

INSURANCE ID
(Online Platform for Insurance Claim Processing)

By
Khairil Azri bin Azlan
14468

Dissertation is submitted in partial fulfillment of
the requirements for the Bachelor of Technology (Hons)
(Information & Communication Technology)

MAY 2015

Universiti Teknologi PETRONAS
Bandar Seri Iskandar
31750 Tronoh
Perak Darul Ridzuan

CERTIFICATION OF APPROVAL

INSURANCE ID

By

KHAIRIL AZRI BIN AZLAN

14468

A project dissertation submitted to the
Information & Communication Technology Programme
Universiti Teknologi PETRONAS
MAY 2015

In partial fulfillment of the requirement for
BACHELOR OF TECHNOLOGY (HONS)
INFORMATION AND COMMUNICATION TECHNOLOGY

Approved by,

(Dr. Aliza bt. Sarlan)

Department of Computer Information Science
Universiti Teknologi PETRONAS

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements and that the original work contained have not been undertaken of done by unspecified sources or persons.

(KHAIRIL AZRI BIN AZLAN)

ACKNOWLEDGEMENT

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the name of ALLAH S.W.T, The Almighty God, The Most Gracious and Most Merciful, my highest gratitude towards Him for giving me the willpower and opportunity to complete my project for the completion of my undergraduate program in Information and Computer Science, Universiti Teknologi PETRONAS (UTP).

I owe a debt of gratitude to my project's supervisor Dr. Aliza bt. Sarlan for her encouragements, supports, and all the advises she had given me during the period of completing this project. Without her assistance, co-operations and willingness to share her knowledge and experience, the project will not be completed.

I would also like to thank my family for all their supports and encouragements throughout my years in UTP. As far as I am concerned, they have already given out their all as well as putting their patience and confidence at every stage of my study.

Thanks also to all my friends, those who had been supporting me continuously in completing this project, giving me the help I needed be it directly or indirectly, voluntarily or not, I sincerely thank you all for your help.

Lastly, I also would like to thank Universiti Teknologi PETRONAS (UTP) for giving me the opportunity to learn and experience the real project development through this Final Year Project. This is a valuable and beneficial project for my preparation before I move to the real working environment in the future. ☺

ABSTRACT

This project intends to boost the current technological implementation of Malaysian's insurance and healthcare information system, by developing a unique platform to serve online collaboration features, enabling the three user groups which is the healthcare providers, insurance carriers and their registered clients to communicate and delivering their services in a more efficient manner as this will eventually accelerates the tedious and time consuming insurance-related processes. This project is realized to overcome the difficulties in insurance verification process which are currently being done manually. The current approach is impractical for emergency cases where timely events turn out to be the real deal in determining a patient's live. Thus, by taking advantage of the Internet, a collaboration platform can be developed to allow faster processing of medical and insurance related documents. The prototype of INSURANCE ID had been developed by using Client-Server Architecture as a web-based application which it will be made accessible via internet browsers for desktop users and web applications for the clients. The development of this project is hoped to mark a new milestone for Malaysian insurance system to continue to be established in light of helping the unfortunate, securing their lives and restoring hope, in order to protect their rightful liberties as the residents of Malaysia.

KEYWORDS: Malaysia, insurance, web insurance system, mobile insurance system, online insurance system, claim verification, insurance processing.

TABLE OF CONTENTS

| | |
|-----------------------------------|---|
| Certification of Approval..... | 2 |
| Certification of Originality..... | 3 |
| Acknowledgement..... | 4 |
| Abstract..... | 5 |
| Table of Contents..... | 6 |
| List of Figures..... | 8 |
| List of Tables..... | 9 |

CHAPTER 1: INTRODUCTION

| | |
|-------------------------------------|----|
| 1.1 Background of Study..... | 11 |
| 1.2 Problem Statement..... | 12 |
| 1.3 Objective..... | 13 |
| 1.4 Scope..... | 13 |
| 1.5 Limitation..... | 13 |
| 1.6 Relevancy Of The Project..... | 14 |
| 1.7 Feasibility Of The Project..... | 15 |

CHAPTER 2: LITERATURE REVIEW

| | |
|---|----|
| 2.1 Malaysia Insurance Overview..... | 16 |
| 2.1.1 Demand For Insurance..... | 16 |
| 2.1.2 Health Financing System..... | 17 |
| 2.1.3 Private Health Insurance Schemes..... | 17 |
| 2.1.4 Basic Health Insurance Process Flow..... | 18 |
| 2.1.5 The Competition Law Enforcement..... | 19 |
| 2.2 Internet Prominence..... | 19 |
| 2.2.1 Inter-Organizational Workflow System..... | 20 |
| 2.2.2 Cloud-Based System..... | 20 |
| 2.2.3 Green Technology..... | 20 |

TABLE OF CONTENTS

CHAPTER 3: METHODOLOGY

| | |
|--|----|
| 3.1 System Development Life Cycle..... | 21 |
| 3.2 Project Phases..... | 22 |
| 3.2.1 Planning..... | 22 |
| 3.2.2 Analysis..... | 25 |
| 3.2.3 Design..... | 29 |
| 3.2.4 Development..... | 32 |
| 3.3 Project Activities..... | 35 |

CHAPTER 4: RESULT AND DISCUSSION

| | |
|---|----|
| 4.1 Process Flow of Online Health Insurance Claim Processing..... | 37 |
| 4.2 The Insurance ID Platform..... | 39 |
| 4.2.1 Desktop Platform..... | 39 |
| 4.2.2 Mobile Platform..... | 45 |
| 4.3 Testing and Feedback..... | 46 |
| 4.3.1 Functionality Testing..... | 46 |
| 4.3.2 User Testing..... | 46 |
| 4.3.3 Feedback..... | 46 |

CHAPTER 5: CONCLUSION AND RECOMMENDATION

| | |
|---|----|
| 5.1 Achieved Objectives..... | 50 |
| 5.2 Recommendation And Future Work..... | 50 |
| 5.3 Summary..... | 50 |
| Reference..... | 52 |
| Appendix..... | 53 |

LIST OF FIGURES

| | |
|---|----|
| Figure 1: Admission Process Flow of Health Insurance Claim Procedure..... | 11 |
| Figure 2: Discharge Process Flow of Health Insurance Claim Procedure..... | 11 |
| Figure 3: Percentage of Health Insurance Possession in Malaysia..... | 16 |
| Figure 4: Prudential Health Insurance Claim Process Flow..... | 18 |
| Figure 5: Iterative and Incremental Methodology..... | 21 |
| Figure 6: Use Case Diagram for Desktop Platform..... | 27 |
| Figure 7: Use Case Diagram for Mobile Platform..... | 28 |
| Figure 8: System Architecture..... | 29 |
| Figure 9: Module Architecture..... | 30 |
| Figure 10: User Activity Diagram..... | 37 |
| Figure 11: Guest Registration Page (i)..... | 40 |
| Figure 12: Guest Registration Page (ii)..... | 40 |
| Figure 13: Guest Login Page..... | 40 |
| Figure 14: Insurance Home Page..... | 41 |
| Figure 15: Insurance Staff Page..... | 41 |
| Figure 16: Insurance Client Page..... | 42 |
| Figure 17: Insurance Claim Page..... | 42 |
| Figure 18: Healthcare Home Page..... | 43 |
| Figure 19: Healthcare Staff Page..... | 43 |
| Figure 20: Healthcare Client Page..... | 44 |
| Figure 21: Healthcare Claim Page..... | 44 |
| Figure 22: Login, Registration, and Home Page for Mobile Platform..... | 45 |
| Figure 23: Survey Score for Attribute Usefulness..... | 47 |
| Figure 24: Survey Score for Attribute Ease of Use..... | 48 |
| Figure 25: Survey Score for Attribute Ease of Learning..... | 48 |
| Figure 26: Survey Score for Attribute Satisfaction | 48 |
| Figure 27: Survey Score for Attribute Functionality..... | 49 |
| Figure 28: Insurance ID Score Chart..... | 49 |

LIST OF TABLES

| | |
|---|----|
| Table 1: Terms and Definition..... | 24 |
| Table 2: Requirement's Priority..... | 26 |
| Table 3: Database's Table Attributes..... | 31 |
| Table 4: Initial GUI Design..... | 32 |
| Table 5: Project Activities..... | 35 |
| Table 6: Tool Used..... | 38 |
| Table 7: System Score..... | 47 |
| Table 8: Gantt's Chart..... | 53 |

CHAPTER 1

INTRODUCTION

The usage of mobile devices nowadays had tremendously increased among the people of nationwide as internet emerges into the world connecting more and more people together. And significantly, people in the present are really into the mobile devices for the conveniences it has to offer. As their popularity grows, millions of mobile applications have been developed and introduced to extend the various functions and purposes of such mobile devices. Plus, together with the inter-networking capabilities, many brilliant ideas have been developed into multimillion dollar apps which in return, help to dynamically improve the state of the world.

While at this time in Malaysia, the current approach of insurance and health financing system can be further enhanced by developing an online platform that can act as a medium for all insurance-related activity between its various types of users. And with the rise of the web as the major platform for making data and services available for humans and applications, a new challenge has become prevalent requiring not only the support of workflows within individual organizations, but also workflows crossing organizational boundaries referred to as interorganizational workflows (Stoilov & Stoilova, 2005).

Mobile implementation is really important as to minimize the physical activity that is needed in issuing claim to the insurance carrier. Thus, the project will give more focus on delivering a system that can cater for online Health Insurance claim verification procedure between its various groups of users, consisting of mobile and desktop platforms, accessible via the internet. Furthermore, the project is developed to serve as an initial platform to process insurance related activity. Thus, it can be ultimately be extended and expanded in the future to include all other insurance related activity.

1.1 BACKGROUND OF STUDY

In Malaysia, the current communication and data transfer activities between insurance and healthcare organizations are being accomplished merely by using fax machines and email approaches. As these approaches require a huge amount of time, it is not really relevant anymore in today's world. A new online system need to be implemented to cater for all insurance related activity.

INSURANCE ID will replicate the current insurance claim procedure used by the insurance organizations in order to save the time needed to process the claim issuance. However, the platform will only imitate the admission process of an insurance client from the issuance of claim until the issuance of Guarantee Letter by the insurance carrier. Figure 1 and 2 below are created to illustrate the current methods of manual insurance claim verification procedure.



Figure 1: Admission Process Flow of Health Insurance Claim Procedure

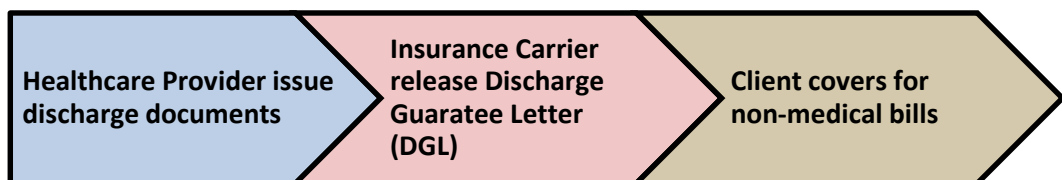


Figure 2: Discharge Process Flow of Health Insurance Claim Procedure

The basic admission process includes 3 steps which need to be redefined using online approaches. It includes the transfer of documents and information from the healthcare and insurance organizations. Using online approaches, all related documents need to be redefine intensively using forms to capture the input from user which later on will be saved in the designated database. Then, the captured information will be propagated among the users as according to the newly proposed process flow of online insurance claim verification procedure.

1.2 PROBLEM STATEMENTS

“Difficulty in obtaining the verification statement of Health Insurance claim which is being done manually at the present time.”

It is time-consuming and therefore not practical for emergency cases because the users of the system need to manually handle the process each time a request is sent. Consequently, with the technology that we have obtained in Malaysia so far, it is possible to further optimize this solution by the method of mobile implementation. By going online, most of the processes can be automated, thus saving more time for the whole insurance processes to take place.

At this current moment, an app to accelerate the insurance-related processes has not yet been developed or be made available in the market. But, there are a few existing insurance-related apps that are has been developed to provide general information about the insurance system. In contrary, the information provided are not adhered to consistent updates from the organizer thus making the apps static, filled with ineffective contents, and the worst case, having relentless of promotional advertising. Significantly by time, the user will lose interest to use the applications.

INSURANCE ID will focus on speeding up the current insurance claim processes by automating some of the procedures which are being done manually in the present time. INSURANCE ID that will be developed will provide much friendlier user interface along with dynamic and interactive contents, intended only to accelerate the current insurance claim verification process.

In the future, the idea of developing this app will hasten almost all insurance-related processes and activities where everyone can easily manage their insurance accountings and records just by using their mobile devices, initiated only with the touch of their fingertips. Last but not least, it is hoped that the development of this project will mark a significant milestone for Malaysian insurance system to continue to flourish in light of serving the unfortunate securing their lives, restoring hope, and giving them their rightful liberties.

1.3 OBJECTIVE

The objective of this project includes:

- To analyse the current approach of health insurance claim procedure.
- To design an improved version of online insurance claim processing.
- To develop a system that can cater for desktop and mobile user interaction.

1.4 SCOPE

The scope of this project will be in accordance to:

- Process: Admission Process of Health Insurance Claim Procedure.
- Affected Organization: Healthcare Providers, Insurance Carriers, and their clients (patients).
- Project Development: Web development, server and database configuration, JavaScript, SQL, PHP, HTML, and CSS scripting.

1.5 LIMITATION

The limitation of this project includes:

- The project will only be developed as a prototype as more research and studies have to be conducted to really implement this project online.
- The prototype can only be accessed using the author's computer since the databases and scripts are only defined locally.
- INSURANCE ID is a web development project. This means that it can be accessed through any devices' internet browser, given that:
 - ❖ The server, database, and WIFI programs had been set up and running soundly on the author's computer.
 - ❖ The user's device is connected to a WIFI connection that will be generated by the author's computer.

1.6 RELEVANCY OF THE PROJECT

Being aware of the time inefficiency of the current manual insurance claim approval method, INSURANCE ID will be developed to resolve the problem. The system is being built to be use by every citizen of Malaysia in order to manage their insurance credentials using their mobile phones, only intended for clients, whereas desktop access will be made available to be used by the insurance and healthcare organizations.

Inside the system, there will be 3 main groups of users which are the Healthcare Providers, Insurance Carriers, and their Clients as the main focus group of users. The idea is to give the Client the ability to interact with other groups of users just from within the app to secure their insurance processes as the app acts as a medium for all insurance-related activity.

Thus, the project aims to redefine the current manual insurance claim procedure using online approaches. It will be designed in a way that it can be triggered by either the customers or their healthcare providers. And in return, the app will provide swifter and quicker methods of insurance approval method which can be very helpful in timely events and emergency cases.

1.7 FEASIBILITY OF THE PROJECT

In regards to time, this project requires a very high commitment as the study involves various fields of users and in-depth knowledge on internet technicality. And since the research period is very short, the process of finding the research outcome and transfer it into the working system is quite challenging. Thus, that will be the sole reason why this project only focuses on the claim verification procedure of the health insurance rather than the whole process.

The time given for this project to be developed is two semesters of study which equivalent to 8 months of period. Thus for the first semester, this project will be focused on the planning, analysis, and design phases. Meanwhile for the second semester, the prototype for this project will be developed and evaluated.

In terms of technical, INSURANCE ID will mainly focus on the intractability of its various users in securing the insurance process. Thus, a stable connection between the various user types needs to be established before the apps is developed. Besides that, the functions and processes of the mobile application are feasible to program within the time frame.

CHAPTER 2

LITERATURE REVIEW

2.1 MALAYSIAN INSURANCE OVERVIEW

Juliana Arifin et al. (2013) defined the term insurance, “insurance as practised in the conventional financial system refers to a financial protection system that serves as a risk management strategy or tool, to reduce risk uncertainty and provides a planned financing technique that distribute losses.” Therefore, by having insurance, the future risks can be transferred to someone else by paying a small amount of premiums.

2.1.1 Demand For Insurance

Prior studies attempted to examine the insurance demand results on 2 factors which is demographic factors (Lin & Grace, 2007; Yusof et al., 2009) and economic factors (Ching et al., 2010). Plus, it is reported that there is a large untapped market that still exists with only 54% of the population having a life insurance in 2010 (Abd. Kadir, 2011).

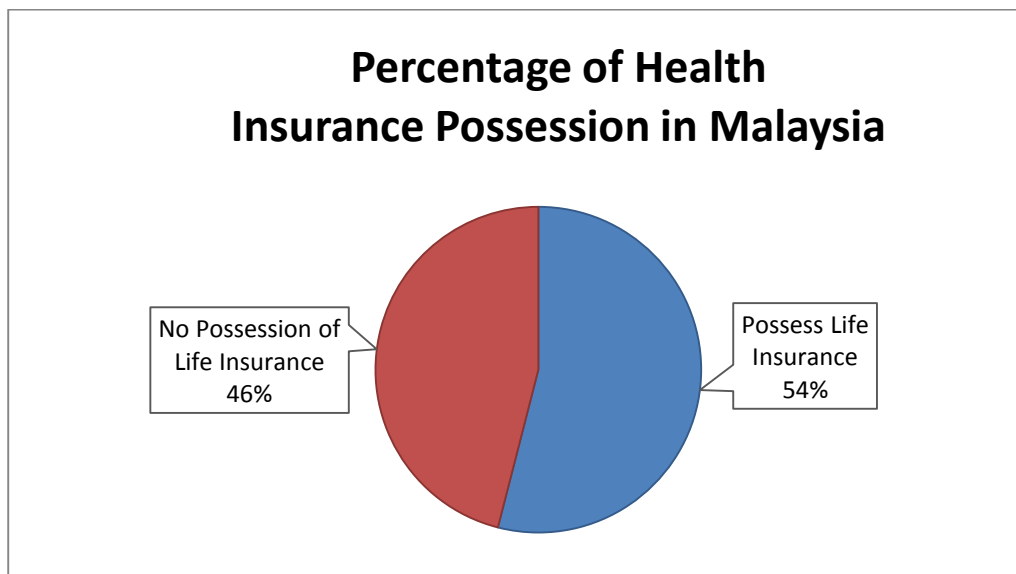


Figure 3: Percentage of Health Insurance Possession in Malaysia.

A more focused study was carried out soon after that by Abu Bakar et al. in 2012 which reveals the factors that affect the decision to purchase health insurance. Salaried individuals may bear in mind that they need to consider their income level, age, gender, race-religion, education level, job sector and risk attitude before applying for health insurance. While for the non-salaried individuals, they may need to consider about race-religion, education level, marital status and out-of-pocket health expenditures. Health insurance can serve as the main sources of financing health care apart from direct taxes, and out of pocket payments. (Abu Bakar et al., 2012).

2.1.2 Health Financing System

Tarn et al. (2008) findings really establish a very firm idea on what is going on with the country's health financing system. In his journal article entitled, "Health-Care Systems and Pharmacoeconomic Research in Asia-Pacific Region", he stated:

“Public health services in Malaysia are financed mainly from taxes on earned income. Other sources of financing for health services are private voluntary insurance, social security, and user fees. Private voluntary insurance is gaining popularity now in Malaysia because there is no compulsory National Health Insurance (NHI) scheme that is being implemented yet at the moment.”

However, the government has been considering to introduce NHI in place of tax revenue as the main financing of its national healthcare system (Ren, 2009). It can be said that the current health financing system in Malaysia are not yet matured and additional studies and research are needed to further defined an efficient financing system in Malaysia. Although numerous nations have defined theirs, Malaysia will need to consider all affected and effected factors for the system to be implemented as it can bring about a new era for Malaysian people altogether.

2.1.3 Private Health Insurance Schemes

Sekhri & Savedoff (2005) in their study, "Private Health Insurance: Implications for Developing Countries" states that Private health insurance is playing an increasing role in both high and low-income countries. Private health insurance had preceded many modern social insurance systems in Western Europe, allowing these countries

to develop the mechanisms, institutions, and capacities that subsequently made it possible to provide a universal access to healthcare. They also argued that the sprouting of numerous new private health insurance schemes cannot be ignored. Instead, it can be harnessed to serve the public interest if governments implement effective regulations and focus public funds on programmes for those who are poor and vulnerable.

In Malaysia, the private health insurance scheme which are gaining popularity these days are not being fully utilized by the government. It is still at its infant stage where substantial new insurance schemes are taking root and benefits only the individual organization, not the country as a whole (Abd. Kadir, 2011). Thus, by implementing one platform for insurance related services, governed by the government themselves, the private health insurance activity can be managed and well-structured to allow for the growth of the country.

2.1.4 Basic Health Insurance Process Flow

For Health Insurance scheme, the basic process flow in issuing a claim are shown using Figure 4 below, obtained from www.prudential.com.my.

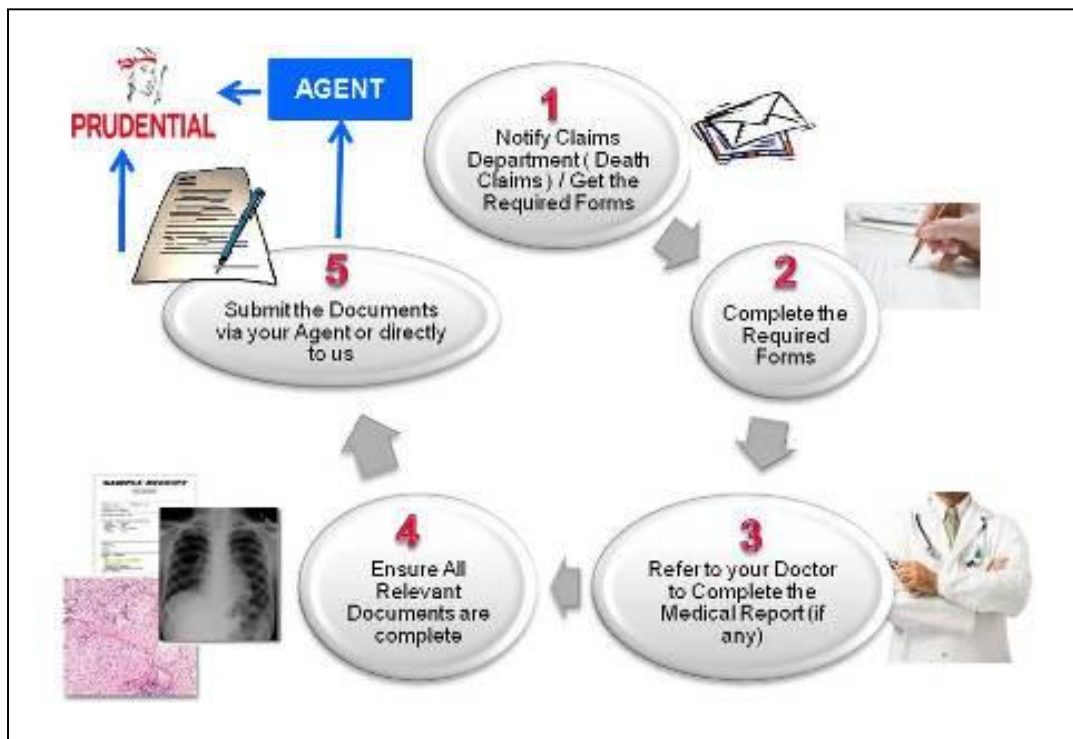


Figure 4: Prudential Health Insurance Claim Process Flow

The diagram demonstrates the process of issuing claim for Prudential insurance family. It is the most basic procedure where one has to follow in order to obtain their claim verification statement, the Guarantee Letter (GL). Thus, in order to define an online procedure for the above process, 3 organizations will be affected which are the insurance carrier, the healthcare provider, and their respected Clients.

According to the diagram, the client will have to initiate the claim. Then, the healthcare provider must add in medical details about the patient before it is being sent to the insurance carrier for verification. Successful claimant will be issued a Guarantee Letter (GL) which will specify the payable amount by the insurance carrier, according to the client's Insurance Policy. Lastly, the clients have to accept the GL before any amount is paid to the healthcare provider and the claim is resolved.

2.1.5 The Competition Law Enforcement

Competition law enforcement promotes the process of competition to ensure that market functions efficiently. Trade association is important in Malaysia for collecting and disseminating information among members where only non-sensitive information such as statistics and blacklisted clients are shared to assist the industry in making better decision and identifying potentially fraudulent claim (Abdul & Ahamat, 2015). Thus, by having a real platform for the insurance industry, the markets can be managed in a more systematic manner under the involvement of related governmental services and higher agencies contribution.

2.2 INTERNET PROMINENCE

In relation to the growing benefits of the internet, the Central Bank of Malaysia (Bank Negara Malaysia, BNM) has established guidelines that allow insurers to offer their services online. Some insurers have already begun to use the Internet to conduct their daily business transactions, as it provides them with favourable technological implementations. Many of them stated that security, customer readiness and cost of initial investment were important considerations when deciding to adopt Internet technologies (Ainin Sulaiman et al., 2005).

2.2.1 Inter-Organizational Workflow System

With the rise of the web as the major platform for making data and services available for humans and applications, a new challenge has become prevalent requiring not only the support of workflows within individual organizations, but also crossing organizational boundaries referred to as inter-organizational workflows (Stoilov & Stoilova, 2005). By referring to project's development context, a dependable communication medium can really be configured to allow for effective communication and data transfer medium for the affected user. Thus, a huge amount of time can be saved from individual activity to diminish the initial problem statement that has been outlined in this project.

2.2.2 Cloud-Based System

Cloud will be the final medium for this project to be implemented because of the 24/7 accessibility that it has to offer. Cloud-based system consists of groups of interconnected computers that offers on-demand services, broad network access, pooling of resources, and outlined services (Wooten, Klink, Sinek, Bai, & Sharma, 2012). Using cloud-based implementation, all users will have access to the platforms wherever they are and whenever they want, given that they are connected to the internet. Cloud-based system also adheres to mobile implementation. Thus, a real collaboration platform between various user groups will need cloud-based implementation to support the connectivity and accessibility intended for its users.

2.2.3 Green Technology

While we are focusing to give value to our organizations, the environment also has their stand in receiving the same credit from us human. And while we are striving to uplift our current quality of life, the environment is playing an ultimately important factor in deciding the nature of the place we live today. Even though the environment is suffering from the global heat emission, technology seems to drive factors of the procedure towards paperless based working environment. It means that less tree needs to be cut down for the overall paper production. In fact, the use of system in handling work and replacing paper has brought on a new discovery to the world (Johnston & Spencer, 2005).

CHAPTER 3 METHODOLOGY

3.1 SYSTEM DEVELOPMENT LIFE CYCLE (SDLC)

The methodology used for this project is Iterative and Incremental as an approach to Agile Software Development method. This approach consists of frameworks which has both the combination of linear and iterative occurrence amongst the phases of the methodology. As this project only focus on the small part of a bigger system, the phases of this methodology can be further iterated to include other additional functions that will sums up the actual idea of INSURANCE ID in the future.

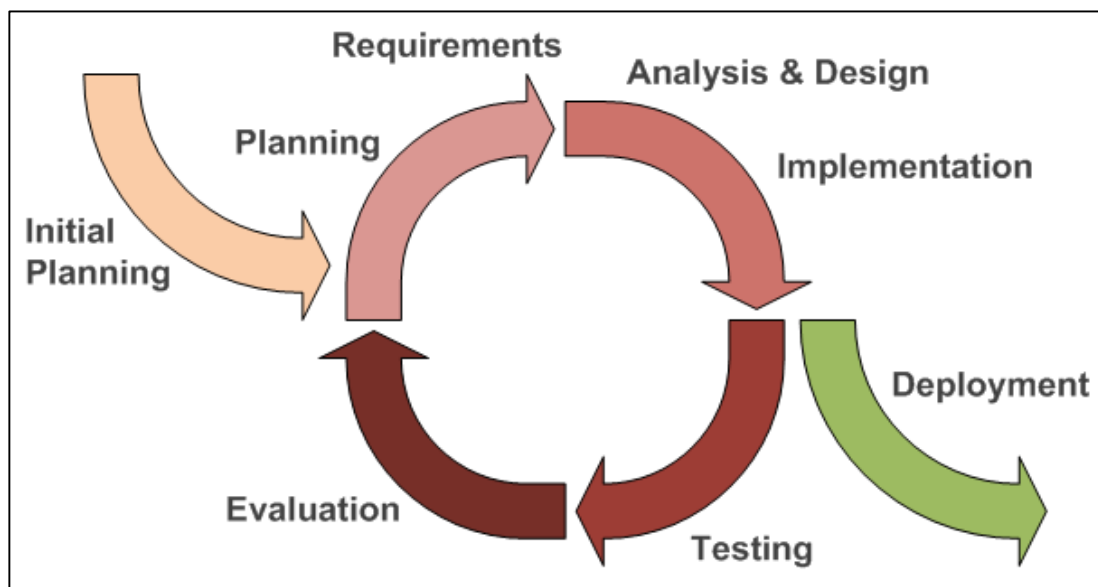


Figure 5: Iterative and Incremental Methodology

The phases of this methodology can be divided into 4 main stages which are the planning, analysis, design and development. The planning, analysis and design phases are conducted during the 4 months of Final Year Project I whereas the development of the project is conducted during the period of FYP II.

3.2 PROJECT PHASES

3.2.1 Planning

The planning phase is initiated by defining the problem statement of the project. Then, further research is conducted using internet and Google search engine to find related information to support the problem statement. After that, the objectives are crafted to outline what this project should do in relation to solve the underlying problem that is defined earlier. Next, the project's scope, relevancy, feasibility and limitation are determined to further support the development of the project. These information are then used as a baseline to monitor the project progress stage by stage. And to ensure that the tasks are correctly assigned, a Gantt chart is developed to make sure that enough time is allocated for the specific tasks and the project can be completed according to the time projected. The Gantt chart is attached on the Appendix section.

Next, journals, scholarly articles and books are widely used as secondary data collection tools to discover the solution or the current implementation in other countries, and to strengthen the knowledge about the subject of research. The findings are then analysed to enable comparative study on the current approaches of automating the insurance related processes. These findings are stated earlier in the Literature Review section of this document and further documentation can be access on the Appendix section at the end of this document.

INSURANCE ID is to be developed as a platform that connects different types of users together in processing health insurance claim. Thus, the system has to be able to accept users from various organizations mainly involving the healthcare providers, the insurance carriers, and their fellow clients. Thus, an interview is set up with an insurance organization to gather more information about the current approaches of Malaysian Insurance Carrier in regards to how the information is communicated between the affected organizations. The interview also serves as a preliminary study for the project as its findings have cleared up all the mispointing ideas in developing the insurance collaboration platform.

So, from the interview the author had found that:

- Etiqa is using the usual business model for Health Insurance claim that have been explained previously in the Introduction section and documents are communicated using fax machine and email.
- The used of fax machines until the presence time have not caused any major security problems to the organization, thus, the fax machine approaches are said to be extremely secured in delivering the related documentation.
- The current issue faced by the organization is related to time where the manual verification often require a huge amount of time to process while the medium used to communicate the documents is fax machines.
- Currently, the claim is mainly initiated by the Healthcare Provider using the Insurance Carrier terminal. Clients however can also initiate claim by filling related forms and documents, and later send it directly to their insurance carrier or through their agent.
- The insurance claims are verified by the Claim Assessor of the Insurance Carrier organization. Often, extended review from the organization's Medical Expert is needed in verifying the medical information.
- Currently, the system can only be accessed using the organization's specified terminals. External system will have no access to the organization's system.
- If the process is made available via mobile phones, it can extensively secure more customers to the insurance organizations.
- Online approaches can be very beneficial if it can reduce the time taken for each claim to be processed. But, security measures would be the out most important factor in determining whether the system is reliable or not.

The interview had successfully oriented the project towards its objectives. Therefore, several terms were defined/redefined and listed in Table 1, in order to make sure that the proposed online procedure could work. However, it has to be noted that the terms may seem irrelevant or had been defined differently outside of this document and the system. These terms will be widely used inside this document as they will all acts as an object to show the interactions and processes that are related to the INSURANCE ID system.

Table 1: IID Used Terms and Definition

| | Term | Explanation |
|----------------------|-------------------|--|
| System Users | Staff | A staff belongs to any organization and differentiated by their organization type. In other words, there will be two types of staff, Insurance Carrier staff and Healthcare Provider staff. Staff will have access to the system through a desktop web browser. An admin staff account shall be created along with any registration of organization account. |
| | Client | Client is the mobile user of IID system or in other words, the Claimant which will be explained in detail in the next row. For Client, it is further divided into 2 types: <ol style="list-style-type: none"> 1. Patient is a registered customer of Healthcare Provider. In claim issuance, if the details of the patient sent by the client are not yet a registered patient inside the INSURANCE ID system, the patient can be registered by the staff in charge as soon as they arrive to that particular Healthcare Provider's place. 2. Participant is a registered customer of Insurance Carrier, or in other words, the policy holder. For the implementation of this project, their information is made discreet to everyone except to their Insurance Carrier. They can be registered by the organization's staff through the INSURANCE ID platform. |
| | Claimant | Claimant can access the system via smartphone. Claimant will be using the web apps to add and review their insurance policy, as well as initiate the claim procedure whenever and wherever it is needed. In addition, the system can also enumerate up to 3 different policies, whether it is the account owner's or someone else's. As Claimant can also add in someone else's policy inside their phone, they may not be the affected patient to issue claim procedure. This feature is made available due to the current technological acceptance in Malaysia, where not everyone owns a smartphone. Thus, any claim initiation is openly available to be triggered given that the claimant possesses needed information on behalf of the patient. |
| Electronic Documents | Claim Statement | The initial document created to describe the need for medical attention and insurance coverage. It will be sent to both Insurance Carrier and Healthcare Provider for further interpretation. The statement will be considered resolved as soon as the client have accepted the Outcome Statement that later will be updated by the Insurance Carrier as final documents of the claim application. |
| | Policy Statement | A statement created to describe the insurance information intended for a particular participant whenever they are registered by the insurance staff. As INSURANCE ID only focuses on Health Insurance, thus the only policy type available to be created is Health-Insurance policy. |
| | Medical Statement | A statement issued by Healthcare Provider, required by the Insurance Carrier in order for them to verify the claim issuance. The Medical Statement will be updated by the Healthcare Organization to send related medical information to the Insurance Organizations. |
| | Outcome Statement | The final document updated by Insurance Carrier in order to describe the result of claimant's application whether the claim is accepted or not. After receiving the Outcome statement, the client will have to accept it in order to resolve the claim application. |

3.2.2 Analysis

During this phase, all user requirements for the new system are identified to craft an improved platform of which all insurance related processes would commence. The method used to identify the suitable requirements for the system is grading of significant requirement. Each requirement are graded from 1 to 5 according to their significance to the organization and to the development of the project. Then, the sum of both grades will be taken as the Requirement Priority. The highest priority of the whole requirements will be given extra focus during the development phase as they possess more important roles than the others, to actualize the newly proposed claim verification procedure.

The significant grade is given according to the importance of the requirement in regards to the newly proposed procedure of online claim verification. Requirements which have the higher priority will be given extra focus as they are more important to allow for the proposed procedure to work. Other requirements will also be developed but less focus is given because they will only act as the secondary and tertiary function of INSURANCE ID. The priority will also determine how much details are used in order to develop the individual requirements.

Table 3.2 are derived to rank the requirement efficiently according to their significance. The highest priority recorded is “10” while the lowest priority recorded is “6”. The requirements that have the priority of “10” as described in the table are the compulsory functions needed to be developed to represent each individual activity in the newly proposed insurance claim procedure. Without successful implementation of all priority “10” requirements, the new procedure could not be realized.

Even though other requirements that possess priority less than 10 may seem not as important, bear in mind that they also possess significant role in supporting the newly proposed procedure. Without them, the individual activity in the procedure may seem irrelevant. If there exist some requirements of priority below than 5 had been defined, this means that the requirement is less significant to the project’s objective, thus their functionality is rejected. The requirements are listed below in Table 2.

Table 2: Requirement's Priority

| Req# | Requirement Details | Organization Significant | FYP Significant | Requirement Priority |
|--|-----------------------------------|--------------------------|-----------------|----------------------|
| User Group: Insurance Carrier | | | | |
| IC-1 | Register account | 4 | 2 | 6 |
| IC-2 | Login to system | 4 | 3 | 7 |
| IC-3 | Logout from system | 4 | 3 | 7 |
| IC-4 | Change login password | 4 | 3 | 7 |
| IC-5 | Review claim issuance | 5 | 5 | 10 |
| IC-6 | Register participant | 5 | 5 | 10 |
| IC-7 | Create Policy Statement | 5 | 5 | 10 |
| IC-8 | Update Outcome Statement | 5 | 5 | 10 |
| IC-9 | View participant details | 5 | 4 | 9 |
| IC-10 | View attached Policy Statement | 5 | 4 | 9 |
| IC-11 | View attached Medical Statement | 5 | 4 | 9 |
| IC-12 | Receive notification from system | 5 | 5 | 10 |
| IC-13 | Create staff for the organization | 5 | 1 | 6 |
| IC-14 | View staff information | 5 | 1 | 6 |
| User Group: Healthcare Provider | | | | |
| HP-1 | Register account | 4 | 2 | 6 |
| HP-2 | Login to system | 4 | 3 | 7 |
| HP-3 | Logout from system | 4 | 3 | 7 |
| HP-4 | Change login password | 4 | 3 | 7 |
| HP-5 | Initiates claim procedure | 5 | 5 | 10 |
| HP-6 | Review claim issuance | 5 | 5 | 10 |
| HP-7 | Register patient | 5 | 5 | 10 |
| HP-8 | Attach Medical Statement | 5 | 5 | 10 |
| HP-9 | View patient details | 5 | 4 | 9 |
| HP-10 | View attached Policy Statement | 5 | 4 | 9 |
| HP-11 | View attached Medical Statement | 5 | 4 | 9 |
| HP-12 | Receive notification from system | 5 | 5 | 10 |
| HP-13 | Create staff for the organization | 5 | 1 | 6 |
| HP-14 | View staff information | 5 | 1 | 6 |
| User Group: Clients | | | | |
| C-1 | Login to system | 4 | 4 | 8 |
| C-2 | Register user account | 4 | 4 | 8 |
| C-3 | Logout from system | 4 | 4 | 8 |
| C-4 | Change login password | 4 | 4 | 8 |
| C-5 | Update claimant information | 5 | 5 | 10 |
| C-6 | Add Policy Statement | 5 | 5 | 10 |
| C-7 | View Policy Statement | 5 | 4 | 9 |
| C-8 | Remove Policy Statement | 5 | 4 | 9 |
| C-9 | Initiates claim procedure | 5 | 5 | 10 |
| C-10 | View Claim Status | 5 | 5 | 10 |
| C-11 | Receive notification | 5 | 5 | 10 |
| C-12 | Accept Outcome Statement | 5 | 5 | 10 |

In relation to Table 2, two Use Case diagrams are produced in order to visualize the individual functionality of INSURANCE ID, differentiated according to the access platform and their respected user groups. The idea is to give mutual benefits to both group of users whereby Insurance and Healthcare Organization’s staff will have access through the desktop platform while client can access it through mobile apps.

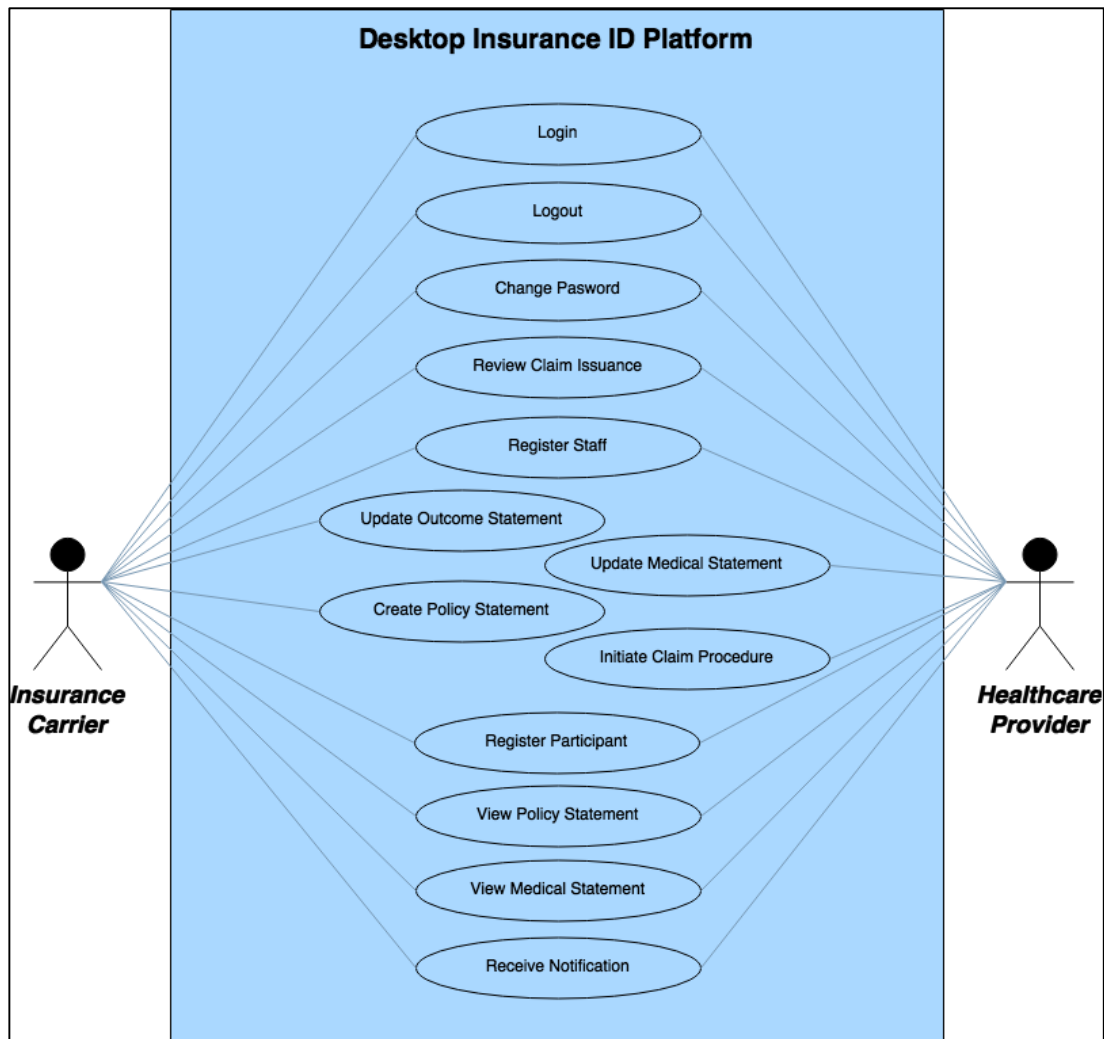


Figure 6: Use Case Diagram for Desktop Platform

The functionality of the Insurance Carrier and the Healthcare Provider are defined relatively as required, only to support the automation process of the INSURANCE ID system. Both of the organizations will share almost the same administrative functionality as to provide a wider scope of functions of the platform. The separate use cases were only defined to realize the proposed procedure of the system and to signify the individual functionality of each user organizational origins.

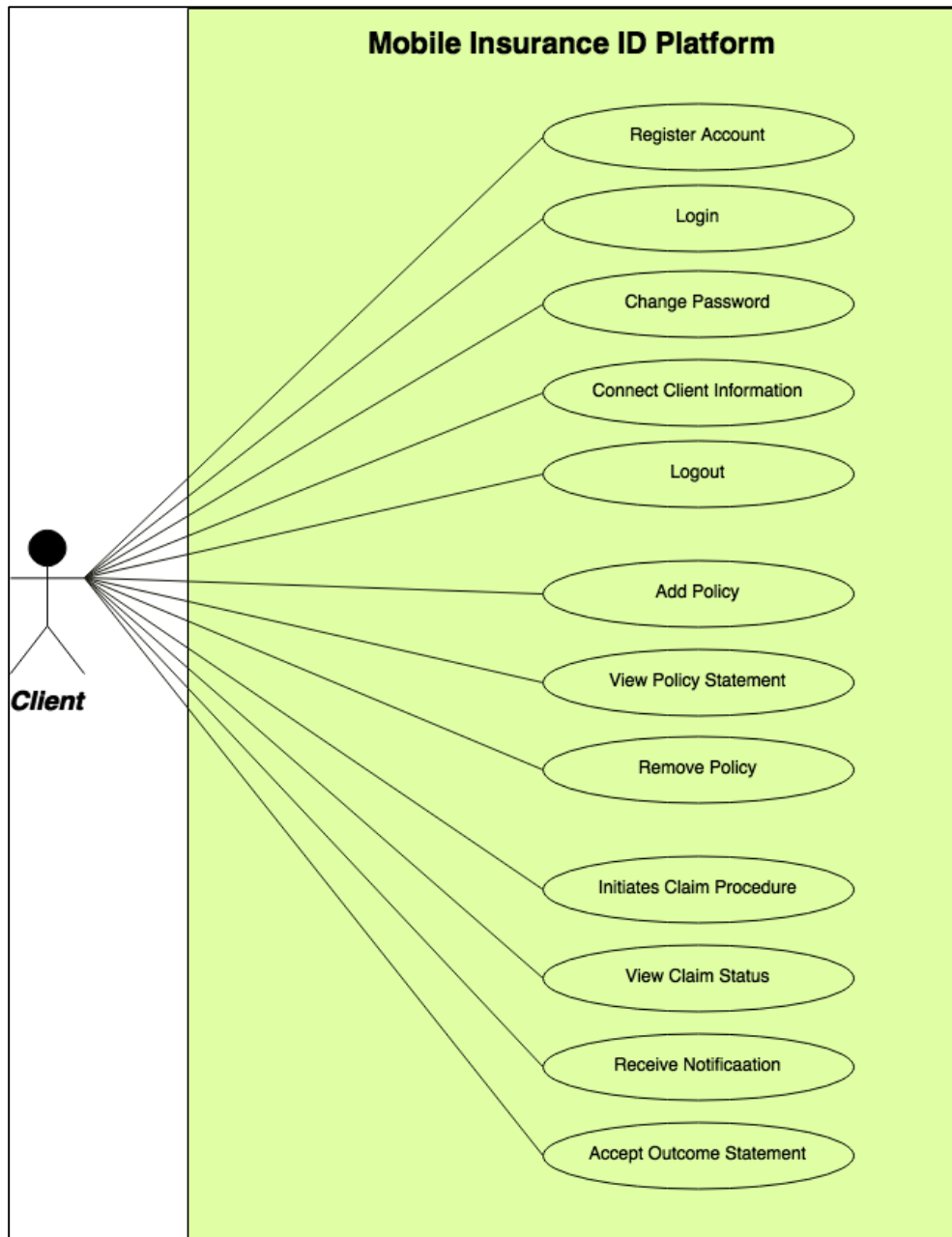


Figure 7: Use Case Diagram for Mobile Platform

The client possesses different functionality from those of the organization. As the main focus group, the client will use the system to track their insurance related information. They can add up to 3 insurance policies even if they are not the sole holder of that particular insurance policy. This is to give more value to the system so that additional policies can also be managed using the same apps. Minimal security measures are applied in every confidential and personal information and document transfer to prevent from fraudulent commotion and data theft. In this project, NRIC NO is used as to provide minimal identity authentication when using the system.

3.2.3 Design

In this phase, several system designs are produced to further explain the project. First, the system architecture is established to define the interconnection of individual objects that will contribute to INSURANCE ID. However, all implementation will only be done locally using author's hardware as this project was only meant to be developed as a working prototype for the newly proposed claim procedure.

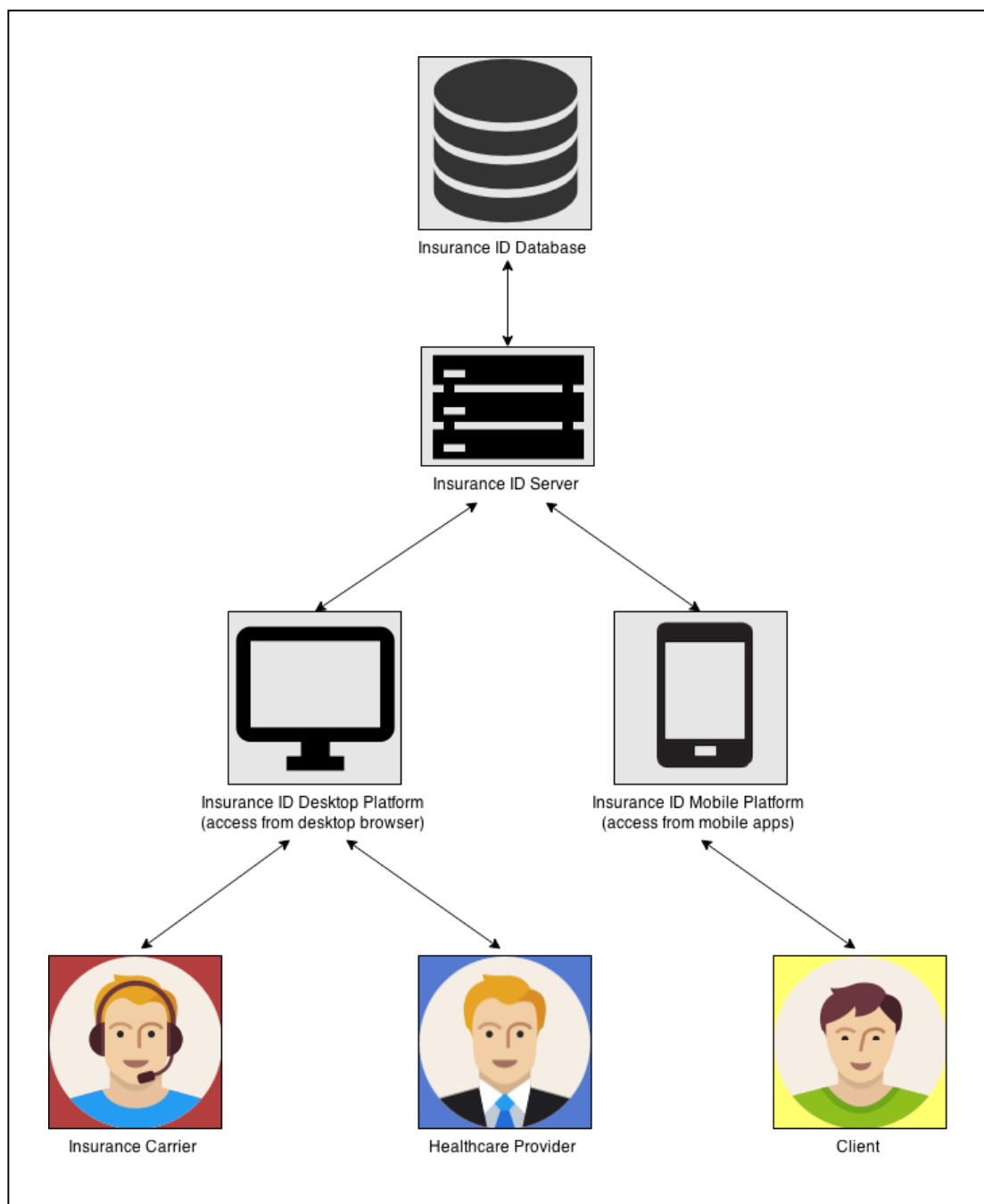


Figure 8: System Architecture

Next, the requirements and functionality analysed in the previous section are now classified into modules consisting of webpages, each differentiated according to the user access throughout their participation in the system. Figure 9 below are created to establish a different perspective of the system architecture where each module is then iteratively developed according to the view.

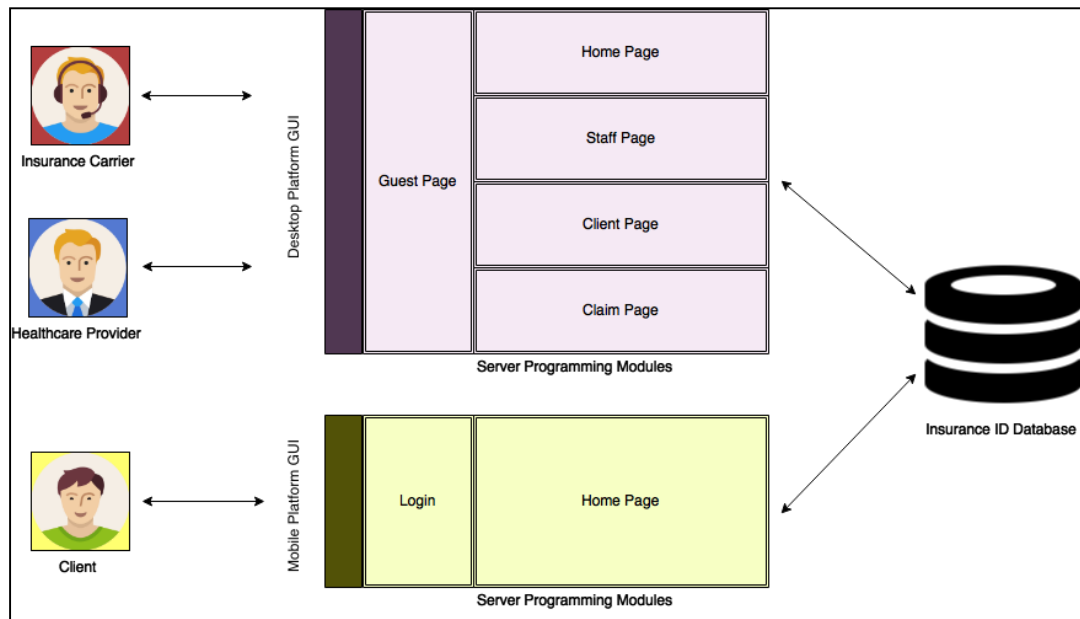


Figure 9: Module Architecture

Each module represents a webpage that will be displayed to the user during their access. Therefore, each page must have a discrete functionality to represent the system's idea, as an individual page to display information and at the same time can provide essential functionality to the user. Moving on, the whole system for the prototype will be built using web development as the current world's technological implementation have permitted easier cross-platform development. Thus, the project could easily be converted to suit any mobile devices in the future if it is going to be implemented.

The tables and database are only defined for the distinctive purpose of defining new ideas, to build the collaboration platform. Thus, the current database architecture is not practical to be implemented outside of this project as more detailed information on each organization is surely required. Further explanation of each database's table are listed in Table 3 next page as to show all the supplementary attributes that each

of table encompasses. The table describes the type of information stored in each table, the primary and also foreign key used by the table. Thus, it will be easier to start the development having all these details already defined in this section.

Table 3: Database's Table Attributes

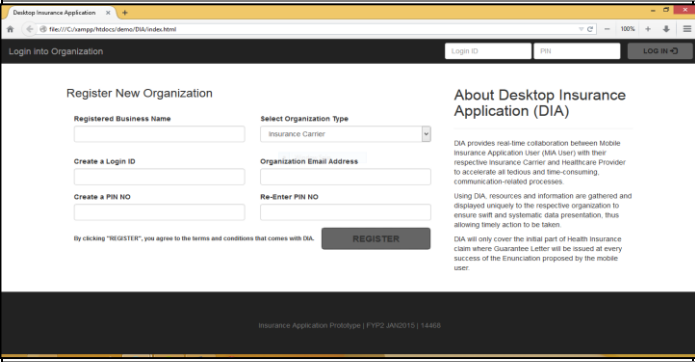
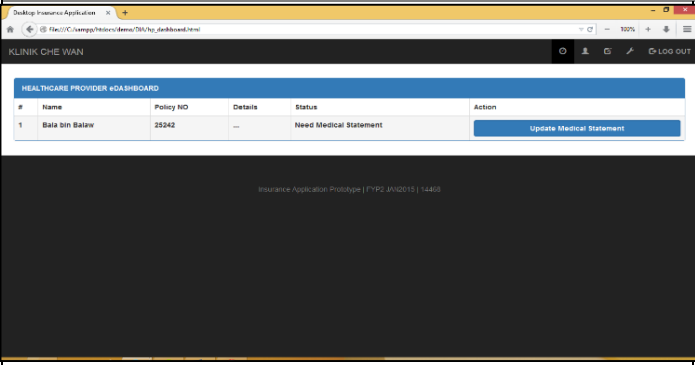
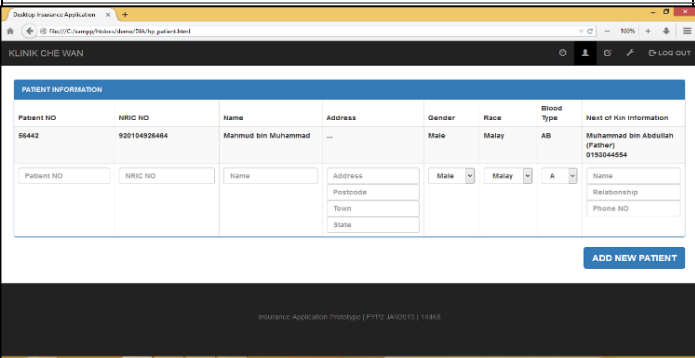
| TABLE NAME | CONTENT | PRIMARY KEY | FOREIGN KEY |
|------------|---|-----------------|---|
| CLAIMANT | Mobile data and account information | email, password | nric_no |
| CLIENT | Client's personal information and mobile possession | nric_no | nric_no outc_no medr_no claim_no policy_no mobile |
| STAFF | Staff's personal information | nric_no | org_no |
| ORG | Organizational information | org_no | admin_nric |
| CLAIM | Claim statement related data | claim_no | client_nric creator_nric |
| POLICY | Policy statement related data | policy_no | client_nric staff_nric org_id |
| MEDR | Medical statement related data | medr_no | client_nric staff_nric claim_no policy_no org_id |
| OUTC | Outcome statement related data | outc_no | client_nric staff_nric claim_no policy_no medr_no org_id |

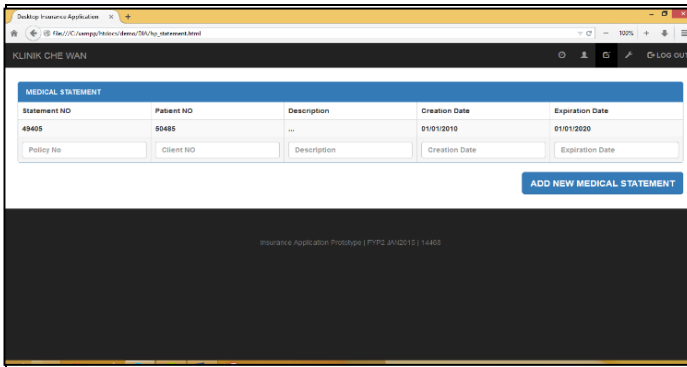
Even though only minimal declaration of the database, tables, and columns are made, the project only intends to discover a new way of communicating documents online through a single system using various platforms. Thus, the declared information should suffice for the development of the new system according to the inquiry that has been done earlier during the analysis phase.

3.2.4 Development

The development phase begins with creating the initial Graphical User Interface (GUI) design. The initial GUI designs for the system are realized in order to see its page relation and information representation. It will be further iterated during the development phase as to add-in more specific information needed to apply the new approach for insurance claim system. The details that can be seen inside the screenshot were meant only to mock up real information that later on will be realized using the actual prototype.

Table 4: Initial Graphical User Interface Design

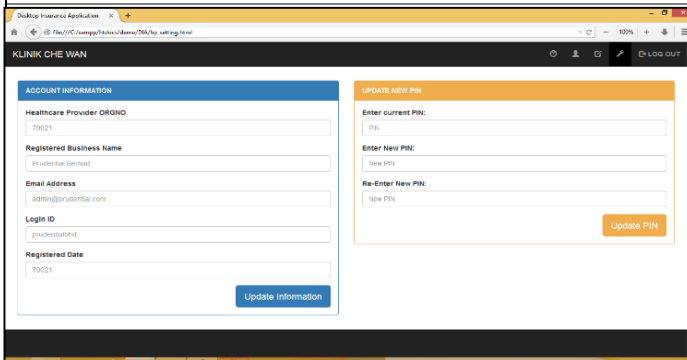
| Screenshot | Explanation |
|---|---|
|  | <p>Web Platform - Guest Page</p> <p>Information Displayed:</p> <ul style="list-style-type: none"> • About • Staff Login Form • Organization Register Form |
|  | <p>Healthcare - Home Page</p> <p>Information Displayed:</p> <ul style="list-style-type: none"> • Claim Issuance |
|  | <p>Healthcare - Patient Page</p> <p>Information Displayed:</p> <ul style="list-style-type: none"> • Patient Details • Register Patient Form |



Healthcare - Statement Page

Information Displayed:

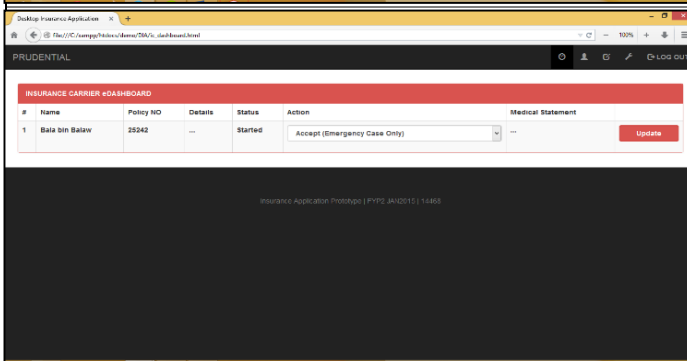
- Medical Statement Details
- Create Statement Form



Healthcare - Setting Page

Information Displayed:

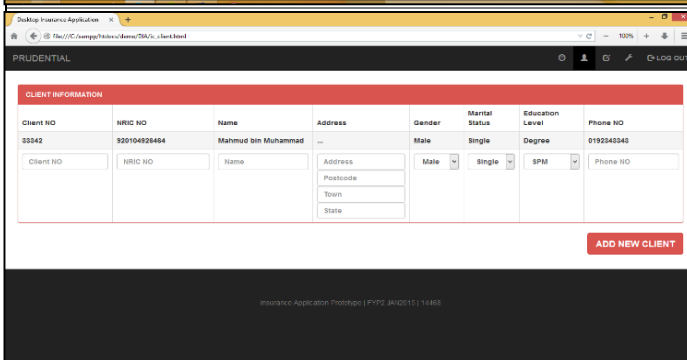
- Update Information Form
- Update PIN Form



Insurance - Home Page

Information Displayed:

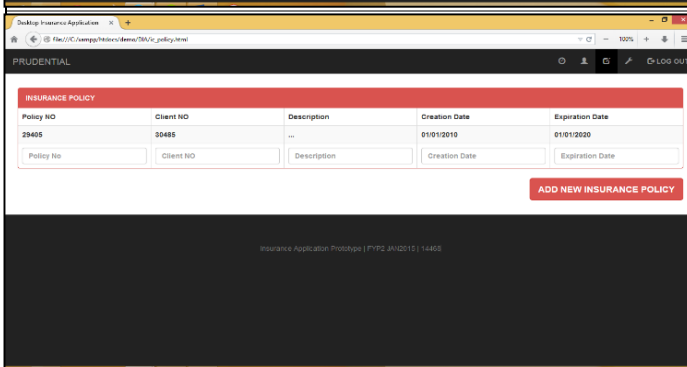
- Claim Issuance



Insurance - Client Page

Information Displayed:

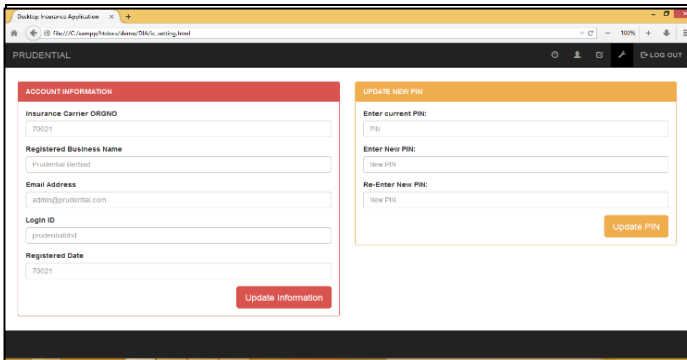
- Participant Details
- Register Participant Form



Insurance - Statement Page

Information Displayed:

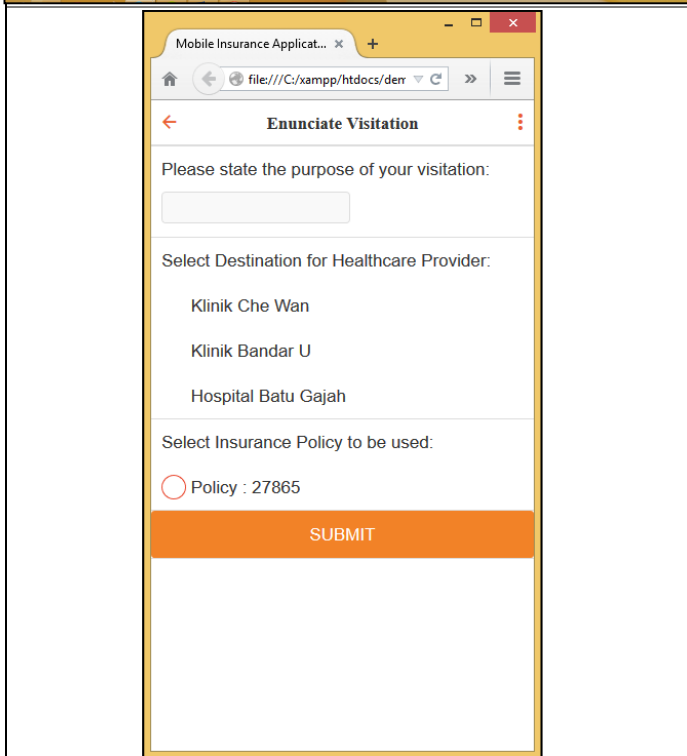
- Policy Statement Details
- Create Statement Form



Insurance - Setting Page

Information Displayed:

- Update Information Form
- Update PIN Form



Mobile Platform - Initiate Claim Page

Information Displayed:

- Claim Form

These platforms were built using the current core technological features which is HTML that is used for structuring and presenting content for the World Wide Web. In this new version of the HTML markup language, Application Programming Interfaces (APIs) is introduced to be used for complex web applications, which also opens up new door for cross-platform mobile/web applications development.

In relation to HTML, CSS is also used to format the look while delivering the contents more efficiently and more user friendly. PHP is used as the server scripting language as well as MySQL as its partner to perform all database related activity. As the author's knowledge is limited only to the mentioned scripting types, requirements that require more knowledge and skills will be put on-hold until a functional way is found to also include them in the system.

3.3 PROJECT ACTIVITIES

In this subtopic, all activities related to the development of the project are shown and explained to provide more insight of the project development. The first table formulize is the Project Activities, show in Table 5 below.

Table 5: Project Activities

| Objective | Activities | Methods |
|--|--|---|
| Analyse To analyse the current manual operation of Health Insurance's claim verification procedure. | Identify the existing manual technique, current approach and its advantages and weaknesses. | <ul style="list-style-type: none"> • Preliminary interview with Etiqa Insurans Bhd. |
| | Identify challenges faced by affected organizations in relation to effective time management. | <ul style="list-style-type: none"> • Preliminary interview |
| | Identify user perspective on the usability and relevancy of an online platform for insurance services. | <ul style="list-style-type: none"> • Preliminary interview • Past literature review |
| Design To propose an improved process flow for online Health Insurance's claim verification procedure. | Identify the complex of manual health insurance claim verification procedure. | <ul style="list-style-type: none"> • Past literature review • Activity Diagram |
| | Identify requirements and system functionality for the new system. | <ul style="list-style-type: none"> • Requirements Specification • Use Case diagrams |
| | Identify suitable architecture needed to implement system functionality. | <ul style="list-style-type: none"> • Architecture design • ER Diagram • Database Specification |
| | Identify the modules that will be used for the project. | <ul style="list-style-type: none"> • Module Architecture • Module Specification |
| Develop To develop a prototype of a system that can serve real-time collaboration features. | Identify initial GUI for both platform. | <ul style="list-style-type: none"> • Initial GUI |
| | Identify the new procedure of online claim verification. | <ul style="list-style-type: none"> • Activity Diagram |
| | Identify further iteration needed to realize the project. | <ul style="list-style-type: none"> • Documentation |
| | Identify bugs and errors overcome during development. | <ul style="list-style-type: none"> • Documentation |
| | Identify further development of the project that can be implemented in the future. | <ul style="list-style-type: none"> • Documentation |

Next, several tools comprise of a hardware and a number of software are used in order to develop the system. As the project is meant to be developed as a prototype, everything related to the project's development are only defined locally using the author's hardware. The details are listed in Table 6 below.

Table 6: Tool Used for Development

| | | |
|-----------------|---------------------|--|
| Hardware | Mobile Phone | Used to showcase the mobile sites. |
| | Laptop | Host all software used to run, develop, and documenting the project. |
| Software | Sublime Text 3 | A text editor program used to develop the project. |
| | XAMPP Server | A server and database configuration software used to run the project. |
| | Firefox Web Browser | Used to debug and display the project. |
| | Connectify Hotspot | Used to generate WIFI connection that enables the LAN network to be reached. |

Altogether, the project have been realized during the 8 months execution of both FYP period as to present the university with the required project needed to fulfil the requirement of the author's bachelor's degree. Nonetheless, the project can still be improved in future to include the second part of the claim verification system before it can fully be considered as working prototype to be used in the real

CHAPTER 4
RESULT AND DISCUSSION

4.1 PROCESS FLOW OF ONLINE HEALTH INSURANCE CLAIM PROCESSING

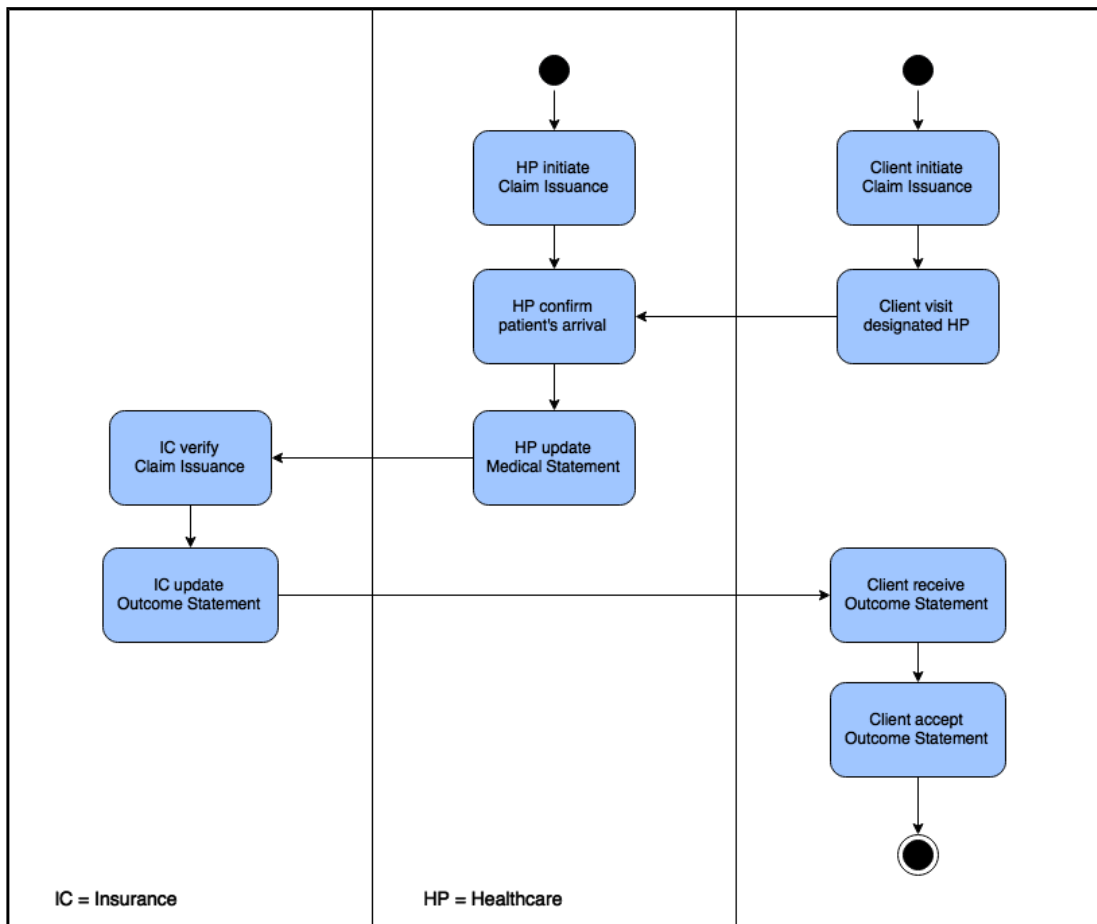


Figure 10: User Activity Diagram

An activity diagram is formulated to signify all the main activities the system has to perform in order to verify a claim. Thus, each claim issuance created is configured to flow accordingly to the given set of statuses until the Outcome Statement is produced at the end of each trail to declare the final settlement from the Insurance Organization.

As mentioned in the activity diagram, the Claim Issuance can be initiated either by the healthcare provider as commonly being done at this time in Malaysia, or by the client themselves using their mobile phone. The claim issuance will be resolved as soon as the client had accepted the Outcome Statement which will be issued to their phone, strictly for mobile users. Else, the claim is considered resolved as soon as the Outcome Statement had been released.

As we go into the technical, these activities are crucial to the system as they have been programmed to leave a substantial mark on the claim's status every time they are triggered. Therefore, the claim is seen as if it is flowing from one organization to another, getting more data and updates on its way to achieve its goal. The claim statuses are divided into 5 phases:

Claim - Status Flow

- 1 Started: Claim issuance is started.
- 2 Arrived: Patient's arrival is confirmed.
- 3 Reviewed: Medical Statement is updated.
- 4 Verified: Outcome Statement is released.
- 5 Resolved: Outcome Statement has been accepted / released (non-mobile user).

4.2 THE INSURANCE ID PLATFORM

A platform comprises of desktop and mobile sites are developed in order to implement the proposed procedure. While the development are using web implementation, the mobile platform is independently develop to suit a defined method, which later on can be packed into application package for mobile apps installation.

4.2.1 Desktop Platform

The desktop platform is divided into three sections, as different pages are prepared exclusively for the Guest, Healthcare Provider, and Insurance Carrier.

4.2.1.1 Guest Pages

Guest pages are the external pages used to login into organization. The first page will display minimal information about the development of INSURANCE ID. Thus, no interaction is to be performed in this page. The second page is the video page. A short video is prepared to briefly explain what INSURANCE ID is all about.

Next is the registration page, where a guest can register his/her organization, given that the organization belongs only to either Healthcare group or Insurance group. The guest will have to enter their personal information to create an Admin account, which will then be used to create an organization registered with INSURANCE ID. The last page is the login page where each user will use to log in to their account. The system will then navigate the user to a proper landing site according to their organization and account type which will further define their roles in the system.

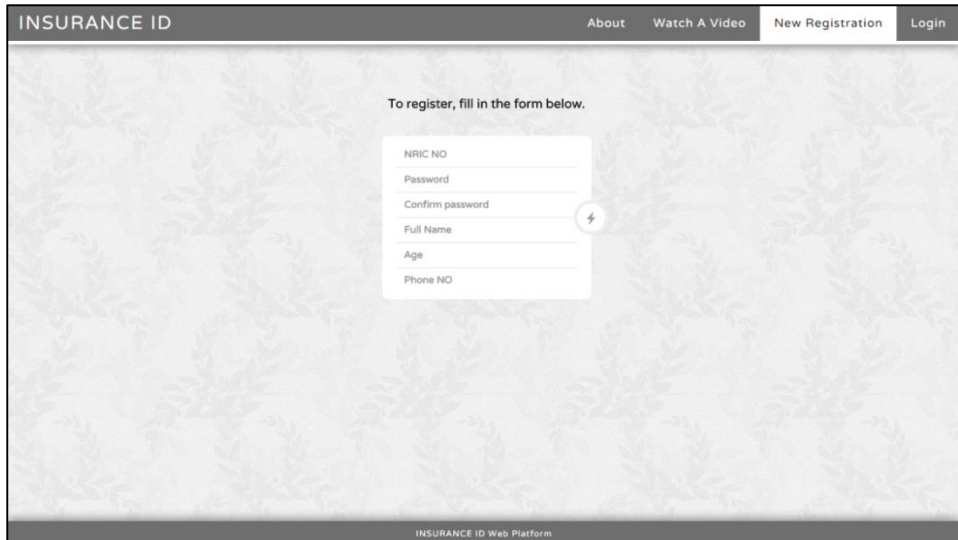


Figure 11: Guest Registration Page (i)

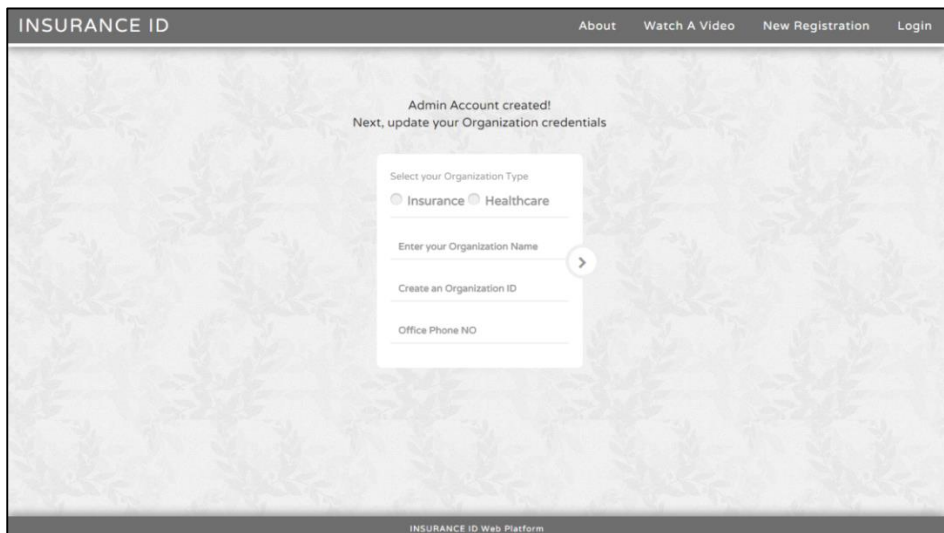


Figure 12: Guest Registration Page (ii)

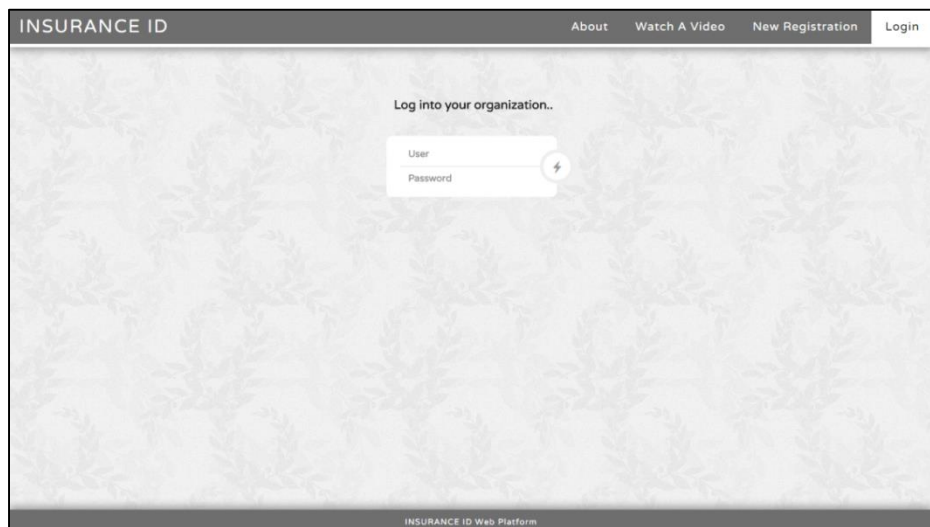


Figure 13: Guest Login Page

4.2.1.2 Insurance Carrier Pages

The user of an insurance organization will be directed to the Insurance Home Page after being successfully logged into the system. Inside this page, an insurance staff can view his/her account information.

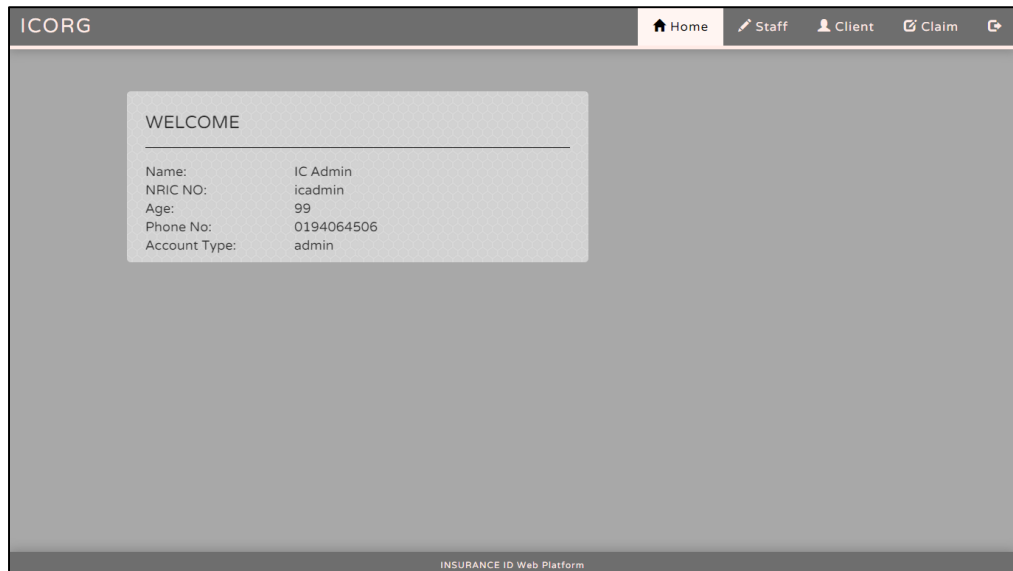


Figure 14: Insurance Home Page

Next, the Staff Page can be accessed by clicking the navigation bar on top of the page. Inside this page, an insurance staff can see a list of registered staff within their organization, as well as create new staff account.

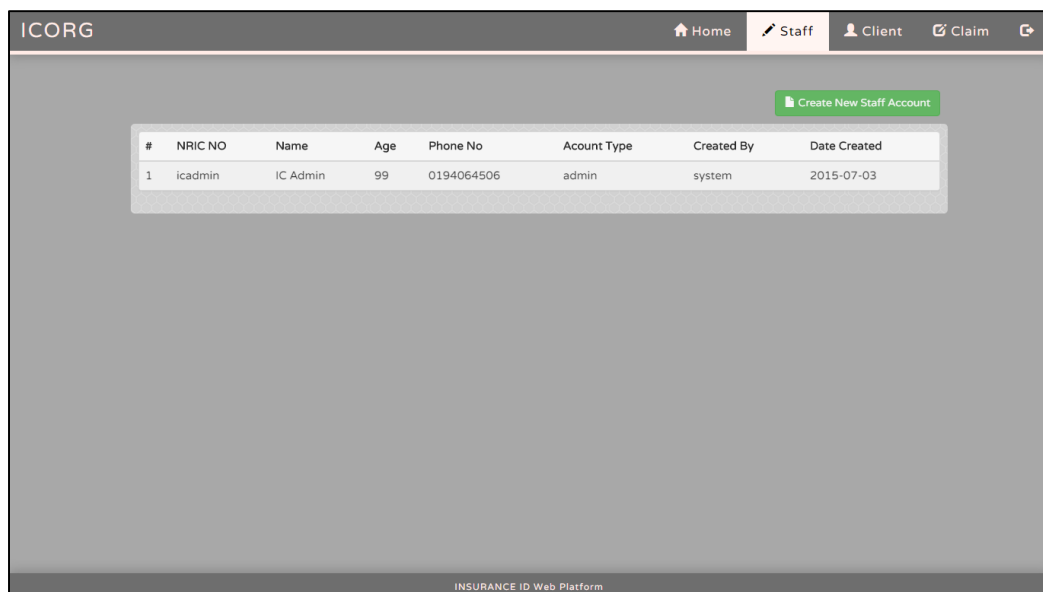


Figure 15: Insurance Staff Page

The Client Page stores information related to a client. An insurance staff can register new client and create insurance policy from this page.

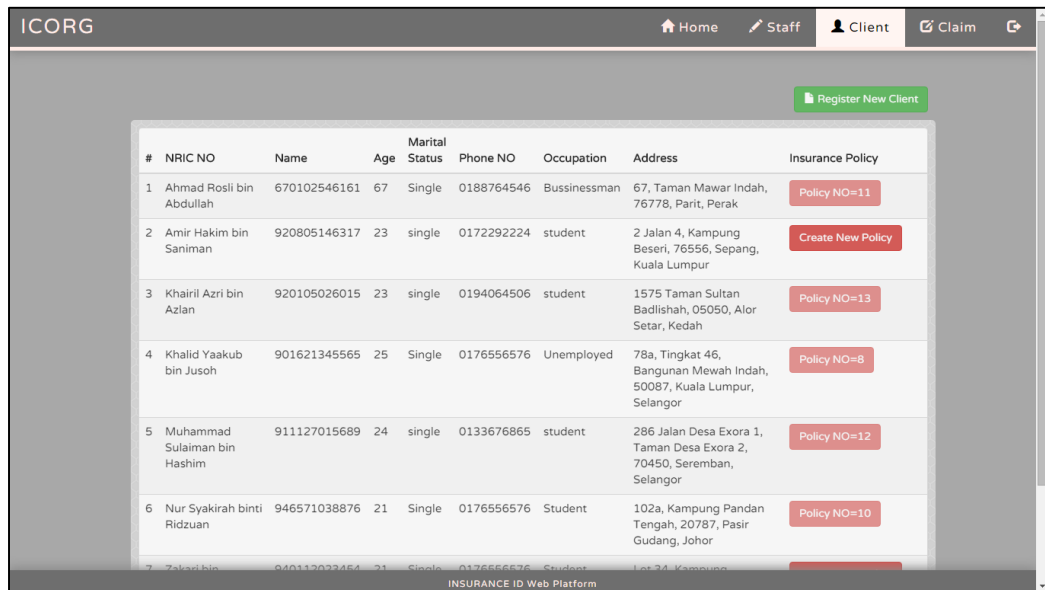


Figure 16: Insurance Client Page

Finally, claim related information will be displayed on the Claim Page. An insurance staff can update Outcome Statement or review resolved claims from this page.

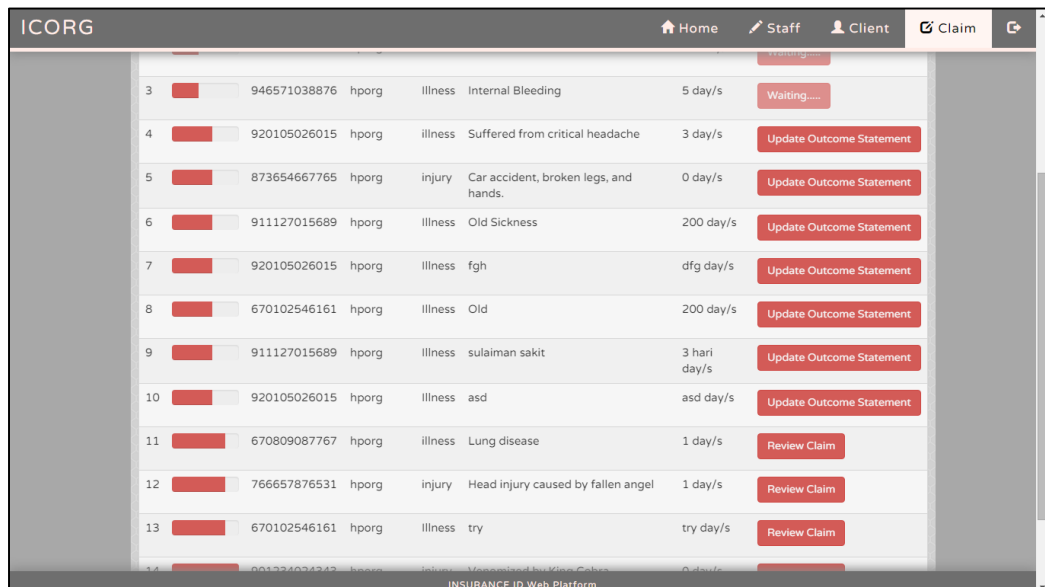


Figure 17: Insurance Claim Page

4.2.1.3 Healthcare Provider Pages

While for the Healthcare Providers, they will also be directed to the Healthcare Home Page once they have login to the system. Similarly with those of Insurance pages, a healthcare staff can also view his/her account information in Home Page and create new staff account from the Staff Page.

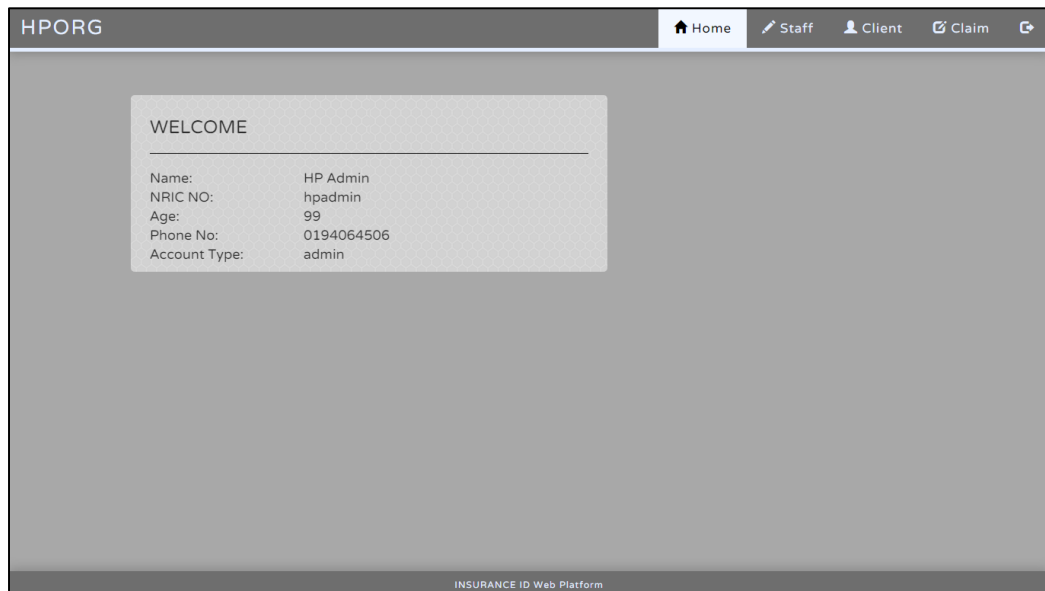


Figure 18: Healthcare Home Page

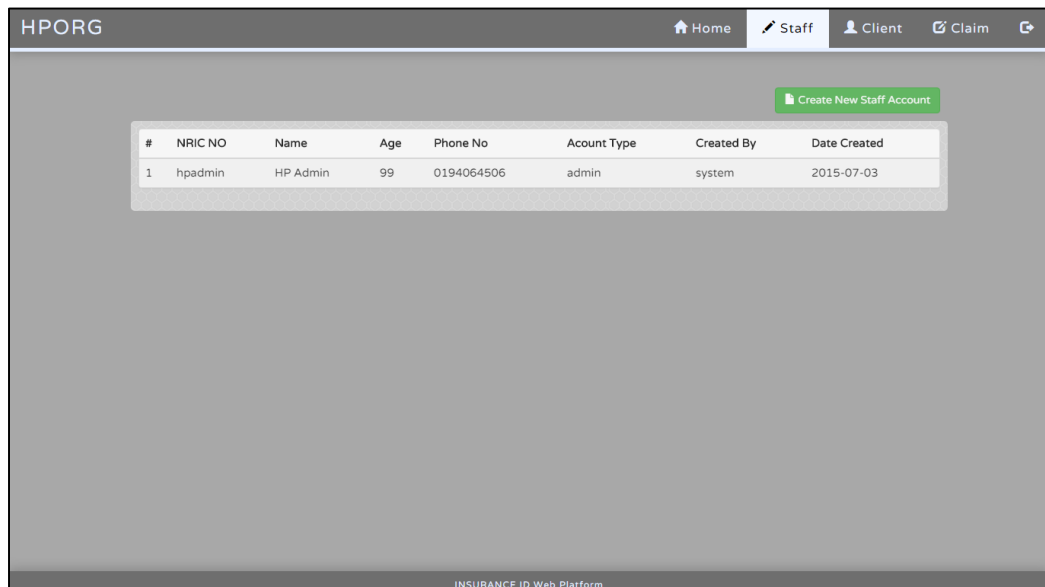


Figure 19: Healthcare Staff Page

Meanwhile, the Healthcare Client Page is designed a little bit differently to include

the Claim Initiation Process. For every client who possess health-insurance policy, and there's no current claim issued for that particular policy, a healthcare staff can initiate the claim issuance for their patients.

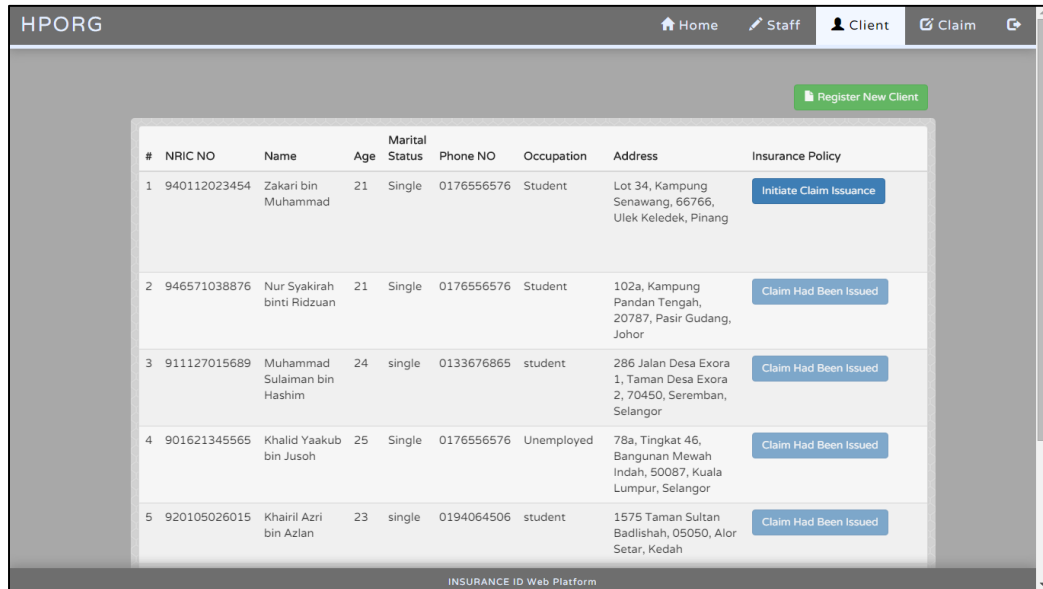


Figure 20: Healthcare Client Page

Last but not least, healthcare staffs have to confirm patient arrival for every claim issued. After it has been confirmed, Medical Statement has to be updated to be used by the insurance organization to verify whether a claim is accepted or rejected.

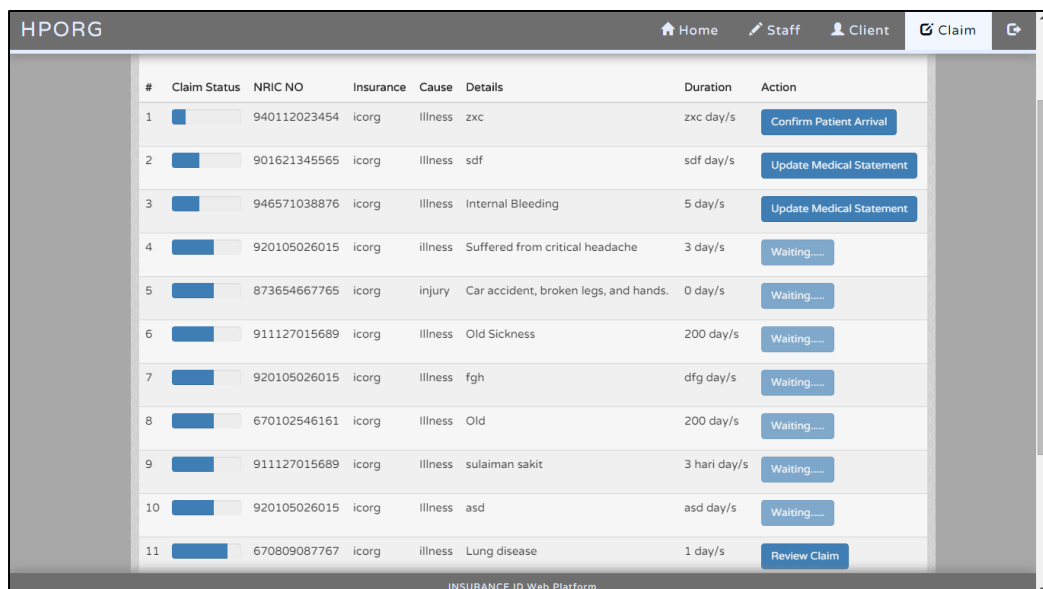


Figure 21: Healthcare Claim Page

4.2.2 Mobile Platform

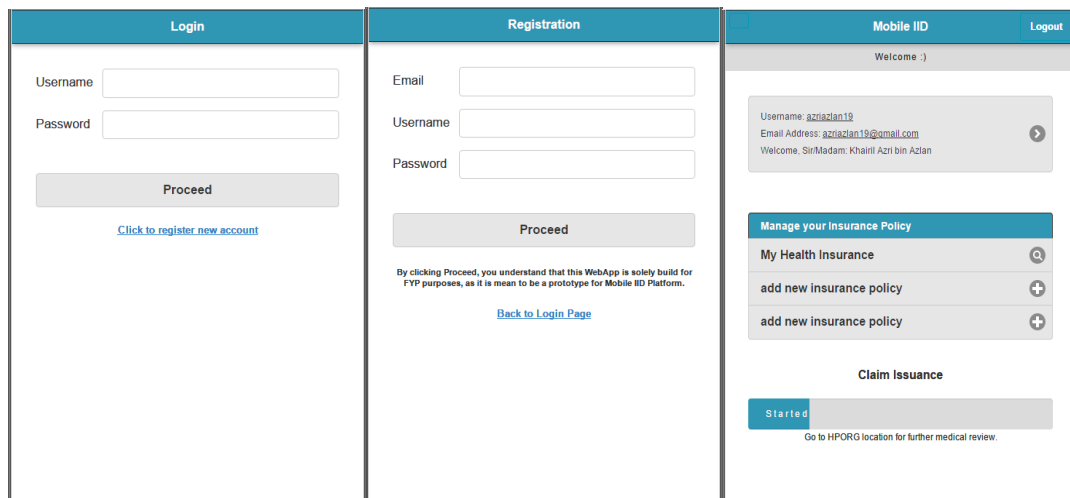


Figure 22: Login, Registration, and Home Page for Mobile Platform

The architecture of the mobile platform is somehow similar to that of desktop platform which is using client-server architecture. Every now and then, a user will needs to login to INSURANCE ID to use the web apps. The login activity is crucial as it serves as an authentication system to differentiate between numerous users of the system.

For new users, upon creating their new account, they will be automatically redirected to the Mobile Home Page. If they are a registered client of INSURANCE ID, they can connect their account to display their client's information on their devices. It is not considered as compulsory to connect account, so this made the system's accessibility open to anyone who wishes to manage theirs or others insurance policy.

The web apps permitted only 3 policies to be added. Now, this is just a feature of the system which is easily extendable in the future to allow for more policy management at one time. Besides, claim can only be initiated within the policy view page which is available right after the policy has been successfully added.

Only one claim can be initiated from the device at one time. Thus, the bottom-most components in the web apps Home Page displays the current claim status of a claim initiated within the device. It also provides some instructions for the user.

4.3 TESTING AND FEEDBACK

4.3.1 Functionality Testing

The project needs to be tested for conformance with the requirements stated earlier during the planning phase. The testing includes data flow checking, input and form validation, requirements verification, as well as database management and error checking. Often, these tests are repeatedly carried out until the underlying problem regarding the system is solved or a new method is found. However, most of the tests are executed with regards to align all the claim's statuses in order to form a flow pattern which have been defined earlier as the new process flow of online health insurance claim processing as this is the most crucial part of the system.

4.3.2 User Testing

Only mobile platform is tested externally by 10 university students under the author's supervision to discover the time effectiveness of the system. During the test, the participant is required to connect to the system using their mobile phone to perform all functions outlined to them. Meanwhile, the insurance and healthcare organization functionality is controlled by the author and sample data are used to mock up a real event. At the end of the testing period, each tester is given a survey form to fill in their feedbacks regarding the system.

The survey questions are divided into 5 attributes namely Usefulness, Ease of Use, Ease of Learning, Satisfaction, and Performance for each attribute is set with 5 scale-type questions ranging from 0 - 5. Thus, the maximum score for each section will be 25. Next, the average section score of all participants are obtained and considered to be the system score according to their attributes.

4.3.3 Feedback

The feedbacks from the test are tabulated and analysed to give a clearer view of the system score. The average points of all attributed is acquired then used to illustrate a score chart. The mentioned table and chart are displayed on the next page. Any additional documents for testing and feedback methods can be found at the Appendix section of this document.

Table 7: IID System Score

| | Usefulness | Ease of Use | Ease of Learning | Satisfaction | Functionality |
|----------------|------------|-------------|------------------|--------------|---------------|
| p1 | 20 | 17 | 25 | 18 | 21 |
| p2 | 21 | 17 | 24 | 19 | 23 |
| p3 | 25 | 15 | 25 | 19 | 24 |
| p4 | 24 | 19 | 23 | 18 | 25 |
| p5 | 24 | 20 | 21 | 20 | 23 |
| p6 | 20 | 21 | 21 | 21 | 19 |
| p7 | 19 | 18 | 25 | 17 | 24 |
| p8 | 19 | 19 | 24 | 18 | 21 |
| p9 | 19 | 17 | 21 | 18 | 22 |
| p10 | 24 | 19 | 23 | 19 | 22 |
| Average | 21.5 | 18.2 | 23.2 | 18.7 | 22.4 |

The reason why the lowest attribute is the “Ease of Use” is because the mobile platform didn’t come with a proper instruction on its every page. Thus, the user may feel lost inside the navigation system not knowing where they’re supposed to go to. Also, the mobile platform does not provide any means to recover from mistakes. So, any request that have been successfully recognised by the server will be accepted and processed even if it is not intentionally required by the user. The “Satisfaction” attribute had the second-last place because the overall system is not fully been integrated yet. Thus, there exist a small lags when transferring data from one location to another. Also, there is a twitch in some of the pages which resides outside of the author’s knowledge to repair and fix it.

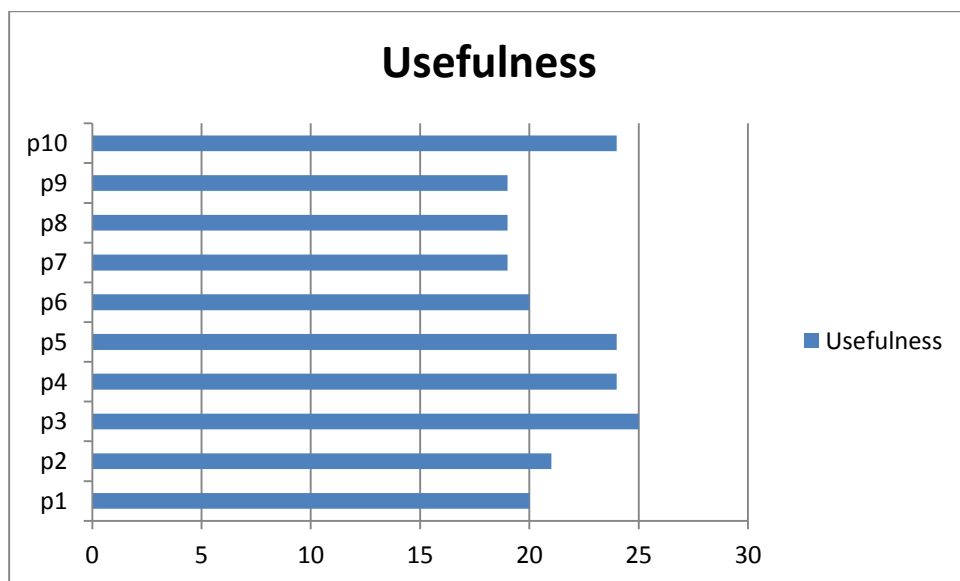


Figure 23: Survey Score for Attribute Usefulness

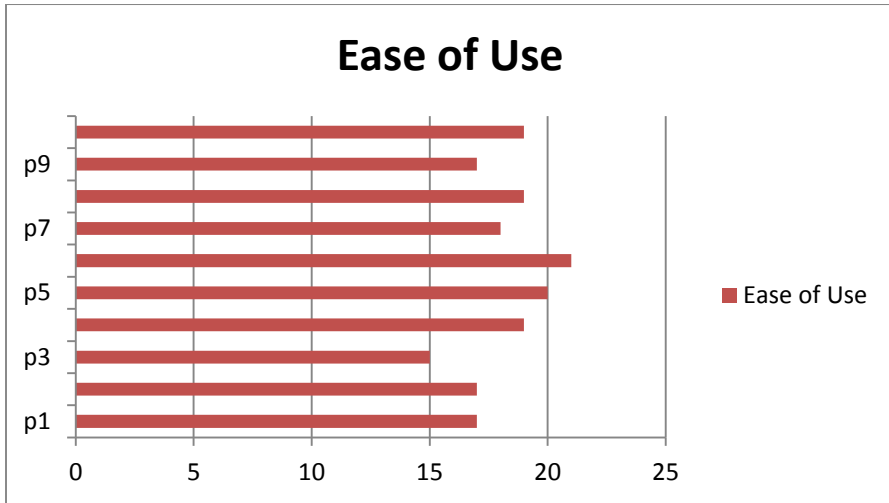


Figure 24: Survey Score for Attribute Ease of Use

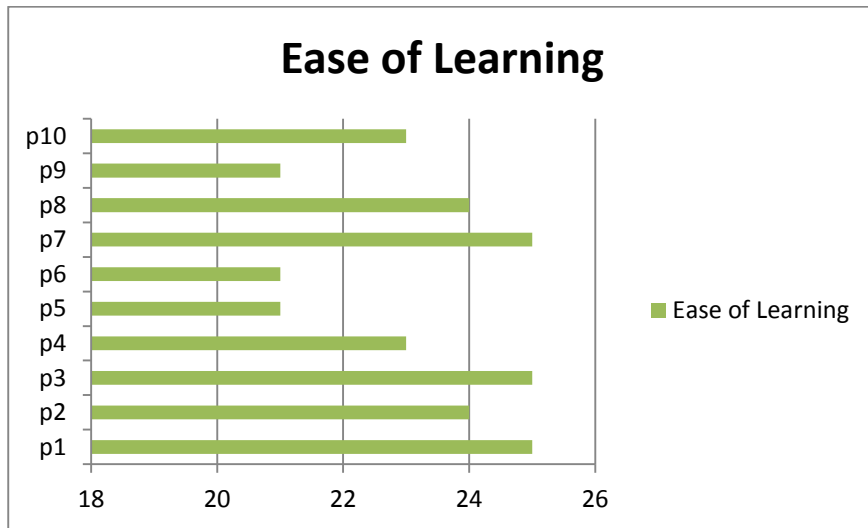


Figure 25: Survey Score for Attribute Ease of Learning

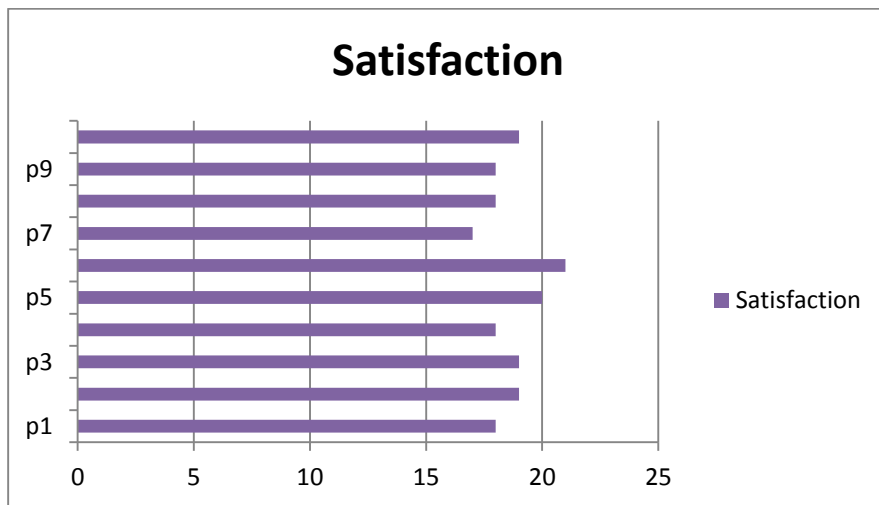


Figure 26: Survey Score for Attribute Satisfaction

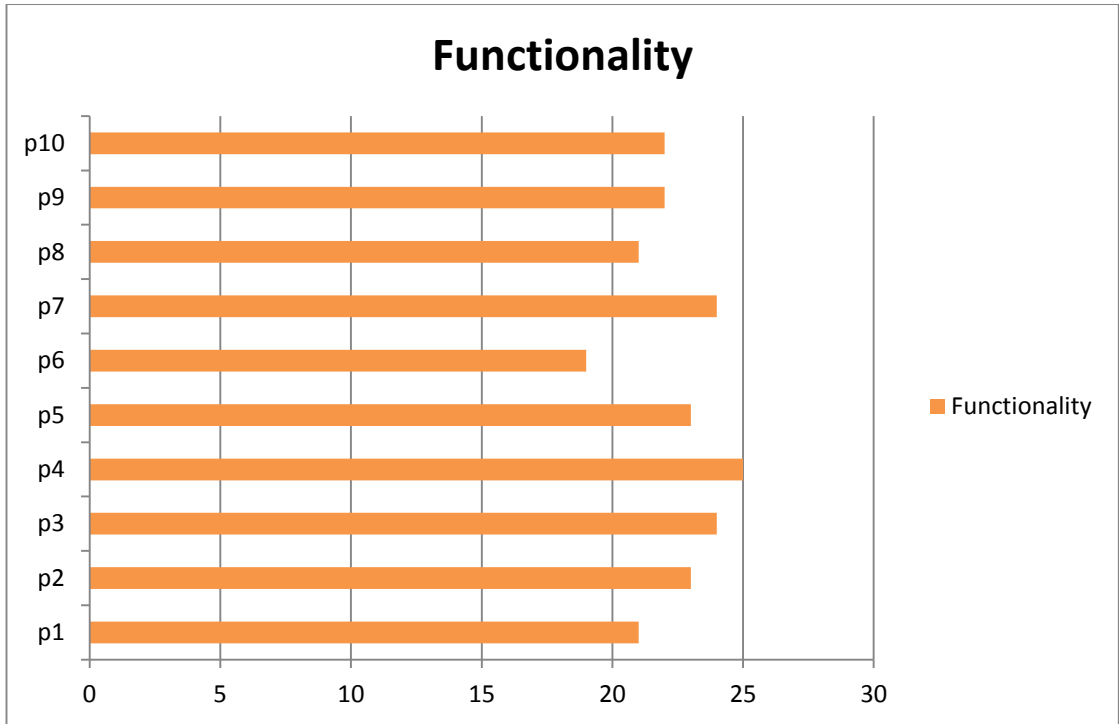


Figure 27: Survey Score for Attribute Functionality

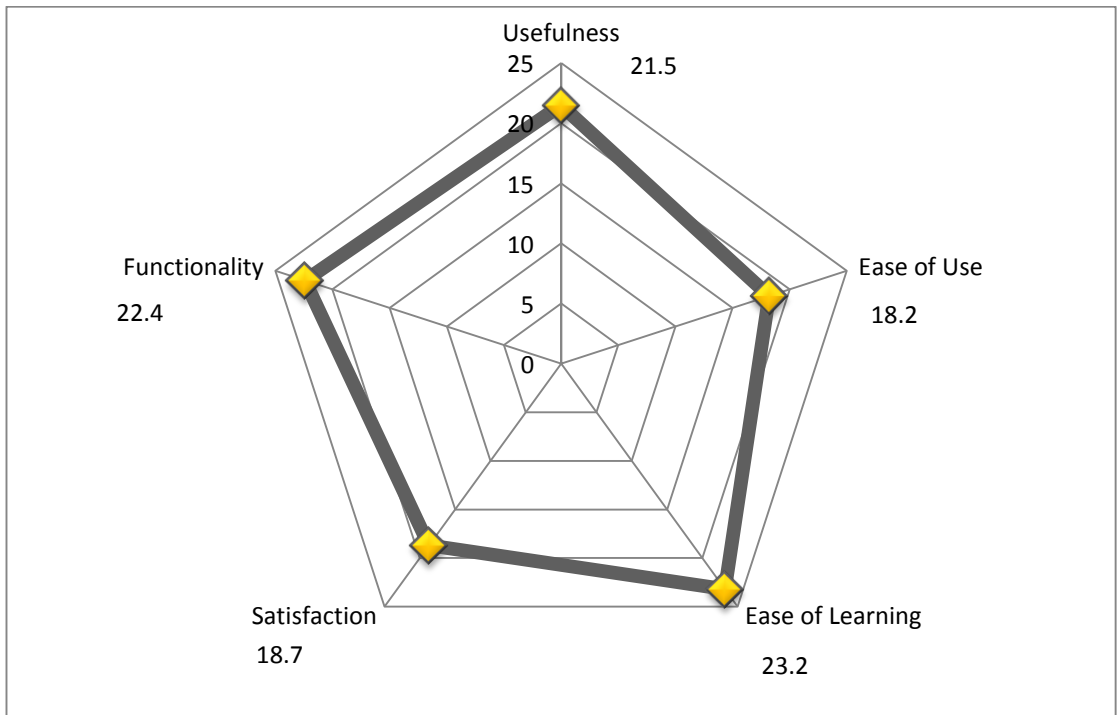


Figure 28: Insurance ID Score Chart

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 ACHIEVED OBJECTIVES

The three objectives defined at the earliest stage of this project were achieved with the completion of INSURANCE ID platforms. During the Planning and Analysis phase, the current procedure of Health Insurance claim is analysed to achieve further understanding of the current subject. Then, a new procedure for the online claim is proposed at the closing of Design phase to conclude the process that needs to be implemented inside the system. Finally, the system is developed using the data that had been analysed previously to suit the current execution of the Health Insurance claim procedure which is being done manually on the outside/real world.

5.2 RECOMMENDATION AND FUTURE WORK

INSURANCE ID specifically focuses on the health insurance process flow. As the project only focuses on the admission procedure, it is highly recommended that the development will be continued to better support the whole insurance infrastructure, including the current Admission and Discharge procedures so that it could really be deployed and use as a medium for communication, financial management, and efficient productivity for affected insurance-related matters.

Moreover, there exist a considerable amount of insurance schemes provided by numerous insurance carriers being practised in Malaysia which can shelter almost all the unfortunate events of unforeseen or unwanted occurrences. Thus, the project can be further developed to sustain all other insurance schemes dynamically or by using structured development of the system.

Last but not least, the involvement of banking institutions in the system could also be an important advantage to its users where it could ease up the currency flow between all groups of users which indeed can be assumed as another important feature that has to be implemented in the system.

5.3 SUMMARY

To conclude the report, the research and development of this project by merely using literature review approach have identified different types of methods, procedures and techniques that have been used successfully in the past to accomplish a similar target aimed by this project. However, this project is still unique while having its distinctive scopes and objectives clearly set to adhere to the Malaysian context of practices, together with some major improvements for the new mobile implementation of the system. The schedule of the project is workable as referring to the methodology which, with the accomplishment of this dissertation, the project can already be considered as complete. Most importantly, the objectives stated at the initial stage of the project have been achieved as the project is proven to be able to cater for time-related problems that are currently faced by most of the insurance company in Malaysia.

From other point of view, the completion of this project will mark a significant milestone for the insurance carriers, healthcare institutions, and broadly the citizen of Malaysia as the new mobile implementation for the insurance processes could extensively benefits the nation on the whole. As the world migrates into the new era, Malaysia too needs to keep on pacing forward in order to uplift its current status of the upper middle income country by providing subsequent advancement for its resident as to improve their daily life quality. With the successful implementation of this project in the future, it is hoped that it will help to relinquish most of the current problems faced by the Malaysian in insurance-related matters presently, besides more likely aiming to provide the uttermost betterment for all.

REFERENCES

- Abdul, N., & Ahamat, H. (2015). Competition Law and the Malaysian Financial Sector. *Procedia - Social and Behavioral Sciences*, 74-80.
- Arifin , J., Sulong , Z., & Yazid, A. (2013). A conceptual model of literature review for family takaful (Islamic life insurance) demand in Malaysia. *International Business Research*, 210-216.
- Arifin, J., Yazid, A., & Hussin, M. (2014). Demand of Family Takaful in Malaysia: Critical Determinant Factors Examined. *International Review of Management and Business Research*, 982-992.
- Bakar, A., Regupathi, A., Aljunid, S., & Omar, M. (2012). Factors affecting demand for individual health insurance in Malaysia. *BMC Public Health*, A10.
- Bauer, A., Bowman, A., Keyser, R., Urminski, C., Youngstrom, L., & Alfred, T. (2006). *United States Patent No. US7124088B2*.
- Chee, H. (2008). Ownership, control, and contention: Challenges for the future of healthcare in Malaysia. *Social Science & Medicine*, 2145-2156.
- Rechkoska, U., Ciulla, C., & Sikoski, J. (2014). Design and Development of an Android Accounting Application Using Web Services and Quality of Experience for Mobile Computing. *AICT2014: The Tenth Advance International Conference on Telecommunications*, (pp. 181-186).
- Ren, H. (2010). *Malaysian Healthcare Where are We Heading ? A critical look at the proposed National Health Financial Scheme*.
- Sekhri, N., & Savedoff, W. (2005). Policy and Practice Private health insurance : implications for developing countries. *Bulletin of the World Health Organization*, 127-134.
- Sinek, F., Bai, Y., & Sharma, M. (2012). Design and Implementation of a Secure Healthcare Social Cloud System. *2012 12th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (ccgrid 2012)*, 805-810.
- Sulaiman , A., Jaafar , N., & Kiat , T. (2005). Internet Activities among Malaysian Insurance Companies. *Journal of Internet Banking and Commerce*.
- Tarn, Y.-H., Hu, S., Kamae, I., Yang, B.-M., Li, S.-C., & Tangcharoensathien, V. (2008). Health-care systems and pharmaco-economic research in Asia-Pacific region. *Value in health : the journal of the International Society for Pharmacoeconomics and Outcomes Research*, S137-55.
- Wengnoon, R., & Limpiyakorn, Y. (2014). Extension of Insurance Premium Payment to Mobile Application with QR Code. *2014 International Conference on Information Science & Applications (ICISA)*, 1-4.

APPENDIX

Table 8: Project Development Gantt's Chart

| # | FYP1 | Week | | | | | | | | | | | | | |
|----|----------------------------------|------|---|---|---|---|---|---|---|---|----|----|----|----|----|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | Planning Phase | | | | | | | | | | | | | | |
| 1 | Selection of project title | | | | | | | | | | | | | | |
| 2 | Define the scope and objectives | | | | | | | | | | | | | | |
| | Analysis Phase | | | | | | | | | | | | | | |
| 3 | Literature review research | | | | | | | | | | | | | | |
| 4 | Preliminary study | | | | | | | | | | | | | | |
| 5 | Define the process flow | | | | | | | | | | | | | | |
| 6 | Define the system objects | | | | | | | | | | | | | | |
| 7 | Define user requirement priority | | | | | | | | | | | | | | |
| 8 | Develop use case diagram | | | | | | | | | | | | | | |
| | Design Phase | | | | | | | | | | | | | | |
| 9 | Develop system architecture | | | | | | | | | | | | | | |
| 10 | Develop module architecture | | | | | | | | | | | | | | |
| 11 | Develop database diagram | | | | | | | | | | | | | | |
| # | FYP2 | Week | | | | | | | | | | | | | |
| | Development Phase | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1 | Configure database attributes | | | | | | | | | | | | | | |
| 2 | Design UI for desktop platform | | | | | | | | | | | | | | |
| 3 | Develop required scripts | | | | | | | | | | | | | | |
| 4 | Functional testing | | | | | | | | | | | | | | |
| 5 | Design UI for mobile platform | | | | | | | | | | | | | | |
| 6 | Develop required scripts | | | | | | | | | | | | | | |
| 7 | Functional testing | | | | | | | | | | | | | | |
| 8 | Design new UI for the platform | | | | | | | | | | | | | | |
| 9 | Integrate both platform | | | | | | | | | | | | | | |
| 10 | Integration testing | | | | | | | | | | | | | | |
| 11 | User acceptance testing | | | | | | | | | | | | | | |
| 12 | Project final presentation | | | | | | | | | | | | | | |