specification, lack of an appropriate development methodology, and poor decomposition of design into manageable components. However, when the software being developed is a database system, the lifecycle is more specifically referred to as the Database System Development Lifecycle (DSDLC) or Database Lifecycle (DBLC). The stages of the database lifecycle are shown in Figure 2.1. However, the data conversion and loading phase and the operational maintenance phase are not included in the process of developing *Baby-Friendly Pediatric Ward Information System (BFIS).*

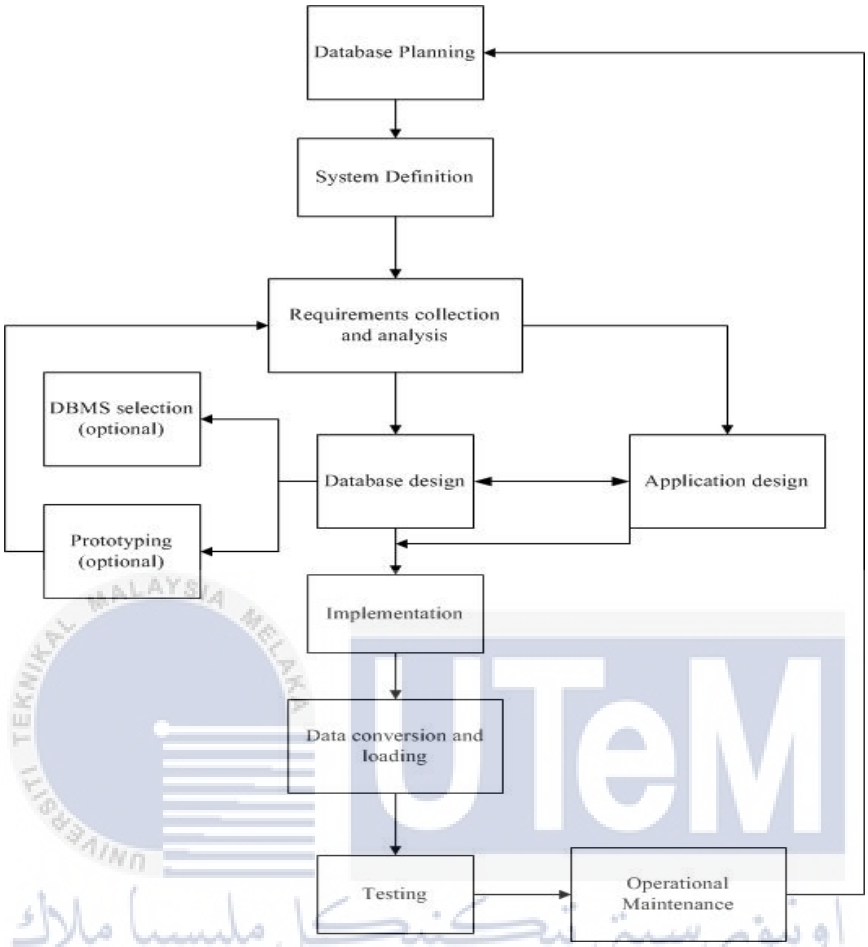

Figure 2.1: DBLC (Connoly Begg, 2010)

2.2 Project Methodology

The first phase in database lifecycle is database planning. Database planning is a management activity that allows the stages of the database lifecycle to be realized as efficiently and effectively as possible. The Information System strategy of the organization must be integrated with database planning. This phase clearly defines the mission statement and objectives for the database system. The mission of *Baby Friendly Pediatric Ward Information System (BFIS)* is to provide effective treatment to provide quality, ethics, efficient and professional to infants, children, parents and guardians.

While the objectives of *BFIS* are to maintain patient information and warded history in a computerized system, to manage accessibility control of patient information, and to generate a historical report about patient detained in ward systematically. Concisely, this phase explains about planning how the stages of the lifecycle can be utilized in most efficiently and effectively.

The second phase in database lifecycle is system definition. This phase describes the scope and boundaries of a database system and the major user views. The major users for *BFIS* are divided into two category which is Hospital Jasin Pediatric Ward doctors and nurse. Each user in this system has different access right on the system. This system has several modules need to be completed in the attempt to keep the project on the track from inception until completion. The module used in *BFIS* are user authentication module, registered member module, a patient module, schedule module, bed module, warded module and lastly, is generate report module. In essence, this phase specifying the scope and boundaries of the project, including the major user views, its users, and application areas.

The third phase in database lifecycle is requirement collection and analysis. In this phase, the process of collecting and analyzing information about the organization that is to be supported by the database system is explained, and this information is used to identify the requirements for the new system. Several studies and observation performed shows that the current patient warded management for Hospital Jasin is still using a manual system and was found to be inefficient in meeting the growing demands of the population. The deficiencies are detected in the existing system such as all the record related to patient detained in ward are only saved in the paper-based system, not in the automatic system, the information of patient warded record is not properly recorded. Therefore, the requirements for the new system is identified based on the information from the requirements collected and analyzed on the current manual system.

Hence, *BFIS* is developed in order to overcome the deficiency in the current management of Pediatric Ward in Hospital Jasin by helps to authenticate the validity of

doctor and nurse before they can use the system, enables doctor to view patient warded history through the system and enables nurse to assign patient into warded and assign available doctor to treat the patient. Briefly, this phase elaborates about the activities of collection and analysis of the requirements for the new database system. The details of this phase will be explained in Chapter III – Analysis.

The next phase in database lifecycle is database design. This phase explains in detail the process of creating a design that will support the enterprise's mission and objectives statement for the required database system. The database design phase is made up of three main phases which are conceptual database design, logical database design, and physical database design. This phase will be explained in details in Chapter IV – Design.

Conceptual database design is the process of setting up a model of the data, independent of all physical considerations. The data model of *BFIS* is built using the information documented in the previous phase, requirement collection and analysis. In this phase, the Entity Relationship Diagram (ERD) for *BFIS* is developed, and the relationships and the participation constraints in the form of business rules are described in details. The conceptual data model is a source of information for the next phase, called logical database design.

Logical database design is the process of developing a model of the data dictionary and query design based on a particular data model, but independent of a specific DBMS and other physical considerations. The conceptual data model created in the previous phase is refined and mapped onto a logical data model. The technique of user transaction is used in *BFIS* to test the rightness of a logical data model and to validate the conceptual design.

While, a physical database design is a process of producing a description of the implementation of the database on the secondary storage. This phase is the third and final phase of the database design process. This phase also describes the selection of DBMS,

usage of stored procedures, triggers, and other related database objects, security mechanism (privileges, passwords, user-level security), and database contingency (backup and recovery mechanism) for the *BFIS.*

Another phase in database lifecycle is DBMS selecting. In this phase, an appropriate DBMS is chosen to support the database system. Oracle Database 10g Express Edition has been chosen to be implemented on *BFIS.* Various features are used to evaluate the selected DBMS product, Oracle Database 10g Express Edition that will be implemented in *BFIS*. The possible elements for evaluation are grouped by data definition, physical definition, accessibility, transaction handling, utilities, development, and other features. The final step of DBMS selection is to document the process and to provide a statement of the findings and recommendations for Oracle Database 10g Express Edition. In short, this phase guides how to select a suitable DBMS for the database system.

Besides, the next phase in database lifecycle is application design. This phase involves the design of the user interface and the application programs that use and process the database. There are several guidelines used in designing a user interface for *BFIS* such as meaningful title, comprehensible instructions, consistent use of color, error messages for unacceptable values and others. Concisely, in this phase, the user interface and application program for the system are defined and designed.

Moreover, another phase in database design is implementation. The physical realization of the database and application designs are explained in this phase. The database implementation for *BFIS* is achieved using the DDL of Oracle DBMS. Any specified user views are also applied at this stage. Besides, the application programs for *BFIS* are embedded within a host programming language, PHP. Security and integrity controls for the system are also be implemented. This phase will be explained in details in Chapter V – Implementation.

The final phase in database lifecycle is testing. This phase involves the process of running the database system with the intent of finding errors. Before *BFIS* is going live, it should be thoroughly tested. Testing of the system will be covered the usability of the database system. After testing is complete, the *BFIS* is ready to be signed off and handed over to the users. Briefly, in this phase database system is tested for errors and validated against the requirements specified by users. The details of this phase will be explained in Chapter VI – Testing.

2.3 Project Schedules and milestone

Table 2.1 Project Schedule and milestones

Milestones	Expected Documents	Dates
1. Proposal PSM	1. Proposed proposal • Executive summary of project proposal • Project background • Problem statements • Objective of the project • Project methodology • Expected results/Benefit • References	Week 1 22 – 26 February 2016
2. Proposal Correction /Improvement	1. Proposed proposal with correction/improvement • Executive summary of project proposal • Project background • Problem statements • Objective of the project • Project methodology	Week 2 29 February 2016 – 4 March 2016

	• Expected results/Benefit • References	
3. Approval of Proposal	1. Submission of the proposal 2. Approval of the proposal	Week 3 7 – 11 March 2016
4. Introduction	1. Chapter 1 (Introduction) • Project Background • Problem Statements • Objective • Scope • Project Significance • Expected Output • Conclusion	Week 4 14 – 18 March 2016
5. Project Methodology and Planning	1. Chapter 2 (Project Methodology and Planning) • Introduction • Project Methodology • Project Schedule and Milestones • Conclusion	Week 5 21 – 25 March 2016
6. Problem Analysis	1. Chapter 3 (Analysis) • Introduction • Problem Analysis • Proposes Improvement/Solution • Requirement Analysis of the to-be system • Functional Requirement • Non-functional Requirement • Other Requirement • Conclusion	Week 6 28 March – 1 April 2016
7. Design	1. Chapter 4 (Design)	Week 7

	• Introduction
	• System Architecture Design
	• Database Design
	  - Conceptual Design
	  - Logical Design
	  - Physical Design
	• Graphical User Interface (GUI) Design
	• Conclusion
		4 – 22 April 2016

8. Implementation of the system	1. Chapter 5 (Implementation) • Introduction • System Development Environment • Database Implementation • Conclusion	Week 8 25 – 29 April 2016
9. Test of the project system	1. Chapter 6 (Testing) • Introduction • Test Plan • Test Strategy • Test Design • Test Results and Analysis	Week 9 2– 6 May 2016
10. Project Demonstration and PSM Report	1. Project demonstration of the system 2. Project Report	Week 10 9– 27 May 2016
11. Final Presentation	1. Final presentation of the system to supervisor and evaluator.	Week 11 30 May – 3 June

2.3.1 GANTT CHART

Table 2.2 Gantt chart of project activities

No.	Task Name	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15
1.	Verification of Proposal	■														
2.	Preparing chapter 1 and system progress		■													
3.	Preparing chapter 2 and system progress			■	■											
4.	Preparing chapter 3 and system progress					■										
5.	Preparing chapter 4 and system progress						■	■	■	■						
6.	Demonstration presentation to supervisor								■	■						
7.	Preparing final report										■	■	■			
8.	Final preparation													■	■	
9.	Presentation of system															■

2.4 Conclusion

As the conclusion, this chapter also explains briefly on the system project management in the schedule and milestones as guide while developing the system. The next chapter will discuss about the undertaking necessity which is including the product prerequisite, equipment prerequisite and other pre-requisite which is functional and non-functional requirement.

CHAPTER III

ANALYSIS

3.1 Introduction

Identification and analysis of needs is an important phase of the project lifecycle to ensure that the implementation proceeds in comprehensive, cost-effective and efficient. System analysis frequently goes specifically from the truth finding to execution dependent data analysis. The data and information that are collected from the Hospital Jasin, Malacca, and the information is examined and analyzed a framework representation as a functional and non-functional functional which determines the structure of the information and the procedures which utilize the information. Hence, it is important to ensure that the duration period of time this system regulations require can be completed within a predetermined period of time.

3.2 Problem Analysis

Baby-Friendly Pediatric Ward Information System (BFIS) is a system developed for Children Pediatric Ward in Hospital Jasin, Malacca in order to accommodate the uses and advantages of using BFIS. In the current system, files containing data relating to the patient will be forfeited if the patient no longer comes within more than 5 years. So, the new system, will give the advantages for users and patients in handling management of the treatment process in ward. Then arise some problems in the management of patient's details that cannot be avoided. Among the problems was record of patients where nurse have to fill all the forms on the paper after the doctor monitor patient health conditions during detained in ward, which can be said as less effective, less systematic and system access. Here is the flow how this old system work on managing patient's and report process:

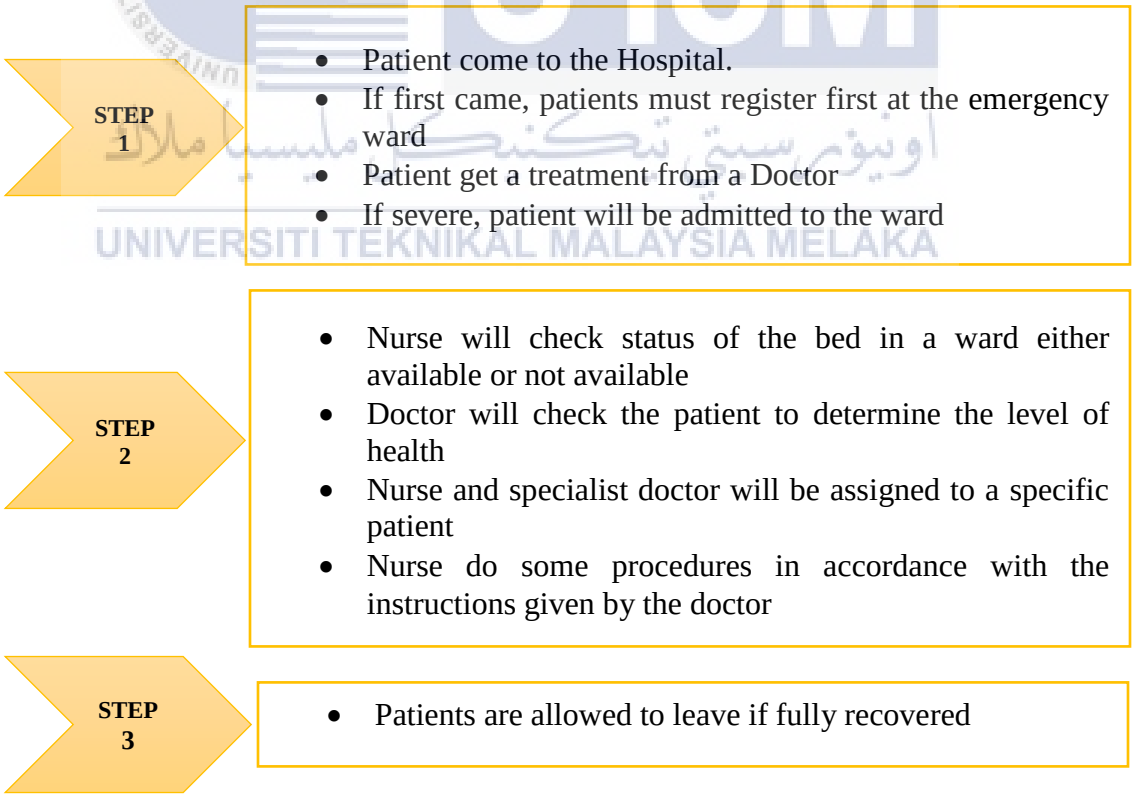

Figure 3.1: Flow of current business

3.3 The proposed improvements/solution

According to the current manual system, a web-based system that must produce to manage all the information related to patient's details and reports. Therefore, a system of managing Pediatric Ward in Hospital Jasin, Malacca will be developed for the purpose of managing all patient's treatment reports in a ward that has been produced to the user. This system will be a medium for doctor and nurse regarding to managing patient's data simultaneously. In this system, doctor are able to view the history of patient detained in ward and able to view his or her own schedule in order to treat a particular patient in a particular ward. Administration staff who could be the doctor or the nurse is able to generate reports of number of patient detained in ward daily and monthly.

Besides, nurse are able to view information on patients who do not reside in the ward and enter the patient data into the system if the patient should be detained in ward. Besides, nurse are able to assign an available doctor on certain time to the patient who detained in ward and are able to update the data if the patient was discharged from the hospital.

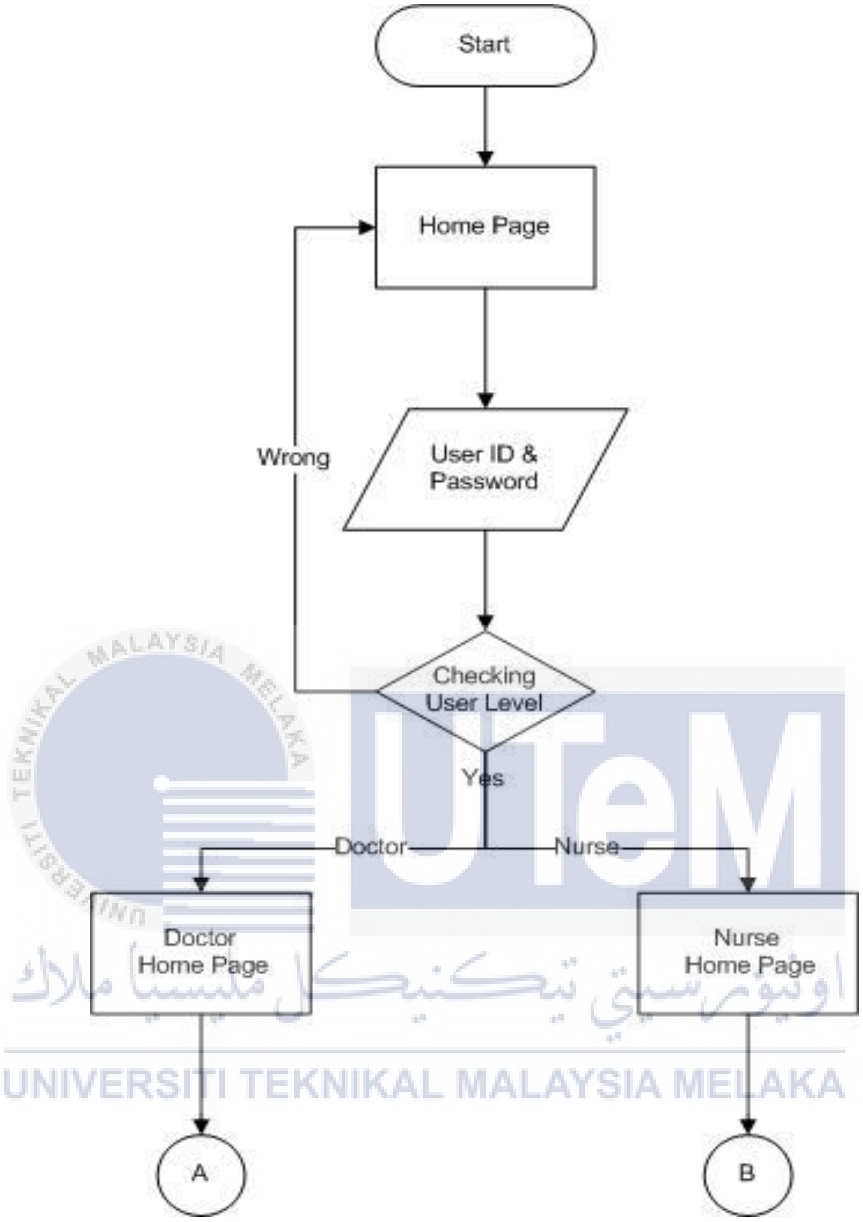

Figure 3.2: Flow Chart of the login page

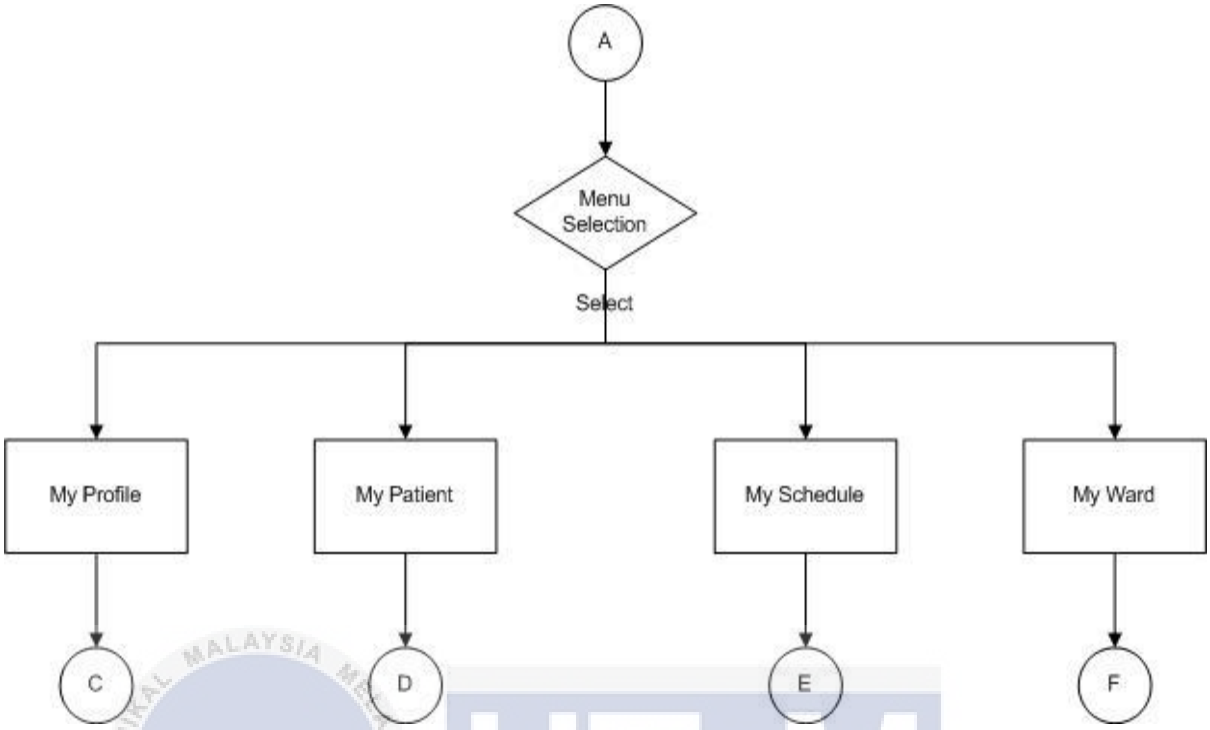

Figure 3.3: Flow Chart of the doctor page

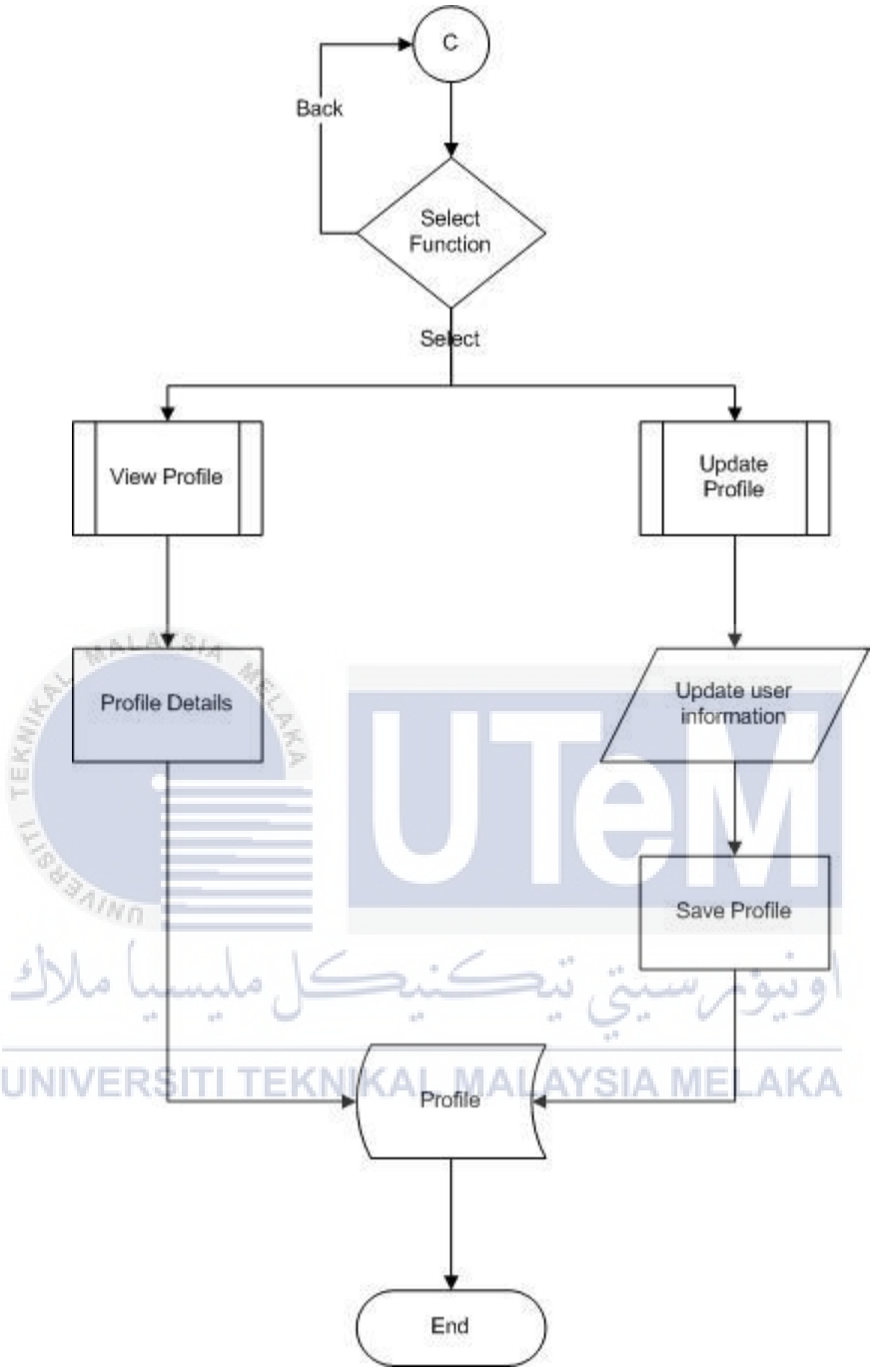

Figure 3.4: Flow chart of the doctor profile page

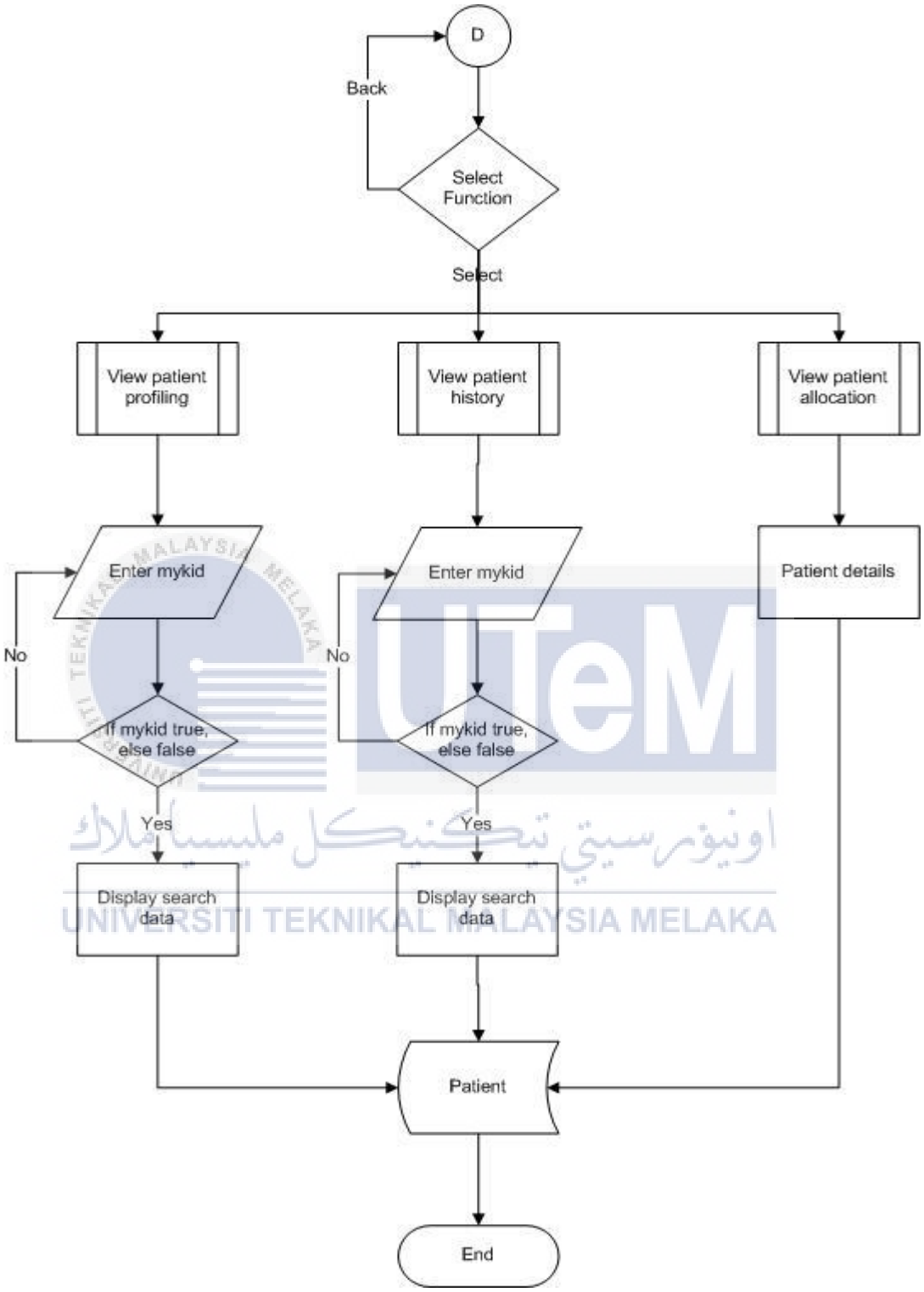

Figure 3.5: Flow chart for view patient by doctor

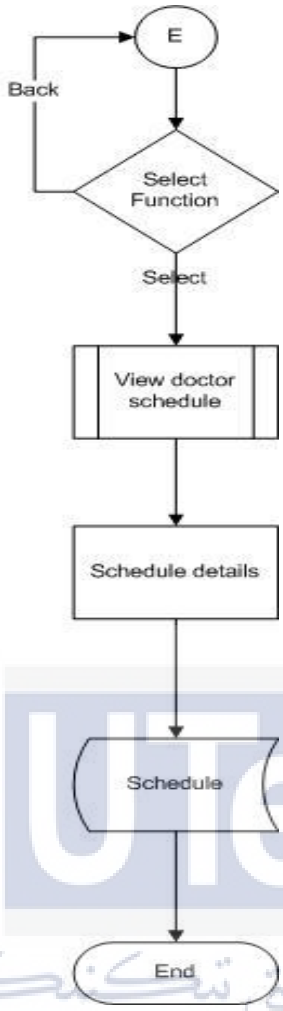

Figure 3.6: Flow chart for view schedule by doctor

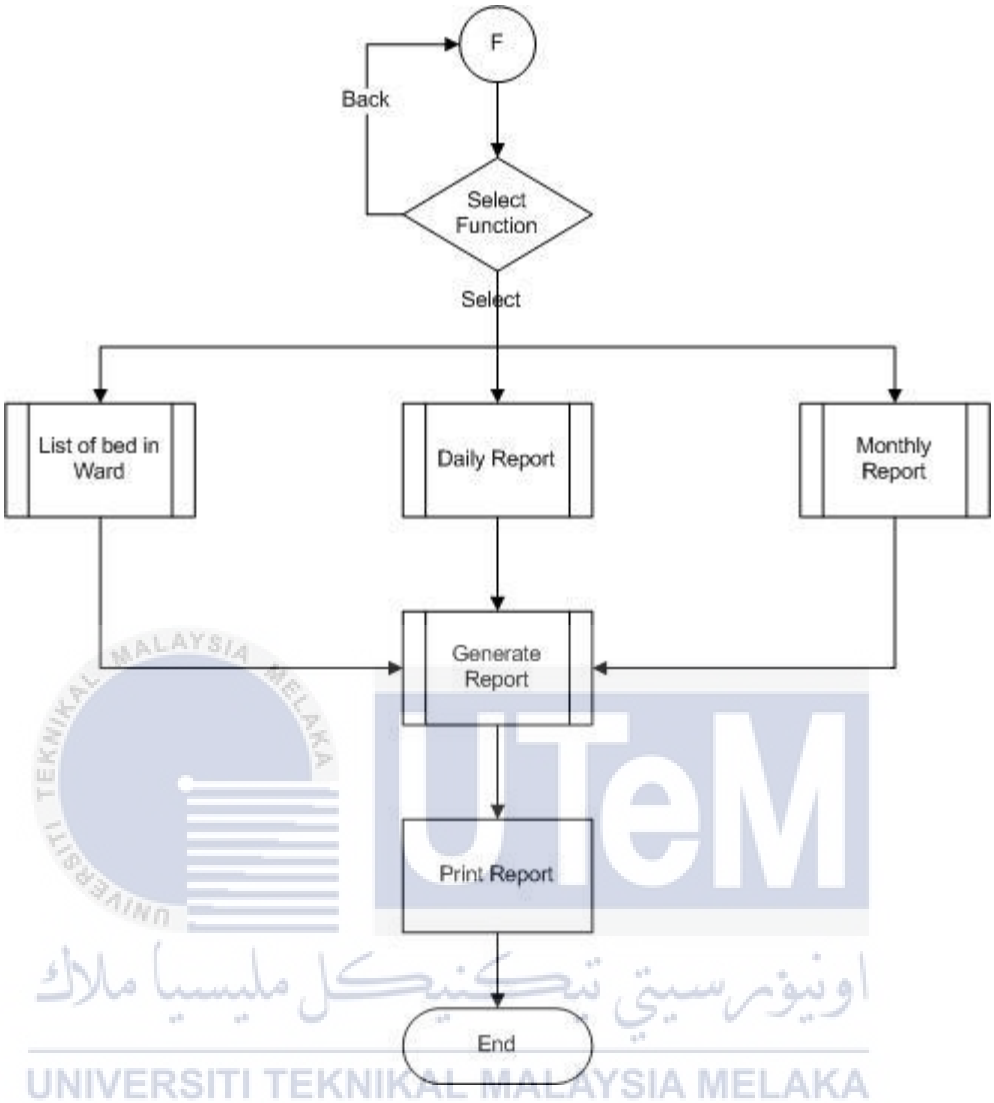

Figure 3.7: Flow chart for generate report by doctor

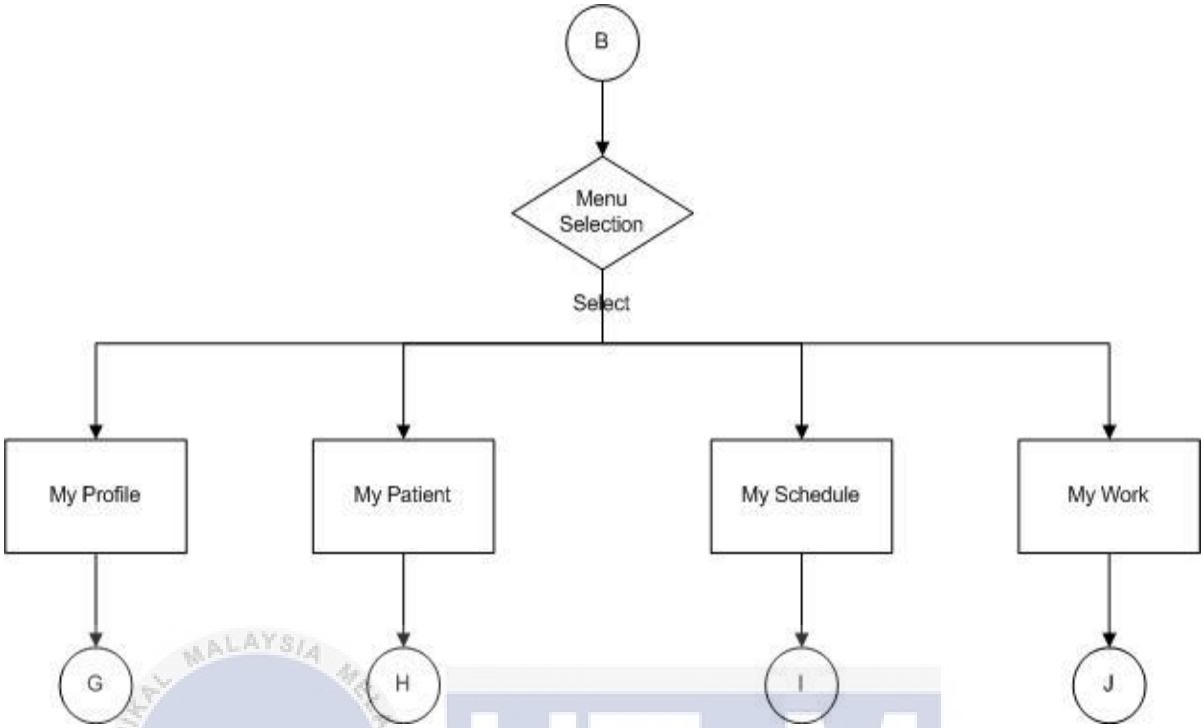

Figure 3.8: Flow Chart of the nurse page

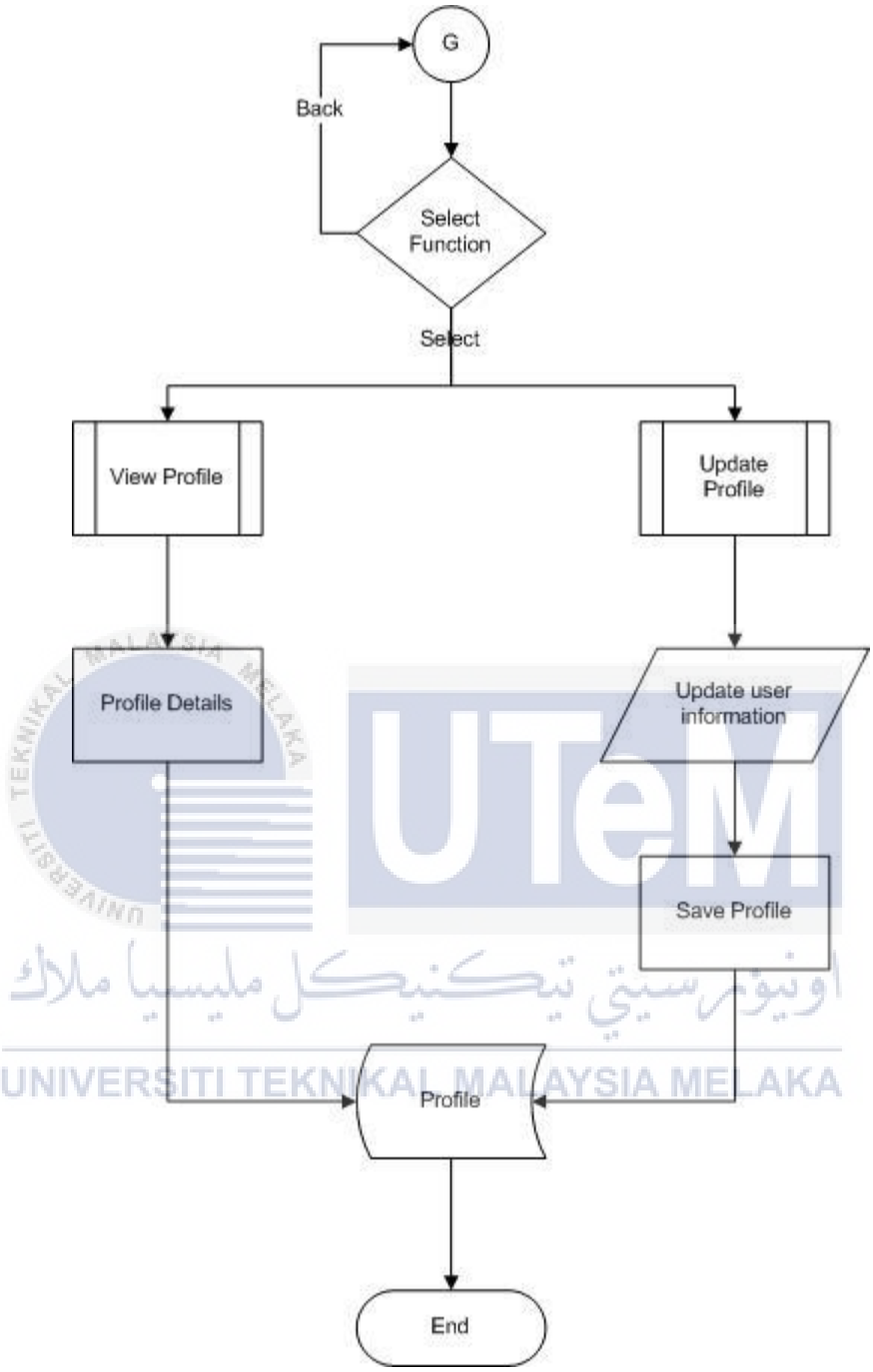

Figure 3.9: Flow Chart of the nurse profile page

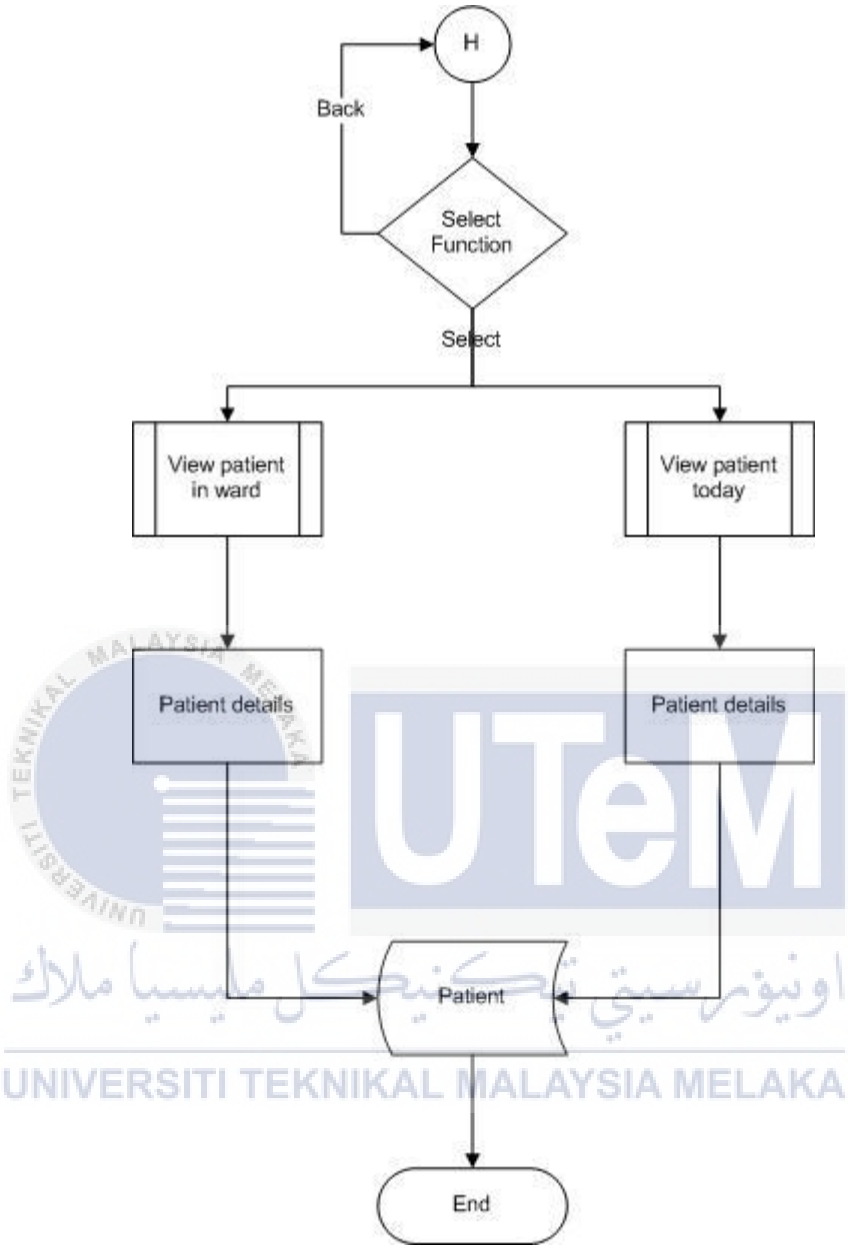

Figure 3.10: Flow Chart for view patient by nurse

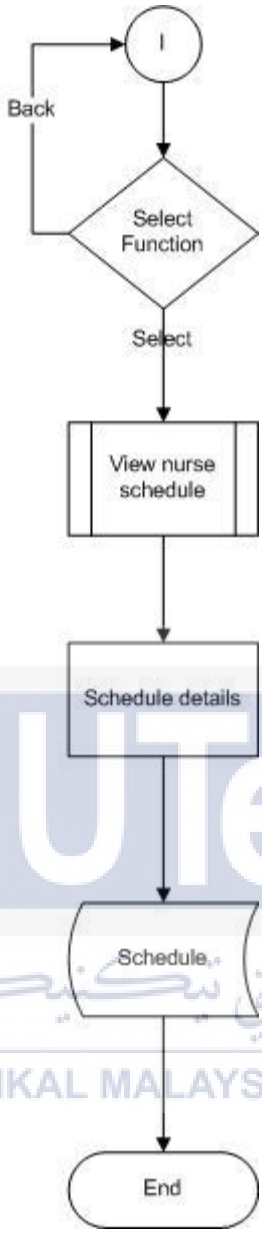

Figure 3.11: Flow Chart for view schedule by nurse

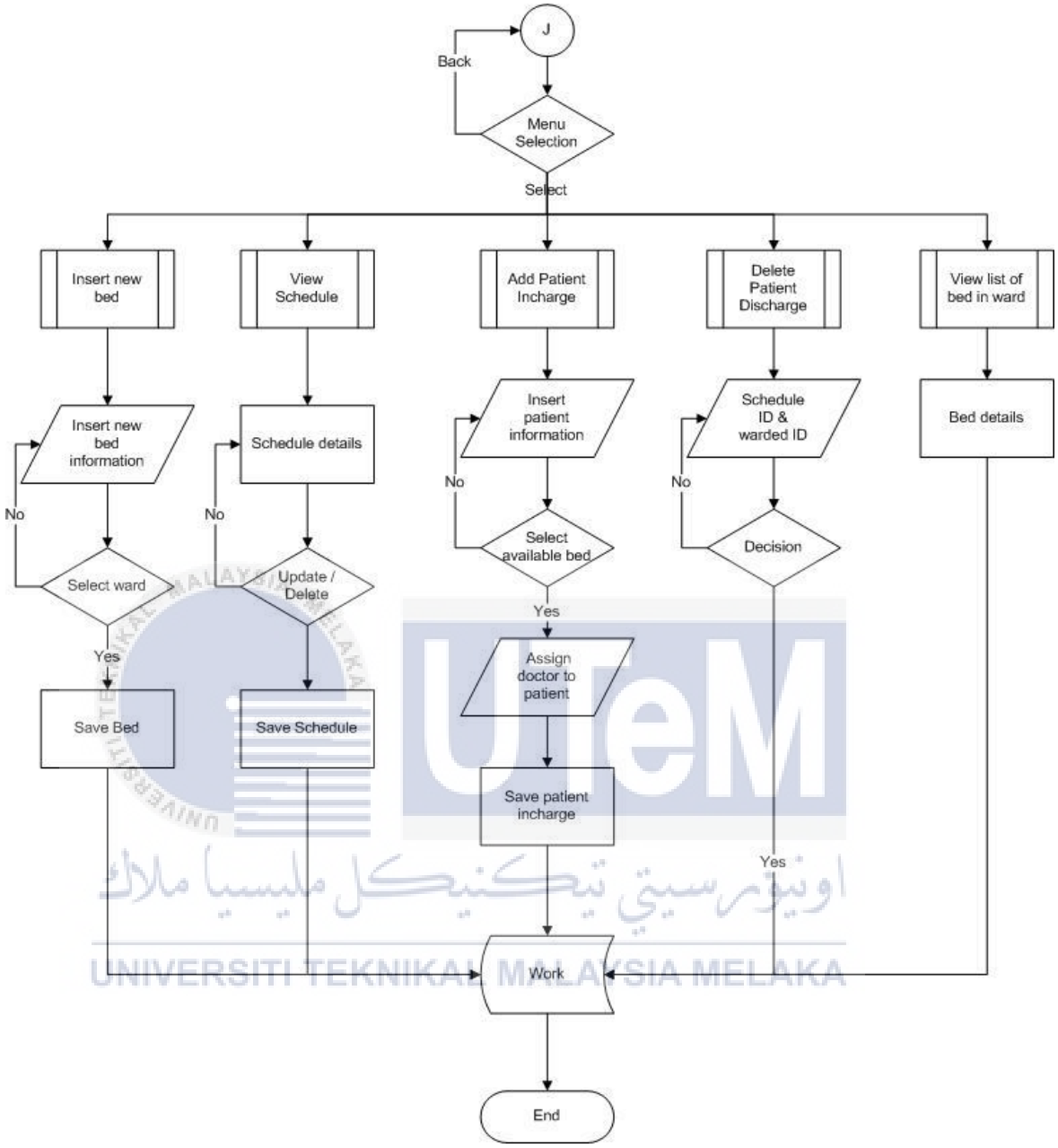

Figure 3.12: Flow Chart for manage patient by nurse

3.4 Requirement analysis of the to-be system

Requirement category are consist of functional and non-functional requirement. The explanation regarding functional and non-functional requirement is stated below:

3.4.1 Functional Requirement

The functional requirement is defined as a function of the system or its component as it related to the behavior of the system.

3.4.1.1 Function of the system

Table 3.1: Functional Requirement

No	Requirement	Description
1	Authenticate user	-The system is able to allow user to login and logout through the system -The system is able to verify and validate user id and password
2	Doctor management	-This system is able to manage patient warded information -This system is able to generate a report daily and monthly -This system is able to view the patient details -This system is able to view patient history details -This system is able to view user schedule -This system is able to view and update user profile
3.	Nurse management	-This system is able to view the patient details -This system is able to view patient in ward

		-This system is able to view patient on that day -This system is able to manage patient detained in ward -This system is able to view user schedule -This system is able to view and update user profile -This system is able to remove data when patient is discharged
5.	Reporting	-This system is able to generate multiple report -This system is able to print the report details.

3.4.1.2 Data Flow Diagram

A Data Flow Diagram (DFD) is a two-dimensional diagram that explains how data is processed and transferred into a system. The context diagram, and level 0 of the DFD have been illustrated from Figure 3.13 until Figure 3.19.

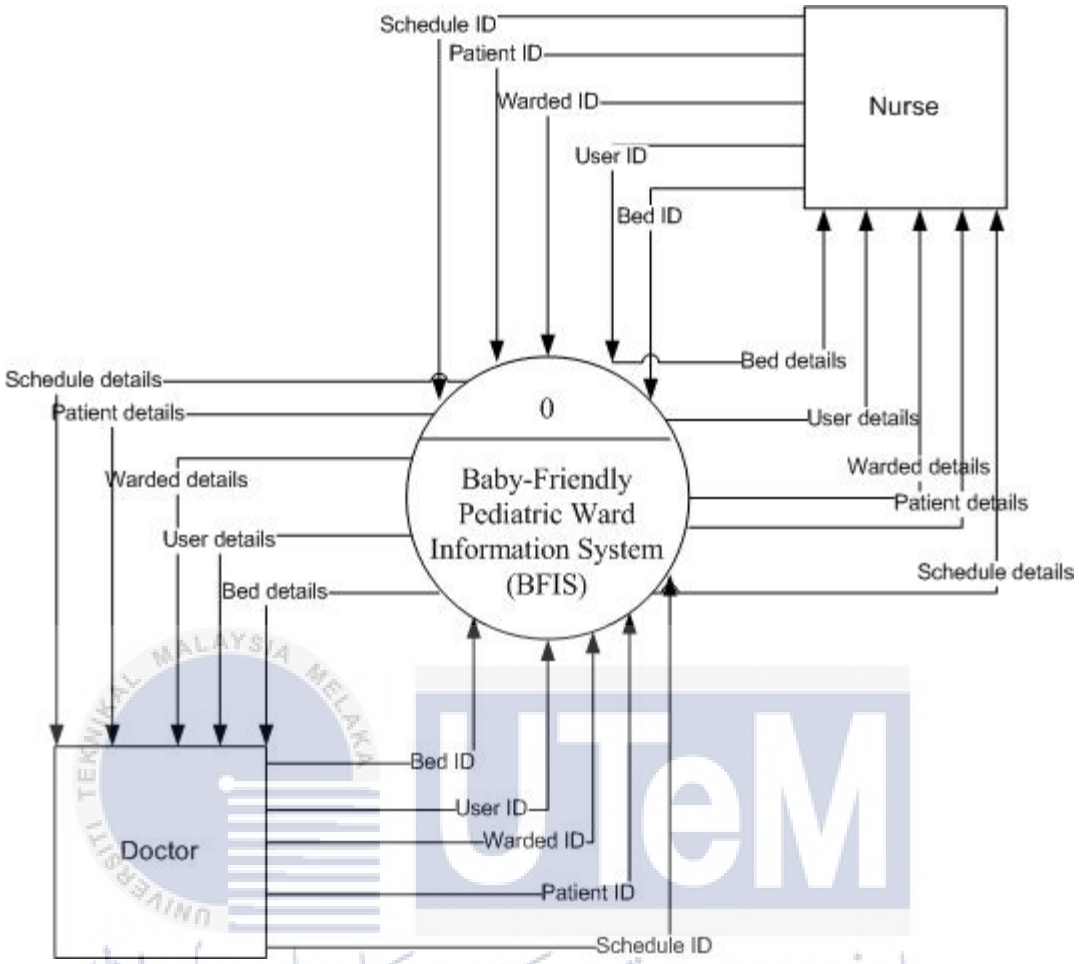

Figure 3.13: Context Diagram for BFIS

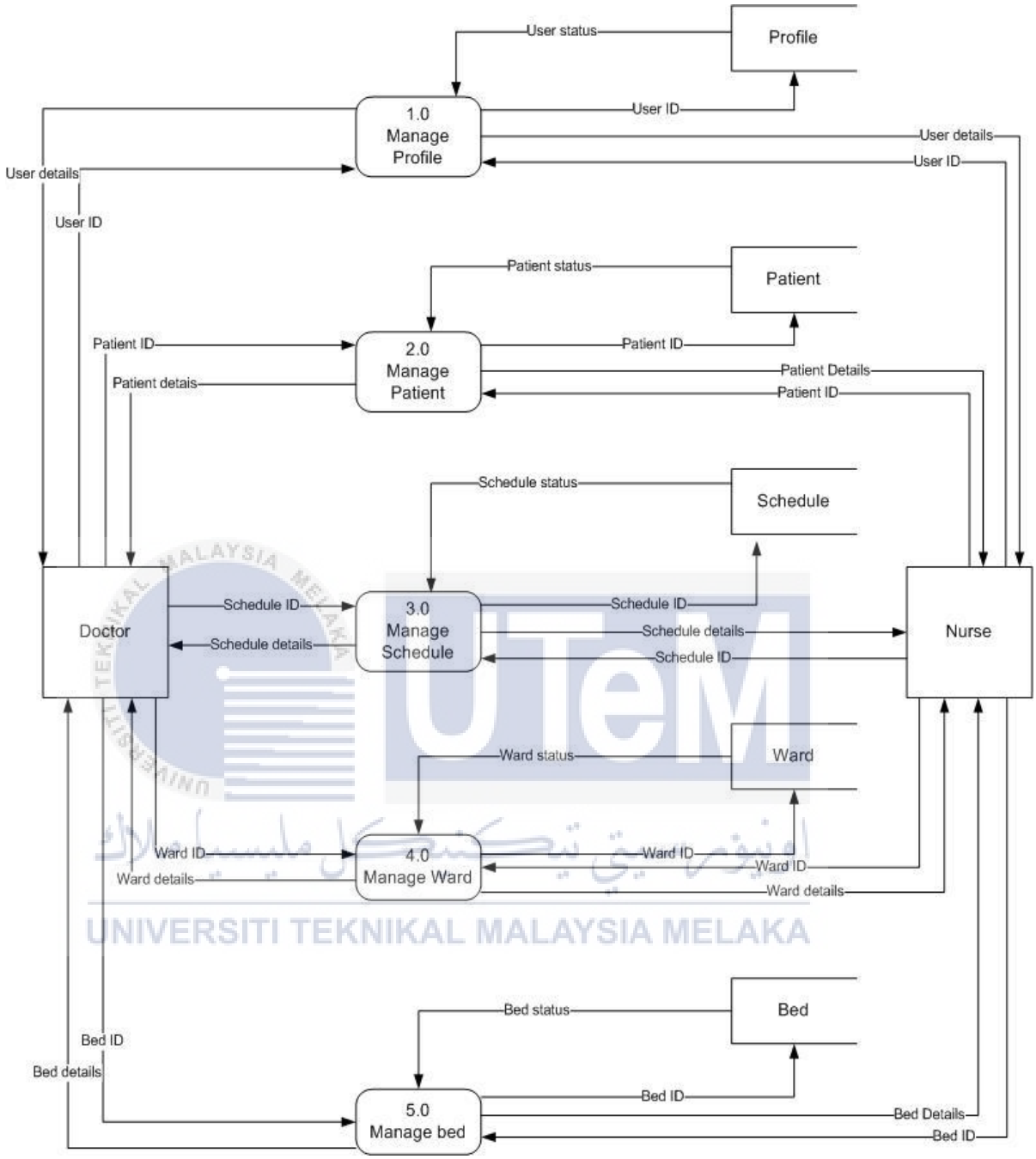

Figure 3.14: Level 0 of BFIS

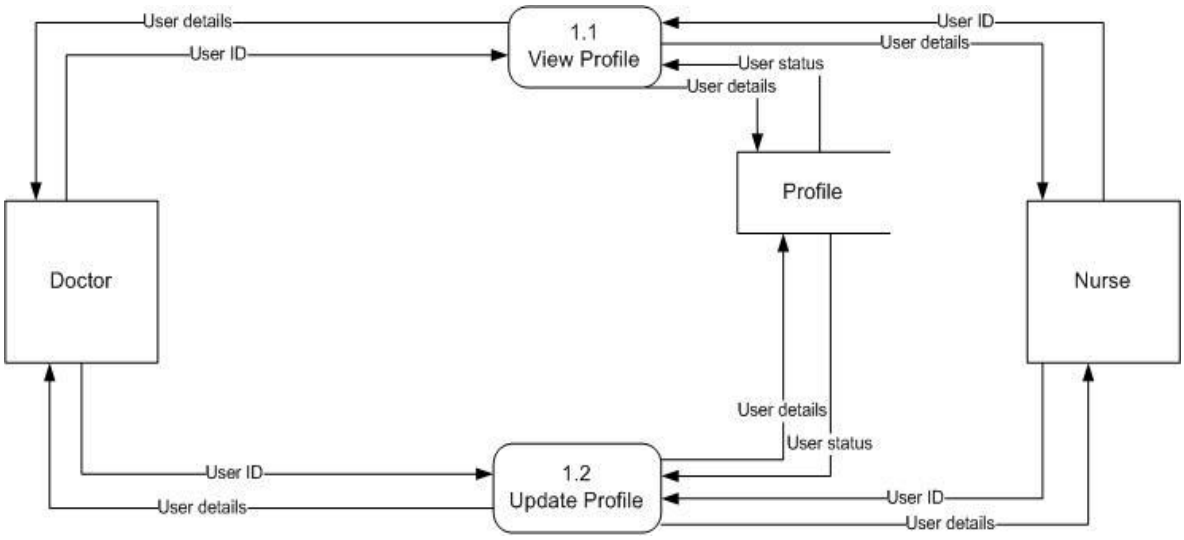

Figure 3.15: Level 1 for Process 1.0 Manage Profile

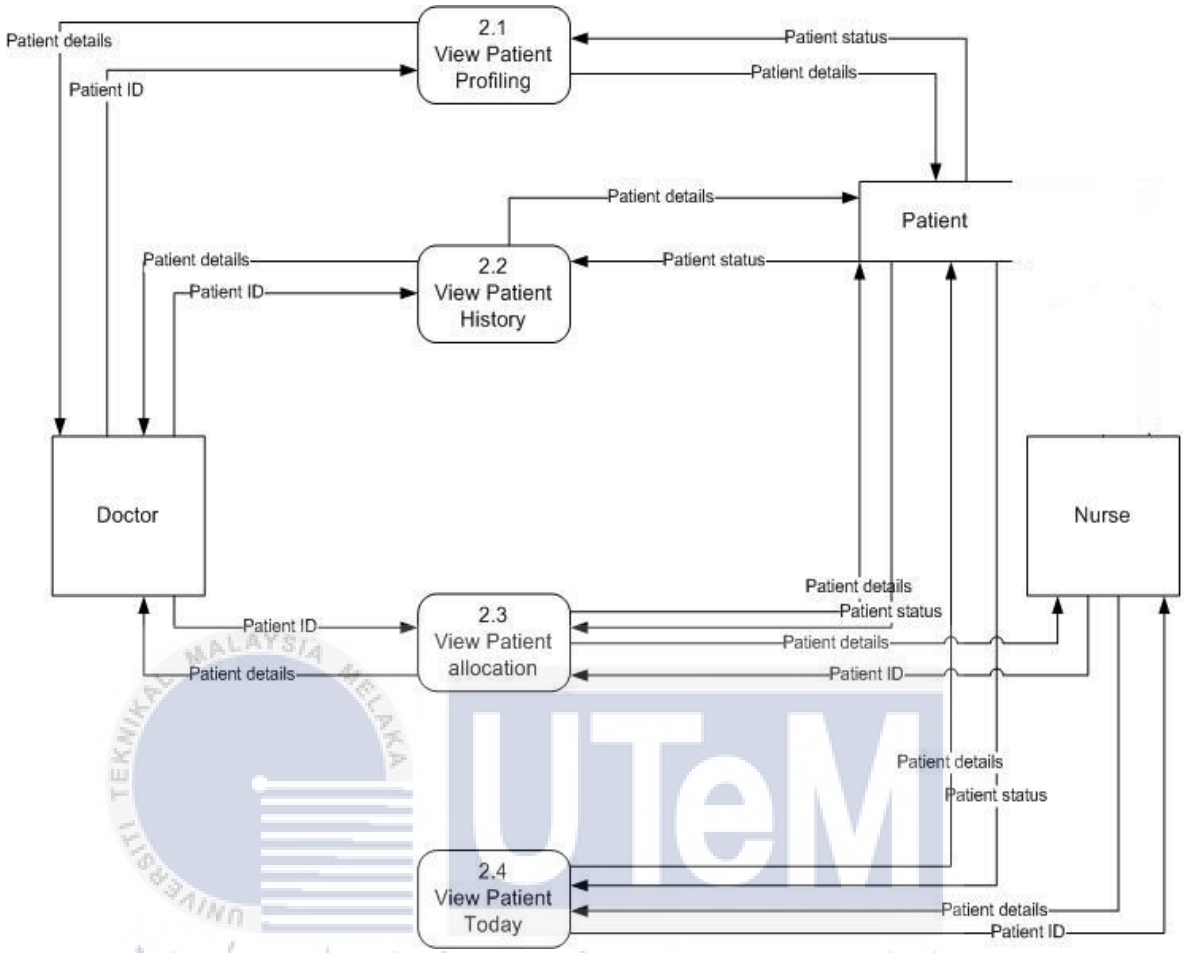

Figure 3.16: Level 1 for Process 2.0 Manage Patient

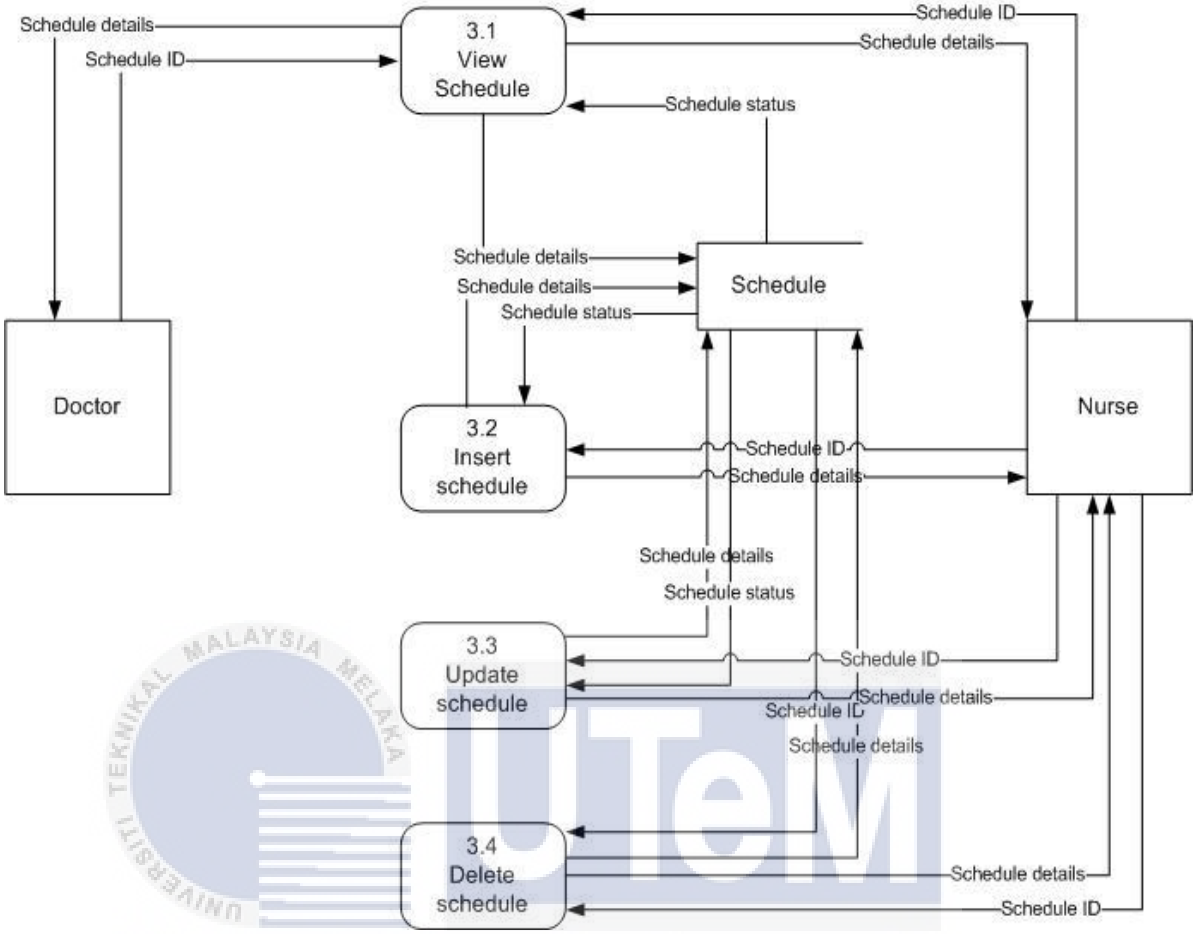

Figure 3.17: Level 1 for Process 3.0 Manage Schedule

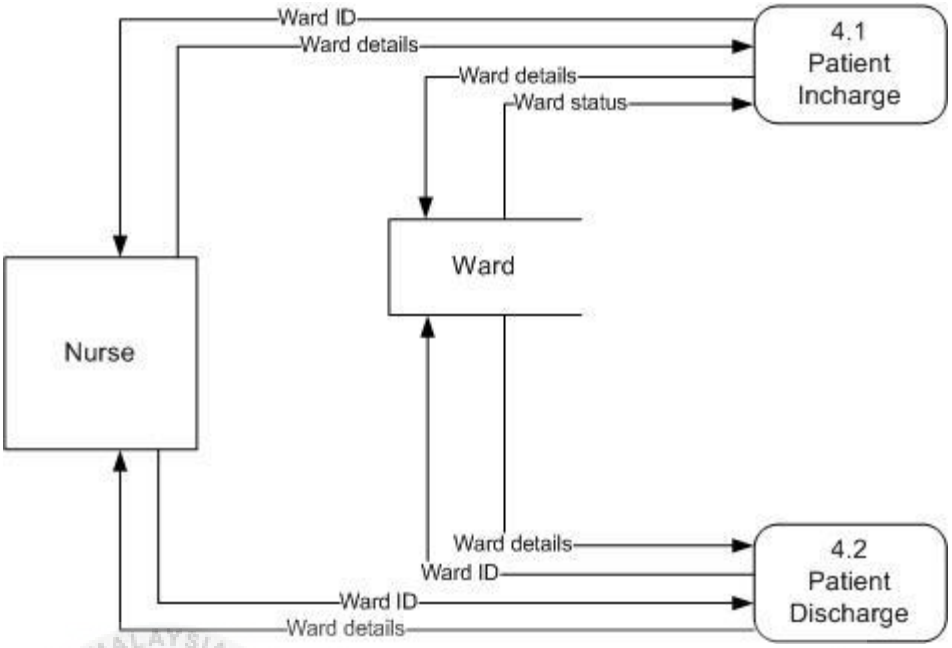

Figure 3.18: Level 1 for Process 4.0 Manage Ward

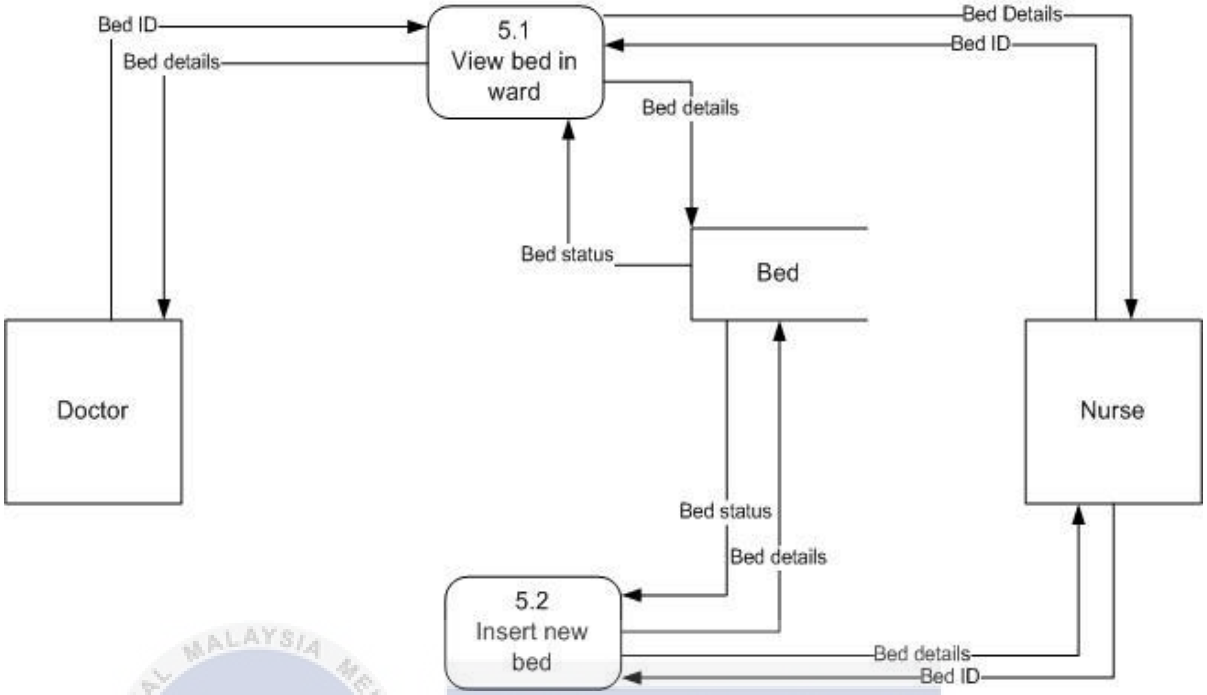

Figure 3.19: Level 1 for Process 5.0 Manage Bed

3.4.2 Non-functional Requirement

In systems engineering and requirements engineering, a non-functional requirement is a requirement that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors.

Table 3.2: Non-Functional Requirement

No.	Requirement	Description
1	Response Time	• Time taken to receive information. • Response time is below than 10 second.
2	Safety	• Not causing harm, injury or damage to users.
3	Database	• Structure, efficiency and integrity of stored data.
4	Integrity	• Preserving data contents and structures, especially when failures occur.
5	Efficiency	• Taking minimal time, effort, resources or cost to create, or operating a solution.

3.4.3 Other Requirements

This section consist of other requirement which have divided by three categories such as software requirements, hardware requirements and others requirements.

3.4.3.1 Software Requirements

1) Development Tool
    - Adobe Dreamweaver CS6
    - Adobe illustrator CS6
    - Xampp control panel Server v3.2.1 – win 32
    - Microsoft Office Visio 2010
    - Microsoft Office Word 2013
    - Microsoft Office Power Point 2013
    - Notepad++
2) Operating System
    - Windows 10
3) DBMS System
    - Oracle Database 10g Express Edition

3.4.3.2 Hardware Requirements

1) Personal Computer
    - At least 1 GB memory space to support the DBMS.
    - At least 80 GB storage space to support large number of data.
2) Printer
3) Scanner
4) Mouse

5) Internet cable
6) HDMI Cable
7) Projector
8) Thumb drive 8GB

3.4.3.3 Others Requirement

1. Google Chrome
2. Internet access
3. Video Player

3.5 Conclusion

As a conclusion, the current system has been modified become a better system with several of functionality. Some of the features of the current system are preserved such as the most important module which is prescription management. The following chapter will examine about the task outline where the physical design, conceptual design and logical design will be examined.

CHAPTER IV

DESIGN

4.1 Introduction

Database Design is the procedure of delivering a point by point information model of a database. This sensible information model contains everything the needed logical and physical outline decisions and physical storage parameters expected to produce a design in a Data Definition Language (DDL), which can be utilized to make a database.

Designing is the most crucial phase in the development of a system. The logical system design arrived as a result of system analysis and is converted into a physical system design. Physical design is a detailed description of what is needed to solve the

original problem. Input, output, databases, forms, codification schemes and processing specifications are drawn up into details. Data structure, control process, interface, documentation, and procedures are decided at this stage.

There are several techniques used for describing the system design of the system. These techniques are shown by using Entity Relationship Diagram (ERD), business rules, data dictionary and normalization, selection of Database Management System (DBMS), and the Graphical User Interface (GUI).

4.2.1 System Architecture Design

Architecture view are representations of the overall architecture that are meaningful to one or more stakeholders in the system. The architect chooses and develops a set of views that will enable the architecture to be communicated to, and understood by all the stakeholders, and enable them to verify that the system will address their concerns.

Web-based system is chosen as the architecture view in this project is because it suits the needs of customers who will place their orders online. Customers can place their orders by surfing the website easily. A web-based application is accessible anywhere and through any range of devices. Besides that, it is easier to install or to be maintained and it will grow as we grow.

Figure 4.1: Cloud based System

4.3 Database Design

This section is divided into three categories. Firstly is conceptual design, followed by physical and logical design.

4.3.1 Conceptual Design

Conceptual design consist of two subsection. The first one Entity Relationship Diagram (ERD). The second one is business rules.

4.3.1.1 Entity Relationship Diagram (ERD)

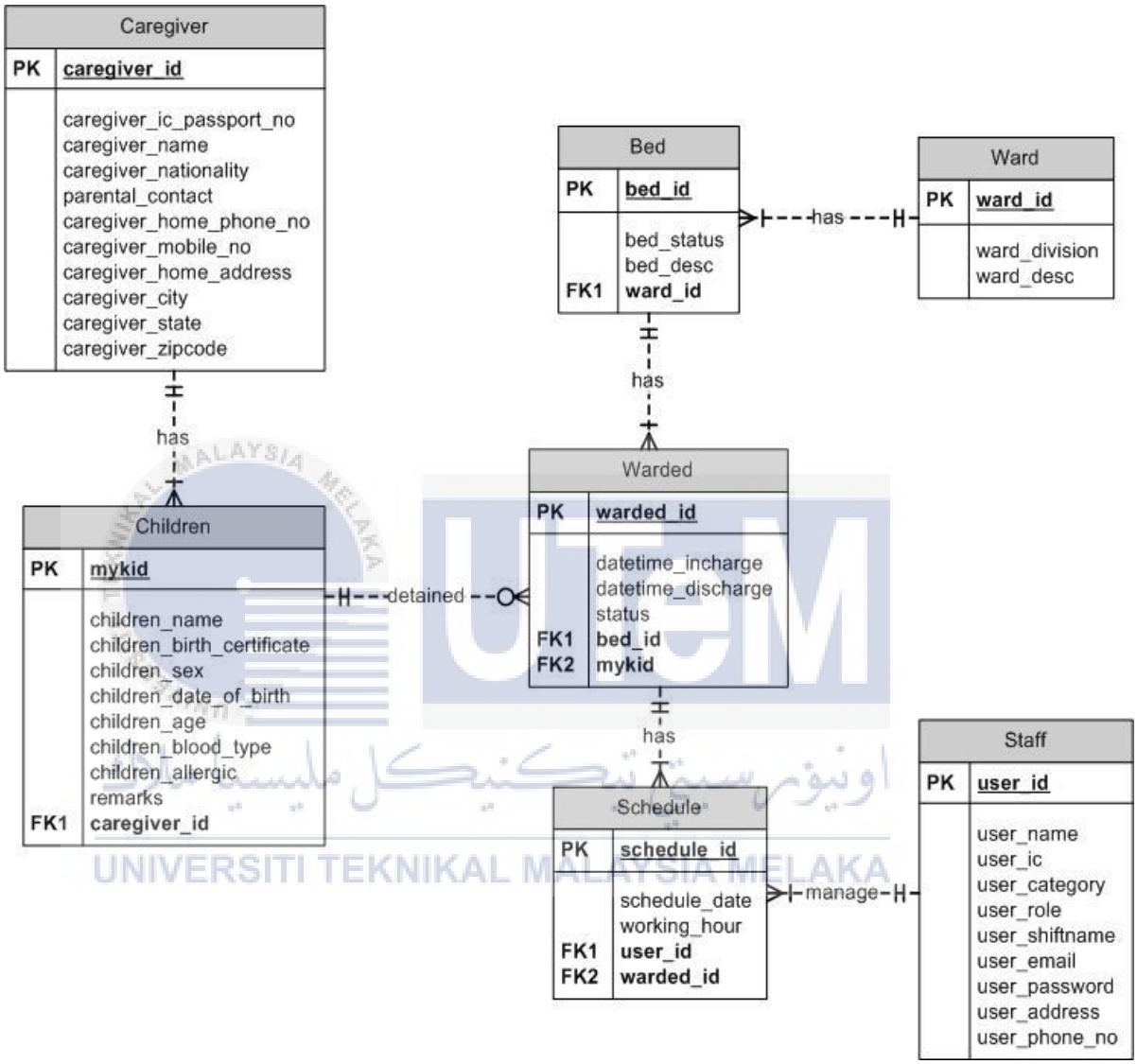

Figure 4.2: Entity Relationship Diagram (ERD) for BFIS

4.3.1.2 Business Rules

1. Each caregiver can have more than one children and one children can have only one caregiver.
2. Each ward can have more than one bed and one bed can have only one ward.
3. Each staff can have more than one schedule and one schedule can have only one staff.
4. Each children may or may not have more than one times detained in warded and one warded can have only one children.
5. One bed can have more than one warded and one warded can have only one bed.
6. One warded may have more than one schedule and one schedule can have only one warded.

4.3.2 Logical Design

Logical design is divided into three categories. Firstly are data dictionary, followed by conceptual design which using normalization and query design.

4.3.2.1 Data Dictionary

Table 4.0: Data dictionary for BFIS

Table	Column	Data type	Constraint	Reference Table	Description
Caregiver	Caregiver_id	VARCHAR (10)	Primary Key	-	Caregiver's unique number
	caregiver_ic_passport_no	VARCHAR (20)	Not null	-	Caregiver's ic no
	caregiver_name	VARCHAR (20)	Not null	-	Caregiver's name
	caregiver_nationality	VARCHAR (30)	Not null	-	Caregiver's nationality
	parental_contact	VARCHAR (20)	Not null	-	Caregiver's parental contact
	caregiver_home_phone_no	VARCHAR (30)	Not null	-	Caregiver's home phone no
	caregiver_mobile_no	VARCHAR (30)	Not null	-	Caregiver's mobile no
	caregiver_home_address	VARCHAR (100)	Not null	-	Caregiver's home address
	caregiver_city	VARCHAR (30)	Not null	-	Caregiver's city
	caregiver_state	VARCHAR (30)	Not null	-	Caregiver's state
	caregiver_zipcode	VARCHAR (10)	Not null	-	Caregiver's zipcode

Children	Mykid	VARCHAR (14)	Primary key	-	Children's unique number
	children_name	VARCHAR (50)	Not null	-	Children's name
	children_birth_certificate	VARCHAR (20)	Not null	-	Children's birth certificate
	children_sex	VARCHAR (10)	Not null	-	Children's sex
	children_date_of_birth	DATE	Not null	-	Children's DOB
	children_age	VARCHAR (5)	Not null	-	Children's age
	children_blood_type	VARCHAR (5)	Not null	-	Children's blood type
	children_allergic	VARCHAR (10)	Not null	-	Children's allergic
	Remarks	VARCHAR (200)	Not null	-	Children's remarks
	caregiver_id	VARCHAR (10)	Foreign Key	Caregiver	Caregiver's unique no.
Ward	ward_id	VARCHAR (20)	Primary key	-	Ward's unique number
	ward_division	VARCHAR (30)	Not null	-	Ward's division
Staff	user_id	VARCHAR (10)	Primary key	-	Staff's unique number
	user_name	VARCHAR (30)	Not null	-	Staff's user name
	user_ic	VARCHAR (20)	Not null	-	Staff's ic no.
	user_category	VARCHAR (10)	Not null	-	Staff's category
	user_role	VARCHAR (40)	Not null	-	Staff's role

	user_shiftname	VARCHAR (30)	Not null	-	Staff's shiftname
	user_email	VARCHAR (40)	Not null	-	Staff's email
	user_password	VARCHAR (12)	Not null	-	Staff's password
	user_address	VARCHAR (50)	Not null	-	Staff's address
	user_phone_no	VARCHAR (15)	Not null	-	Staff's phone no
Bed	bed_id	VARCHAR (10)	Primary key	-	Bed's unique number
	bed_status	VARCHAR (13)	Not null	-	Bed's status
	bed_desc	VARCHAR (100)	Not null	-	Bed's description
	Ward_id	VARCHAR (20)	Foreign key	Ward	Bed's ward id
Warded	warded_id	VARCHAR (10)	Primary key	-	Warded's unique number
	datetime_incharge	DATE	Not Null	-	Warded's date time incharge
	datetime_discharge	DATE	Not Null	-	Warded's date time discharge
	status	VARCHAR (10)	Not Null	-	Warded's status
	bed_id	VARCHAR (10)	Foreign Key	Bed	Warded's bed id
	Mykid	VARCHAR (14)	Foreign Key	Children	Warded's mykid

Schedule	schedule_id	VARCHAR (10)	Primary key	-	Schedule's unique number
	schedule_date	DATE	Not null	-	Schedule's date
	working_hour	VARCHAR (20)	Not null	-	Schedule's working hour
	Mykid	VARCHAR (14)	Foreign Key	Children	Schedule's mykid
	user_id	VARCHAR (10)	Foreign Key	Staff	Schedule's user id
	warded_id	VARCHAR (10)	Foreign key	Warded	Schedule's warded_id

4.3.2.2 Conceptual Design using Normalization

This conceptual design using normalization is displayed using relational schema. It shows all the seven table with attribute, primary key and foreign key for each tables.

Caregiver (caregiver_id, caregiver_ic_passport_no, caregiver_name, caregiver_nationality, parental_contact, caregiver_home_phone_no, caregiver_mobile_no, caregiver_home_address, caregiver_city, caregiver_state, caregiver_zipcode)

Primary key caregiver_id

Ward (ward_id, ward_division)

Primary key ward_id

Staff (user_id, user_name, user_ic, user_category, user_role, user_shiftname, user_email, user_password, user_address, user_phone_no)
Primary key user_id

Children (mykid, children_name, children_birth_certificate, children_sex, children_date_of_birth, children_age, children_blood_type, children_allergic, remarks, caregiver_id)
Primary key children_id
Foreign key caregiver_id references Caregiver (caregiver_id)

Bed (bed_id, bed_status, bed_desc, ward_id)
Primary key bed_id
Foreign key ward_id references Ward (ward_id)

Warded (warded_id, datetime_incharge, datetime_discharge, bed_id, mykid, status)
Primary key warded_id
Foreign key bed_id references Bed (bed_id)
Foreign key mykid references Children (mykid)

Schedule (schedule_id, schedule_date, working_hour, mykid, user_id, warded_id)
Primary key schedule_id
Foreign key mykid references Children (mykid)
Foreign key user_id references Staff (user_id)
Foreign key warded_id references Warded (warded_id)

4.3.2.3 Query Design

There are a variety of designing queries can be carried out to produce the output. Each query must meet the requirements of proposed user and each of the displayed data must have a reason and purpose of its own. Examples of query design proposed is as follows:

- Simple SQL Query

The SELECT statement is utilized to choose information needed from a database. The WHERE clause is utilized to display only the predefined model. The AND operator shows a record if both the first condition AND the second condition are valid. The OR operator shows a record if either the first condition OR the second condition is valid. The ORDER BY keyword word is utilized to sort the outcome set by one or more segments, where user are allow to use the ASC or DESC fundamental word which provided in database. To sort the records in an increase order, you may user the ASC fundamental word.

select schedule_date, working_hour, mykid, user_id, warded_id from schedule where user_id = '$user_id' and schedule_date=to_char(sysdate) order by user_id;	Search the schedule and display the schedule details based on user_id.

- Join Multiple Table SQL Query

A SQL JOIN statement is a combination of two or more tables. An attribute from one table can be joined to another attribute in another table.

select k.warded_id, b.bed_id, c.mykid, c.children_name, k.datetime_incharge, w.ward_id, w.ward_division from children c, warded k, ward w, bed b where c.mykid= k.mykid and w.ward_id= b.ward_id and b.bed_id= k.bed_id order by c.mykid;	Search the patient and display the patient details based on list of patient detained in ward

- Subquery SQL

A Subquery or Inner query or Nested query is a query inside another SQL query and embedded inside of the WHERE provision. A subquery is utilized to return information that will be utilized as a part of the fundamental inquiry as a condition to further confine the information to be recovered. Subqueries that arrival more than one line must be utilized with different worth operators, for example, the IN operators.

select mykid, children_name,children_birth_certificate,children_ blood_type, children_allergic from children minus select mykid, children_name,children_birth_certificate,children_ blood_type, children_allergic from children where mykid	Display the information of the available patient who are not detained in a ward

IN (select mykid from warded);	

- Aggregate Query

SQL aggregate functions return a single value, calculated from values in a column. Useful aggregate functions:

- COUNT() - Returns the number of rows
- FIRST() - Returns the first value
- LAST() - Returns the last value
- AVG() - Returns the average value
- MAX() - Returns the largest value
- MIN() - Returns the smallest value
- SUM() - Returns the sum

select w.ward_id as ward_name, count (k.warded_id) as No_of_admission from ward w, bed b, warded k where w.ward_id= b.ward_id and b.bed_id= k.bed_id and k.datetime_incharge=to_char(sysdate) group by w.ward_id order by count (k.warded_id) desc;	Display the number of patient who detained in a ward on that day.

CREATE VIEW Available_Bed_View as select ward_id as ward_name, count(bed_id) as bed_available from bed where bed_status='AVAILABLE'	To display the number of bed available in each ward.

group by ward_id order by count(bed_id);	

4.3.3 Physical Design

Physical design is consist of three categories which are DBMS selected, trigger and store procedure.

4.3.3.1 DBMS Selected

-Adopted from www.bingapis.com-

The selection of Database Management System (DBMS) for this project is Oracle 10g Express edition. This is because, Oracle has many advantages and features that makes it popular and thereby makes it as the world's largest enterprise software company. Oracle comes with new versions with new features implemented in the new version while the features of earlier versions still being maintained. One important aspect is that Oracle databases tend to be backwards compatible. When Oracle releases a new version, their documentation contains a list of all the features new to that version thus makes it user friendly for one to learn the new features.

Oracle is a database that responds very well with excellent performance in demanding environments. Oracle is a major database where the added features pass the ACID test, which is important in ensuring the integrity of data. Data is the heart of any system in an organization. A reliable and adequate database system must have the following properties:

(a) Atomicity

- The results of a transaction's execution are either all committed or all rolled back.

(b) Consistency

- The database is transformed from one valid state to another valid state. Illegal transactions are not allowed and if an integrity constraint cannot be satisfied, then the transaction is rolled back.

(c) Isolation

- The results of a transaction are invisible to other transactions until the transaction is complete thus increasing the security of data.

(d) Durability

- Once committed (completed), the results of a transaction are permanent and survived future system and media failures, thus ensuring maintenance and protection of data.

All the above criteria explained are well maintained by Oracle database. Therefore, by using Oracle as this project's DBMS, it will bring a lot of benefits to the system.

4.3.3.2 Trigger

As a part of final year project for database management student, a number of trigger before and after should be constructed and written in section 4.3.3.2.1 and 4.3.3.2.2 respectively.

4.3.3.2.1 Trigger Before

Table 4.1: Table Trigger Before

No	Trigger Name	Description

1	Create or replace trigger "system"."bed_trig"
	before insert on bed
	for each row
	declare
	w_id bed.bed_id%type;
	begin
	select bed_seq.nextval into w_id from dual;
	:new.bed_id := 'BED00' || w_id;
	:new.bed_status := 'available';
	end;
		A trigger is done to produce a unique id to be used as the primary key for table bed.

2	Create or replace trigger "system"."warded_trig" before insert on warded for each row declare w_id warded.warded_id%type; begin select warded_seq.nextval into w_id from dual; :new.warded_id := 'wd00' || w_id;	A trigger is done to produce a unique id to be used as the primary key for table warded.

	:new.datetime_discharge := null; :new.status := 'WAIT'; end;	

3	Create or replace trigger "system"."staff_trig"
	before insert on staff
	for each row
	declare
	w_id staff.user_id%type;
	begin
	select staff_seq.nextval into w_id from dual;
	:new.user_id := 'ST00' || w_id;
	end;
		A trigger is done to produce a unique id to be used as the primary key for table staff.

4	Create or replace trigger "system"."schedule_trig"
	before insert on schedule
	for each row
	declare
	w_id schedule.schedule_id%type;
	begin
	select schedule_seq.nextval into w_id from dual;
	:new.schedule_id := 'SC00' || w_id;
	end;
		A trigger is done to produce a unique id to be used as the primary key for table schedule.

5	Create or replace trigger "system"."caregiver_trig" before insert on caregiver for each row declare c_id caregiver.caregiver_id%type; begin select caregiver_seq.nextval into c_id from dual; :new.caregiver_id := 'CG00' || c_id; end;	A trigger is done to produce a unique id to be used as the primary key for table caregiver.

4.3.3.2.2 Trigger After

Table 4.2: Table Trigger After

No	Trigger Name	Descriptions

1	Create or replace trigger
	"system"."bedstatus_after_trig"
	after insert on warded
	for each row
	begin
	update bed
	set bed_status = 'non-available'
	where bed_id = :new.bed_id;
	end;
		A trigger is done to update table bed status into Non-available after patient is detained in a ward.

2	Create or replace trigger
	“system”.”bedstatus_delete_trig”
	after delete on warded
	for each row
	begin
	update bed
	set bed_status= ‘available’
	where bed_id= :old.bed_id;
	insert into warded_log
	(warded_id,datetime_incharge,datetime_discharge,bed_id,mykid)
	values (:old.warded_id, :old.datetime_incharge,
	sysdate, :old.bed_id, :old.mykid);
	end;
		A trigger is done to update table bed status into Available after the patient is discharge from the ward.

3	Create or replace trigger
	"system"."schedulestatus_after_trig"
	after insert on schedule
	for each row
	begin
	update warded
	set status = 'IN-PROGRESS'
	where warded_id = :new.warded_id;
	end;
		A trigger is done to update table warded into ‘in-progress’ after new schedule is created for the warded.

4	Create or replace trigger
	"system"."schedulestatus_delete_trig"
	after delete on schedule
	for each row
	begin
	update warded
	set status= 'CHECKED'
	where warded_id= :old.warded_id;
	insert into schedule_log
	(schedule_id,schedule_date,working_hour,mykid,user_id, warded_id)
	values (:old.schedule_id, sysdate, :old.working_hour, :old.mykid, :old.user_id, :old.warded_id);
	end;
		A trigger is done to update table warded into ‘checked’ after the schedule is deleted.

4.3.3.3 Stored Procedure

Stored procedure that are implement to this project consist of four type which are select, insert, update and delete. By using this store procedure, it will reduce the code line that implement on PHP file. Besides, it will speed up the process to execute the query and retrieve the data from database.

Table 4.3: Table Stored Procedure

No	Stored Procedure Name	Type
1	WARDREPORTBYDOCTOR	SELECT
2	VIEWSCHEDULE	
3	VIEWPATIENTINWARD	
4	VIEWBYMONTH	
5	USERSINGLE	
6	DISPLAYAVAILABLECHILDREN	
7	DISPLAYAVAILABLEDOCTOR	
8	DISPLAYBEDAVAILABLE	
9	DISPLAYCHILDREN	
10	DISPLAYCHILDRENHISTORY	
11	DISPLAYCHILDRENINWARD	
12	PATIENTTODISCHARGE	
13	ADD_SCHEDULE	INSERT
14	ASSIGN_PATIENT_TO_WARD	
15	UPDATEDOCTOR_PROC	UPDATE
16	UPDATENURSE_PROC	
17	UPDATESCHEDULE_PROC	
18	DISCHARGEPATIENT	DELETE
19	DELETESCHEDULE	

4.4 Graphical User Interface (GUI) Design

User interface design is the design of the software applications and sites which concentrate on the user's experience and cooperation. The objective of user interface design is to make the user's connection as straightforward and proficient as possible.

Below are the draft of BFIS's interfaces that have been done to show the implemented triggers and stored procedures through the database. The triggers used in this system are auto-generated primary key for all tables and the stored procedures used are for inserting, updating and deleting data from tables. The figures shown below are specifically for inserting, updating, and deleting data on table Menu by BFIS's staff.

There are the example of interface that have been implement through this system from Figure 4.3 until Figure 4.15.

Figure 4.3: Home Page of BFIS system

Staff consist of doctor and nurse. All staff will use the same login form. The home page for the staff will be different depends on the staff category.

Figure 4.4: Login authenticate interface

Figure 4.5: Doctor Home Page

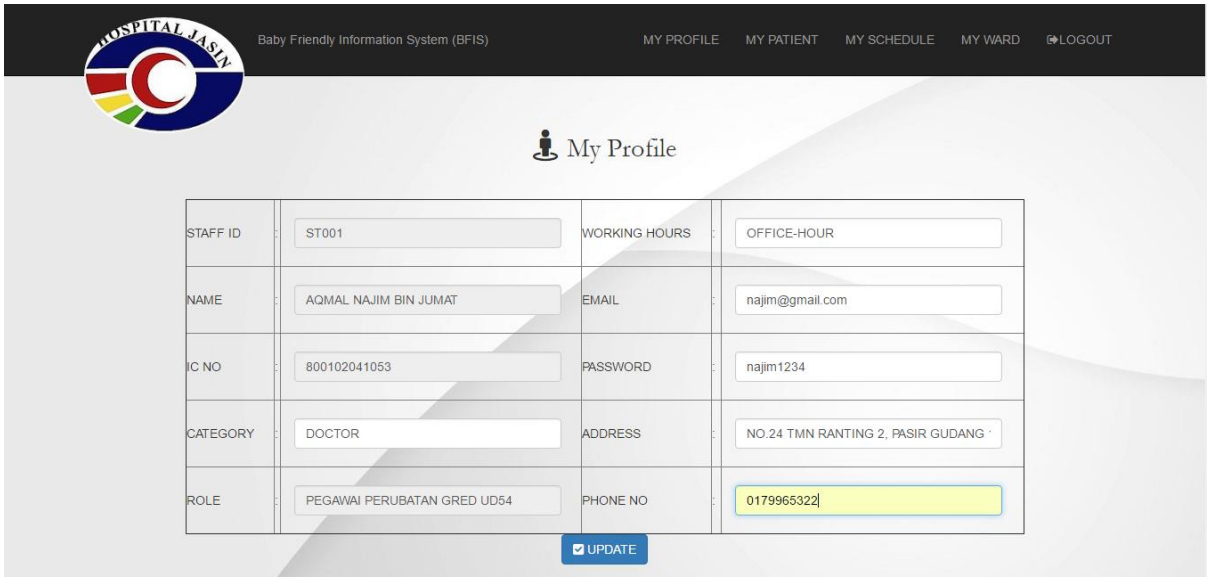

Figure 4.6: Update User Profile

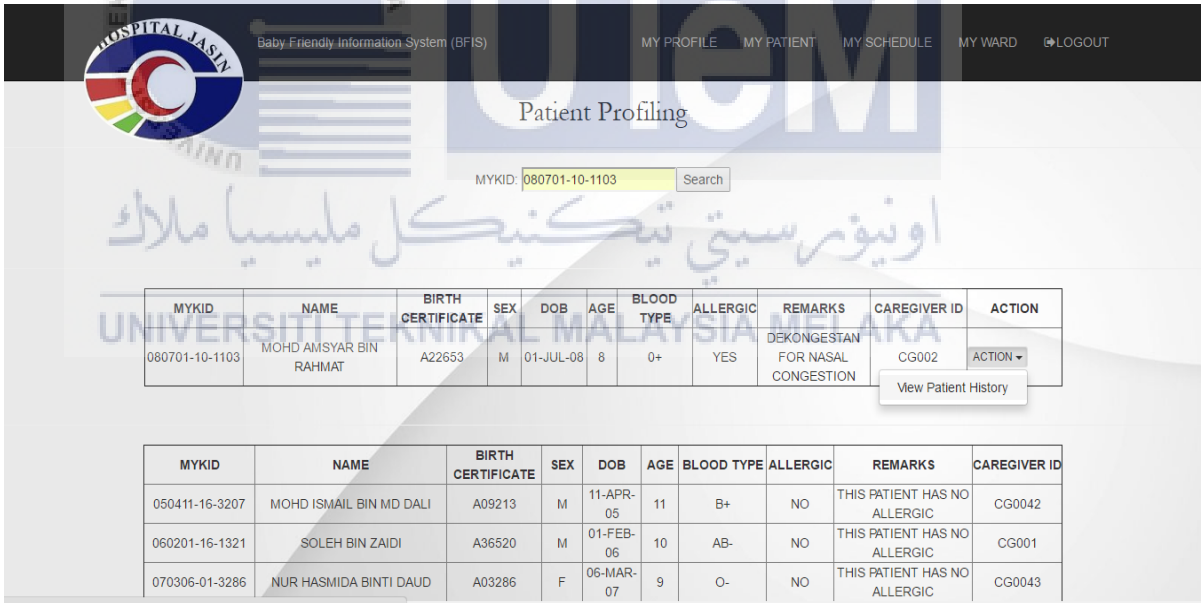

Figure 4.7: My Patient-Patient Profiling

In Figure 4.7, when the doctor click on “View Patient History” button, the history warded on that patient will be displayed (as in Figure 4.8).

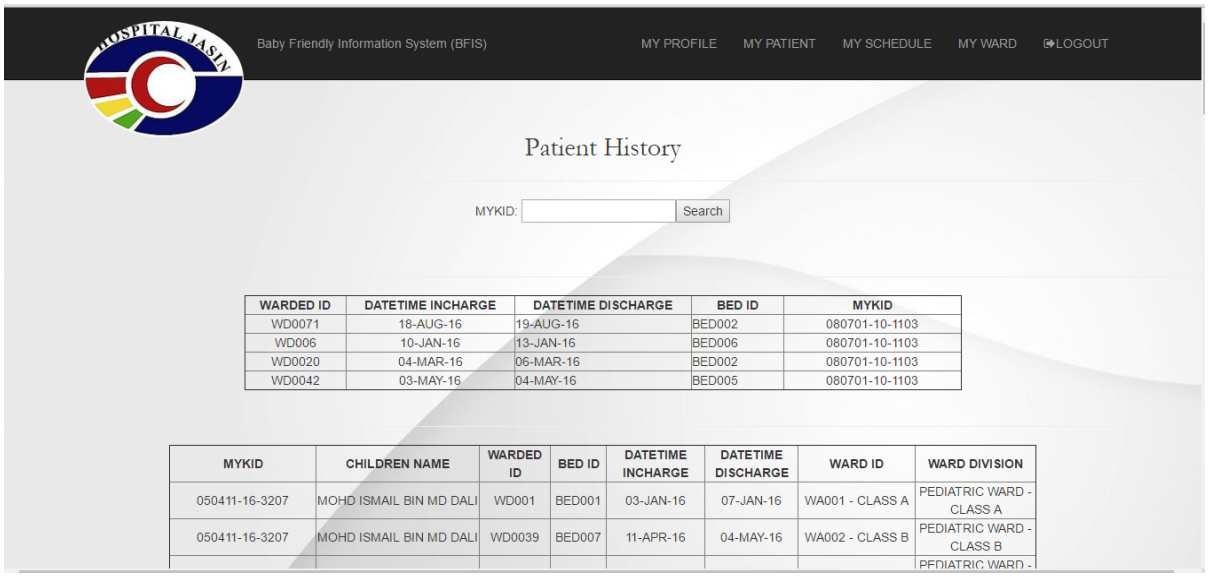

Figure 4.8: Patient History

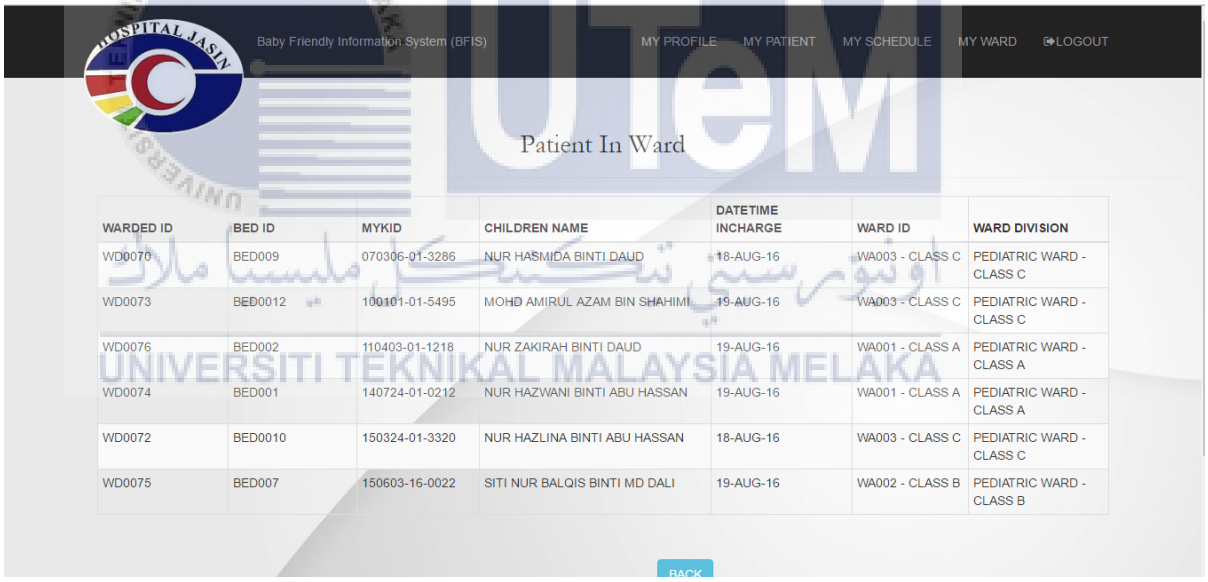

Figure 4.9: Patient detained in ward

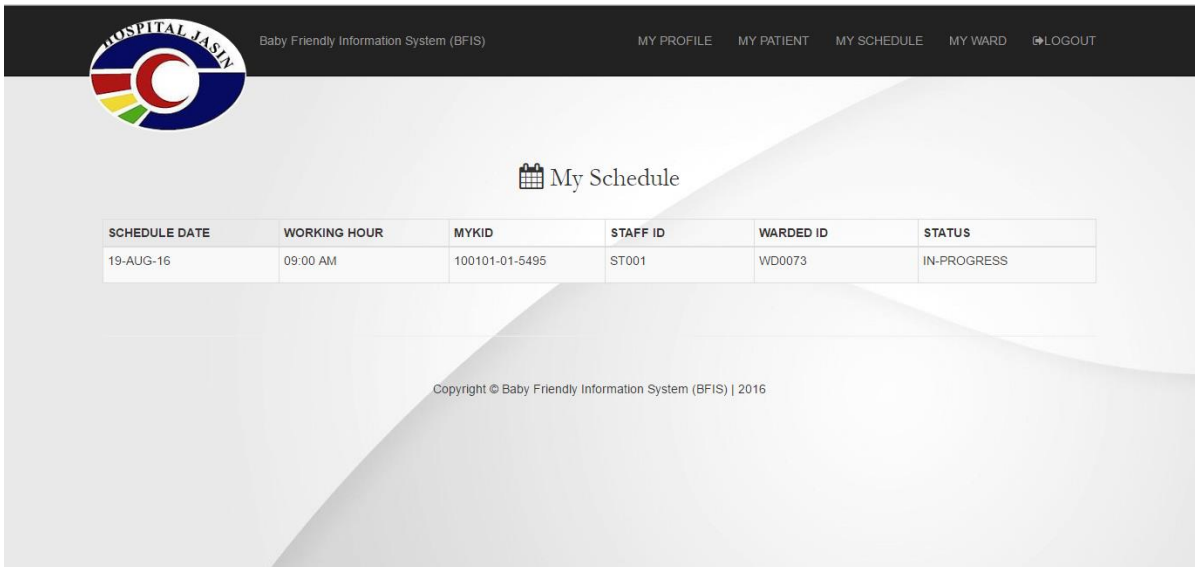

Figure 4.10: Doctor Schedule by daily

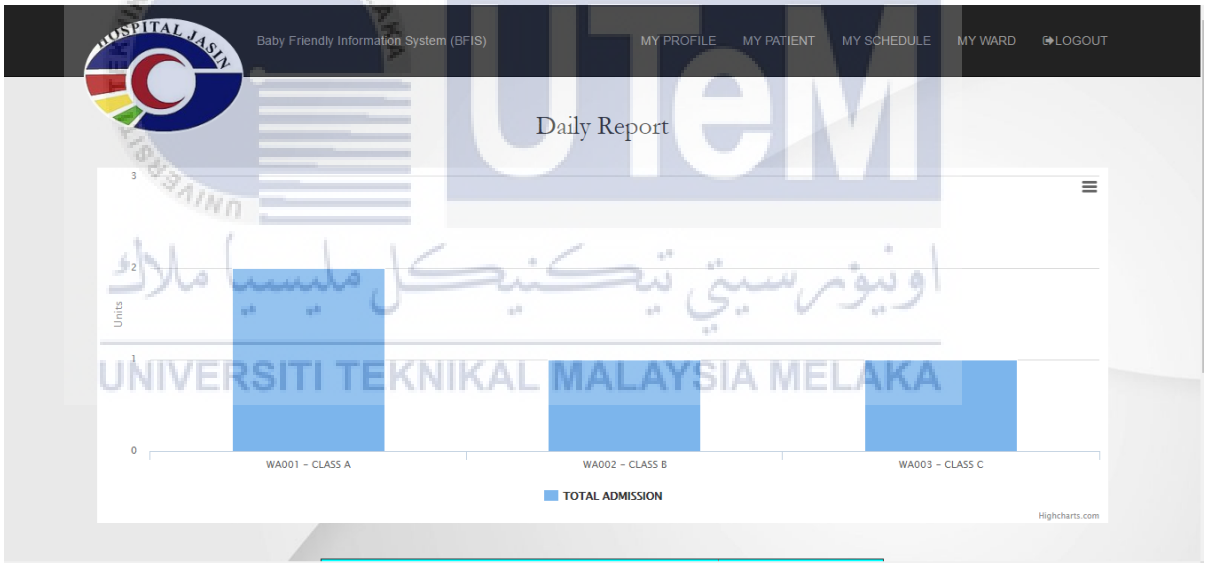

Figure 4.11: Generate daily report by Doctor

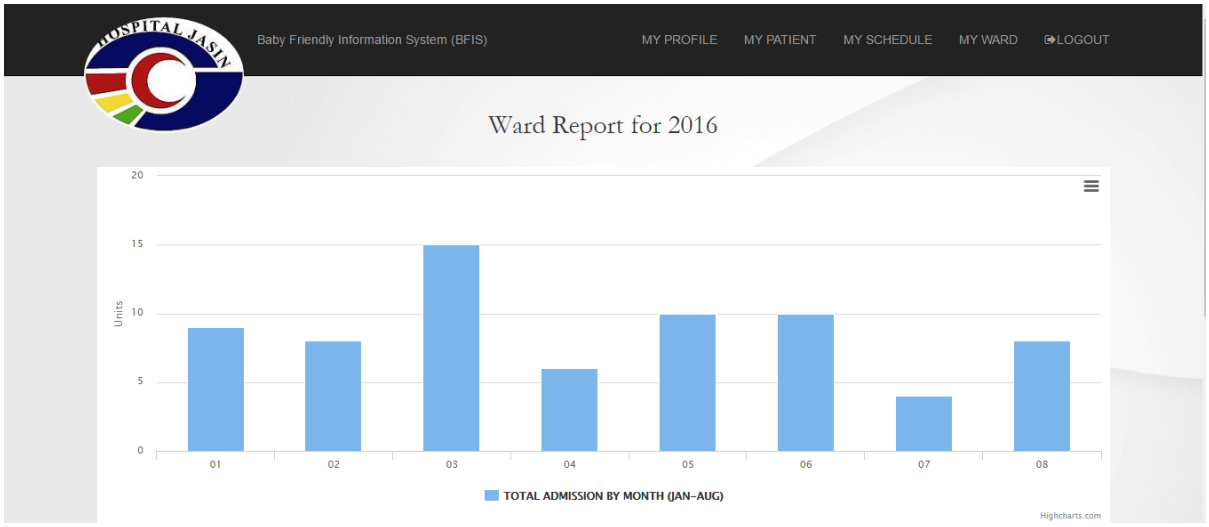

Figure 4.12: Generate monthly report by Doctor

Figure 4.13: Add new bed

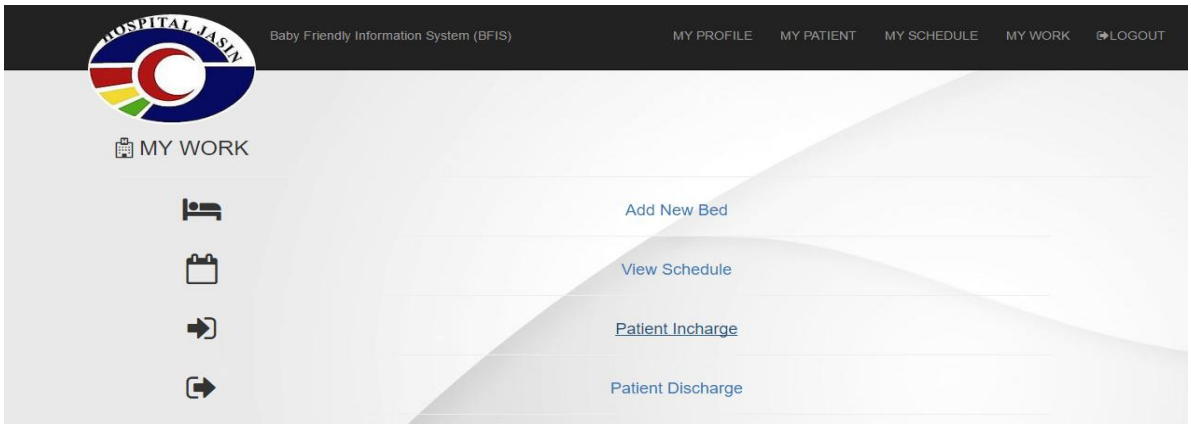

Figure 4.14: Manage Patient

Please refer to appendix C, from Figure 4.14.1 until Figure 4.14.5 to view the interface for manage patient detained in ward.

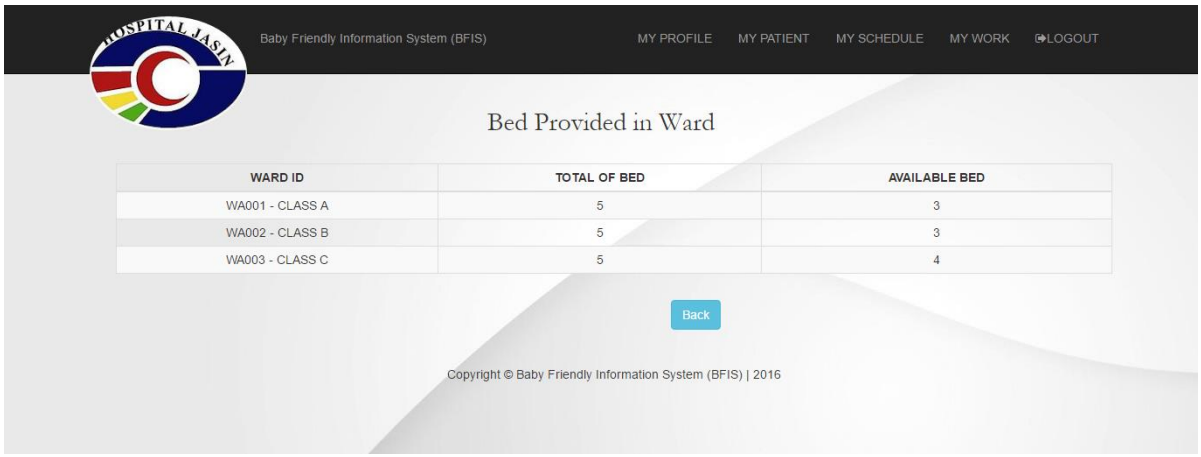

Figure 4.15: Bed Report

4.5 CONCLUSION

This chapter is mainly discussed on the project design which includes the Conceptual Design (Entity Relationship Diagram and Business Rules), Logical Design (Data Dictionary and Normalization), Physical Design (Selection of DBMS) and the Graphical User Interface (GUI) Design. By discussing these designs into details, the knowledge and understanding of this system will be gained and will be very useful during the implementation part.

For the next chapter, the implementation of this system being developed will be elaborated into details by explaining the system database environment setup (installation steps), description of database and database object creation, and database implementation (DDL, DCL and DML).

CHAPTER V

IMPLEMENTATION

5.1 Introduction

This chapter will discuss about the usage of the undertaking those two sections which are the framework advancement and database execution. Implementation is the physical realization of the database and application designs. After completion of the design stages, now in a position to implement the database and the applications. The system development environment will be explained on how the installation step, assign admin login and starting the database services. Other than that, it also consists about the database creation and database object.

For the database implementation includes the Data Definition Language (DDL) or Data Control Language (DCL) statements in the chosen DBMS which is Oracle 10g

Express Edition. The DDL statements are compiled and used to create the database schemas and empty database files. Besides, it also describes the implementation of main process such as stored procedure and trigger using the selected programming language. Moreover, for this database implementation is describing data loading process. This chapter guarantees that the system being create is meeting all system prerequisites as said in the past chapter. The system will be produced stage by stage on the module requirement.

5.2 Software Development Environment Setup

This section will explain the initial setup of the project Baby-Friendly Pediatric Ward Information System. All the components that are required for this project BFIS will be explained. The architecture used by the project is the three-tier of system architecture. Figure 5.1 demonstrates the system framework of Management System for BFIS.

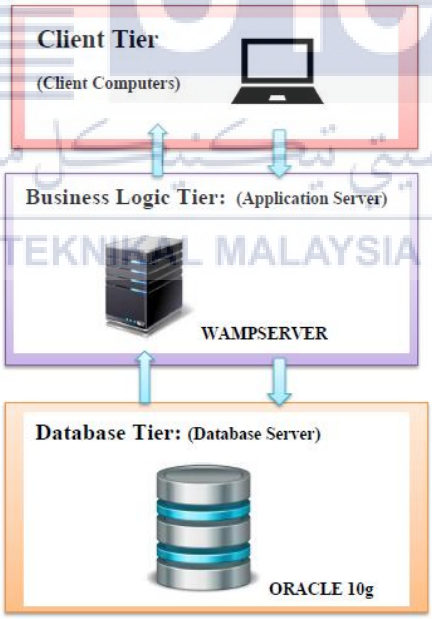

Figure 5.1: Three-Tier System Architecture.

5.2.1 Software Development Setup

In order to develop BFIS system, a developer need to have a personal computer or note book that have an authoring tool to design and compile a PHP programming language such as Adobe Dreamweaver CS6. Besides that, the developer needs to install XAMPPSERVER 2.5 as a server. The project is using a Oracle 10g Express Edition as a database of a project. Project data will be stored at 'http://127.0.0.1:8080/apex' . The link will be created automatically after completed installation of the Oracle Database Express Edition.

For the server parts, client keep running as "http:\\localhost" in the web browser, the web browser will display the main page of the XAMPPSERVER. An organizer name as "system" was made in the registry "C:\xampp\htdocs at the point when the client keep typing so as to run as a localhost "http:\\localhost" in the web program, the program will show the fundamental page of the XAMPP Server.

5.2.1.1 Software Development Setup - Server

XamppServer in Windows Platform (Installation of XAMPP Server Guide) used to launch the web that has been design in PHP.

STEP 1:

Download the software at https://sourceforge.net/projects/xampp/files/XAMPP%20Windows/1.7.7/xampp-win32-1.7.7-VC9-installer.exe/download.

Then,double click on that exe document - xampp-win32-1.7.7-VC9-installer.exe.The installer language will popup. Choose English language and click 'Ok'.

Figure 5.2: Xampp Server Installer Language.

STEP 2:

Click 'Next' button to continue the installation process after welcome Xampp Setup Wizard popup.

Figure 5.3: Xampp Server 1.7.7 Setup Wizard.

STEP 3:

Select the component you want to install.

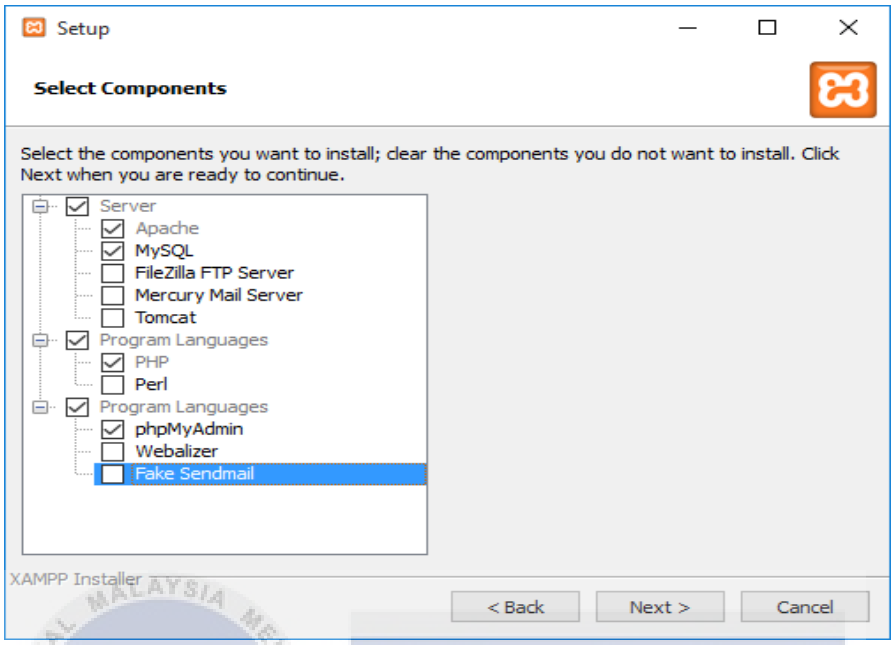

Figure 5.4: Xampp Setup Wizard – Select Components

STEP 4:

The software will install XAMPPServer in C drive. Now, click on 'Next' button after selecting installation location for XAMPPServer 1.7.7.

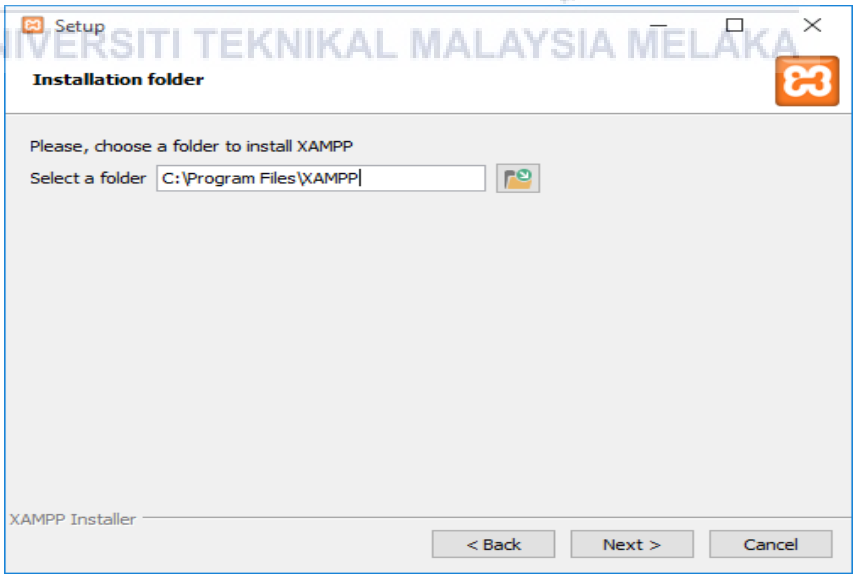

Figure 5.5: Install Xampp Server in "C:\" drive.

STEP 5:

Now, Xampp Server is completely install into the system.

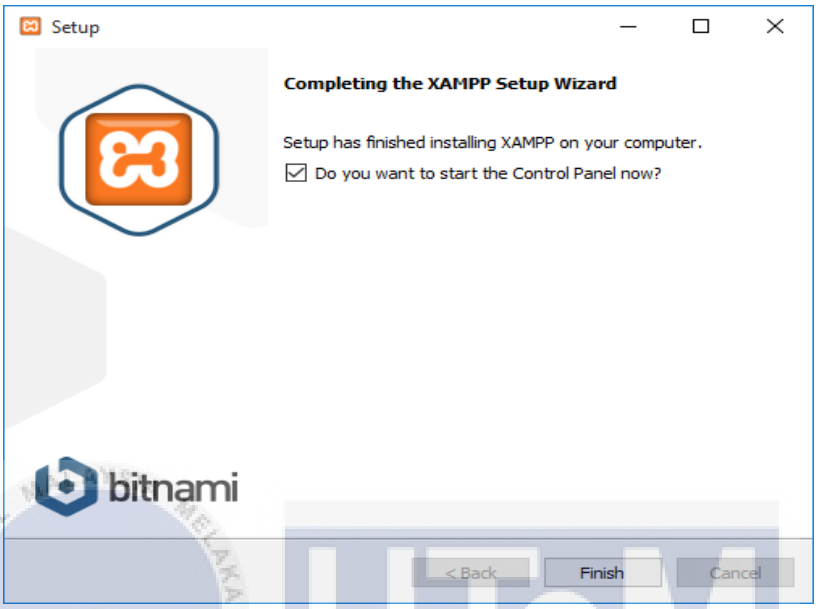

Figure 5.6: Completing Xampp Setup Wizard

STEP 6:

The XamppServer icon will appear on screen task bar .Then click on it. After that, click 'Yes' button when a popup user account control come out.

Figure 5.7: Local XamppServer.

STEP 7:

A Xampp control panel application will view. It will show the installation XamppServer 1.7.7 dialog with Apache, MySQL, FileZilla, Mercury and Tomcat at computer. Checked on check box, then click on 'Start' button.

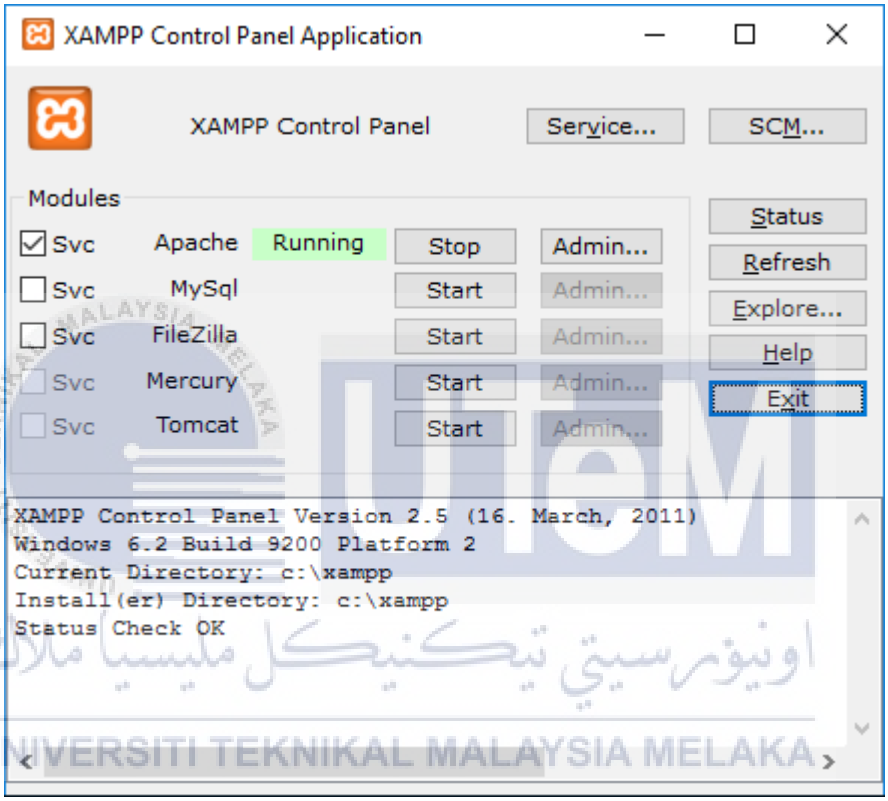

Figure 5.8: Successful Installation.

5.2.2 Database Development Setup

Developer setup the database in particular connection of a database which is include the configuration database setup that have describe at 5.2.2.1.

5.2.2.1 Configuration Database Setup - Oracle Database Express Edition

Step 1: Installing and configuring Oracle Database

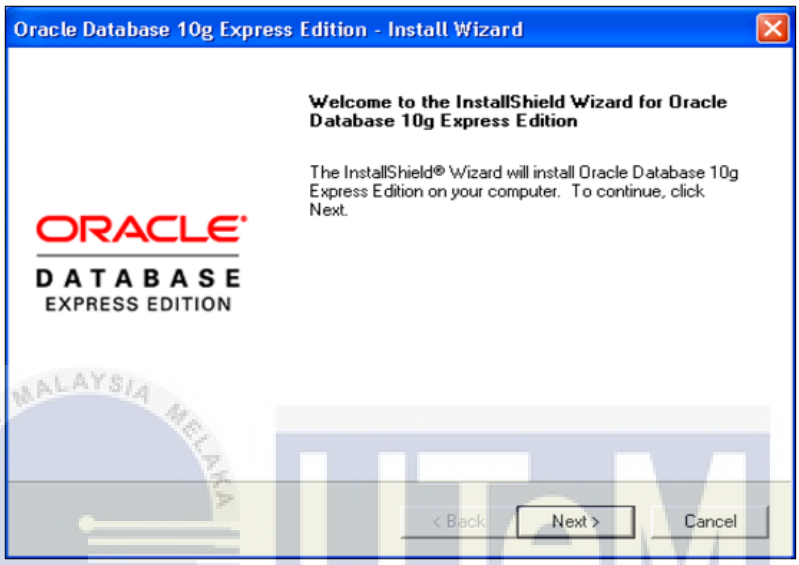

Figure 5.9: Oracle Database 10g Express Edition

1. In the Oracle Database 10g Express Edition - Install Wizard welcome window refer to figure 5.2, click 'Next' button.

2. In the License Agreement window, select 'I accept' and then click 'Next'.

3. In the Choose Destination Location window refer Figure 5.10, either accept the default or click Browse to select a different installation directory. (Do not select a directory that has spaces in its name.) Then click 'Next' button.

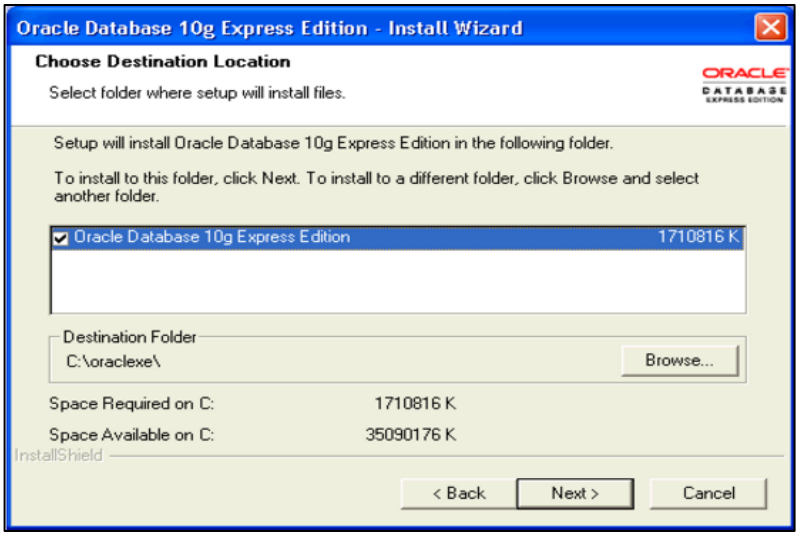

Figure 5.10: Choose Destination Location window

4. In the Specify Database Passwords window, enter and confirm the password to use for the SYS and SYSTEM database accounts. Keep these simple and write them down, because you will need them again. Then click 'Next' button.

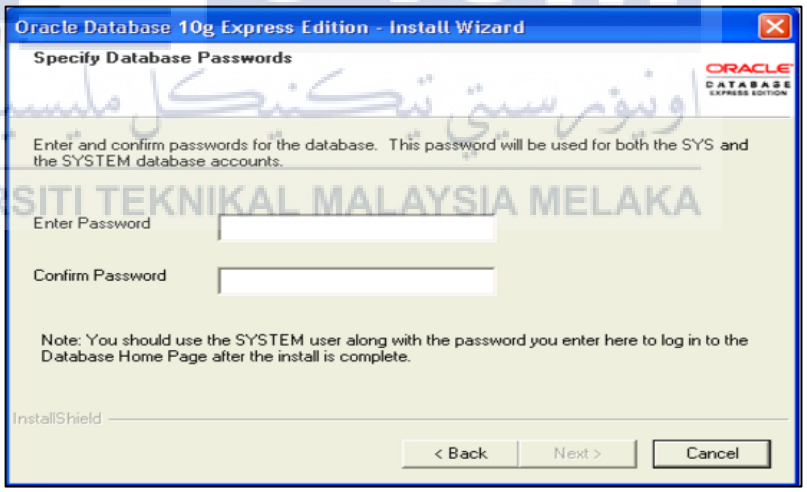

Figure 5.11: Specify Database Passwords window

5. In the Summary window, review the installation settings, and if you are satisfied, click Install. Otherwise, click Back and modify the settings as necessary

6. In the InstallShield Wizard Complete window, to display the Database Home Page, click Launch the Database homepage. Then click Finish.

Step 2: Logging in as the Database Administrator

The first thing need to do is to log in as the Oracle Database XE Administrator. Follow these steps:

i. Open the Database Home Page login window:

- On Windows, from the **Start** menu, select **Programs** (or **All Programs**), then **Oracle Database 10g Express Edition**, and then **Go To Database Home Page**.
- On Linux, click the **Application** menu (on Gnome) or the **K** menu (on KDE), then point to **Oracle Database 10g Express Edition**, and then **Go To Database Home Page**.

ii. At the Database Home Page login window, enter the following information: 94

- **Username:** Enter system for the user name.
- **Password:** Enter the password that was specified when Oracle Database XE was installed.

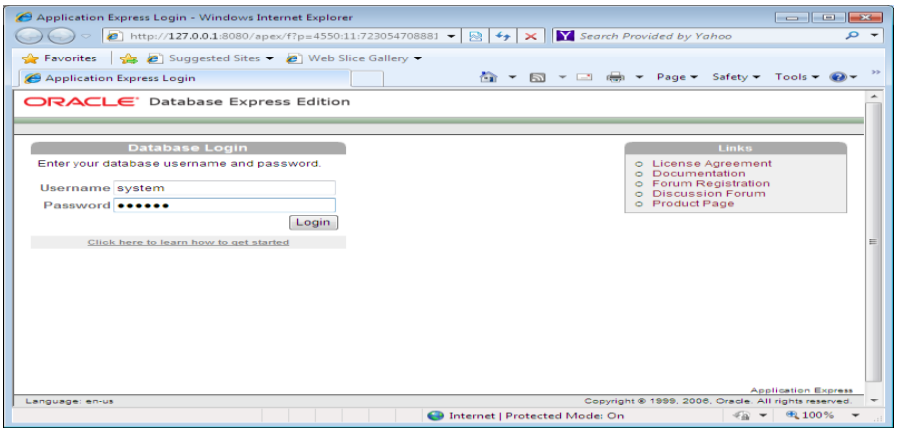

Figure 5.12: Database Home Page Login.

Step 3: Click Login. The Oracle Database XE home page appears.

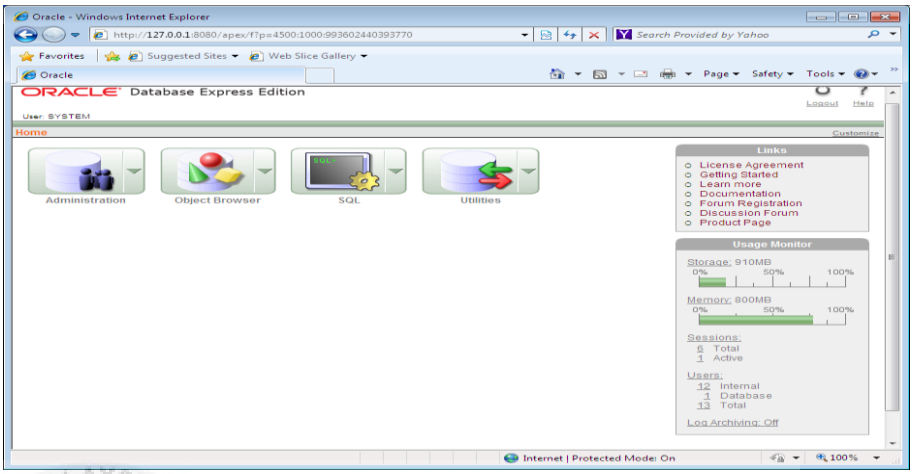

Figure 5.13: Oracle Database XE Home Page.

Step 4: Creating a new account

Select "Administration/Database Users/Create User" via the Oracle Database XE home page. Add an account scott/tiger with all the privileges checked. After finish choose the privilege click button "Create" to generate a new user.

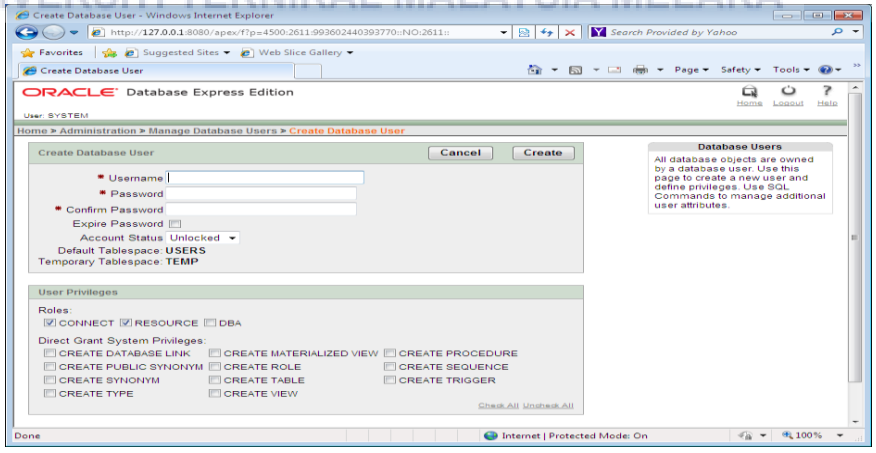

Figure 5.14: Create New User.

5.2.3 Database Creation and Database Objects

Step 1: To create a table use a script that has been created on the notepad it is more easier. Then to build the tables, must generate the script and paste it into the SQL command. To go to the SQL Command page:

i. In the Oracle Database Express Edition home page, click button “SQL”.

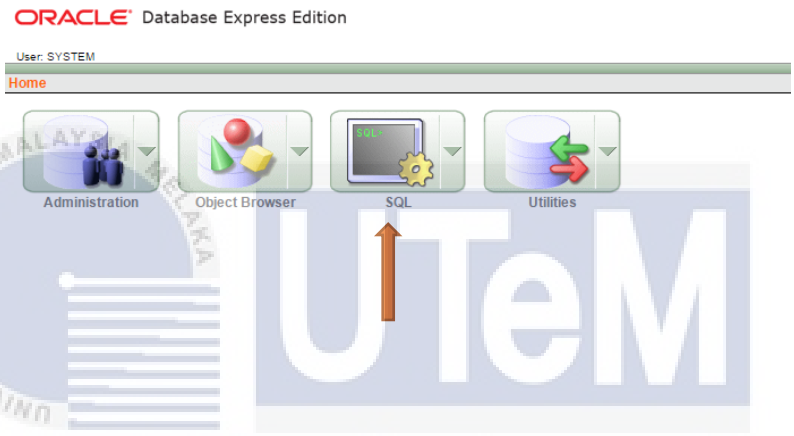

Figure 5.15: Click To “SQL”.

ii. After that, on the page SQL click button “SQL Commands”.

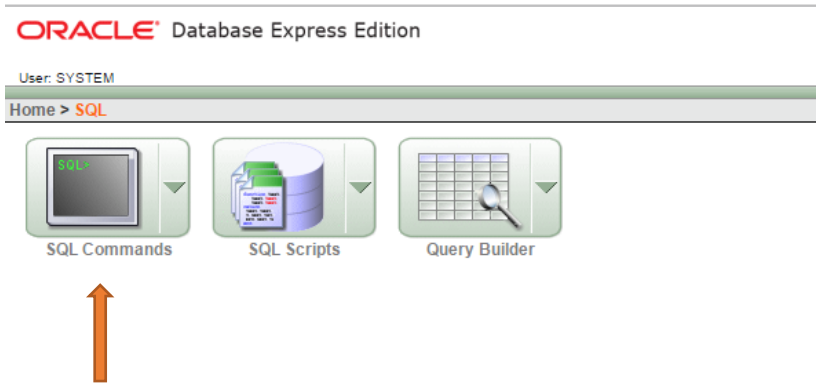

Figure 5.16: Click To “SQL Commands”.

iii. On the SQL Commands page, paste all the script at run the script. After that, the that on the Object Browser will shows all the table has been created.

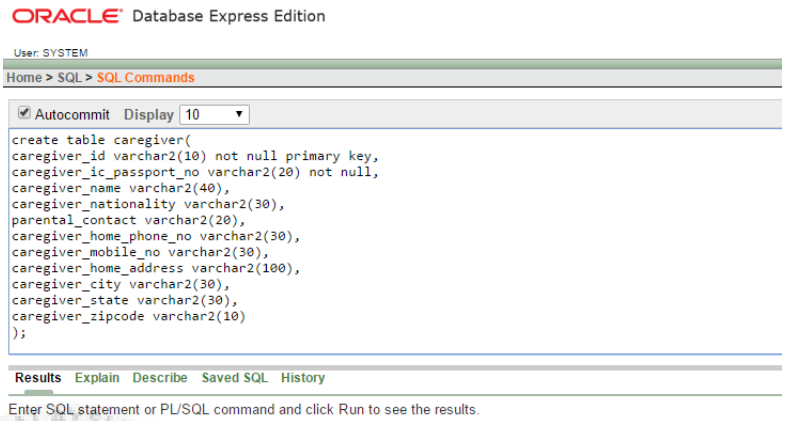

Figure 5.17: Run Script.

Step 2: To view the database object

i. Click to the "Object Browser" to go to the Object Browser page.

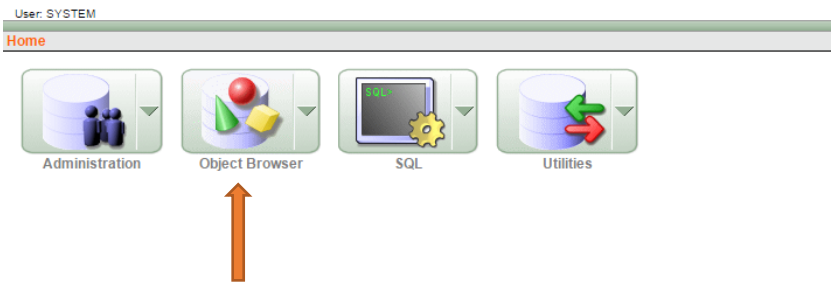

Figure 5.18: Click To "Object Browser".

ii. After go to the “Object Browser page” on the drop down select “Tables”. Then the system will display the entire object that has been created by a user.

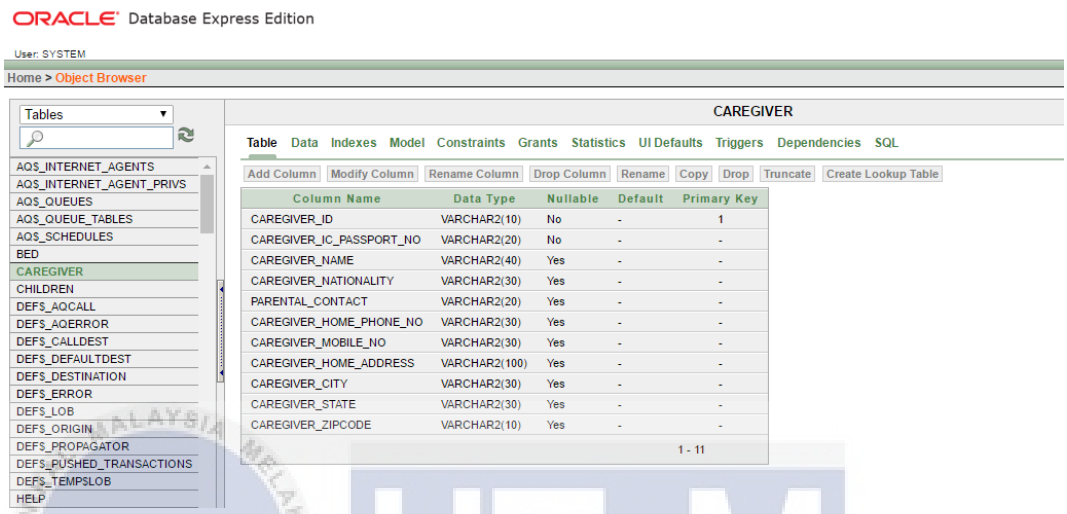

Figure 5.19: Object Browser page.

5.3 Database Implementation

This section will explained about how the database accessing using Oracle query during the development of BFIS system. There are few ways to access the database data:

a. Create Tables

```
CREATE TABLE  "CAREGIVER"
   ("CAREGIVER_ID" VARCHAR2(10) NOT NULL ENABLE,
    "CAREGIVER_IC_PASSPORT_NO" VARCHAR2(20) NOT NULL
ENABLE,
    "CAREGIVER_NAME" VARCHAR2(40),
    "CAREGIVER_NATIONALITY" VARCHAR2(30),
    "PARENTAL_CONTACT" VARCHAR2(20),
    "CAREGIVER_HOME_PHONE_NO" VARCHAR2(30),
    "CAREGIVER_MOBILE_NO" VARCHAR2(30),
    "CAREGIVER_HOME_ADDRESS" VARCHAR2(100),
    "CAREGIVER_CITY" VARCHAR2(30),
    "CAREGIVER_STATE" VARCHAR2(30),
    "CAREGIVER_ZIPCODE" VARCHAR2(10),
     PRIMARY KEY ("CAREGIVER_ID") ENABLE
   )
```

Figure 5.20: Create table "Caregiver"


```
CREATE TABLE  "WARD"
  ("WARD_ID" VARCHAR2(20) NOT NULL ENABLE,
   "WARD_DIVISION" VARCHAR2(30),
    PRIMARY KEY ("WARD_ID") ENABLE
  )
```

Figure 5.21: Create table "Ward"

```
CREATE TABLE  "STAFF"
  ( "USER_ID" VARCHAR2(10) NOT NULL ENABLE,
    "USER_NAME" VARCHAR2(30),
    "USER_IC" VARCHAR2(12),
    "USER_CATEGORY" VARCHAR2(10),
    "USER_ROLE" VARCHAR2(40),
    "USER_SHIFTNAME" VARCHAR2(30),
    "USER_EMAIL" VARCHAR2(40),
    "USER_PASSWORD" VARCHAR2(12),
    "USER_ADDRESS" VARCHAR2(50),
    "USER_PHONE_NO" VARCHAR2(15),
     PRIMARY KEY ("USER_ID") ENABLE
   )
```

Figure 5.22: Create table "Staff"

```
CREATE TABLE  "CHILDREN"
 ( "MYKID" VARCHAR2(14) NOT NULL ENABLE,
   "CHILDREN_NAME" VARCHAR2(50) NOT NULL ENABLE,
   "CHILDREN_BIRTH_CERTIFICATE" VARCHAR2(20),
   "CHILDREN_SEX" VARCHAR2(10),
   "CHILDREN_DATE_OF_BIRTH" DATE,
   "CHILDREN_AGE" VARCHAR2(5),
   "CHILDREN_BLOOD_TYPE" VARCHAR2(5),
   "CHILDREN_ALLERGIC" VARCHAR2(10),
   "REMARKS" VARCHAR2(200),
   "CAREGIVER_ID" VARCHAR2(10),
    PRIMARY KEY ("MYKID") ENABLE,
    FOREIGN KEY ("CAREGIVER_ID")
    REFERENCES  "CAREGIVER" ("CAREGIVER_ID") ENABLE
  )
```


Figure 5.23: Create table "Children"

```
CREATE TABLE  "BED"
  ( "BED_ID" VARCHAR2(10) NOT NULL ENABLE,
    "BED_STATUS" VARCHAR2(13),
    "BED_DESC" VARCHAR2(100),
    "WARD_ID" VARCHAR2(20),
     PRIMARY KEY ("BED_ID") ENABLE
  )
```

Figure 5.24: Create table "Bed"

```
CREATE TABLE  "WARDED"
  ( "WARDED_ID" VARCHAR2(10) NOT NULL ENABLE,
    "DATETIME_INCHARGE" DATE,
    "DATETIME_DISCHARGE" DATE,
    "BED_ID" VARCHAR2(10),
    "MYKID" VARCHAR2(14),
    "STATUS" VARCHAR2(15),
     PRIMARY KEY ("WARDED_ID") ENABLE,
     FOREIGN KEY ("BED_ID")
     REFERENCES  "BED" ("BED_ID") ENABLE,
     FOREIGN KEY ("MYKID")
     REFERENCES  "CHILDREN" ("MYKID") ENABLE
  )
```

Figure 5.25: Create table "Warded"


```
CREATE TABLE  "SCHEDULE"
  ( "SCHEDULE_ID" VARCHAR2(10) NOT NULL ENABLE,
    "SCHEDULE_DATE" DATE,
    "WORKING_HOUR" VARCHAR2(20),
    "MYKID" VARCHAR2(14),
    "USER_ID" VARCHAR2(10),
    "WARDED_ID" VARCHAR2(10),
     PRIMARY KEY ("SCHEDULE_ID") ENABLE,
     FOREIGN KEY ("MYKID")
     REFERENCES  "CHILDREN" ("MYKID") ENABLE,
     FOREIGN KEY ("USER_ID")
     REFERENCES  "STAFF" ("USER_ID") ENABLE,
     FOREIGN KEY ("WARDED_ID")
     REFERENCES  "WARDED" ("WARDED_ID") ENABLE
  )
```

Figure 5.26: Create table "Schedule"

b. TRIGGER clause

TRIGGER clause will automatically execute when a certain event occur in the table of database. Table 5.3 below shows the example of trigger that being used in BFIS. Please refer on the Appendix A, where Table 5.4 will explained the rest of trigger that being used in BFIS.

Table 5.3: Table Trigger Before

No	Trigger Name	Description

1	Create or replace trigger "system"."bed_trig"
	before insert on bed
	for each row
	declare
	w_id bed.bed_id%type;
	begin
	select bed_seq.nextval into w_id from dual;
	:new.bed_id := 'BED00' || w_id;
	:new.bed_status := 'available';
	end;
		A trigger is done to produce a unique id to be used as the primary key for table bed.

2	Create or replace trigger "system"."warded_trig"
	before insert on warded
	for each row
	declare
	w_id warded.warded_id%type;
	begin
	select warded_seq.nextval into w_id from dual;
	:new.warded_id := 'wd00' || w_id;
	:new.datetime_discharge := null;
	:new.status := 'WAIT';
	end;
		A trigger is done to produce a unique id to be used as the primary key for table warded.

3	Create or replace trigger "system"."staff_trig"
	before insert on staff
	for each row
	declare
	w_id staff.user_id%type;
	begin
	select staff_seq.nextval into w_id from dual;
	:new.user_id := 'ST00' || w_id;
	end;
		A trigger is done to produce a unique id to be used as the primary key for table staff.

4	Create or replace trigger "system"."schedule_trig"
	before insert on schedule
	for each row
	declare
	w_id schedule.schedule_id%type;
	begin
	select schedule_seq.nextval into w_id from dual;
	:new.schedule_id := 'SC00' || w_id;
	end;
		A trigger is done to produce a unique id to be used as the primary key for table schedule.

5	Create or replace trigger "system"."caregiver_trig" before insert on caregiver for each row declare c_id caregiver.caregiver_id%type; begin select caregiver_seq.nextval into c_id from dual; :new.caregiver_id := 'CG00' || c_id; end;	A trigger is done to produce a unique id to be used as the primary key for table caregiver.

c. Stored Procedure

Stored procedure is used to control the mechanism of the database. This stored procedure will return the result set of the information from database. Table 5.5 belows will show the example of stored procedure that being used in BFIS. Please refer on the Appendix B, where Table 5.9 will explained the rest of the stored procedure that being used in BFIS.

Table 5.5: Stored Procedure – Select Statement

No	Stored Procedure Name	Description

1	create or replace procedure displayAvailableDoctor(
	rc out sys_refcursor)
	as
	begin
	open rc for select a.user_name, a.user_id,
	s.schedule_date, s.working_hour from staff a,
	schedule s where user_category='DOCTOR' and
	a.user_id= s.user_id and
	s.schedule_date=to_char(sysdate);
	end;
		A stored procedure is done to be used to display the available doctor during particular date.

Table 5.6: Stored Procedure – Insert Statement

No	Stored Procedure Name	Description
1	create or replace procedure add_schedule(a_schedule_date varchar2, a_working_hour varchar2, a_mykid varchar2, a_user_id varchar2,	A stored procedure is done to be used to assign new

	a_warded_id varchar2)
	
	IS
	BEGIN
	
	INSERT INTO schedule(schedule_date, working_hour, mykid, user_id, warded_id)
	VALUES
	(to_date(a_schedule_date,'yyyy/mm/dd'),a_working_hour, a_mykid, a_user_id, a_warded_id);
	END;
		schedule to doctor.

Table 5.7: Stored Procedure – Update Statement

No	Stored Procedure Name	Description
1	create or replace PROCEDURE updateSchedule_proc (r1 in out schedule.schedule_id%TYPE, r2 in out schedule.schedule_date%TYPE, r3 in out schedule.working_hour%TYPE, r4 in out schedule.mykid%TYPE, r5 in out schedule.user_id%TYPE, r6 in out schedule.warded_id%TYPE) as BEGIN UPDATE schedule set schedule_date= r2,	A stored procedure is done to be used to update the schedule date, time or staff id who incharge to treat patient.

	working_hour= r3, mykid= r4, user_id= r5, warded_id= r6 WHERE schedule_id= r1; COMMIT; END;	

Table 5.8: Stored Procedure – Delete Statement

No	Stored Procedure Name	Description

1	create or replace PROCEDURE
	"DELETESCHEDULE" (
	a2 IN SCHEDULE.SCHEDULE_ID%TYPE)
	IS
	BEGIN
	DELETE FROM SCHEDULE WHERE
	SCHEDULE_ID= a2;
	END;
		A stored procedure is done to be used to delete the schedule, after the doctor treat the patient.

5.4 Conclusion

This chapter describe about the implementation phase of the project. It shows about the software development setup, database creation and database object, database implementation and the DDL/DCL statements. The system development environment explains on how the installation step, assign admin login and starting the database services. Other than that, it also consists about the database creation and database object. This chapter also explain about database implementation by present DDL statements in the chosen DBMS which is Oracle 10g Express Edition, describe the stored procedure and trigger. This phase will cover whether the project were fulfill the requirements or not and can meet user satisfaction or not.

The following chapter will discuss about the test strategy, test design, test plan, test result and analysis of the project. The testing stage will test the Baby-Friendly Pediatric ward Information System to guarantee that the system meets the product requirement detail and error had been distinguished before convey the system to the end client.

CHAPTER VI

TESTING

6.1 Introduction

The last activity to be embraced amid the advancement of this system is testing. The testing stage will be elucidated more in this chapter of Baby-Friendly Pediatric Ward Information System (BFIS). The objective of testing is to survey the limit and make sense of which meet each one of the prerequisites. The inspiration driving testing method is to find any bugs of the framework and the developer could settle it. Since Database Life Cycle (DBLC) model is being utilized as a part of this system, every stage must be finished concurring the grouping and the following stage could not be continue if the past stage is not completely finished. This model is simple for the assessment on the grounds that the framework will be conveyed one by one in view of points of reference.

Other than that, this part chapter will be talked about test plan which comprise of test organization, test schedule and test environment. The test strategy will cover about classes of tests. For testing, it was included in test description and test data. The test result and analysis will be tried possibly it will achievement or come up short. The fulfilment of client for utilizing this system will be figured out then when the testing procedure was finished. More clarifications about all these will be clarified in the following sub point of this part.

6.2 Test Plan

Test plan is the undertaking arrangement for the testing work to be done and it mirrors the entire project testing schedule and methodology what the developers will use in this testing stage. The test plan comprises of test organization, test environment and test schedule. Test organization is determination the client that include in the testing procedure. Test environment comprise of the area or spot to complete the testing process and test schedule is the course of action for the length of time and circles amid the testing process.

6.2.1 Test Organization

Test organization is the group of individuals which testing the system through testing procedure. For delivering a decent nature of system, it should be tried from any different background of individuals which have a great deal of encounters in information technology. For helpful data of the system which comprises of quality, weakness, constraint and access of diverse level for administrator and clients. The BFIS will be tried by system developer, project supervisor and one customer.

System developer is the individual who is responsible in developing BFIS while project supervisor is the individual who supervises the work of system developer. Project supervisor will go about as end client of the system. Table 6.1 demonstrates the list of tester which will test the system and their task.

Table 6.1: Test Organization Chart

Tester ID	Title / Position	Responsibilities
Tester 1	System Developer	Responsible for overall project scheduling and resource allocation. They test both equipment and programming frameworks, and dissect and resolve framework issues. Systems engineers keep up, review and upgrade hierarchical emotionally supportive networks by taking a shot at the internal operations of PCs, using existing systems or combining new innovations to address specific issues, every now and again as exhorted by a systems investigator or draftsman and to ensure a successful of the system development.
Tester 2	Project Supervisor	Act about as end customer for admin and staff of the system and give their criticism. Each one of the responses will be an aide for enhance the framework.
Tester 3	Customer	Act about as end client for customer that buy the product from the system and give their feedback. Every one of the reactions will be a guide for improve the system.

6.2.2 Test Environment

A test environment is a setup of testing so as to software and hardware which perform the test on BFIS. Testing procedure comprises of conditions, circumstances and influencing encompassing. Environment fuses the test procedures, association's strategies, system for creating, test apparatuses and enhancing the procedure of testing. Programming applications, framework programming and equipment furthermore ought to be considered as basic part which included in testing methodology of BFIS.

6.2.2.1 Environment Setup

Overseeing and arranging the stage to check that the framework can run successfully for BFIS. The application work space will be shown in Table 6.2.

Table 6.2: Application Workspace Specification

Environment Specification	Description
Operating System	Windows 10
Processor	Intel Core i7
Random Access Memory (RAM)	8 GB
Database	Oracle 10g Express Edition
Server	Apache Web Server
Server-scripting	PHP

6.2.2.2 Software Application

Software application depicts every one of the substance which had been connected into the BFIS. Every one of the applications of the system can be found in Table 6.3.

Table 6.3: Application Environment in BFIS

System Application	• Authenticate user • Profile Management • Patient Management • Schedule Management • Ward Management • Bed Management

6.2.2.3 System Software

System software is the devices and tools which have been utilized and implemented into this system. Table 6.4 underneath demonstrates all the system software of BFIS.

Table 6.4: System Software of BFIS

System Software	• Windows 10 • Oracle 10g Express Edition

	• Adobe Dreamweaver CS6 • Adobe Photoshop CS6 • Adobe Illustrator CS6 • Xampp Server (Apache, PHP) • Notepad ++ • Google Chrome (as Web Browser)

6.2.2.4 System Hardware

System hardware is the equipment which has been utilized and implement into this system. Table 6.5 will demonstrates the used hardware being developed of BFIS.

Table 6.5: System Hardware

System Hardware	Laptop, mouse, keyboard, external hard disk, pen drive, printer and projector.

6.2.3 Test Schedule

Test schedule is the methodology of testing all the information collected in the duration of testing to be conducted on test cases. The target behind test schedule is to ensure each and every testing activity by whom and when those have been perform. Since the term of undertaking headway for around 6 month, the datebook will go about as an

assistant for developer to test on the accurate time which had been set. Table 6.6 underneath shows the test timetable for developer of BFIS.

Table 6.6: Test Schedule of BFIS

Module	Test Activity	Duration	Cycle (Times)
Login	Testing and user acceptance, test unit integration	1 days	10
Design Interface	Testing and user acceptance, test unit integration	3 days	7
Staff Registration	Testing and user acceptance, test unit integration	2 days	10
Staff Management	Testing and user acceptance, test unit integration	3 days	20
Patient Management	Testing and user acceptance, test unit integration	4 days	25
Schedule Management	Testing and user acceptance, test unit integration	4 days	20
Bed Management	Testing and user acceptance, test unit integration	3 days	20
Warded Registration	Testing and user acceptance, test unit integration	5 days	30
Ward Management	Testing and user acceptance, test unit integration	3 days	20
Ward Report	Testing and user acceptance, test unit integration	2 days	7
Error Handling	Testing and user acceptance, test unit integration	3 days	15

6.3 Test Strategy

The test strategy being selected for BFIS is bottom-up strategy which is the order of testing is reversed that the lowest level modules are tested first and then follow by the main module. There are some risk if use this strategy such as infrequently bugs, it will make the software fragile. In bottom-up testing, the lowest module are tested first, with the main module tested last so if there are problems occur at the lowest level module, the progression of the bottom-up strategy will be effect. The methodologies that will be utilized are Black-box and White-box approaches.

Black-box test methodology regards the system as a "black-box", so it doesn't explicitly utilize information of the internal structure. Black-box test design is generally depict as concentrating on testing functional requirements. Black-box test methodology looks at wherefore the accessible inputs and applications and what the normal yield that ought to come about because of every data.

Meanwhile, white-box test outline permit one to look inside the "box", and it concentrates particularly on utilizing internal knowledge of the product to manage the selection of test data. This testing methodology looks under the spreads and into the subsystem of an application. White-box testing empowers us to see what is occurring inside the application. White-box testing gives a level of refinement. Table 6.7 underneath shows the different between black-box and white-box testing.

Table 6.7: Black-Box vs White-Box

Black-Box testing	White-Box testing
Also known as “Behavioral testing”.	Also known as “Structural testing”.
Testing the application based on its behavior.	Testing the application by using internal structure of the coding of application.
Testers involve in this type of testing.	Developer and testers will involve in this type of testing.

6.3.1 Classes of tests

There are three sorts of test which are security testing, functionality test, user acceptance test and error handling.

i. Security Test

Security test is one of the way in order to keep information and data from unauthorized access, use, disclosure, disruption, modification, or destructions. This process is interrelated with the common goals of protecting of confidentiality, authentication, integrity, and availability of data and information of the project.

ii. Functionality Test

Functionality testing is performed to verify that a software application performs and functions correctly according to design specifications. This test is done after the project implementation is completely done. Purpose of this test is to identify defect when the project is complete and the defect cannot be identify

during the unit testing. Project testing includes the testing of the project performances, security, and configuration of sensitivity, startup and recovery form failure mode.

iii. User acceptance Test

This test is to guarantee that this system is easy to understand for the clients which is the staff of BFIS. The system GUI must be clear and comprehension for variety of IT knowledge level among them.

iv. Error handling Test

Error handling test was utilized to verify that the system will acknowledge just right data from the client. The error message or cautioning will show up onto the screen if any wrong information that entered by the client. This is critical to give data of info that client entered it is possible that it wasn't right or unfilled required value.

6.4 Test Design

There are two sorts of test design which are test description and test data. Test description is defense on the activities that obliged and it will be archived for identifying the best information process. At that point, it will depict the test case and expected result, and test data about user acceptance.

6.4.1 Test Description

Test description comprises of reported which complete to distinguish the test case and expected result for every module. This test will recognize the test case to be actualized for this project.

6.4.1.1 User Authentication Management

Table 6.8: Test Description of Login in Home Page

Test Case ID	Description	Testing Type	Expected Output
TC_01-1	Invalid User ID / Invalid Password	Unit testing	'Please enter valid ID or password' message appeared
TC_01-2	User ID blank / Password blank	Unit testing	'Please fill out this field' message appeared
TC_01-3	Valid User ID and Password	Unit testing	User can log in to the system successfully

6.4.1.2 Registration of New Staff

Table 6.9 Test Description of Sign up Form Module

Test Case ID	Description	Testing Type	Expected Output
TC_02-1	All fields are blank	Unit testing	'Please fill out this field' message will appeared
TC_02-2	Valid input for each field	Unit testing	New product register successfully saved in the database

6.4.1.3 Registration of New Bed

Table 6.10 Test Description of Bed Form Module

Test Case ID	Description	Testing Type	Expected Output
TC_03-1	All fields are blank	Unit testing	'Please select an item in the list' message will appeared
TC_03-2	Valid input for each field	Unit testing	New bed register successfully saved in the database

6.4.1.3 Manage Patient detained into Ward

Table 6.11 Test Description of Assign patient into Ward Module

Test Case ID	Description	Testing Type	Expected Output
TC_04-1	Enter MYKID ID	Unit testing	Create new warded details
TC_04-2	All fields are blank	Unit testing	'A value is required' message will appear for each field
TC_04-3	Valid input for each field	Unit testing	New warded register successfully saved in the database

6.4.1.4 Assign Schedule for Doctor

Table 6.12 Test Description of Assign Schedule Form Module

Test Case ID	Description	Testing Type	Expected Output
TC_05-1	Select WARDED ID	Unit testing	Create new schedule details
TC_05-2	All fields are blank	Unit testing	'Please fill out this field' message will appear for each field

TC_05-3	Valid input for each field	Unit testing / Integration	New schedule register successfully saved in the database

6.4.2 Test Data

Test data was utilized for affirmation the expected result, for example, confirming system behavior towards invalid input data.

6.4.2.1 User Authentication Management

Table 6.13 Test Data of Log in Module

Column Name	TD_01-1	TD_01-2	TD_01-3
Test Case ID	TC_01-1	TC_01-2	TC_01-3
User ID	najim		ST001
Password	najim12		najim1234
Result Test Data	Log in failed. Invalid User ID and password	Log in failed. Staff ID and password are required to access into the system	User log in successfully

6.4.2.2 Registration of New User

Table 6.14 Test Data of Users Form Module

Column Name	TD_02-1	TD_02-2
Test Case ID	TC_02-1	TC_02-2
Staff Form	Users does not filled up the fields: User_name: User_ic: User_category: User_role: User_shiftname: User_email: User_password: User_address: User_phone_no:	Users filled up the fields with the correct value: User_name: AQMAL NAJIM BIN JUMAT User_ic: 800102041053 User_category: DOCTOR User_role: PEGAWAI PERUBATAN GRED UD54 User_shiftname: OFFICE-HOUR User_email: najim@gmail.com User_password: najim1234 User_address: NO.24 TMN RANTING 2, PASIR GUDANG 1 User_phone_no: 0179965322

Result Test Data	Error handling will appear that tell the users to fill up the fields	All the data successfully saved into the database

6.4.2.3 Registration of New Bed

Table 6.15 Test Data of Bed Form Module

Column Name	TD_03-1	TD_03-2
Test Case ID	TC_03-1	TC_03-2
Staff Form	Users does not filled up the fields: Bed_desc: Ward_id:	Users filled up the fields with the correct value: Bed_desc: *TWO BED IN ONE ROOM Ward_id: WA002 - CLASS B
Result Test Data	Error handling will appear that tell the users to fill up the fields	All the data successfully saved into the database

6.4.2.4 Manage Patient detained into Ward

Table 6.16 Test Data of Assign Patient into Ward Form Module

Column Name	TD_04-1	TD_04-2
Test Case ID	TC_04-1	TC_04-2
Staff Form	Users does not filled up the fields: Bed_id: Datetime_incharge:	Users filled up the fields with the correct value: Bed_id: BED007 Datetime_incharge: 22-AUG-16
Result Test Data	Error handling will appear that tell the users to fill up the fields	All the data successfully saved into the database

6.4.2.5 Assign Schedule for Doctor

Table 6.17 Test Data of Assign Schedule Form Module

Column Name	TD_05-1	TD_05-2
Test Case ID	TC_05-1	TC_05-2
Staff Form	Users does not filled up the fields: Schedule_date: Working_hour: Staff_id:	Users filled up the fields with the correct value: Schedule_date: 23-AUG-16 Working_hour: 11:00 AM Staff_id: ST001
Result Test Data	Error handling will appear that tell the users to fill up the fields	All the data successfully saved into the database

6.5 Test Results and Analysis

Test results and analysis was included analyzing and make a rundown of record to test the system possibly it is in achievement or fail condition and all predicts yield from the Management System for E-SiLK to verify it will operate effectively.

6.5.1 User Authentication Management

Table 6.18 Test Result and Analysis of Log in Module

Module / Component		Result		
Test Case ID	**Test Data ID**	**Description**	**Success**	**Fail**
TC_01-1	TD_01-1	User ID and Password not exist	√	
TC_01-2	TC_01-2	User ID and Password are blank	√	
TC_01-3	TC_01-3	Valid User ID and Password	√	

6.5.2 Registration of New User

Table 6.19 Test Result and Analysis of User Form Module

Module / Component		Result		
Test Case ID	**Test Data ID**	**Description**	**Success**	**Fail**
TC_02-1	TD_02-1	All fields blank	√	
TC_02-2	TC_02-2	Valid data for all fields	√	

6.5.3 Registration of New Bed

Table 6.20: Test Result and Analysis of Bed Form Module

Module / Component		Result		
Test Case ID	**Test Data ID**	**Description**	**Success**	**Fail**
TC_03-1	TD_03-1	All fields blank	√	
TC_03-2	TC_03-2	Valid data for all fields	√	

6.5.4 Manage Patient detained into Ward

Table 6.21: Test Result and Analysis of Assign Patient into Ward Form Module

Module / Component		Result		
Test Case ID	**Test Data ID**	**Description**	**Success**	**Fail**
TC_04-1	TD_04-1	All fields blank	√	
TC_04-2	TC_04-2	Valid data for all fields	√	

6.5.5 Assign Schedule for Doctor

Table 6.22: Test Result and Analysis of Assign Schedule Form Module

Module / Component		Result		
Test Case ID	**Test Data ID**	**Description**	**Success**	**Fail**
TC_05-1	TD_05-1	All fields blank	√	
TC_05-2	TC_05-2	Valid data for all fields	√	

6.6 Conclusion

This chapter has discussed on test organization, test schedule and test environment. Other than that, this chapter also explains the method used to validate the project to make sure the project quality have met the requirements. The project has undergone several testing phases before the project can be release to the users.

The connection between the client and the system are the most essential to be cleared and understand which known as user friendly system. The great communication between the system and database will guarantee that all clients were easy to retrieve and manipulate data which based on authorization setting. A good system will convey a decent connection of system configuration management with other database platform. Each stage has been clarified in details in this chapter.

The following part is the last chapter of this report that will clarify about Conclusion of the project. This chapter will conclude all of the activities that have been implemented through the development of BFIS.

CHAPTER VII

CONCLUSION

7.1 Introduction

This chapter will discuss the conclusion of the project. Recommendations on how this system can be enhanced will be expressed in next sub topics which is suggestions for development. In addition, proposition for improvement and contribution of the project in the future also discuss in this chapter.

7.2 Observation on Weaknesses and Strengths

Each system has an own advantages and disadvantages of the procedure the system. Advantages are being available about the system strength and disadvantages are available about the system weakness.

7.2.1 Strength

A few points of advantages of this system have been identified. Among them are:

I. This system are able to maintain patient information and warded history in a computerized system. Easily dealing with all the information included in this BFIS utilizing the computerized system.

II. This system are able to manage accessibility control of patient information.

III. This system are able to generate a historical report about patient detained in ward systematically.

IV. Data storage is more secure by putting all the data in a centralized database. The database is provided to allow storage and retrieval of data to be generated.

7.2.2 Weaknesses

This system has several weakness. Among them are:

I. The user have no right to reset a forgotten password if the user forgot their current password and this system does not have much secure on the database where there are lack of password security.

II. This system are only generate a daily and monthly report for the current year.

7.3 Propositions for Improvement

There are some suggestions or opinion to improve and favor the system. System development is an extremely element process, which requires the developer to reliably check system to guarantee that it is running smoothly. Some future upgrades that developer would like to implement next time are as below:

I. If a user forgets a password, then the admin will reset the password with a default password and after successfully entering the system users need to change the password. Implement password security by using encryption, to avoid intrusions occur. Passwords stored in the database must be in a condition that is safe and is only known by the user itself.

II. Provides an interface where the user can enter the date and time to generate a report that is more interesting and effective.

7.4 Contribution

This system has many contribution. One of the contribution is this system are able to facilitate the work of managing patient detained in ward in Hospital Jasin, Malacca. Thus, user are no longer need to open back the patient document racks in order to find patient history log. By using this system, user only need to insert patient mykid in order to view patient history log.

The second contribution is that it can create a schedule for doctor right after patient is assigned into ward. It ease the doctor to check his schedule. Finally, the system can generate daily and monthly report of patient detained in ward to the Doctor for the purposes of analysis and reference.

7.5 Conclusion

In a conclusion, this system has succeeds in achieving its objectives. The objectives of this project are to maintain patient information and warded history in a computerized system. Second objective is to manage accessibility control of patient information. The last objective is to generate a historical report about patient detained in ward systematically. This project is being built using SDLC methodology. It has completed stages of planning, analysis, design, implementation and testing.

After this system has finished, the conclusion that can be made was this system has been successfully developed and have meet the requirements mentioned at the earlier stage of the system development. However, there are still a few weaknesses in specific parts of the system that need to be improved in the future. The improvement makes the system better and more comprehensive. Nevertheless, as long as this system has achieved the entire objectives stated before, this implies that the purpose for this project has been reached and it will be helpful to users.

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APPENDIX A

(Create Trigger Schema)

Table 5.4: Table Trigger After

No	Trigger Name	Descriptions

1	Create or replace trigger
	"system"."bedstatus_after_trig"
	after insert on warded
	for each row
	begin
	update bed
	set bed_status = 'non-available'
	where bed_id = :new.bed_id;
	end;
		A trigger is done to update table bed status into Non-available after patient is detained in a ward.

2	Create or replace trigger
	“system”.”bedstatus_delete_trig”
	after delete on warded
	for each row
	begin
	update bed
	set bed_status= ‘available’
	where bed_id= :old.bed_id;
	insert into warded_log
	(warded_id,datetime_incharge,datetime_discharge,
	bed_id,mykid)
	values (:old.warded_id, :old.datetime_incharge,
	sysdate, :old.bed_id, :old.mykid);
	end;
		A trigger is done to update table bed status into Available after the patient is discharge from the ward.

3	Create or replace trigger
	"system"."schedulestatus_after_trig"
	after insert on schedule
	for each row
	begin
	update warded
	set status = 'IN-PROGRESS'
	where warded_id = :new.warded_id;
	end;
		A trigger is done to update table warded into 'in-progress' after new schedule is created for the warded.

4	Create or replace trigger
	"system"."schedulestatus_delete_trig"
	after delete on schedule
	for each row
	begin
	update warded
	set status= 'CHECKED'
	where warded_id= :old.warded_id;
	insert into schedule_log
	(schedule_id,schedule_date,working_hour,mykid,user_id, warded_id)
	values (:old.schedule_id, sysdate, :old.working_hour,
	:old.mykid, :old.user_id, :old.warded_id);
	end;
		A trigger is done to update table warded into 'checked' after the schedule is deleted.

APPENDIX B

(Create Stored Procedure Schema)

Table 5.9: Stored Procedure

No	Stored Procedure Name	Description	Type

1	create or replace procedure assign_patient_to_ward(
	w_datetime_incharge varchar2,
	w_bed_id varchar2,
	w_mykid varchar2)
	
	IS
	BEGIN
	
	INSERT INTO
	warded(datetime_incharge,bed_id,mykid)
	VALUES
	(to_date(w_datetime_incharge,'yyyy/mm/dd'),w_bed
	_id,w_mykid);
	END;
		A stored procedure is done to be used to assign patient into warded.	INSERT

2	create or replace procedure wardReportByDoctor(
	rc out sys_refcursor)
	as
	begin
	open rc for
	select w.ward_id as ward_name, count
	(k.warded_id) as No_of_admission
	from ward w, bed b, warded k
	where w.ward_id= b.ward_id and b.bed_id= k.bed_id
	and k.datetime_incharge=to_char(sysdate)
	group by w.ward_id
	order by count (k.warded_id) desc;
	end;
		A stored procedure is done to view number of patient detained in ward during particular day.	SELECT

3	create or replace procedure viewSchedule(
	rc out sys_refcursor)
	as
	begin
	open rc for
	select * FROM SCHEDULE;
	end;
		A stored procedure is done to be used to view list of schedule.	SELECT

4	create or replace procedure viewPatientInWard(rc out sys_refcursor) as begin open rc for	A stored procedure is done to be used to view patient who	SELECT

	select k.warded_id, b.bed_id, c.mykid, c.children_name, k.datetime_incharge, w.ward_id, w.ward_division, k.status from children c, warded k, ward w, bed b where c.mykid= k.mykid and w.ward_id= b.ward_id AND b.bed_id= k.bed_id order by c.mykid; end;	detained in ward.	

5	create or replace procedure viewByMonth (myrc out sys_refcursor) as
	begin
	open myrc
	for
	select TO_CHAR(k.datetime_discharge,'mm') as months, count (k.warded_id) as No_of_admission
	from ward w, bed b, warded_log k
	where w.ward_id= b.ward_id and b.bed_id= k.bed_id
	group by to_char(k.datetime_discharge, 'mm')
	order by to_char(k.datetime_discharge, 'mm');
	end;
		A stored procedure is done to be used to view number of patient detained in ward by monthly.	SELECT

6	create or replace PROCEDURE "USERSINGLE" (id IN varchar2, p1 OUT SYS_REFCURSOR) AS
	BEGIN
	OPEN p1 FOR select *
	from staff where user_id=id;
	END;
		A stored procedure is done to be used to view details of staff.	SELECT

7	create or replace procedure displayAvailableChildren(
	rc out sys_refcursor)
	as
	begin
	open rc for select mykid, children_name,children_birth_certificate,children_blood_type, children_allergic from children
	minus
	select mykid, children_name,children_birth_certificate,children_blood_type, children_allergic from children
	where mykid
	in
	(select mykid from warded);
	end;
		A stored procedure is done to be used to display list of patient who not in a ward.	SELECT

8	create or replace procedure displayBedAvailable(
	rc out sys_refcursor)
	as
	begin
	open rc for select ward_id as ward_name, bed_id as bed_no, bed_status
	from bed where bed_status='AVAILABLE'
	order by ward_id, bed_id asc;
	end;
		A stored procedure is done to be used to display the available bed in each ward.	SELECT

9	create or replace procedure displayChildren(
	rc out sys_refcursor)
	as
	begin
	open rc for select * from children order by MYKID;
	end;
		A stored procedure is done to be used to display list of patient.	SELECT

10	create or replace procedure displayChildrenHistory(
	rc out sys_refcursor)
	as
	begin
	open rc for select c.mykid, c.children_name, k.warded_id, b.bed_id,k.datetime_incharge, k.datetime_discharge, w.ward_id, w.ward_division
	from children c, warded_log k, ward w, bed b
	where c.mykid= k.mykid and w.ward_id= b.ward_id and b.bed_id= k.bed_id
	order by mykid, k.datetime_incharge;
	end;
		A stored procedure is done to be used to display patient history.	SELECT

11	create or replace procedure displayChildrenInWard(
	rc out sys_refcursor)
	as
	begin
	open rc for select w.warded_id, c.mykid, c.children_name , w.bed_id as bed_no from warded w, children c
	where c.mykid= w.mykid
	order by warded_id, datetime_incharge desc;
	end;
		A stored procedure is done to be used to display list of children who detained in ward.	SELECT

12	create or replace procedure PATIENTTODISCHARGE(rc out sys_refcursor) as begin	A stored procedure is done to be used to view	SELECT

	open rc for select * from warded ; end;	patient in warded.	

13	create or replace PROCEDURE updateNurse_proc
	(r1 in out staff.user_id%TYPE,
	r2 in out staff.user_name%TYPE,
	r3 in out staff.user_ic%TYPE,
	r4 in out staff.user_category%TYPE,
	r5 in out staff.user_role%TYPE,
	r6 in out staff.user_shiftname%TYPE,
	r7 in out staff.user_email%TYPE,
	r8 in out staff.user_password%TYPE,
	r9 in out staff.user_address%TYPE,
	r10 in out staff.user_phone_no%TYPE)
	as
	BEGIN
	
	UPDATE staff set
	user_name= r2,
	user_ic= r3,
	user_category= r4,
	user_role= r5,
	user_shiftname= r6,
	user_email= r7,
	user_password= r8,
	user_address= r9,
	user_phone_no= r10
	WHERE user_id= r1;
	COMMIT;
	END;
		A stored procedure is done to be used to update nurse profile.	UPDATE

14	create or replace PROCEDURE updateDoctor_proc (r1 in out staff.user_id%TYPE, r2 in out staff.user_name%TYPE, r3 in out staff.user_ic%TYPE, r4 in out staff.user_category%TYPE, r5 in out staff.user_role%TYPE, r6 in out staff.user_shiftname%TYPE, r7 in out staff.user_email%TYPE, r8 in out staff.user_password%TYPE, r9 in out staff.user_address%TYPE, r10 in out staff.user_phone_no%TYPE) as BEGIN UPDATE staff set user_name= r2,	A stored procedure is done to be used to update doctor profile.	UPDATE

	user_ic= r3, user_category= r4, user_role= r5, user_shiftname= r6, user_email= r7, user_password= r8, user_address= r9, user_phone_no= r10 WHERE user_id= r1; COMMIT; END;		

15	create or replace PROCEDURE
	"DISCHARGEPATIENT" (
	a1 IN WARDED.WARDED_ID%TYPE)
	IS
	BEGIN
	DELETE FROM WARDED WHERE
	WARDED_ID= a1;
	END;
		A stored procedure is done to be used to delete patient details after discharge from hospital.	DELETE

APPENDIX C

(User Manual)

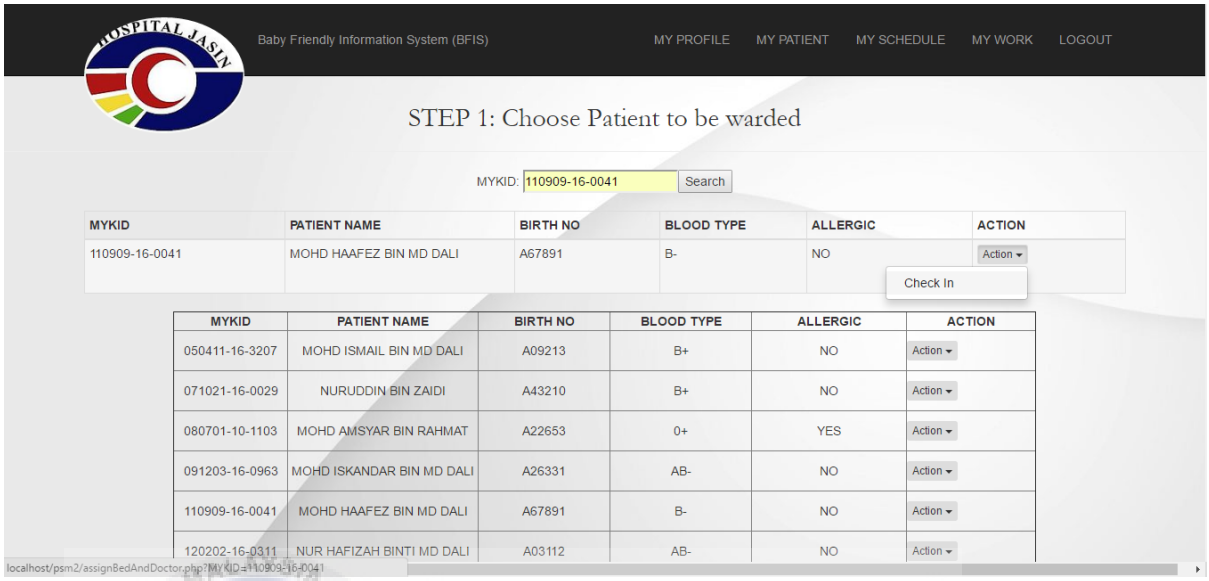


Figure 4.14.1: Manage Patient – step 1

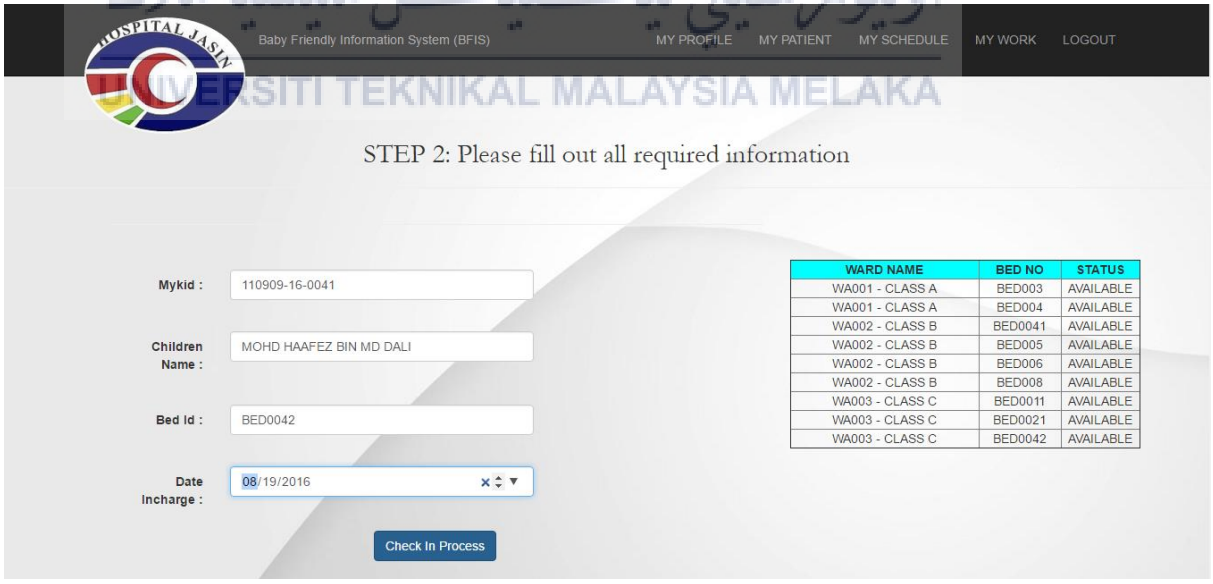


Figure 4.14.2: Manage Patient – step 2

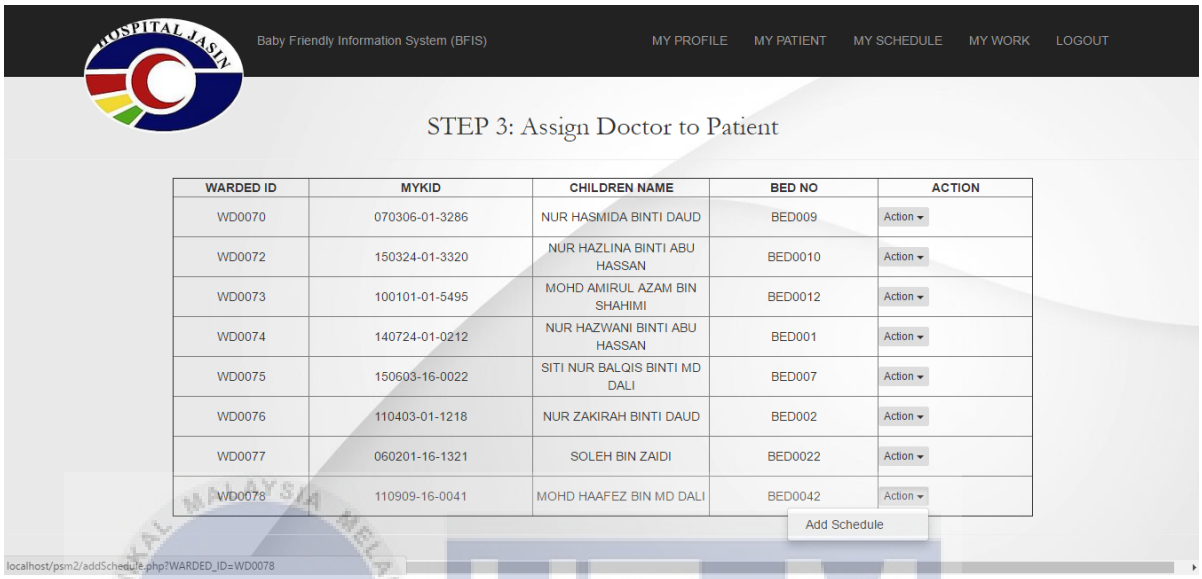


Figure 4.14.3: Manage Patient – step 3

Figure 4.14.4: Manage Patient – step 4

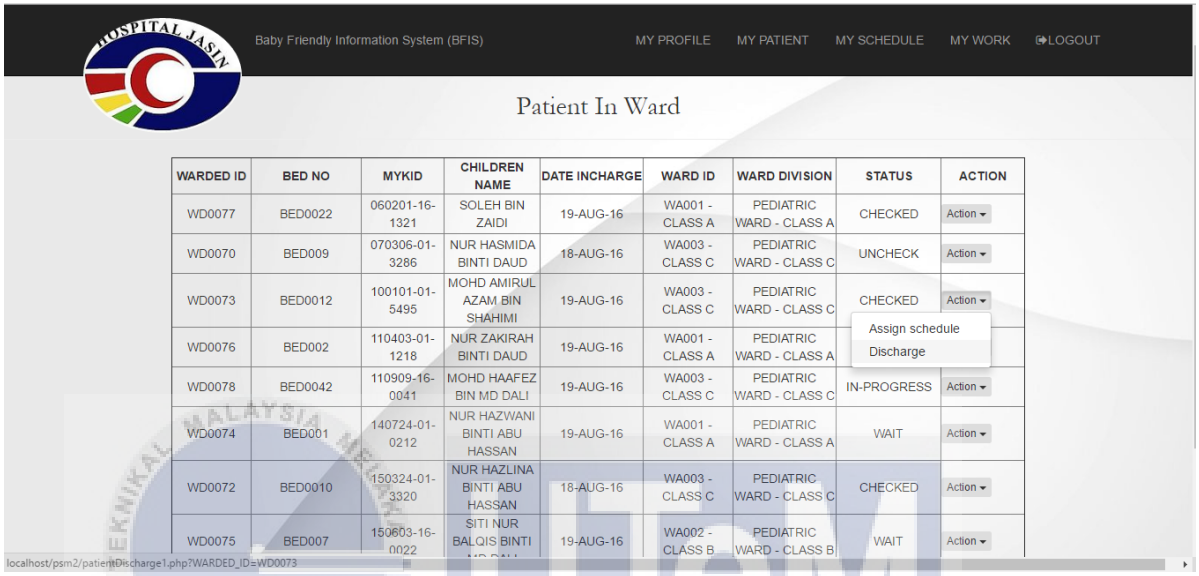


Figure 4.14.5: Assign schedule and discharge patient

APPENDIX D

(Turnitin)

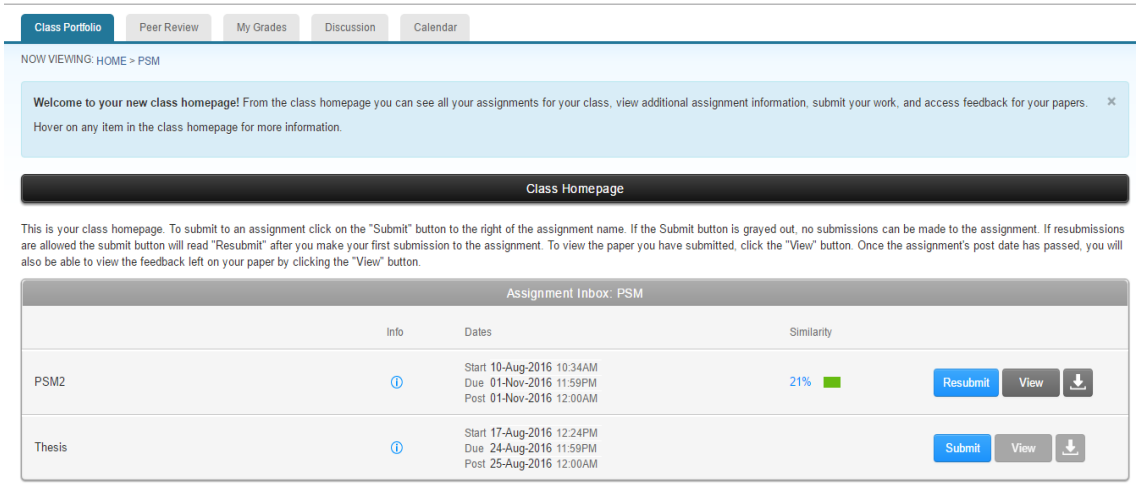


Figure 1.0: Turnitin- Submission of PSM2: 21% Similarity

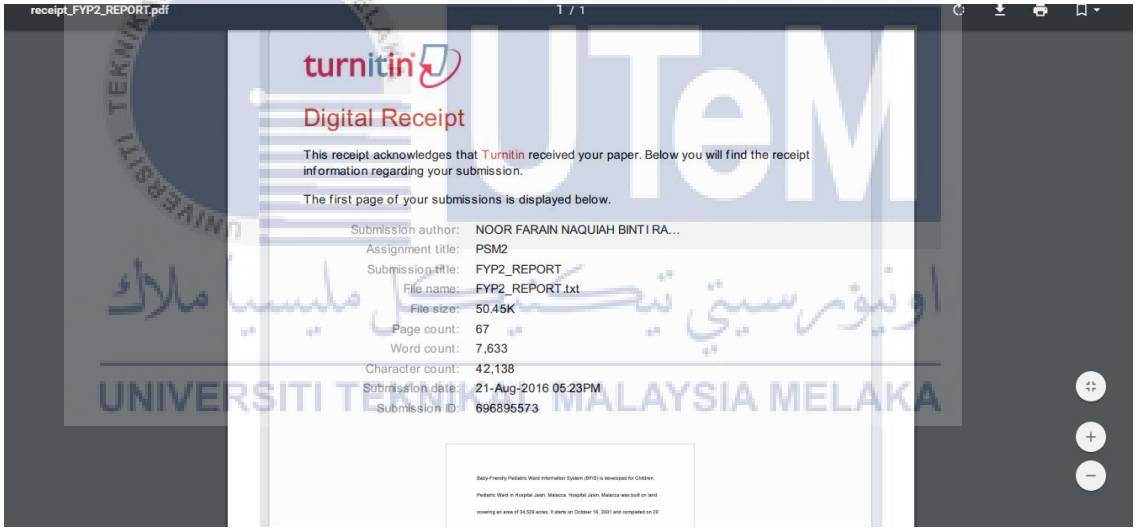


Figure 2.0: Turnitin- Digital Receipt

APPENDIX E

(Interview attachments)

JABATAN KESIHATAN NEGERI MELAKA
ARAS 3, 4, DAN 5
WISMA PERSEKUTUAN,
JALAN BUSINESS CITY, BANDAR MITC,
75450 AYER KEROH, MELAKA

No. Telefon : 06-2356999
No. Faks : 06-2345969
E-mail : jkesihatan@moh.gov.my

Ruj Tuan :
Ruj. Kami : JKN/M (U) 6588 s.k. 0253 Jld 1 (31.)
Tarikh : 24 Mac 2016

Cik Noor Farain Naquiah Binti Rahmat
Pelajar
Fakulti teknologi Maklumat & Komunikasi
Universiti Teknikal Malaysia Melaka

Cik,

KEBENARAN UNTUK MENJALANKAN KAJI SELIDIK BAGI KAJIAN PROJEK SARJANA MUDA (PSM) DI HOSPITAL JASIN, MELAKA

Dengan segala hormatnya merujuk kepada perkara di atas.

2. Jabatan Kesihatan Negeri Melaka telah menerima surat permohonan kebenaran untuk menjalankan kaji selidik bagi kajian Projek Sarjana Muda (PSM) di Hospital Jasin , Melaka daripada pihak Cik Noor Farain Naquiah Bertarikh 17 Mac 2016 bersama-sama dengan No pendaftaran penyelidikan: 29863 dengan tajuk : "Baby Friendly Pediatric Ward Information System in Hospital Jasin , Malacca"

3. Untuk makluman pihak Cik Noor Farain Naquiah, pihak Jabatan Kesihatan Negeri Melaka telah menyemak borang permohonan dan pendaftaran Cik Noor Farain Naquiah di NMRR setelah meneliti tiada masalah terhadap permohonan tersebut.

4. Pihak Jabatan Kesihatan Negeri Melaka tiada halangan untuk memberi kebenaran dan kelulusan untuk menjalankan kajian tersebut namun pihak Cik Noor Farain Naquiah perlu mengikut arahan dan garis panduan yang terdapat dalam surat pekeliling Ketua Pengarah Kesihatan Malaysia bil 10/2015 iaitu Garis Panduan Institut Kesihatan Negara mengenai Penyelidikan di Institusi dan Fasiliti Kementerian Kesihatan Malaysia (Pindaan 01/2015) semasa menjalankan penyelidikan di fasiliti tersebut.

5. Pihak Cik Noor Farain Naquiah juga dikehendaki berhubung dengan Pengarah Hospital Jasin dan memaklumkan kepada beliau kajian Cik Noor Farain Naquiah.

UTeM

اونيۏرسيتي تيکنيکل مليسيا ملاک

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Utk Dr. Sharimin

Datuk Dr. Ghazali Bin Othman

17 Mac 2016

Pengarah Kementerian Kesihatan Negeri Melaka

75450 Ayer Keroh,

Melaka.

Datuk Dr,

PERMOHONAN KELULUSAN MENJALANKAN KAJI SELIDIK BAGI KAJIAN PROJEK SARJANA MUDA (PSM) DI HOSPITAL JASIN, MELAKA

Dengan segala hormatnya, saya merujuk kepada perkara tersebut diatas.

2. Saya Noor Farain Naquiah Binti Rahmat merupakan pelajar dari Universiti Teknikal Malaysia Melaka (UTeM) ingin melaksanakan satu kaji selidik di Hospital Jasin, Melaka bertajuk "Research ID: 29863; Research Title: Baby-Friendly Pediatric Ward Information System in Hospital Jasin, Malacca". Saya telah mendaftarkan diri di National Medical Research Register (NMRR). Walaubagaimanapun, penyelidikan ini tidak memerlukan kelulusan oleh JawatanKuasa Etika Penyelidikan Perubatan JEPP (Medical Research Ethics Committee MREC) kerana penyelidikan ini tidak melibatkan klinikal pesakit.

3. Oleh itu, saya mengharapkan kerjasama dari pihak Dr. untuk meluluskan permohonan bagi menjayakan kaji selidik ini.

Segala kerjasama dan keprihatinan Dr. amatlah dihargai dan didahului dengan ucapan terima kasih. Sekian, terima kasih.

Yang Benar,

FarainRahmat

Noor Farain Naquiah Binti Rahmat

Pelajar

Fakulti Teknologi Maklumat & Komunikasi

Universiti Teknikal Malaysia Melaka

☎ 012-9196110

✉ faraleeyna66@gmail.com

Research Submission

Investigator Initiated Research (IIR)

Research ID	29863

Research Title	BABY-FRIENDLY PEDIATRIC WARD INFORMATION SYSTEM IN HOSPITAL JASIN, MALACCA
Research Abbreviation	BFIS

Approval Type	Research Registration

Corresponding Person	NOOR FARAIN NAQUIAH BINTI RAHMAT
Email	faraleeyna66@gmail.com
Mobile Phone	0129196110

Built PDF By	NOOR FARAIN NAQUIAH BINTI RAHMAT
Built PDF Date	16-03-2016 03:24:11 PM

Research Details

1.1 Research Title	BABY-FRIENDLY PEDIATRIC WARD INFORMATION SYSTEM IN HOSPITAL JASIN, MALACCA	
1.2 Research Title Abbreviation	BFIS	
1.3 Collaborative Research	Yes	**This is NOT a collaborative work with any of the NIH institutes**
	No	**Clinical Research Centre (CRC)**
	No	**Institute for Medical Research (IMR)**
	No	**Institute for Public Health (IPH)**
	No	**Institute for Health Management (IHM)**
	No	**Institute for Health Systems Research (IHSR)**
	No	**Institute for Health Behavioural Research (IHBR)**
1.4 Purpose of submission	*Research Registration*	
2.1 Protocol Id		
2.2 Research Type	Action Research	
2.3 Research Subtype		
2.4 Study Phase		
2.5 Student Academic Project	Bachelor	
2.6 Student Academic Project Specify		
2.7 Research Objective	1. To generate computerized system 2. Information achievement 3. To generate report systematically 4. To generate payment receipt systematically	
2.8 Research Description	Baby-Friendly Pediatric Ward Information System (BFIS) is developed for Children Pediatric Ward in Hospital Jasin, Malacca. This is a multidisciplinary hospital wards including nursery and postnatal maternal care where infants receive treatment here. This system is to help Hospital Jasin, Malacca in Children Pediatric Ward management. This Children Pediatric Ward use manual system in recording their patients information and treatment report. This record is stored in a specific file based on patients identification number. This system is fully computerized system that develops to overcome the manual business problems using paper and filling system. In current system, most record is return that was managed by staff. These written records have their own disadvantages, where it is easily destroyed and the life-time of patient records short. So, the new system, will give the advantages for users and patients in handling treatment process. Users are referred to nurses and doctors in Children Pediatric Ward in Hospital Jasin, Malacca. It enable user to make the patients registration and management, assignation of nurse and doctor who in duty, record patients treatment and controlling appointment scheduling. With this information, BFIS will be able to monitor, check, verify and validate the information from each patients. It will be control by users in Children Pediatric Ward in Hospital Jasin, Malacca.	
2.9 Keywords	Baby-Friendly Pediatric Ward Information System (BFIS) is developed for Children Pediatric Ward in Hospital Jasin, Malacca	
2.10 Expected / Actual research Date Start	21-03-2016	
2.11 Expected / Actual research Date Completed	01-06-2016	
2.12 Research Duration (month)	2	
2.13 Recruitment Status		
2.14.1 Disease Area	Others , specify	
2.14.2 Disease Area Specific Disease	*Others, specify*	

2.14.3 Disease Area Other Specify pediatric ward

2.15.1 Therapeutic Area

2.15.2 Therapeutic Area, In Text

2.16 Key inclusion and exclusion criteria

2.17.1 Target number of subject in Malaysia

2.17.2 Target number of site in Malaysia

2.18.1 Outcome Measure, Primary

2.18.2 Outcome Measure, Secondary

2.19.1 Intervention Type

2.19.2 Intervention Type, Other, specify

2.19.3 Name of intervention under investigation

Sponsors

User ID	Sponsor Organization / Institution	Sponsor Type	Funding Source	Sponsor Contact Name	Email	Inactive
40364	UNIVERSITI TEKNIKAL MALAYSIA MELAKA (UTEM)	Investigator Initiated Research	Self-funding	NOOR FARAIN NAQUIAH BINTI RAHMAT	faraleeyna66@gmail.com	No

Study Site(s)

Site ID	Site conducted	User ID	Investigator Name	Role	State conducted
202209	HOSPITAL JASIN	40364	NOOR FARAIN NAQUIAH BINTI RAHMAT	Principal / Coordinating Investigator	Melaka

Investigator(s)

User ID	Name	Investigator's Institution	Department	Role	State	Email / Mobile phone	Inactive
40364	NOOR FARAIN NAQUIAH BINTI RAHMAT	UNIVERSITI TEKNIKAL MALAYSIA MELAKA (UTEM)		Principal / Coordinating Investigator	Melaka	faraleeyna66@gmail.com 0129196110	No

KETUA PENGARAH KESIHATAN MALAYSIA
DIRECTOR GENERAL OF HEALTH MALAYSIA
Kementerian Kesihatan Malaysia
Aras 12, Blok E7, Kompleks E
Pusat Pentadbiran Kerajaan Persekutuan
62590 PUTRAJAYA

Tel. : 03-8883 2545
Faks : 03-8889 5542
Web : anhisham@moh.gov.my

Ruj. Kami: (17)KKM/NIHSEC/100-1/1/1 Jld 2

Tarikh: 21 Oktober 2015

SEPERTI SENARAI EDARAN

YBhg Datuk/Dato'/Datin/Tuan/Puan,

SURAT PEKELILING KETUA PENGARAH KESIHATAN MALAYSIA BIL. 10 /2015

GARISPANDUAN INSTITUT KESIHATAN NEGARA MENGENAI PENYELIDIKAN DI INSTITUSI DAN FASILITI KEMENTERIAN KESIHATAN MALAYSIA (PINDAAN 01/2015)

1. TUJUAN

Pekeliling ini bertujuan untuk memaklumkan pindaan garispanduan yang digunakan untuk maksud Penyelidikan di Institusi dan fasiliti Kementerian Kesihatan Malaysia (KKM).

Pindaan garispanduan yang bertajuk ***"NIH GUIDELINES FOR CONDUCTING RESEARCH IN MOH INSTITUTIONS AND FACILITIES"*** ini disediakan untuk mempertingkatkan kualiti proposal / protokol Penyelidikan seterusnya mempercepatkan proses kelulusan melaksanakan Penyelidikan.

2. ASPEK PENTING GARISPANDUAN

Berikut adalah aspek – aspek penting di dalam garis panduan ini:

PPKN. MELAKA	
TPKN (KA)	/
TPKN (PERUBATAN)	/
TPKN (G)	/
TPKN (PENGURUSAN)	
TPKN (F)	
TPKN (BKKM)	
P. HOSPITAL	
PKD	

2.1 Semua Penyelidikan mesti memperolehi kelulusan Kementerian Kesihatan Malaysia melalui tatacara yang telah ditetapkan mengikut kategori seperti berikut:-

(i) Penyelidik Institut Kesihatan Negara *(NIH Researcher/Investigator)*

(ii) Penyelidik selain Institut Kesihatan Negara yang memohon Geran Penyelidikan *(Non NIH Researcher / Investigators applying for grant)*

(iii) Penyelidik selain Institut Kesihatan Negara yang tidak memohon Geran Penyelidikan, tetapi menggunakan fasiliti, data dan/atau pesakit fasiliti KKM *(Non NIH Researcher / Investigator, not requesting for Grant, using MOH facilities, Data and/or MOH Patients)*

2.2 Semua penyelidikan yang dilaksanakan di Institusi dan fasiliti Kementerian Kesihatan Malaysia (KKM) mesti didaftarkan secara online di *National Medical Research Register (NMRR)* – https://www.nmrr.gov.my

Edaran kepada ue'l + PKD

Maklumkan kpd semua ketua PTJ.

2.3 Penyelidikan yang mempunyai aspek etika mesti memperolehi kelulusan dari Jawatankuasa Etika dan Penyelidikan Perubatan (JEPP), KKM – *Medical Research and Ethics Committee (MREC), MOH*

2.4 Permohonan Geran akan diputuskan oleh Panel Penilai Geran Penyelidikan KKM *(MOH Research Grant Review Board)* tertakluk kepada sokongan Jawatankuasa Penilaian Penyelidikan Institut Kesihatan Negara (JPP-NIH) **DAN** kelulusan etika dari Jawatankuasa Etika Penyelidikan Perubatan *(MREC)*. Keputusan panel penilai adalah muktamad. Geran penyelidikan KKM tidak diperuntukkan untuk tujuan disertasi dan tesis pelajar universiti.

2.5 Sebarang sebaran (*dissemination*) hasil penyelidikan samada melalui penulisan, penerbitan, pengiklanan, pembentangan atau untuk tujuan terbitan di media cetak atau elektronik, mesti memperolehi kelulusan Ketua Pengarah Kesihatan.

3. TARIKH PERLAKSANAAN

Surat Pekeliling berserta Garispanduan ini berkuatkuasa mulai tarikh pekeliling ini dikeluarkan. Berikutan penguatkuasaan ini, Surat Pekeliling Ketua Pengarah Kesihatan Malaysia Bilangan **9/2007 adalah terbatal**.

4. PERTANYAAN

Sebarang pertanyaan boleh dikemukakan kepada:

Pengarah Urusetia NIH
Kementerian Kesihatan Malaysia
d/a Institut Pengurusan Kesihatan
Jalan Rumah Sakit, Bangsar
59000 KUALA LUMPUR
Tel: 03 2287 4032

Sekian.

"BERKHIDMAT UNTUK NEGARA"

Yang Ikhlas,

(DATUK DR. NOOR HISHAM BIN ABDULLAH)

NIH GUIDELINES FOR CONDUCTING RESEARCH IN THE MINISTRY OF HEALTH INSTITUTIONS AND FACILITIES

National Institutes of Health
Ministry of Health

October 2015

NIH GUIDELINES FOR CONDUCTING RESEARCH IN MOH INSTITUTIONS AND FACILITIES

These Guidelines describe Ministry of Health (MOH) policies governing the conduct of research in MOH institutions and facilities. The policy statements in these Guidelines are based on a review of existing circulars issued by the MOH [*NIH Guidelines for Conducting Research in the MOH Institutions & Facilities Draft Version 2.1 27 August 2007*]. Where necessary, changes in the guidelines are in line with international practice on research ethics and governance. The use of information technology to facilitate the review and approval process is also included.

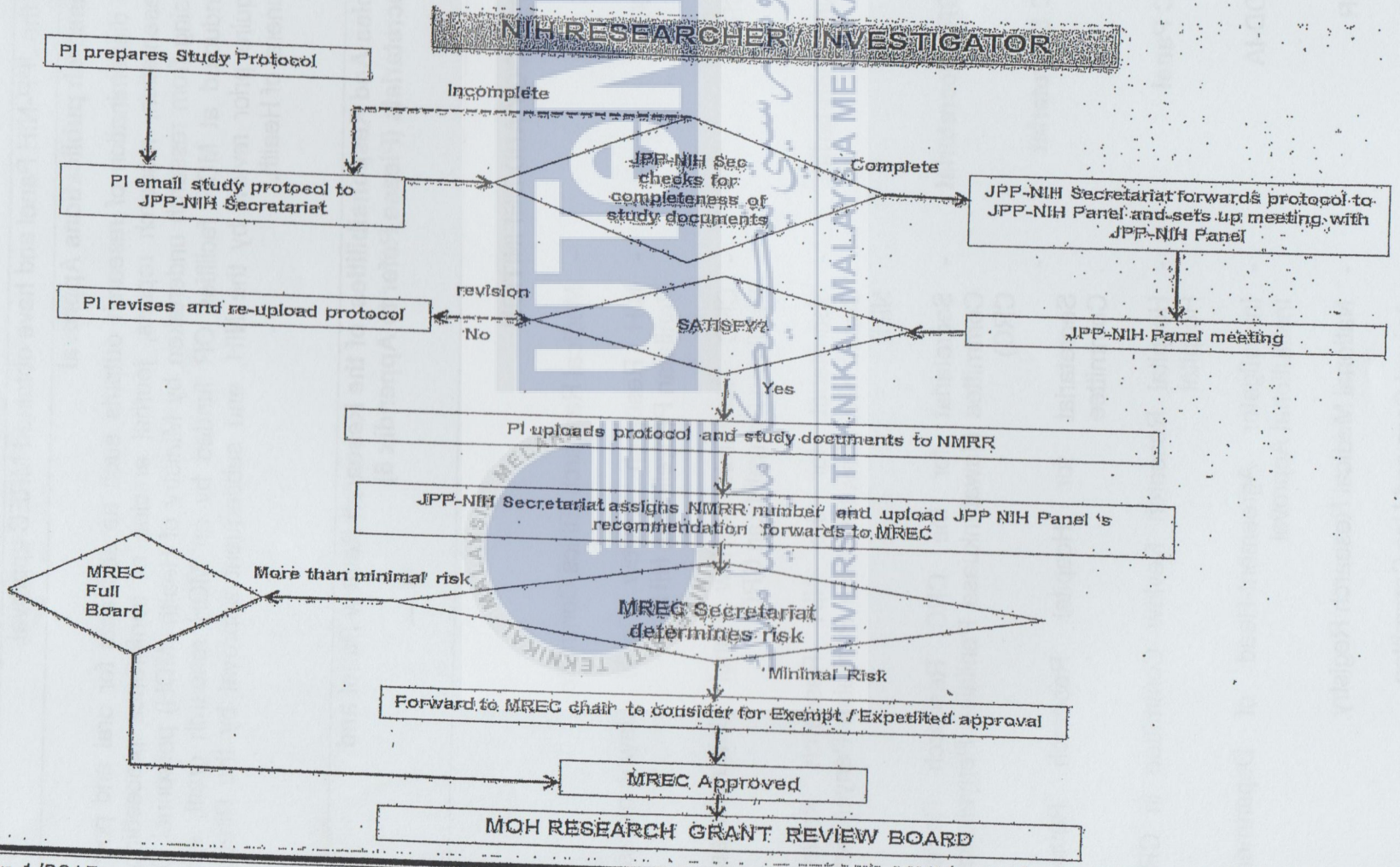
#	Policy Statements
1	**All research undertaken by Ministry of Health (MOH) personnel OR conducted in MOH facilities OR funded by an MOH research grant shall require approval according to the following categories:** i. NIH Researcher / Investigator - (Refer to **Appendix 1**) ii. Non NIH Researcher/Investigators applying for a grant -. (Refer to **Appendix 2**) iii. Non NIH Researcher/Investigator, not applying for grant, using MOH facilities, data and/or MOH patients - (Refer to **Appendix 3**)
2	**Prior approval by the MOH: The researcher / investigator:** i. must sign an Investigator Agreement and obtain approval from his or her Head of Department (**IA-HOD-IA**) (Refer document 1 template in **Appendix 4**) ii. should obtain permission to conduct research at the respective facilities/ institutions (Refer document 2 template in **Appendix 5**) iii. undertaking collaborative research, where a party external to the MOH is involved, is required to obtain a formal Letter of Agreement (LoA) between the related MOH institution / division and the external party.
3	**Research involving human subjects requires prior ethics review and approval by the Medical Research and Ethics Committee (MREC)** A human subject (in the context of research) is "a living individual about whom an investigator obtains either data through intervention (eg. clinical trial) or interaction (eg questionnaire in health survey) with the individual, or identifiable private information". Submission to MREC for ethics review and approval is conducted online at www.nmrr.gov.my
4	**MOH Research Grant Approval** The MOH Research Grant Review Board, chaired by the Deputy Director General of Health (Research and Technical Support) shall convene and give final approval to research projects requesting funds that have been supported

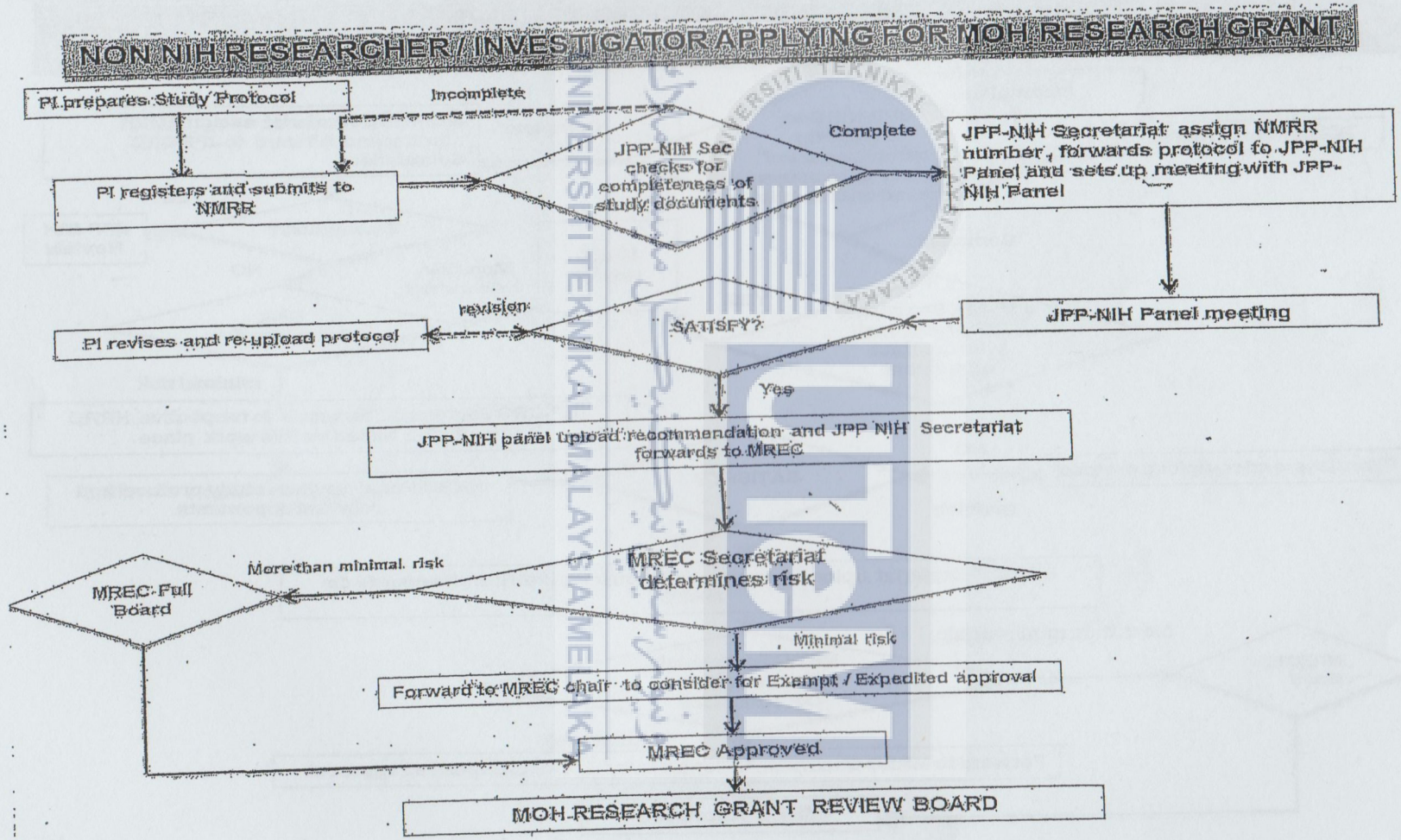
#	Policy Statements
	by the JPP-NIH Panel and have obtained MREC approval.
5	**Research publications Approval** All dissemination of research outputs such as abstracts for oral and poster presentation, research reports, journal articles or conference proceedings, arising from research undertaken by Ministry of Health (MOH) personnel OR conducted at MOH facilities OR funded by an MOH research grant, shall require prior review by the NIH, and subsequent approval by the Director General of Health.
6	**Roles And Responsibilities of the Research Review Panel and Secretariats (Please Refer to Appendix 6)**

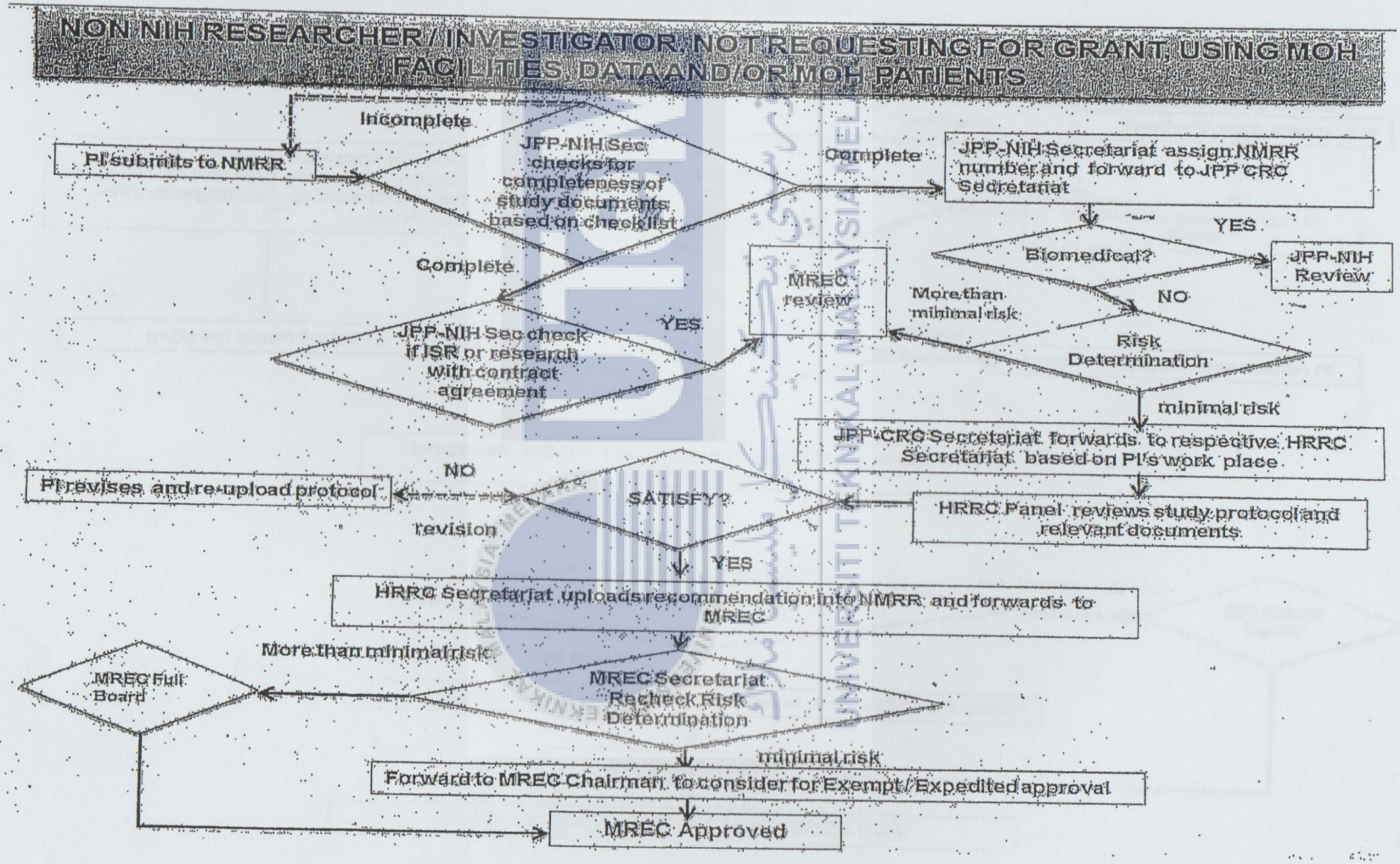
TERMINOLOGY AND DEFINITION

MREC	-	Medical Research Ethics Committee
JPP-NIH	-	NIH Research Review Panel (Jawatankuasa Penilaian Penyelidikan NIH)
JPP-CRC	-	CRC Research Review Panel (Jawatankuasa Penilaian Penyelidikan CRC)
JPP-NIH Secretariat	-	Secretariat for the NIH Research Review Committee (Jawatankuasa Penilaian Penyelidikan NIH)
JPP-CRC Secretariat	-	Secretariat for the CRC Research Review Committee (Jawatankuasa Penilaian Penyelidikan CRC)
HRRC Secretariat	-	Secretariat for Hospital Research Review Committee
HRRC Panel	-	Hospital Research Review Committee in CRC Hospital
IA-HOD-IA	-	Investigator Agreement-Head of Department-Institutional Approval
NMRR	-	National Medical Research Registry
ACUC	-	Animal Care and Use Committee
PI	-	Principle Investigator

APPENDIX 1


NIH RESEARCHER/ INVESTIGATOR
PI prepares Study Protocol
Incomplete
PI email study protocol to JPP-NIH Secretariat
JPP-NIH Sec checks for completeness of study documents
Complete
JPP-NIH Secretariat forwards protocol to JPP-NIH Panel and sets up meeting with JPP-NIH Panel
JPP-NIH Panel meeting
revision
PI revises and re-upload protocol
No
SATISFY?
Yes
PI uploads protocol and study documents to NMRR
JPP-NIH Secretariat assigns NMRR number and upload JPP NIH Panel 's recommendation forwards to MREC
MREC Full Board
More than minimal risk
MREC Secretariat determines risk
Minimal Risk
Forward to MREC chair to consider for Exempt / Expedited approval
MREC Approved
MOH RESEARCH GRANT REVIEW BOARD


NON NIH RESEARCHER/ INVESTIGATOR APPLYING FOR MOH RESEARCH GRANT
PI prepares Study Protocol
Incomplete
PI registers and submits to NMRR
JPP-NIH Sec checks for completeness of study documents
Complete
JPP-NIH Secretariat assign NMRR number, forwards protocol to JPP-NIH Panel and sets up meeting with JPP-NIH Panel
JPP-NIH Panel meeting
revision
PI revises and re-upload protocol
SATISFY?
Yes
JPP-NIH panel upload recommendation and JPP NIH Secretariat forwards to MREC
MREC Secretariat determines risk
More than minimal risk
MREC Full Board
Minimal risk
Forward to MREC chair to consider for Exempt / Expedited approval
MREC Approved
MOH RESEARCH GRANT REVIEW BOARD


NON NIH RESEARCHER/ INVESTIGATOR NOT REQUESTING FOR GRANT USING MOH FACILITIES, DATA AND/OR MOH PATIENTS
PI submits to NMRR
Incomplete
JPP-NIH Sec checks for completeness of study documents based on checklist
Complete
JPP-NIH Secretariat assign NMRR number and forward to JPP CRC Secretariat
YES
Biomedical?
JPP-NIH Review
NO
Risk Determination
More than minimal risk
MREC review
minimal risk
JPP-CRC Secretariat forwards to respective HRRC Secretariat based on PI's work place
HRRC Panel reviews study protocol and relevant documents
SATISFY?
NO
revision
PI revises and re-upload protocol
YES
JPP-NIH Sec check if ISR or research with contract agreement
YES
HRRC Secretariat uploads recommendation into NMRR and forwards to MREC
More than minimal risk
MREC Secretariat Recheck Risk Determination
MREC Full Board
minimal risk
Forward to MREC Chairman to consider for Exempt/ Expedited approval
MREC Approved

Document Template 1 - Investigator Agreement, Head of Department and Institutional Approval Form (IA-HOD-IA)

INVESTIGATOR'S AGREEMENT, HEAD OF DEPARTMENT AND ORGANISATIONAL / INSTITUTIONAL APPROVAL
PERSETUJUAN PENYELIDIK DAN KEBENARAN KETUA JABATAN DAN PENGARAH ORGANISASI/INSTITUSI

This document is intended for online submission for formal research registration. It is issued as the Investigator's Agreement to participate in the research as well as **Approval from investigator's Head of Department and Instituition Director** . Please upload this document in the required section in NMRR upon completion together with the protocol..
***Note: This form is NOT to be used for obtaining permission to conduct the research at the named / selected study site(s).*

*Dokumen ini adalah untuk penghantaran 'online' mengikut prosedur rasmi pendaftaran penyelidikan. Borang ini dikeluarkan sebagai pengakuan penyelidik untuk menjalankan penyelidikan dan persetujuan serta kebenaran daripada **Ketua Jabatan dan Pengarah Institusi masing - masing**. Sila lengkapkan borang ini dan memuat naik ke dalam sistem NMRR di seksyen yang telah ditetapkan.*
***Nota : Borang ini BUKAN digunakan untuk tujuan mendapatkan keizinan untuk menjalankan penyelidikan di lokasi kajian yang dipilih.*

Research Title *[Tajuk Penyelidikan]*			
Research ID *[Nombor Pendaftaran]*		**Protocol number (if available)** *[No. Protocol (jika ada)]*	

INVESTIGATOR'S AGREEMENT
PERSETUJUAN PENYELIDIK

I am the investigator for the above research and am responsible to the conduct the research.
Saya adalah penyelidik penyelidikan yang tersebut d iatas dan akan bertanggungjawab untuk melaksanakan penyelidikan tersebut.

Name *[Nama]*	
IC number *[No. K/P]*	
Institute *[Institusi]*	
Signature and Official Stamp *[Tandatangan dan Cop Rasmi]*	
Date *[Tarikh]*	

HEAD OF DEPARTMENT'S APPROVAL
PERSETUJUAN KETUA JABATAN

I agree to allow the above named officer to conduct the research.
Saya bersetuju dan membenarkan pegawai di atas menjalankan projek penyelidikan tersebut di atas.

Name of Head of Department *[Nama Ketua Jabatan]*	
Signature and Official Stamp *[Tandatangan dan Cop Rasmi]*	
Date *[Tarikh]*	

ORGANISATIONAL / INSTITUTIONAL DIRECTOR'S APPROVAL
KEBENARAN ORGANISASI / INSTITUSI

I acknowledge and approve the named officer to conduct the research.
Saya mengesahkan dan membenarkan pegawai *di atas menjalankan projek penyelidikan tersebut di atas*

Name of Director *[Nama Pengarah]*	
Signature and Official Stamp *[Tandatangan dan Cop Rasmi]*	
Date *[Tarikh]*	

APPENDIX 5

Document Template 2

Rujukan kami:
Tarikh:

Pengarah [*Institusi / Hospital*]
[*Alamat institusi / hospital*]

YBhg Dato' / Tuan / Puan,

PERMOHONAN KEBENARAN PENGGUNAAN [*nama fasiliti*] UNTUK MENJALANKAN PENYELIDIKAN

Dengan hormatnya saya merujuk kepada perkara tersebut di atas.

2. Saya perlu menggunakan fasiliti YBhg Dato'/Tuan/Puan untuk aktiviti penyelidikan bertajuk, "[*nombor pendaftaran NMRR - Tajuk Penyelidikan*]". Penyelidikan ini telah diluluskan oleh Jawatankuasa Etika Penyelidikan Perubatan JEPP (*Medical Research Ethics Committee MREC*). Bersama-sama ini disertakan surat kebenaran MREC (Lampiran 1) dan kertas kajian (*protocol)* / makluman ringkas projek (Lampiran 2).

3. Pegawai dari fasiliti YBhg Dato'/Tuan/Puan yang terlibat dalam penyelidikan ini adalah seperti berikut: (jika berkenaan)

i. [nama pegawai #1]
ii. [nama pegawai #2]

4. Fasiliti/Jabatan di tempat YBhg Dato'/Tuan/Puan yang diperlukan adalah seperti berikut:

i. [Fasiliti/Jabatan #1]
ii. [Fasilit/Jabatani #2]

5. Aktiviti penyelidikan yang akan dijalankan di fasiliti YBhg Dato' / Tuan / Puan adalah seperti berikut:

i. [aktiviti #1]
ii. [aktiviti #2]

Kami berharap mendapat kebenaran YBhg Dato' / Tuan / Puan.

Sekian, terima kasih.

Saya yang menurut perintah,

.....
(Nama Ketua Penyelidik)
s.k.
<Ketua Jabatan Ketua Penyelidik>
< Ketua Jabatan Tapak Penyelidikan
<Nama Penyelidik bersama (Co-Invesigator) di lokasi berkaitan>

APPENDIX 5(a)

Surat Kebenaran MREC

LAMPIRAN 2

Protokol (*full protocol*)

Ringkasan Projek Penyelidikan

Tajuk Penyelidikan:

Nama dan Jabatan Ketua Penyelidik:

Nombor pendaftaran NMRR:

Rujukan kelulusan MREC:

Tarikh mula penyelidikan:

Tarikh tamat penyelidikan:

Objektif penyelidikan:

Ringkasan metodologi penyelidikan:

APPENDIX 5 (b)

MAKLUMBALAS PERMOHONAN KEBENARAN PENGGUNAAN < nama fasiliti> UNTUK MENJALANKAN PENYELIDIKAN

Tajuk Penyelidikan :
Nama dan Jabatan Ketua Penyelidik :

Pihak hospital/institusi dengan ini membuat keputusan seperti berikut : -

☐ Membenarkan projek penyelidikan dijalankan

☐ Tidak membenarkan projek penyelidikan dijalankan

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah

.....
(<Ketua Jabatan di mana penyelidikan akan dijalankan>)

.....
(<Nama Pengarah >)

S.K.
<Ketua CRC hospital >
<Nama penyelidik bersama (co- investigators) di fasiliti berkaitan (jika berkaitan)

APPENDIX 6

ROLES AND RESPONSIBILITIES OF REVIEW PANELS AND SECRETARIATS

1. **JPP-NIH Secretariat**
   a. Examine all documents for data and document completeness
   b. Distribute documents for further action to the JPP-NIH Panel,
   c. Distribute documents to the JPP-CRC Secretariat (for distribution to Hospital CRC Secretariat)
   d. Forward supported protocols to MREC for further action.
   (Please refer to Appendix 1, 2 and 3)

2. **JPP-NIH Review Panel**
   a. Review the scientific merit of submitted protocols
   b. Support or reject research applications from NIH researchers/investigators and Non NIH researchers applying for grants
   c. Approve protocols with non-human subjects and forward for further action by the MOH Research Grant Panel (if applicable).
   (Please refer to Appendix 1 and 2)

3. **JPP-CRC Secretariat**
   a. Receive protocols forwarded by the JPP-NIH Secretariat.
   b. Determine risk
   c. Distribute protocols and study documents to the Hospital CRC Secretariat
   d. Redirect biomedical research protocols to JPP-NIH
   (Please refer to Appendix 3)

4. **HRRC Secretariat**
   a. Distribute protocols received from JPP-CRC Secretariat to HRRC Panel for review.
   b. Upload recommendations from CRC Hospital Panel and forward to MREC
   (Please refer to Appendix 3)

5. **HRRC Review Panel**
   a. Review protocols based on scientific merit forwarded by the CRC Hospital Secretariat
   b. Support or reject research applications from Non NIH researchers
   (Please refer to Appendix 3)

Note:

i. For Industry Sponsored Research (ISR) and protocols involving research agreements, the JPP-NIH Secretariat shall forward the protocols and study documents directly to MREC for approval.

ii. Studies involving collaboration with international agencies or Institution will be directed to MREC for further action.

iii. For ACUC, herbal studies, stem cell approval etc, please submit to the various committees before submitting to JPP-NIH Secretariat.

PEJABAT PENGARAH KESIHATAN
NEGERI MELAKA,
TINGKAT 3,4 DAN 5, WISMA PERSEKUTUAN,
JALAN BUSINESS CITY, BANDAR MITC,
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Pejaba Am :06-2356999
No. Faks : 06-2345951 (Pej.Pengarah)
: 06-2345966 (Kewangan)
: 06-2345958 (Kes. Awam)

TERIMA
19 NOV 2015
Bahagian Perubatan
JKN Melaka

Ruj. Tuan :
Ruj. Kami : JKNM:PENG(T) 16 Jld.54
Tarikh : 18 November 2015
06 Safar 1437H

SEPERTI SENARAI EDARAN

YBhg. Datuk/Tuan/Puan,

SURAT PEKELILING KETUA PENGARAH KESIHATAN MALAYSIA BIL. 10/2015

GARISPANDUAN INSTITUT KESIHATAN NEGARA MENGENAI PENYELIDIKAN DI INSTITUSI DAN FASILITI KEMENTERIAN KESIHATAN MALAYSIA (PINDAAN 01/2015)

Dengan segala hormatnya saya merujuk surat daripada Pejabat Ketua Pengarah Kesihatan Malaysia Bil (17)KKM/NIHSEC/100-1/1/1 Jld 2 bertarikh 21 Oktober 2015 mengenai perkara tersebut di atas

2. Bersama-sama ini disertakan Surat Pekeliling Ketua Pengarah Kesihatan Malaysia Bil 10/2015 untuk memaklumkan pindaan garispanduan yang digunakan untuk penyelidikan di Institusi dan fasiliti Kementerian Kesihatan Malaysia untuk tindakan YBhg. Datuk/tuan/puan selanjutnya.

3. Oleh yang demikan, YBhg. Datuk/tuan/puan bolehlah menggunapakai garispanduan ini mulai tarikh surat pekeliling ini dikeluarkan.

Sekian. Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

"PENYAYANG, BEKERJA BERPASUKAN DAN PROFESIONALISMA ADALAH BUDAYA KERJA KITA"

Saya yang menurut perintah,

(DATUK DR. GHAZALI BIN OTHMAN – MMC: 26797)
Pengarah Kesihatan Negeri
Melaka

minta CRC bantang kerja
- MPP

DDGO/f0

SENARAI EDARAN

Timbalan Pengarah Kesihatan Negeri Kesihatan Awam/
Perubatan/Pengurusan/Pergigian/Farmasi/Keselamatan & Kualiti
Makanan

Pengarah Hospital Melaka/Alor Gajah/Jasin

Pegawai Kesihatan Daerah Melaka Tengah/
Alor Gajah/Jasin

Pegawai Pergigian Daerah Melaka Tengah/Alor Gajah/Jasin

Ketua Jurutera JKNM

Ketua Penolong Pegawai Perubatan Negeri

Ketua Penyelia Jururawat Negeri