KEMI-TORNIO UNIVERSITY OF APPLIED SCIENCES

A Customer Data Handling System Analysis

Case NIB Insurance Company

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CONTENTS

ABSTRACT

Beyene-Kesti, Martha Hailu. 2011. A customer data handling system analysis. Case NIB insurance company. Bachelor's Thesis. Kemi-Tornio University of Applied Sciences. Business and Culture. Pages 84. Appendices 8.

The objective of this thesis is to transform the manual data handling system to a computerised system for NIB insurance company. The thesis includes an analysis document which is used to describe the transformation of manual data handling system to computerised system for NIB insurance company. I was motivated to do this thesis because I worked in NIB insurance company as an underwriter officer and faced the problem related to the manual data handling system.

The methodology that I used for this project is the object oriented system analysis and design methodology. Object oriented method is one of the best system analysis and design methods because of its significant features. To collect data, I applied the interview technique based on my earlier work experience. In addition, I implemented unified modelling language tool (henceforth UML). UML is used to visualise all the requirements and analysis of the project; therefore, it is easy to understand for any level of knowledge.

The outcome of the thesis is an analysis document which is useful to replace the manual data handling system by the computerized system for NIB insurance and other companies, which need to solve their similar problems.

Key words: OODA, UML, DDMS, User Interface, Linux, CRC, System Use Case

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1 INTRODUCTION

1.1 Background of the project

Storing data in the computer and using data from the computer is much easier than using paper. At the same time, it needs smaller space compared to the file cabinet. In this thesis work, I presented a computer system used to change the existing manual customer data handling system to a computerized data processing system. The system developed for one Ethiopian insurance company, called NIB insurance. I chose this company because I worked there as an underwriting officer for eleven months in 2007. My job description included the following tasks: describing the services in detail for customers, calculating the premium for the services, signing the contract with the customer based on the previous agreement, putting the customer information in the file, and renewing the customer policies.

On the basis of my work experience as an underwriter officer, I became familiar with the company's problems of using a manual file handling system. Based on my observations while I was working as an underwriter officer in NIB insurance, I learned that the organization used a time-consuming and tedious manual data handling system to record customer files. As a result, the staffs at NIB insurance were faced with many problems related with the manual data record system. Some of the problems were as follows: to find the customer files with a minimal amount of time, to renew the customer policy, to prepare different report at the time, to respond for the customer claim on time, to correct the errors occurred on the paper sides, to secure the customer data, and to search the misplaced customer files.

Therefore, I became motivated to contact the NIB insurance company management in order to discuss an issue and my solution for that. The solution was, to change this manual customer data record system to a modern automated system, by using the knowledge that I have gained during my studying business information technology in Kemi-Tornio University of Applied Science.

Unless the system is modified at NIB insurance, the problems listed above will be perpetuated. This means that even if the services of the NIB insurance company are mandatory for customers, the customers could not get the quality and the expected service from the insurance company. Therefore, the new system that I developed has the power to satisfy the customers and the insurance company's needs.

In general, changing the existing system will be significant for the following reasons: it creates an opportunity for the NIB insurance company to have fast and excellent customer service, to have a safe and reliable place to store sensitive customer data and to become more competent in the market.

Moreover, due to the significant points of view listed above, the aim of the project is to contribute several benefits for the insurance company, the customers, and the insurance company employees. In addition, it is useful to me, to my graduation thesis accomplishment, experience of tackling a "real world" problem, and to applying my theoretical knowledge practically.

1.2 Organization background

NIB Insurance Company (S.C.) is one of the insurance companies in Ethiopia. "The company vision is to be competent by providing high quality service for their customers, and the company mission is to satisfy the growing insurance service needs for the society" (NIB Insurance Company 2009).

1.3 Objective and research questions

The objective of this thesis work is to design an automated system used to change the existing manual customer data handling system to computerized data processing system for one Ethiopian insurance company, called NIB insurance. This system helps the

insurance company to have steady customer service, and consistent work environment that can satisfy the insurance company, customers, and employees.

The research question was how NIB insurance data handling system can be improved by using technology? To improve the NIB insurance data handling system, it is necessary to change the existing manual customer data handling system to the computerized system.

The goal of a computerized system design is to solve problems related to technical and functional requirements. System design includes two sections; the first section is the logical design, which describes the structure and behaviors of the system. The second section is the physical part, which is after the logical design, and it describes the software code writing. (NYS Project Management Guidebook 2001.) My thesis work included the logical design part only.

1.4 Data source and data collection method

In this thesis work, the user requirements were identified through interview, on the basis of my earlier work experience in the company. An interview is defined to be a discussion between a researcher and an interviewee (Maykut & Morehouse 1994). Therefore, any possible means of communication can be used for interview technique. Since, I know the daily workflow of the company because I used to work in the case company, making interview helped me to remember crucial questions that I did not remember when I prepared for the interview and to know the work flow changes made after I resigned the company.

1.4.1 System analysis method

To select an appropriate system analysis methodology is essential, since it is the foundation for the project to accomplish its objectives. Therefore, I discussed with my supervisor and decided to go through with object oriented system analysis and design method. “This method is the most recent and widely used approach, which has so many advantages comparing to that of the structured analysis method” (Avison & Fitzgerald 2006, 420).

The advantages of using object oriented system analysis and design method as described in (Ambler 2001, 10-19). The advantages of object oriented analysis and design are as following: First, it increases the feasibility of the project by providing an opportunity for reusability. Second, it improves the quality of the project by providing an opportunity for users to participate in the development process. Third, it increases the extensibility of the project because classes have both data and functionality; for instance, when I add a new feature to the system I only need to make a change only in the relevant class. Fourth, it decreases the cost of development, since object oriented system development techniques helps the developer to develop the systems in a cheaper way than traditional system development. Fifth, it increases the chance of project success by creating an opportunity to work with the users. Sixth, it reduces maintenance cost by providing a better documentation and at the last object oriented method helps to manage complexity. All the above advantages help the system developer to design, reusable objects that are easy to modify and maintain.

1.4.2 System design tools

The tool that I used for modelling of the analysis document is Microsoft Visio as it supports Unified Modelling Language (henceforth UML) and it is one of the professional software provided by Kemi-Tornio University of Applied Science. The main reason for using UML is that it has become the standard tool for developing a system by using object oriented analysis modeling. In addition, it is possible to find

several profiles, which can help the developer in different cases. (Bennett & Lunn & Skelton 2001, 20.)

1.5 Structure of the thesis

The thesis work consists of five chapters. The second chapter contains feasibility study. The third chapter describes the existing system and the fourth chapter describes analysis of user requirement and modelling of the requirement using UML tools. The fifth chapter presents conclusion and recommendation part of the thesis.

2 FEASIBILITY STUDY

Feasibility study is a logical tool, which is used to help the system developers to make decisions regarding to their project viability (Drucker 1985; Hoagland & Williamson2000; Thompson 2003c; Thompson 2003a cited in Thompson 2005). To measure the feasibility studies in this thesis work, I evaluated operational, technical, schedule and economic aspect of the project.

2.1 Operational feasibility

Operational feasibility measures "how well the solution will work in the target customer. And how the users feel about the system?" (Bentley & Kevin & Whitten 2004, 92). According to that, I measured the operational feasibility of the project in terms of two crucial aspects of operational feasibilities. First, does the solution solve the existing problems from an operational point of view? Second, how do the management and employees take the solution in their operation?

When I answer to the first question, the project will give a better performance than the manual system to the NIB insurance company record system. It also provides necessary information with enough throughputs and an excellent response time to the users. In addition, it is accurate and quick compared to the existing system. At the same time, I can be sure that the system will provide safe and secure storage and back up mechanisms. As a result, for the current condition of the company I can say the solution solves the problems of operation at the required level.

It is also necessary to mention some ideas regarding, how the management and employees take the solution in there operational problems. The project solves problems related to time and cost, so it is acceptable by the managers. Since the new system will also handle reports and premium calculations required by the employees, I could say the computerized system is operationally feasible from the employee's point of view. In addition to that, I suggest being arranging enough level of training for employees to make the system as friendly as possible.

2.2 Technical feasibility

The purpose of assessing technical feasibility is "to find out what hardware and software is currently being used, whether the hardware or software is currently available to build the new system and the capacity of building the new system" (Lancaster 2004, 32). Therefore, my inspiration and education background with the available hardware, software, development environment, and guidance from my supervisor were advantages for technical capability point of view to complete this project.

2.3 Schedule feasibility

Schedule feasibility measures "the time table in which a solution must be developed and how reasonable the project timetable is" Lancaster (2004, 32). One of the project criteria is schedule. In order to make the project schedule feasible the project has to solve a company's problem at a time the solution is needed by the case company. As the management and the employees answered in the interview, this thesis work result is needed by the company. Therefore, I believe the schedule is feasible.

2.4 Economic feasibility

Economic feasibility measures "the cost effectiveness of the project or solution that is often called a cost benefit analysis" Whitten & Kevin & Bentley (2004, 92). To reduce the company working cost is one of the main criteria's which is measured at the time of developing a new computerized system. I measured the economic feasibility of a system in two aspects, tangible cost of the system and intangible cost of the system. I describe those economic benefits of the proposed system with comparing to the existing system as below.

2.4.1 Cost of the existing system

The existing system cost divided in to two sections. The first one is the tangible cost section of the system, and the second one is the intangible cost section of the system. Tangible costs are an expenses which can be expressed by a certain money value (Shelly & Rosenbalatt 2011, 672).

The tangible cost of existing NIB insurance company is illustrating below. The currency used in table 1 is the local currency used in Ethiopia.

Table 1. List of existing system cost / tangible cost

Description	Quantity	Unit price	Total price
Pen	1500	5.00 birr	7500.00 birr
Pencil	500	1.00 birr	500.00birr
Paper	70(pack)	70 birr	4900.00 birr
Inside file folder	1500	20	30,000.00 birr
Cover File	300	90 birr	27,000.00 birr
Man power	5	20,000	182,400.00 birr
Other stationary			50,000.00 birr
Total			302,300.00 birr

The above cost is the yearly cost of the Nib insurance Tana branch and they need to use 302,300.00 birr every year to handle the manual system.

2.4.2 Cost of the new system

A) Tangible costs of the new system

Tangible costs are divided into two different costs those are direct and indirect (operating) costs. Direct costs are one-time costs that the company expend when developing a new system, or buy a certain infrastructure which can be used by the company for a certain period. In contrast, indirect costs are the costs which are expend to accomplish the day to day work activity of the company with in a given time interval. For example, papers, printer ink, maintenance costs of the system, and employees' salary are included in the indirect costs of the company. (ISRD group 2007, 122.)

Table 2 displays the estimated tangible costs of the proposed or computerised system for NIB insurance company. The currency used in table 2 is the local currency used in Ethiopia and abbreviated as birr.

Table 2. Estimated tangible, direct costs accrued from the computerized system

Description / Activity	Quantity	Duration	Unit Price	Total cost	Cost Type
Object oriented analysis -Professional personnel	1	90 days	6000	6000	Direct cost
Object oriented design Professional personnel	1	90 days	6000	6000	Direct cost
Implementation Professional personnel	1	60 days	4000	4,000	Direct cost
Testing	1	30 days	2000	2,000	Direct cost
Network materials - Hub - Repeater - UTP cable - RJ 45 - Professional personals	 1 5 4,000 10 5	 -	 1500.00 600.00 10.00 5.00 2500	 57,050 	Direct cost
Computer HP, ALL-IN-ONE 200-5340 My SQL server	4 1		20,000.00 20,000.00	80,000 20,000	Direct cost
Printer Brother,MFC-5890cN A3-MONITOIMILAITE	1	-	1,500	5000	Direct cost
Software development tools	-	-	-	5,000	Direct cost
User training	-	30 days	-	2,000	Direct cost
			Total	187,050	

Table 3 lists the estimated tangible indirect costs of the proposed or computerised system for NIB insurance company. The currency used in table 3 is the local currency used in Ethiopia and abbreviated as birr.

Table 3. Estimated tangible indirect costs accrued from the computerized system

Purpose	Unit	Amount	Unit price	Total price
Pen	Piece	72	5 birr	360birr
Paper	Pack	24	70 birr	1680 birr
Pencil	Piece	72	1 birr	72 birr
Man power	-	3	-	134,400birr
maintenance				2000birr
Total				138,512.00birr

Conclusion

The existing manual system incurs 302,300.00 birr every year. The new system incurs birr 187,050.00 for development cost. This cost is a onetime cost used to develop the system and the average life span of the computer system estimated around five years. In order to calculate the annual cost of the computerized system, I divided the development cost. i.e. 187,050.00 by 5 and the result are 37,410.00 birr. Therefore, the annual cost of the computerized system estimated around 37,410.00 + 138,512.00 = 175,922.00 birr. As we see from the analysis, by using the new system the company can save around 126,378.00 birr per year. Therefore, I can say the computerized system is economically feasible since the annual costs of the new system are less than the annual cost of the existing system.

B) Intangible benefits of the new system

“Intangible benefits cannot measure in money amount directly. However, they may guide to long term quantifiable benefit for the business”. (Kurbel 2008, 69). The new system provides different benefits; it increases the performance of the company, it provides a backup system for the documents, it increases the accuracy of the reports, and it protects from unauthorized access.

3 DESCRIPTION OF THE EXISTING SYSTEM

3.1 Introduction

This chapter deals with a detailed description of the NIB insurance existing system. In order to make it clearly understandable by the reader, there are several issues that are included in this chapter. First, I specify the key functions of the existing system. Second, I describe the jobs done by the system with their entire input, process, and output. Third, I identify the problems, the basic business rules of the existing system, and forms used as well as the report generated by the existing system. Finally, I describe the proposed new system and finished the chapter.

3.2 System environment and boundary

The system environment is defined as an environment which is found outside of the system, and still interacts with the system. To understand the interactions between the system and its environment help the system developer to comprehend the dominant structure of the system requirements. Therefore, it is important in system development to identify and describe the system environments in detail. To understand the environment in which a new system works, it is useful to understand the system's boundaries clearly, that is, to define what internal part of the system is and what external part of the system but inside the system boundary. (Biemer & Kossiakoff & Seymour & Sweet 2011, 51-56.)

The NIB insurance company system boundaries are described in figure 1.

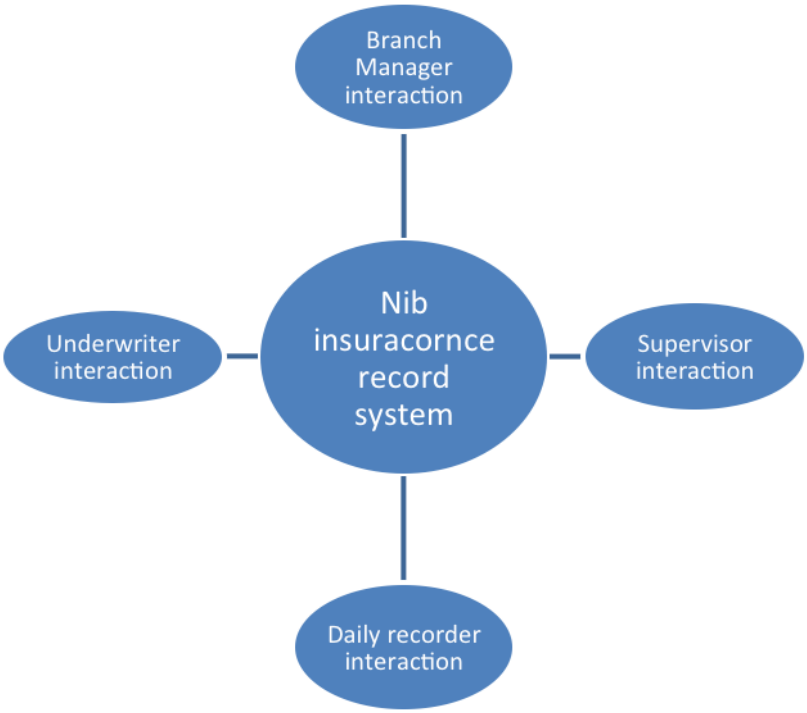

Figure 1. Boundaries of NIB insurance record system

The system boundary of Nib insurance record system represents the interaction among the players in the existing system. Figure 1 shows, the boundaries of the documentation system interact with the branch manager, supervisor, underwriter, and daily recorder.

3.2.1 Underwriter interaction

The underwriter interacts with the data record system. The interaction is by the condition that the underwriter provides the survey form, calculation form and other relevant documents into the Nib insurance data recording system. Then the system accepts the document from the underwriter and transfers it to the next level or supervisor.

3.2.2 Supervisor interaction

The supervisor interacts with the system. The system provides all information to the supervisor. The supervisor interacts with the system by checking and approving of several documents such as the calculation form and survey form to the system. If the documents are right, the supervisor approves it by his signature and transfers it to the branch manager. Otherwise, he returns it to the underwriter for correction.

3.2.3 Brunch manager interaction

The data recording system interacts with the branch manager in the conditions by which the Nib insurance system provides all information to the branch manager. The branch manager checks the entire documents and puts his signature in the documents. After that, the documents that are signed and approved by the branch manager can be given to customers, and the other copy saved in to the file cabinet.

3.2.4 Daily recorder interaction

The existing system interacts with the daily recorder in the environment by which, the system provides unrecorded daily information for the daily journal. The daily journal recorder records daily information in to the system.

3.3 Major functions of the existing system

The major functions of the existing system described as follows: the first function is done by the underwriter, and it comprehends accepting customer demand, calculate the premium and complete the survey form. The second function is done by the supervisor and it contains, checking and approving the policies which are done by the underwriter. The following function is as the same as the second function, but which is done by the branch manager. The last one is done by the daily journal recorder, and it includes

recording the entire policy and document into the main journal. In the next part of the thesis work, I describe the functions in the input, processes and output manner.

3.3.1 Acceptance of customer demand, calculate the premium and complete the survey form

Input: Customer demand for insurance, customer documents that can display the interest of the customer insurance legality,

Process: The underwriter describes different kinds of service that the customer can get from the insurance company. After that the customer provides the documents for the insurance service he/she is interested. Then the underwriter checks the customer document regarding the customer insurance interest legality and as the document fulfils all required information. Next to that, the underwriter calculates the premium for the insurance service demanded by the customer. Finally, if they agree on the premium fee, the underwriter completes the survey questionnaire based on the warranty category.

Output: The outputs of the first task are the policy agreement, completed survey report and calculated premium payment for the agreed policy.

3.3.2 Check and sign by supervisor

Input: The customer and the underwriter agreement form, calculation form, customer documents and survey form, are the inputs for this action.

Process: The supervisor checks all relevant documents; survey form and calculation form as they fulfil all the criteria’s of the policy, and as they are processed in the right way. After that, if everything is correct the supervisor puts his signature as approval and sends it to the next level, but if there is a mistake he/she will returns it back for the underwriter to correct the error.

Output: Checked and approved policy by supervisor.

3.3.3 Check and sign by branch manager

Input: The approved policies and documents by the supervisor.
Process: The branch manager checks the entire documents and policies after the supervisor approval. If the branch manager finds out an error, he will send it back to supervisor for correction.
Output: Final checking and signed policy contract by branch manager.

3.3.4 Record for the daily journal

Input: The customer document, the policy created by the underwriter, the survey form, and calculation form are the inputs that the daily journal used

Process: Based on the cover type and service included in the policy, the daily journal recorder creates the new policy number, and under that policy number registers the customer name, address and phone number. In addition, the recorder records the sum insured value of the asset, the premium value of the asset, the new policy created date, and the policy due date in the daily journal.
Output: Recorded data about the policy, and the customer.

3.4 Reports generated in the existing system

The reports generated by the Nib insurance company include monthly mother insurance report. The purpose of this report is to describe how many mother insurance policies produced during a month. In this report, the sum insured value of the mother insurance, and the premium fee amount described properly. The other report is a weekly report. This report, displays the company over all weekly production. The last report produced by NIB insurance is monthly yellow card report. This report shows the mother insurance policy which has yellow card insurance. Yellow card insurance cover is an insurance policy cover used to give the cars the insurance service at the time they are driving outside of Ethiopia.

3.5 Forms used in the existing system

The Nib insurance record system uses many types of forms in order to input data into the system. All data's recorded in a paper-based manner. The main forms that the company used in the insurance recording system were: premium calculation form, a form used to calculate a price for a policy. Survey form is a form used to measure the market value of the product by observing basic part of an asset. Customer document registrations form, a form used to register basic information about the customer in order to be able to contact the customer in a different situation.

3.6 Problems in the existing system

After discussing the background activity, and objective of the organization the next step is identifying the problems in the existing system. In order to identify the existing problems I used performance, information, economy, control, efficiency, and services (henceforth PIECES) framework. This framework is used to break down the problems occurred in an information system. (Oja & Parsons 2007, 569.)

a) Performance

"Performance of a system is measured in terms of *throughput* and *response time*. *Throughput* measures the amount of work performed over a time period, whereas *response time* is the average delay between a request and a response to that" (Merchant 2005). Regarding to throughput all recorded data in NIB insurance company was performed manually; due to manual handling of data activity the existing system has a low level of throughput. In addition, the response time in the existing system is high due to miss ordered and the large number of data in the file cabinet. Therefore, finding a file from file cabinet is one of the challenges in the existing system.

b) Information

Availability, integrity and confidentiality of information are critical criteria, especially for service organization such as, NIB insurance. I evaluated information value of the existing system interims of input, output, and stored data. Inputting data and updating recorded information in the manual system is difficult and prone to error. In addition,

there is unnecessary recording of data due to the absence of networked and integrated data communications. Furthermore, report generation is a time taking, and it did not deliver on time. When I measured the output of the data, there is a possibility of redundant and incorrect recorded data into the system. Stored data are not secure; this means that data are exposed to theft and privilege. The probability of accessing data by unauthorized persons is high. Meanwhile, there is no back up mechanism in the system.

c) Economics

The value of economics is measured by the amount of expense incurred during the operation of the day to day task. Based on the costs and benefits analysis of the existing system, the manual way of handling system takes high cost due to the manual activities of the system.

d) Control

Since stored data kept without any security or control in the existing system, information might be accessed by an unauthorized person. Therefore, the level of information control in the existing system is very low.

e) Efficiency

There is wastage of time in processing the data. At the same time, it requires excessive effort for registering and processing of data. Materials required for registering and processing are insufficient. Accordingly, delay of decision-making, lack of coordinated information is common.

f) Service

Since there is hand processing of data, the system could not provide fast service. Furthermore, the existing system produces inaccurate, inconsistent, and unreliable results, especially in case of report generating and filling the claim forms. Besides, the system renders poor communication and inflexible system in the company.

3.7 Practices to be preserved from the existing system

There are some activities such as forms and business rules which did not change during the new system development. The main reasons of preserving those activities are there is no challenge, which will come by using them, and it cannot be further modified.

3.8 Alternative options to address problems of the existing system

The aim of this thesis work is to identify the problems of the existing system, and to find out a better solution for NIB insurance. Consequently, I identify the following three different types of database approaches. The database approaches point out the combining and sharing of data thought the organization. I choose this database approaches based on the country development, infrastructure condition, and company financial situation.

3.8.1 Stand-alone database

A stand-alone database is a technology which allows the database to be imbedded in a single machine. Stand-alone database works only in a local area network. It allows clients to process store and resides information in a single machine. There are several advantages of stand-alone database such as it is not complex or does not need extra work to be done by the data base administrator. It is relatively cheap to apply since there is no much complexity and a more extensive infrastructure. Besides, it does not require extra labour costs for data administration and implementation. In addition to that, it is more secure than other database approaches, since there is no need of internet connection. The disadvantages of standalone database are data redundancy, and it works only in a local area network or in a single building. (Waraporn 2006, 117.)

3.8.2 Centralized database approach

A centralized database management system is an approach used to control the database centrally, and all branches are determined based on the single database, which exists in one branch. A centralized database allows exchanging information through wide area network. In a centralized database system, there will be only one or two databases in a particular branch, and any information retrieval or updates from all other branches modified from the centralized branch. (Gillensor 2005, 306.)

There are different advantages by using centralised database approach such as minimizing development, installation and procurement costs. In addition, it is not complex and does not need special infrastructure in order to apply it. At the same time, it has disadvantages such as availability and performance especially in big organization. Waraporn (2006, 120.)

3.8.3 Distributed database approach

Distributed database approach works in different way than centralized database approach. Unlike centralized database it disseminates the data to a different server, site, or network. For example in Lapland higher institution case instead of having Kemi-Tornio University of Applied Science, Rovaniemi University of Applied Science and Lapland University data in one place, creating different three database for each university, and at the same time able to access the entire data in three universities, for that matter distributed data is still considering as logically one or single database (Gillensor 2005, 296).

A distribution database management system (henceforth DDMS) is a database management systems used to manage distributed data over different places. DDMS works for both client server and peer-to-peer architecture. Gillensor (2005, 306.)

In order to choose a database for the system, I made the analysis table that is depicted in table 4. The table clearly describes the measurement criteria's that I used to choose the database approach for the new system. I choose the database approach based on the

advantage and disadvantage of the one database approach over the other. The scales that I used in the table below are described as follows: 5= excellent, 4= very good, 3= good, 2= satisfactory, 1= not good.

Table 4. Weighted approaches for comparing the three alternative database approaches for Nib insurance system

Criteria	Weight	Alternative approaches					
		Standalone database		Centralized database		Distributed database	
Requirements							
		Rating	Score	Rating	Score	Rating	Score
Reflects organizational structure	10	5	50	3	30	2	20
Improve availability	6	5	30	3	18	4	24
Improve performance	7	4	28	4	28	4	28
Complexity	5	5	25	4	20	2	10
Secure	7	4	28	3	21	3	21
Saving economic	4	5	20	4	16	3	12
Easy to maintain	6	5	30	4	24	2	12
Modularity	5	2	10	3	15	4	20
Total	50		221		172		147
Constraints							
Hardware cost	15	5	75	4	60	2	30
Software cost	15	4	60	4	60	3	45
operation time	10	3	30	4	40	5	50
training cost	10	5	50	4	40	2	20
Total	50		225		200		145
Total	100		446		372		292

In order to choose the database approach, which will be suitable for Nib insurance company, I made the above analysis. As the table shows, I divided the overall score based on requirements, constraints, and the total result. Based on the total requirements and constraints, the first one, which is a stand-alone database approach, is the best compared to the rest of approaches. Even though, stand-alone database works in the local area network and in the same building only.

3.9 Architectural design

Architectural diagram is known as deployment diagram too (Penders 2003). Architectural diagram helps to explain the hardware that the developer used in the system. The following diagram describes a general hierarchy of the system. As the figure illustrates, the workstations connected with the application server. Meanwhile, in the application server there are a policy, underwriting rating rules, document management rules and products. Furthermore, the application server uses the database in order to retrieve data. Finally, all data will transfer to head office server for backed up.

Figure 2 illustrates the NIB insurance Tana branch architecture.

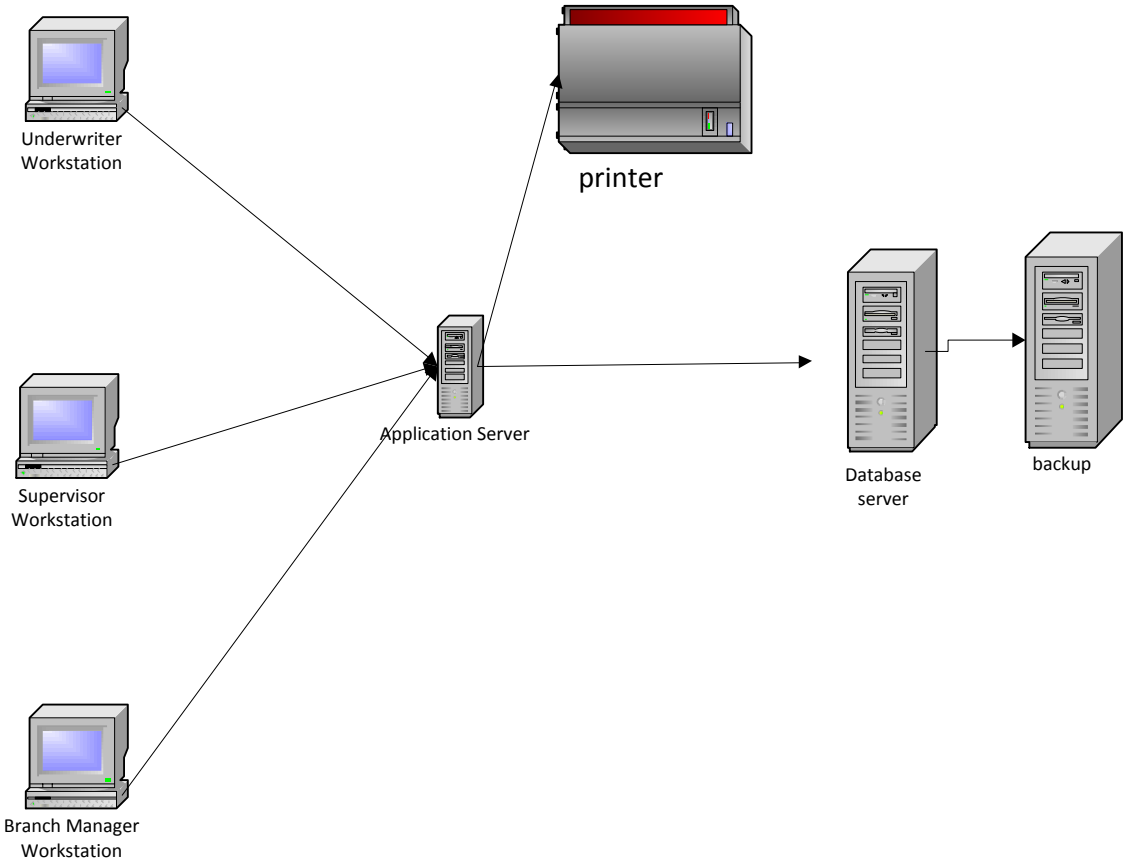

Figure 2. Architectural design

As we see from the figure 2 there are three workstations, one printer, one scanner, and one data base server, and the entire branch data will be backed up in head office database server.

3.10 Essential Modeling

Essential modelling is a technique used to gather requirements, the goal of requirement gathering is to know what the user needs to have in the new system. Essential modelling is used to represent the user requirements collected during requirement gathering. I used essential modelling to understand the nature of a system, and its problem. Essential modelling includes essential use case diagram, essential user interface prototype, CRC, and user interface flow diagram. Ambler (2001, 45.)

3.11 Actors

An actor represents anything or anyone that interact with the system (Jacobson 2003, 48). It includes people who are using the system and other organizations and systems that are using the system. Actors in this system are underwriting officer, supervisor, journal recorder (clerk), casher, and branch manager.

To make it more clearly, I will show the actors and their functions in figure 3. Figure 3 illustrates the NIB insurance existing manual system work flow and work division between the actors.

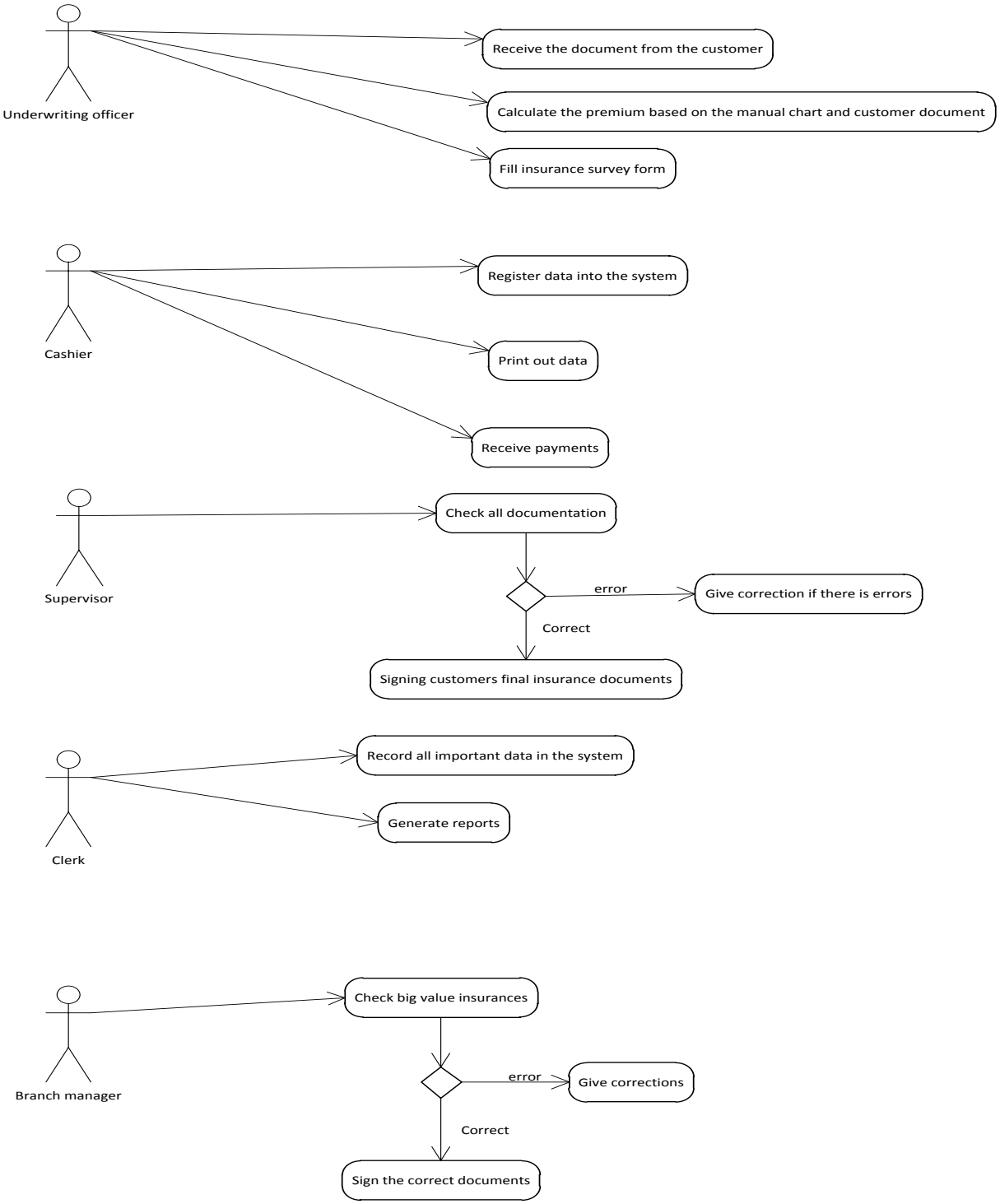

Figure 3. Essential use case diagram

The essential use case diagram detail descriptions will be present in the appendix 1.

3.12 User interface flow diagram

User interface-flow diagram is a diagram which is used to display the user interface sequences in the system. To draw the user interface at the binging of the system development stage helps the developer to reduce the level of mistakes which will happen at the end of development, and it helps the developer to gather the requirements properly. (Thorn 2004, 15.)

Figure 4 shows the main window of the new system after the user log in by using his or her account the main window displayed for the user.

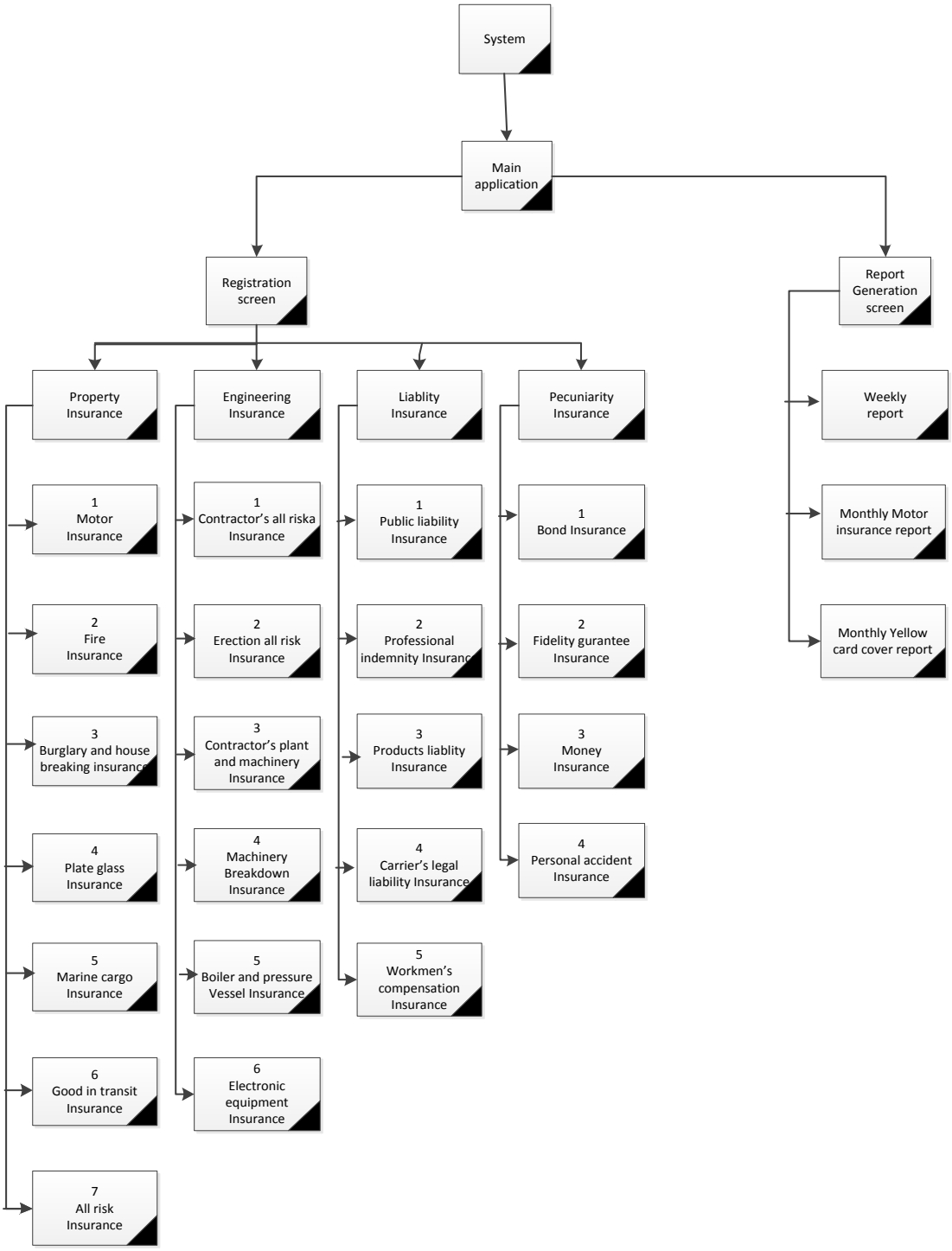

Figure 4. User interface flow diagram

The rest of user interface flow diagrams will be present in the appendices 4,5,6,7.

3.13 CRC diagram

Class Responsibility Collaboration (henceforth CRC) cards are one of the technique used by system developers in order to understand and to collect the requirements of the system efficently. CRC diagram has three sections, the name of the class found on the top of the diagram, the responsibility of the class written in it is left side of the diagram, and the collaboration of the class presented in it is right side of the diagram. In general, this technique is aimed at a better and deeper understanding of the problems and the system situations. It also helps to develop a proper solution by choosing the classes of the system. (Kizza 2009, 16.)

Accordingly, the CRC for NIB insurance company system will be described as follows:

List of CRC cards

Branch manager <<Actor>>	
Check and approve policy Check and approve reports	Unapproved policy Database Security login Pin code Report generation Policy

Security Login<<UI>>	
Accept Username Accept Password Validate User	Account

Underwriter <<Actor>>	
Scan document in to the system. Register Customer Create policy	Database Security login Policy Customer Customer document

Supervisor <<Actor>>	
Check and approve policy Generate Report	Unapproved policy Database Security login Pin code Report generation Policy

Database	
Unapproved policy Database Security login	Pin code Report generation Policy

Account	
Check and approve policy Generate Report	Unapproved policy Database Security login Pin code Report generation Policy

Customer document	
Display information	Customer

Customer Registration	
Register basic customer data Provide customer information Provide policy information	Customer Customer document

Report generation <<UI>>	
Generate Report	Database Policy

Policy<<UI>>	
Display policy type list Display policy premium Display related policy Display unapproved policy	Unapproved policy Database Security login Pin code Report generation Policy

Figure 5. CRC diagrams

4 OBJECT ORIENTED ANALYSIS

4.1 Introduction

Analysis is one of the technics, which is used in system development in order to know how the system works. At the same time, it helps as a bridge between the user and developer to communicate. The object-oriented analysis is one of the analysis methods which, is used to understand what will be built and the problems domain for the system to be developed. Ambler (2001, 182.)

Object oriented analysis is used to describe the system process from a different point of view. For instance, it is used to understand the problems of the users and the needs of the organization. Object oriented analysis is used to combine the manual procedures and methods with computer technology, to develop a new system which meets the requirements of the organization. Use case modelling, sequence diagram, class modelling, activity diagram, and user interface prototypes are the primary object oriented analysis artefacts. (Gupta 2005, 25.)

4.2 System Use Case modeling

A system use case model shows the interaction between the actor and the system. The system use case model involves the essential use case; therefore, it is a series of action that requires an involvement of an actor. “The main different between an essential use case and a system use case is, a high level of implementation decision is included in a system use case” Ambler (2001, 185). The system use case modelling contains UI Identification, business rule identification, actor identification, use case identification and use case diagram.

4.2.1 User interface identification

User interface (henceforth UI) is the portion of the software that the user directly interacts with the system in order to perform the specific tasks (Rutenbeck 2006, 256).

Identifying the UI at the binging of the software development helps to avoid unnecessary mistakes, which might come at the end of the software development. In this thesis work, I identified the UI at the time of requirement gathering.

Table 5 illustrates basic UI interfaces of the NIB insurance new system.

Table 5. Nib insurance UI identification

Identifier	Interface Name
UI 01	Security login screen
UI 02	Main menu screen
UI 03	Insurance registration selection screen
UI 04	Display Premium fee screen.
UI 05	Fell general customer information
UI 06	Unapproved policy by supervisor
UI 24	Report generation is successful
UI 25	Date boundary of the report
UI 26	Approval pin code error screen
UI 27	Successful approval
UI 28	Search screen
UI 29	Print screen
UI 30	NIB insurance system screen
UI 31	Exit Notification screen
UI 32	System login error screen
UI 33	Information -ID
UI 34	Information-Name
UI 35	Information Name and ID
UI 36	Record not found
UI 37	Error Message screen
UI 38	Registration summary
UI 39	Successfully saved
UI 40	Report generation screen

4.2.2 Business rule identification

Business rules (henceforth BR) are the guide intended to influence or direct business behaviour. In other word, business rule comprise an effective operating rules or policy of the software (Addison 2003, 3). The NIB insurance detail business rules or operation principles are described in the appendix 3.

4.2.3 Use Case diagram

Use case is a technique used to gather requirements from the user point of view. It represents the functionality of the system in the system analysis. Use case focuses on the behaviour of the system and its interaction with the users. Since, the system is used by the users, gathering information from the user point of view is essential. Use case diagram helps the developer to involve the users in the early stage of the system development. (Schmuller 2004, 92-98.)

The new NIB insurance system use case diagram display in the next figure.

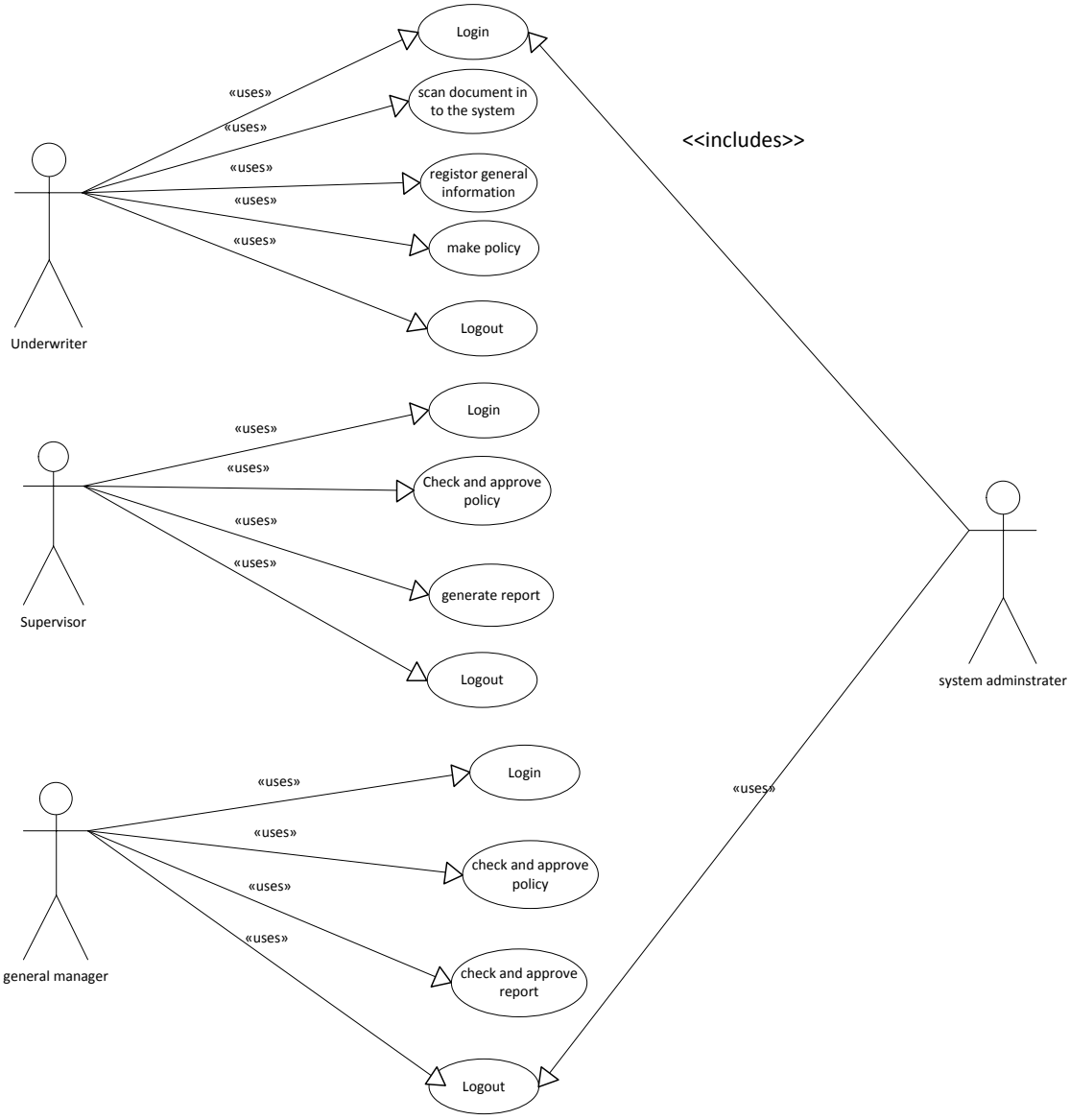

Figure 6. System Use Case diagram

The system Use Case detail descriptions presented in appendix 2.

4.3 Sequence diagrams

Sequence diagram (henceforth SD) is an interaction diagram, which describes how the system interacts with users and other systems by following a certain sequences of action. As a result, it is more focused on the dynamic aspects of the system. In other words, sequence diagram helps to demonstrate how different objects interact with each other in order to achieve the functionality, which, is not possible to get individually. Sequence diagram model illustrates the flow of logic within the system in order to document and validate the logic of the system. Ambler (2001, 197.)

Figure 7 illustrates how the new system processes the customer registration basic course of action.

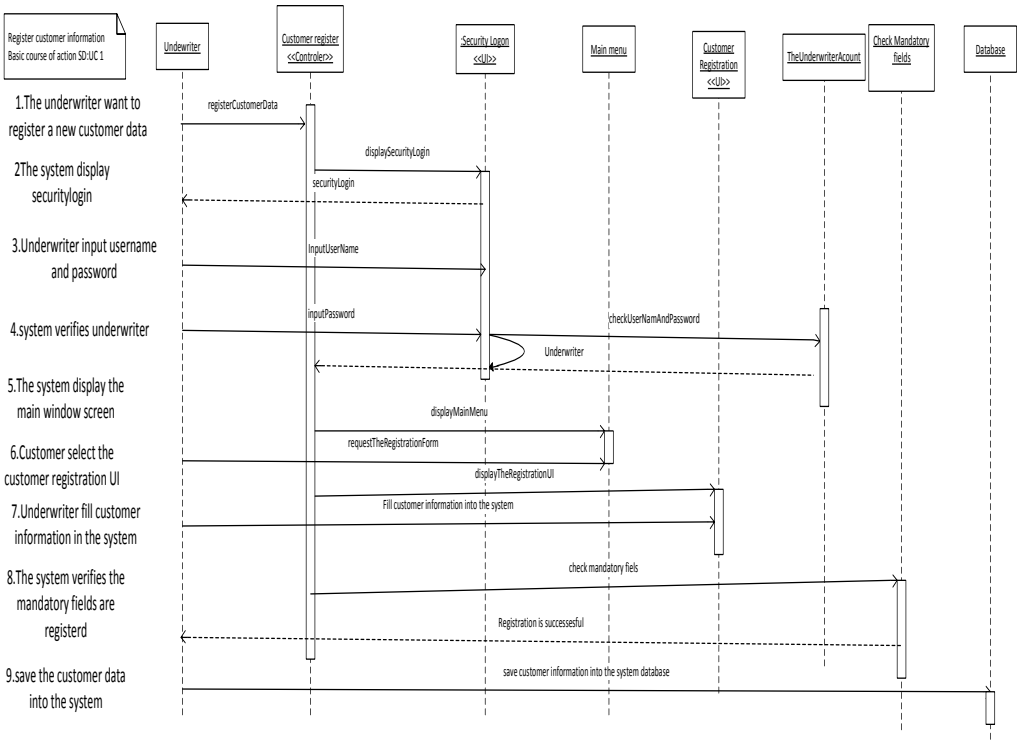

Figure 7. A UML Sequence diagram for the basic course of action for register customer information

The actor for the above figure is the underwriter. In this sequence diagram, the system will make sure two important parts. The first one is as the user is an authorised user, and the second one is as all mandatory fields are filled by the user. In order to differentiate as the user is an authorized user the system requests the user name and password from the user. If those two parts are not successfully accomplished, the system will take the alternative course of actions.

Figure 8 illustrates the alternative course of action for customers' registration system.

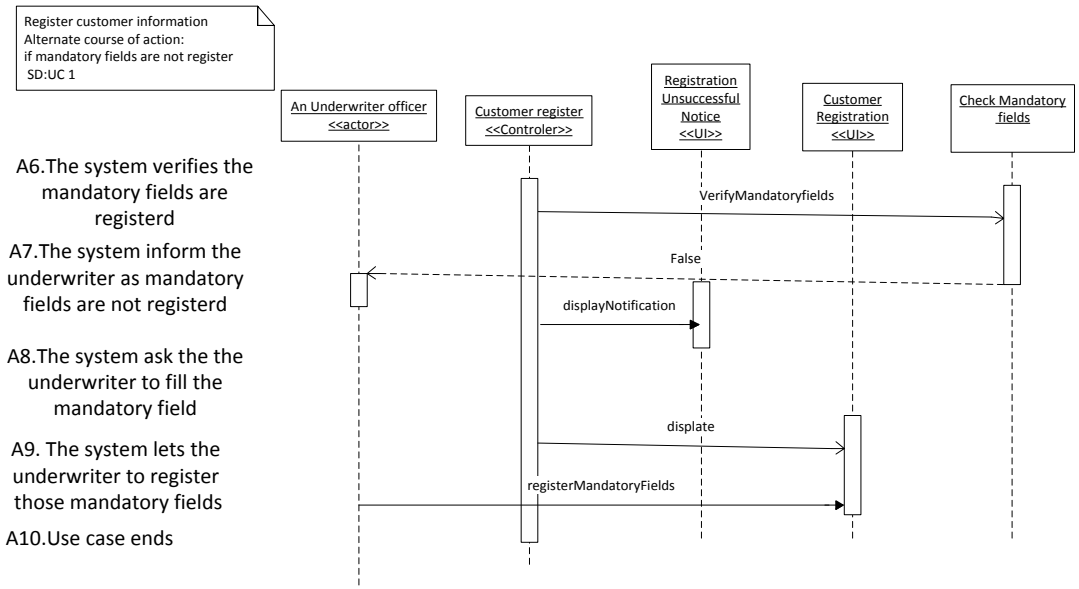

Figure 8. A UML Sequence diagram for an alternative course of action A registers customer information

Figure 8 describes the alternative course of action for customers' registration system. Basically alternative course of action means the system action when the requirements of the business rule or software policy are not full filled. For instance, in the above figure, if the user forgets to fill the mandatory parts in the registration processes or when unauthorised person log in to the system, the system responds by alternative action such as asking the user to log into the system by the right user account.

Figure 9 illustrates how a new insurance policy is created by the computerized system. The actor for this basic course of action is underwriter.

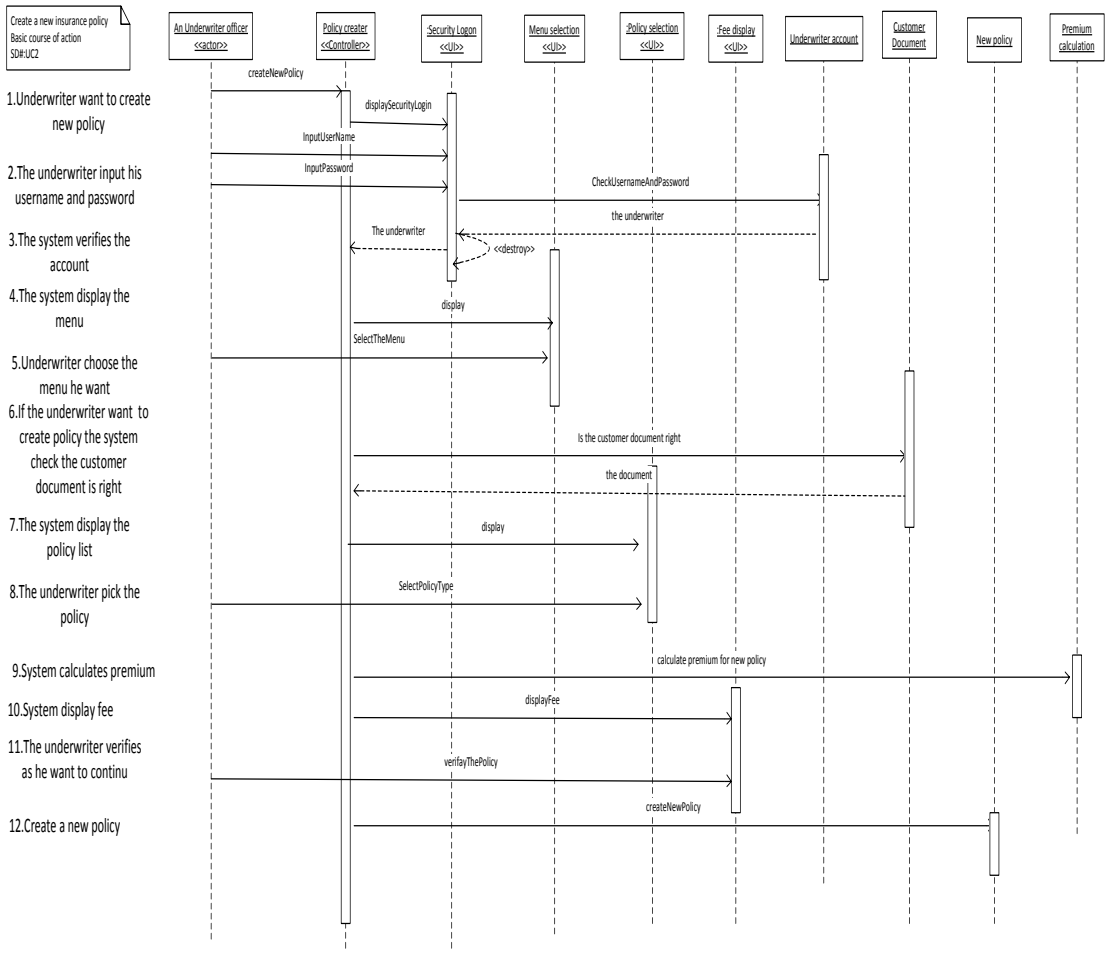

Figure 9. A UML sequence diagram for basic course of action for create Nib insurance policy

Firstly, in order for the user to be able to use the system, he / she must have appropriate credentials. Secondly, all customer documents have to be scanned into the system, and the system will make sure that the documents include all the information needed. Next to that, the system will calculate the fee based on the description written in the customer document and the manual chart which is in the system. Finally, to accomplish the process the customer has to agree on the premium fee; otherwise, the system will take an alternative course of action, and close the system.

Figure 10 shows the first alternative course of action. This alternative case happens if the user inputs the wrong user account or the user is unauthorised person.

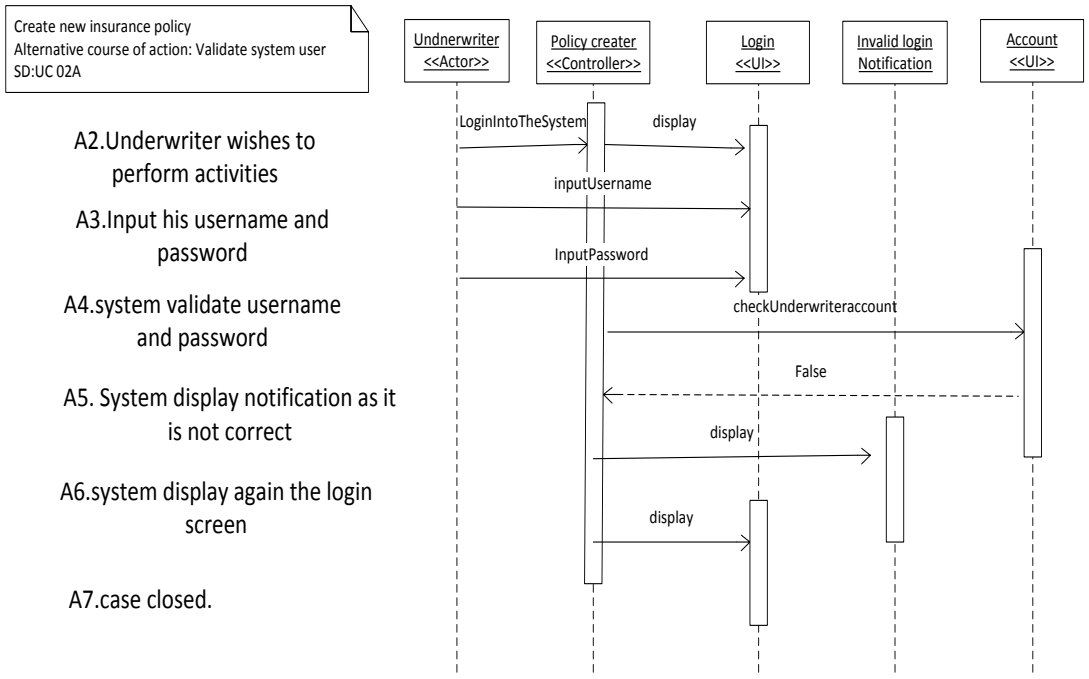

Figure 10. A UML sequence diagram for alternative course of action A "create new insurance policy"

If the underwriter makes a mistake when he/she inputs the user account, or unauthorised user tray to log in into the system. The system will give three chances to the user to input the right user account. If the user does not correct the log in account, the system will inform the user to use the system after a certain time period, and close the system.

Figure 11 illustrates the second alternative course of action for creating new insurance policy basic course of action.

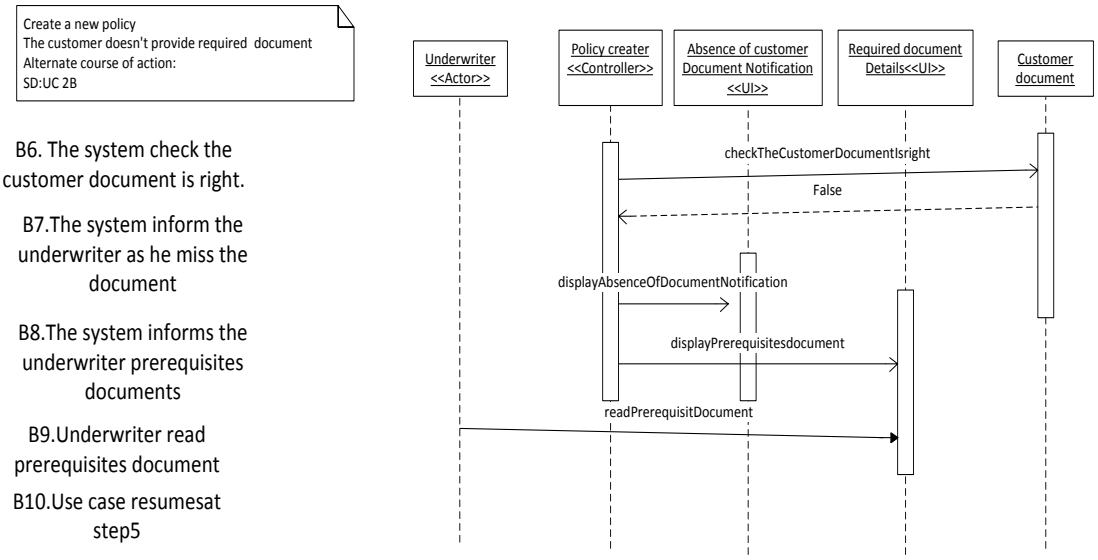

Figure 11. A UML SD for alternative course of action B “create new insurance policy”

Figure 11 shows the second alternative course of action. This alternative course of action happens if the all-important customer documents are not scanned in to the system, or the scanned documents missed basic information, which is used to process the document. In the case of missing an important document, the system informs the user as a certain document missed from the customer documents. Then the system requests the user to insert that document. In the case of missing certain information from the document, the system will inform the user as the document missed information, and the system request to correct the document.

Figure 12 shows the third alternative course of action for creating new insurance policy. This case happens if the customer does not agree about the premium payment.

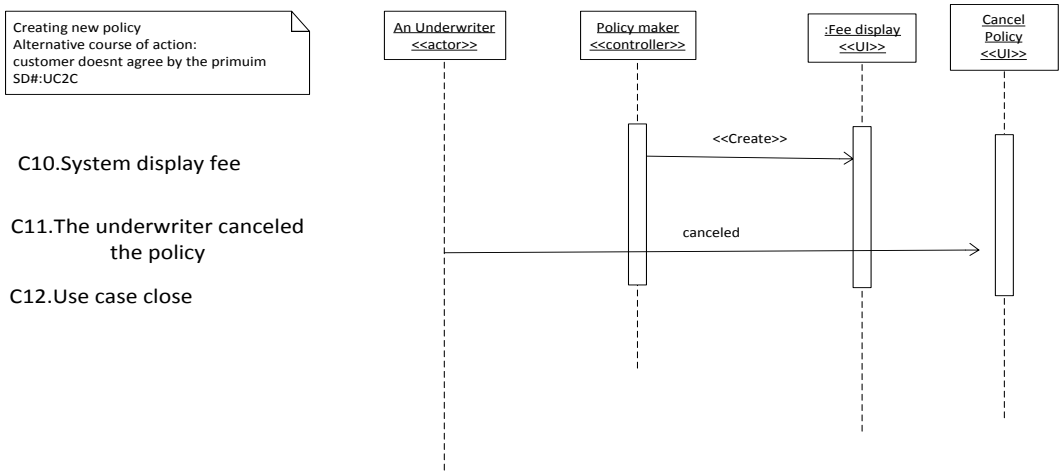

Figure 12. A UML SD for alternative course of action C "creates new insurance policy"

The third alternative course of action will happen after all the documents have been inserted into the system, and the system calculates the premium, but the customer does not agree by the premium fee. In order to avoid the extra work and to save time, I suggest the underwriter to inform the premium fee to customers in advance by manually calculated.

Figure 13 describes a basic course of action; named as checking and approving a new insurance policy.

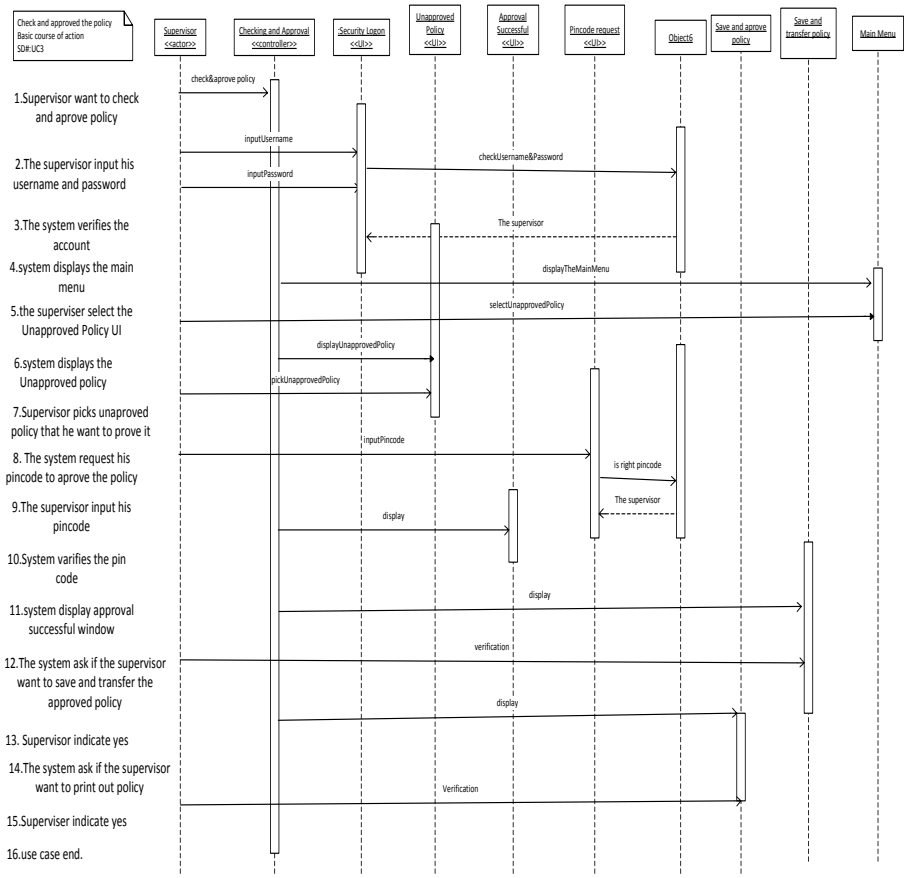

Figure 13. A UML SD for basic course of action for approve insurance policy

Figure 13 describes a basic course of action called checking and approving a new insurance policy. This basic course of action is done by the supervisor. After underwriter underwrites the new policy, that policy directly saved into unchecked or unproved policy part of the system. The system displays unproved policy section for the underwriter, supervisor, and branch manager. After supervisor checks the unproved policy, if everything is right he / she approves the policy by using his pin code. Otherwise, the policies will transfer to the next level of the system. If he/she finds an error the system follows the alternative course of action B.

Figure 14 illustrates how the system respond for the unauthorized user logs in into the system.

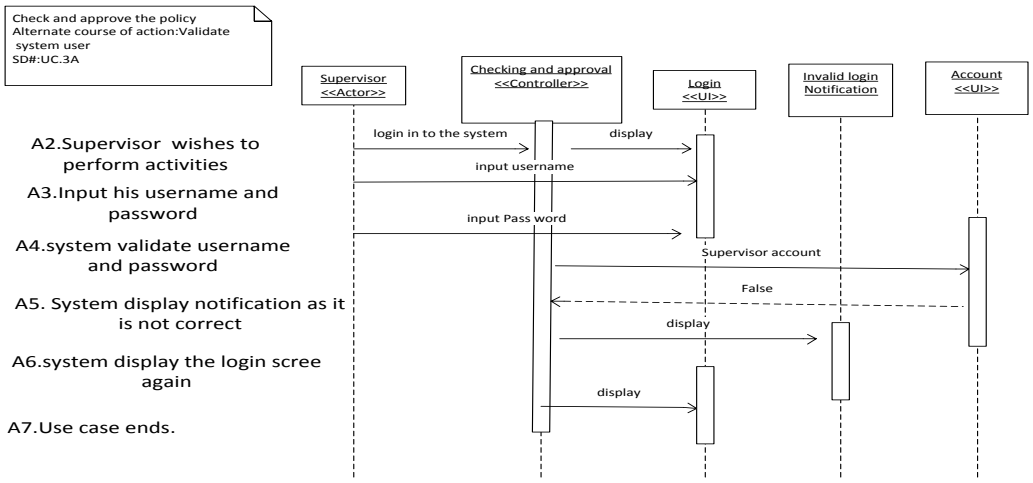

Figure 14. A UML SD for alternative course of action A for approve insurance policy

Figure 14 describe the alternative course of action for the unauthorized user log in into the system. If the user forgets the user account, or unauthorised person try to log in to the system, the system responds by alternative course of action such as asking the user to log into the system by the right user account. After the three wrong trials, the system will inform the user as he/she cannot log into the system for a certain time period and close the system.

Figure 15 illustrates how the system responds if the supervisor fiends error in the processes of checking the new policy.

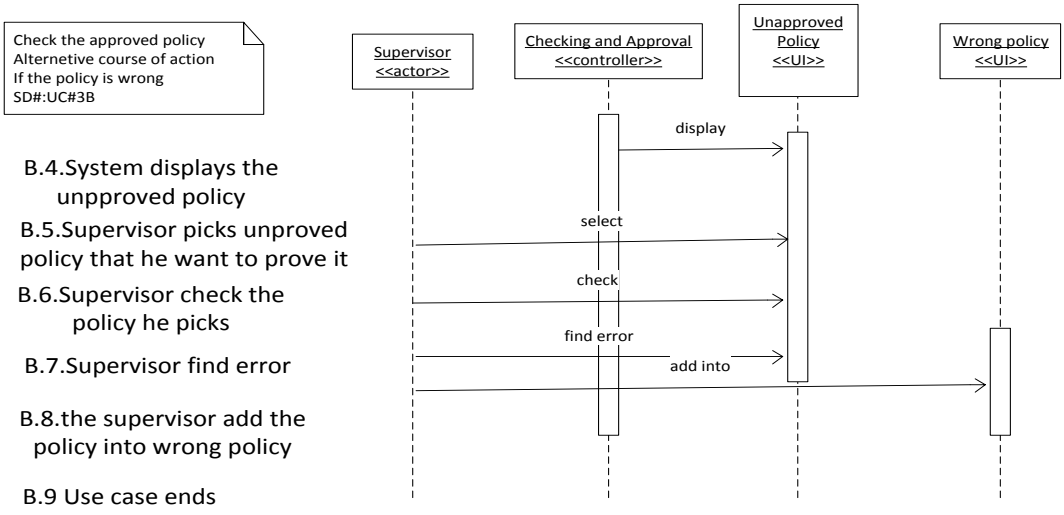

Figure 15. A UML sequence diagram for alternative course of action B for approve insurance policy

Figure 15 shows how the system responds if the supervisor finds error in the new policy. If there is a mistake in the premium calculation, or the policy does not include the important document which, has to be included in the policy; the supervisor writes a note that can describe the error and return the policy back to the underwriter for the correction.

Figure 16 shows how the system responds if the supervisor uses a wrong pin code.

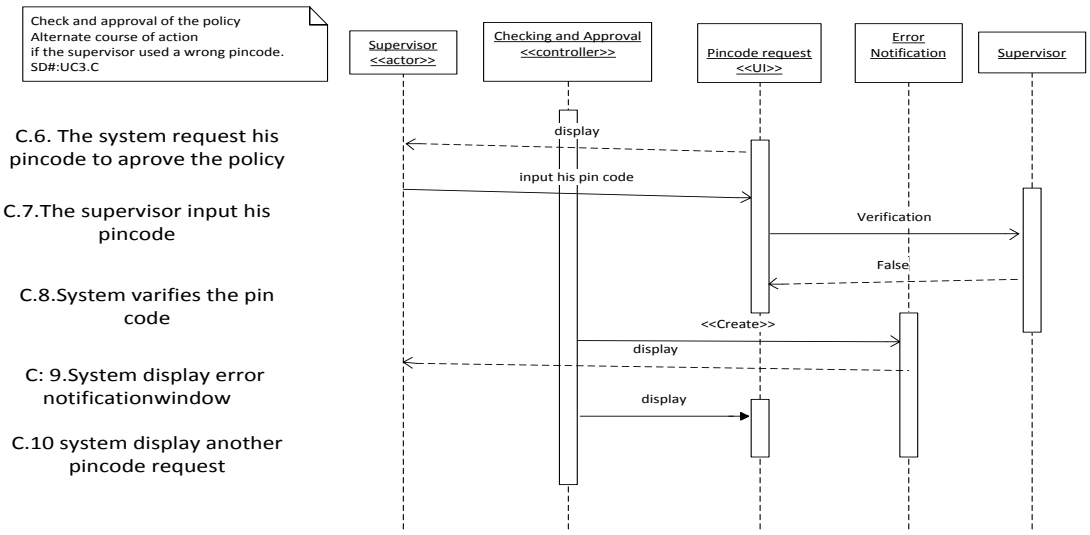

Figure 16. A UML SD for alternative course of action C for "approve insurance policy"

Figure 16 illustrates the alternative course of action when the supervisor used a wrong pin code, in order to approve the policy. After the supervisor checks the policy, before transferring the document to the next level they must approve the policy by using the pin code. If, the supervisor used a wrong approval pin code the system will give the supervisor another two more chances to input the right pin code. After that, the system informs the supervisor to log into the system after a certain time.

Figure 17 display the final checking and approving basic course of action.

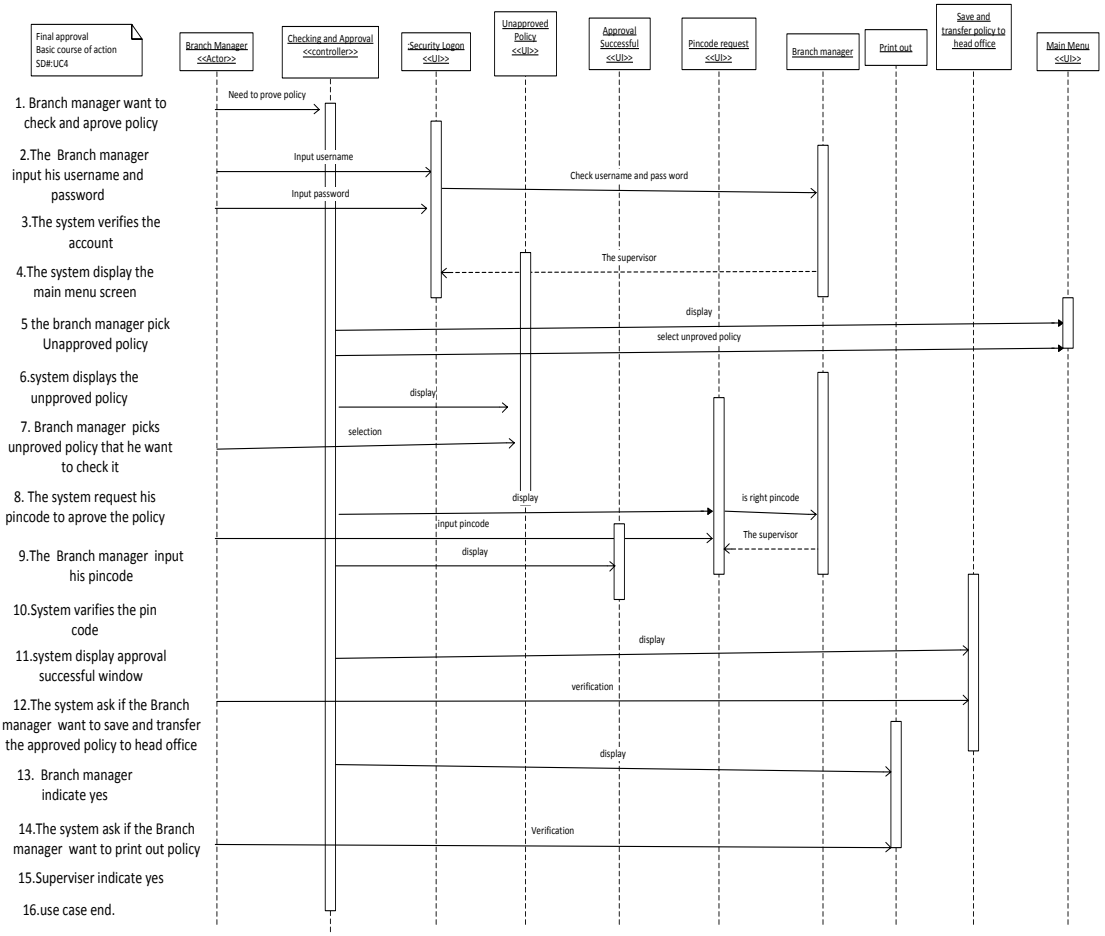

Figure 17. A UML SD for the basic course of action for "final approval of insurance"

The actor, in this basic course of action, is the branch manager. According to one of the insurance business rule, all policy needs to be checked and approved by the branch manager before it will be saved into the database. The system will work in the same way as figure 13 describes. The branch manager will find all unapproved policy from unapproved policy section, and check the policy as it full fill all the requirements, and documents. After that, if the policy is right, the branch manager approves it by using his pin code. On the other hand if he finds out mistake, he will send it back to the supervisor for the correction with the problem description note.

Figure 18 describes the first alternative action which will happen when an unauthorized person logs in into the system.

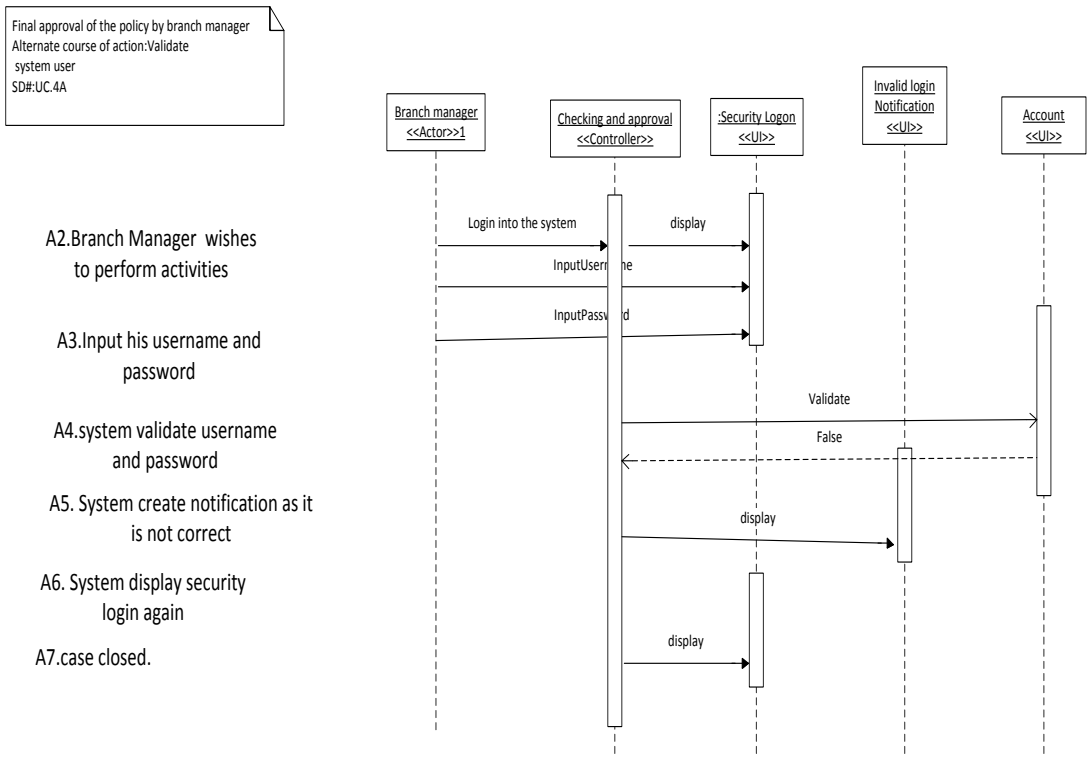

Figure 18. A UML SD for alternative course of action A for "the final approval basic course of action"

Figure 18 illustrates the alternative course of action happened during a branch manager used the wrong log in account. The system informs the branch manager as he used the wrong log in credentials, and to correct it. After the third wrong account, the system will inform the branch manager to use the system after the certain time period, and close the system.

Figure 19 display an alternative course of action which will happen when a branch manager finds an error in the policy.

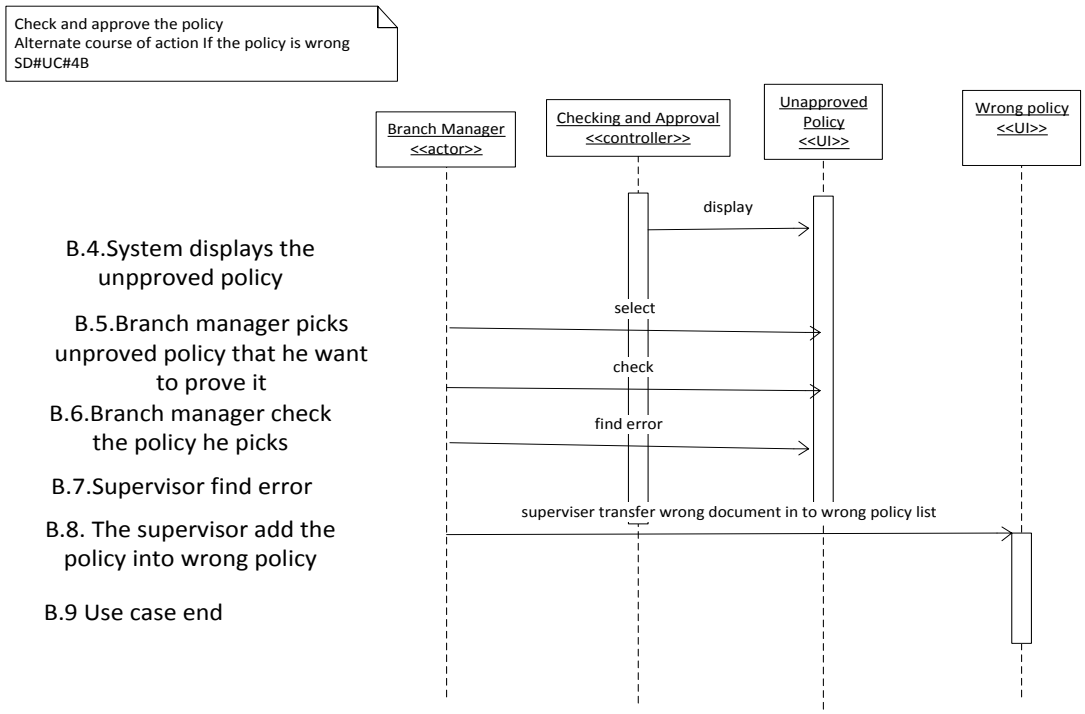

Figure 19. A UML SD for alternative course of action B for "the final approval basic course of action"

Figure 19 illustrates the alternative course of action. This course of action happens when the branch manager finds an error in the policy. The error might be missing essential documents from the policy, or the system used a wrong rate chart for the premium calculation. In these cases, the branch manager writes the description note about the error on the policy. Then return it to the supervisor or underwriter for the correction.

Figure 20 illustrates the alternative course of action which happened when the branch manager input the wrong pin code in order to approve the policy.

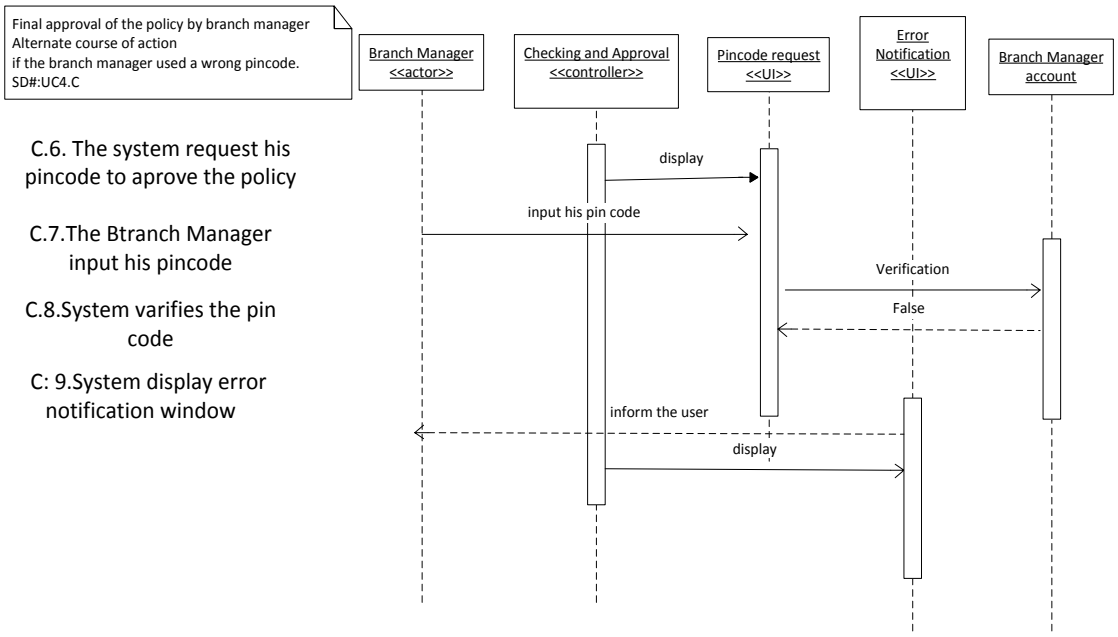

Figure 20. A UML SD for alternative course of action C for "the final approval basic course of action"

Figure 20 illustrates the alternative course of action happened during the branch manager used the wrong pin code. The system informs the branch manager as the pin code is wrong, and to use the right pin code. Then the system will give to the branch manager only two more chances to enter a pin code. After the third wrong pin code trial, the system will inform the branch manager to use the system after the certain time period and close the system.

Figure 21 display how the new system handles the report generation processes. This basic course of action accomplishes by the underwriter.

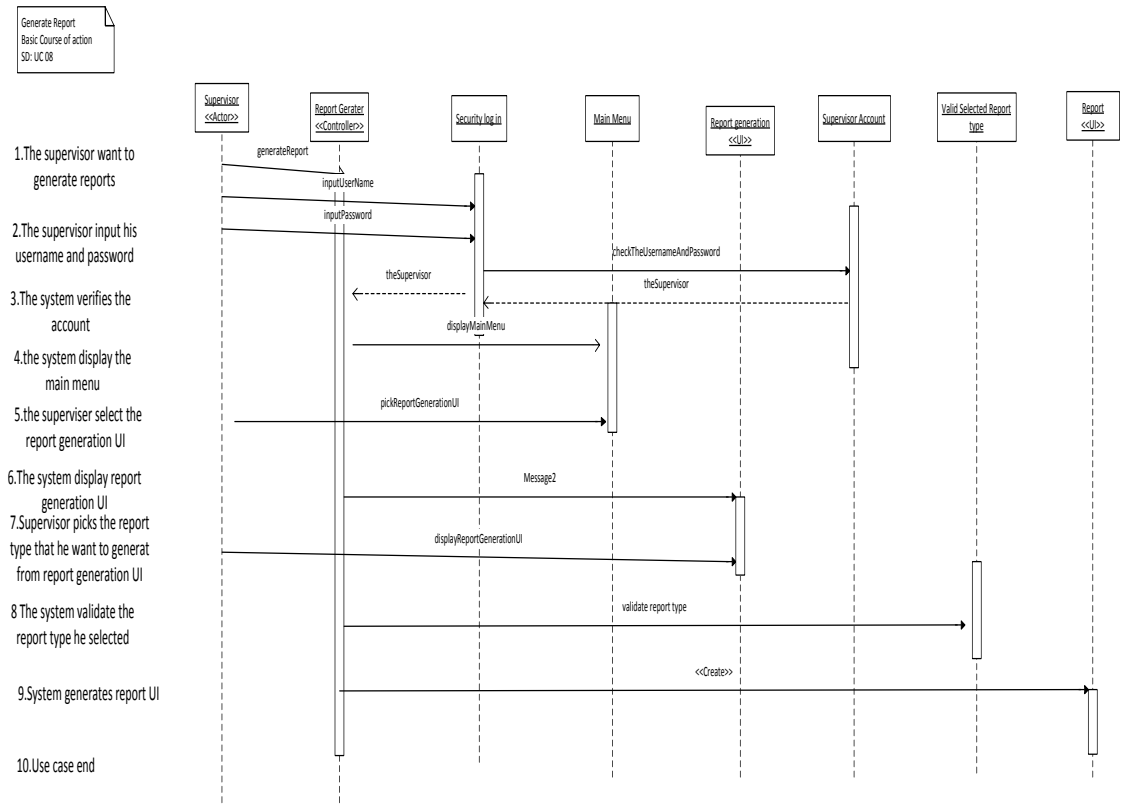

Figure 21. A UML SD for generate reports basic course of action

4.4 Class diagram

Class diagram is used for detailed description of the system. Class model shows the classes of the system, their relationship with each other, their operations, and their attributes in the system. The easiest way to start conceptual modelling is that considering nouns from the existing system during class identification. In addition to that, I have taken the class responsibility collaborator model as a base, and I converted it

directly to a UML class diagram. I made the CRC diagram during requirement definition. Ambler (2001, 208-213.)

Figure 22 shows the class diagram for NIB insurance company in branch level.

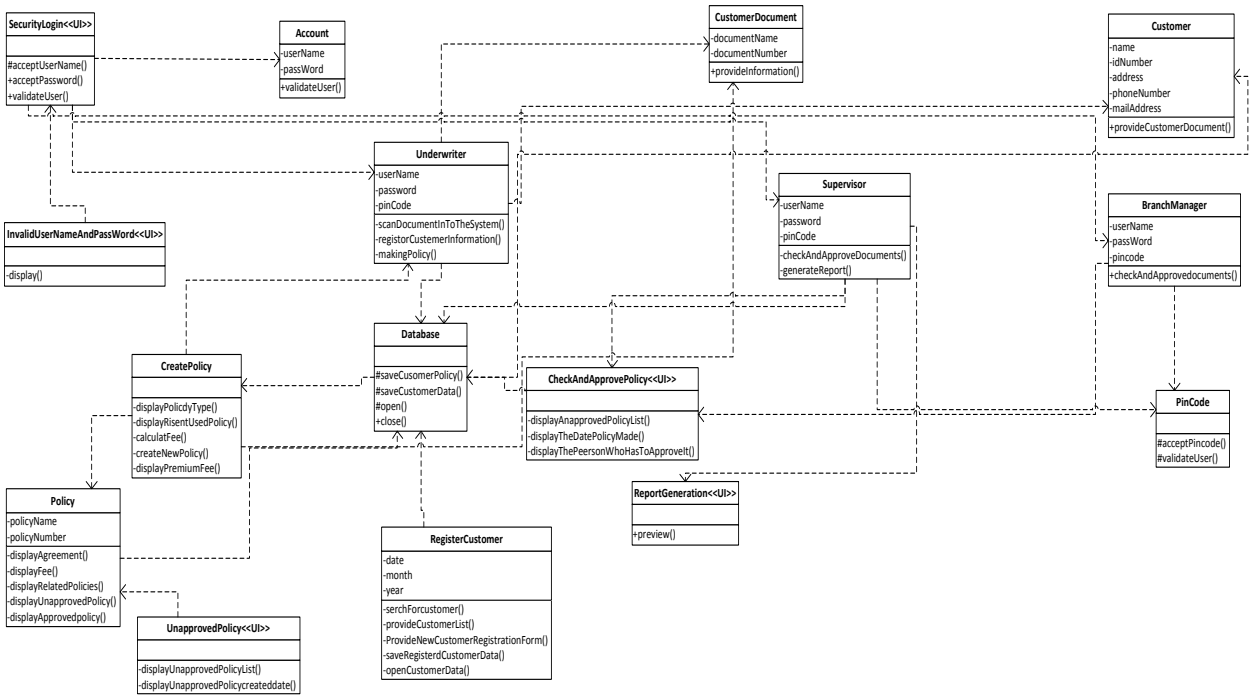

Figure 22. A UML class diagram based on CRC model

Figure 22 illustrates the class diagram which includes all the basic objects of the system. I identified the classes during requirement gathering by using CRC model.

4.5 Deployment diagrams

"Deployment diagram describe how components are deployed on the system hardware, and how the pieces of hardware are connected to one another" (Schmuller 2004).
In the next deployment diagram, I will illustrate how the new NIB insurance system components deployed in the system hardware in a branch level.

Figure 23 shows the computerized system deployment diagram.

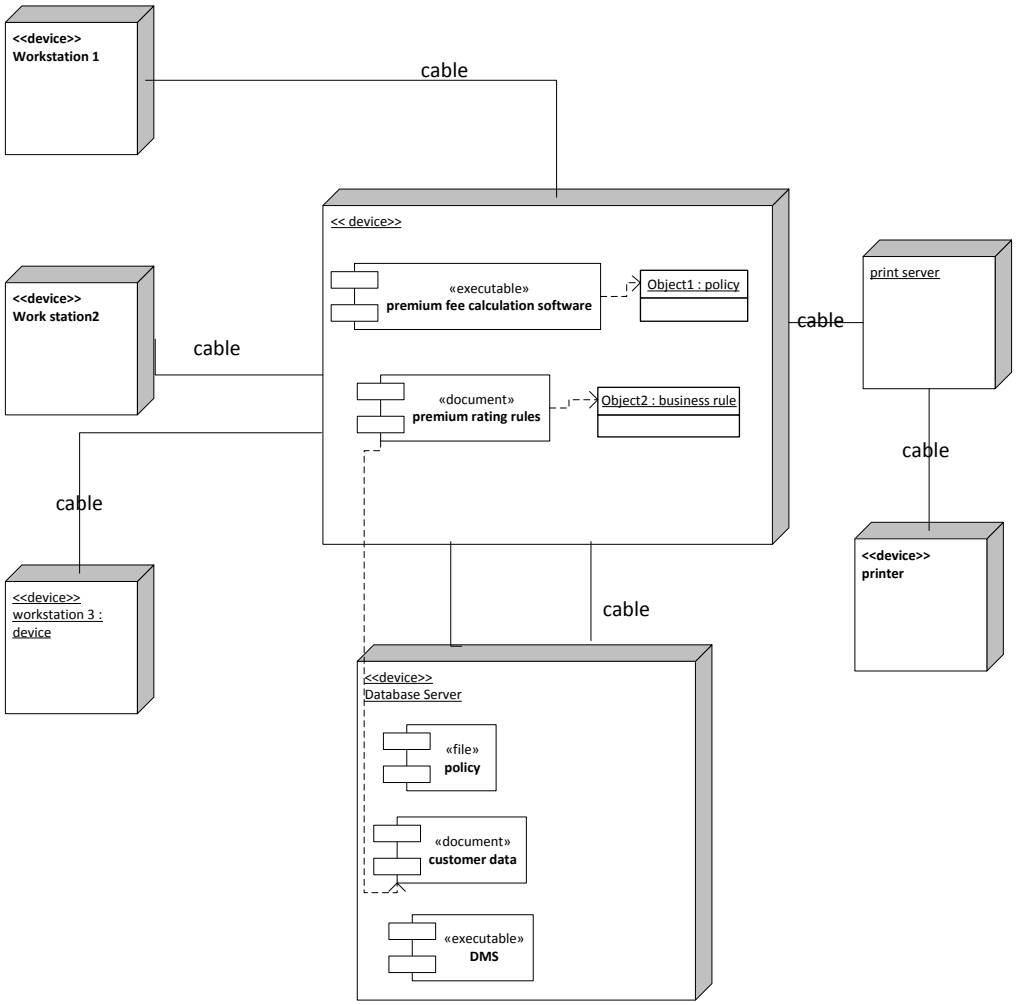

Figure 23. The UML deployment diagram

Figure 23 illustrates how the new system hardware and software work in the new system.

5 CONCLUSION

5.1 Introduction

This thesis work is undertaken with the objective of building a new computerised system to change the existing manual customer data handling system for NIB insurance company. This automated system is used to register customers, record customer documents, create insurance policy, enable checking and approving of policy and generating reports.

The main result at this project is a system analysis document. The document includes gathering requirements of the organization, studying the existing system, and analysing the problem associated with it, and proposing a new system.

In order to choose the database approach, I made an analysis and the overall score was based on meeting the requirements and having less constraints. Based on the analysis, I decided to use the standalone database approach. This approach was chosen, because it was found to be the best in comparison with the centralized and distributed database approach, as it meets all requirements.

5.2 Recommendation

Basically the most cost-benefit-efficient platform solution for the computerized system would be Linux operating system. Linux is free for everyone to use, there are no license costs at all. Linux always comes with a built-in office package, and depending on the distribution it would be either Open Office or Libre Office. Further, most of the software for Linux is free, and if the company would like to use some Windows software and if it is not available for Linux, it is possible to emulate the software so that it works on the platform. (Garrels, 2008.)

The security of the system is one of the biggest reasons, why I chose Linux for the platform of the system. Because of the layered architecture of Linux, it is not as vulnerable for malware as a Windows system would be. (Byron & Shinde 2001).

For this system to be able to function properly, all employees need to be familiar with the different functions of the system. Because of this requirement, the employees probably will need a fair amount of training on the system. If the employees do not train to use the system, their learning process will take much longer time than when participating in training.

5.3 Concluding note

This thesis work helps me to bring a solution for the problems in the NIB insurance company. There are numerous benefits that the company will receive after the implementation of the project. Firstly, the company would benefit from the system by getting organized customer information, and finding customer information would become much than efficient and safer. Secondly, the customer data will be properly backed up; therefore, in a case of fire or other disaster, the data will be safe in a secondary location. Thirdly, the company work will be efficient and faster than the previous one. The third benefit, would translate into to take an increasing number of customers.

As a result of the above advantages, it is my belief that this thesis work has the capacity to replace and upgrade the existing way of data documentation facilitates in use, and makes it efficient and understandable to the users.

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1(3)
Appendix 1

ESSENTIAL USE CASE DESCRIPTION

1) Name: receive document

Actor: Underwriter officer

Description: The customers give important document for underwriter officer.

Precondition: The customer wants insurance service.

Post condition: Checked documents.

Basic course of action: 1. The customer wants the insurance service.
2. The underwriter officer receives documents from the customers, and checked the document as it full fills the information which is needed for issuing a policy.
3. Use case ends.

2) Name: Calculate the premium

Actor: Underwriting officer

Description: The underwriter calculates the premium rate based on the item description in the preformat document and the company manual chart.

Precondition: The document must have information which is used for premium calculation.

Post condition: The premium amount informed to the customer.

Basic course of action: 1. Underwriter checks, the item described in the preformat, from the company rate.
2. Underwriter calculates the premium fee.
3. Underwriter informs the premium value to the customer.
4. Use case ends.

3) Name: Fill the survey form

Actor: Underwriter officer

Description: Underwriter officer survey the insured items.

Precondition: The underwriter and the customer agreement on the premium rate.

Post condition: The underwriter fills the survey form.

Basic course of action: 1. Underwriter checks the insured item based on the documents received from the customer.
2. Record the insured item information on the survey form.
3. Use case ends.

4) Name: Open a new file for the customer

Actor: Cashier

Description: The cashier record information to the system

Precondition: Underwriter approval

Post condition: Opened file.

Basic course of action: 1.Underwriter transfer the document to the cashier

2. The casher record the document into the system

3. Use case ends.

5) Name: Print out

Actor: Cashier

Description: The cashier print out the recorded data for the customer and supervisor

Precondition: The recorded data

Post condition: Closed case

Basic course of action: 1. Printed out the recorded data

2. Use case ends.

6) Name: Check all documents are right

Actor: Supervisor

Description: Check all documents and calculations are right.

Precondition: The cashier provides all documentation to supervisor

Post condition: Closed case

Basic course of action: 1. The supervisor checks the entire documents are right.

2. Return back for correction if there is an error.

3. Use case ends.

7) Name: Signed on the right document

Actor: Supervisor

Description: The supervisor sign on the right printed out document

Precondition: The printed out document must be correct

Post condition: Closed case

Basic course of action: 1. signing on the correct document.

2. use case ends.

8) Name: Record final documentation

Actor: Clerk

Description: Clerk records the final policy in to the system

Precondition: The final document has to be checked and signed by the supervisor and branch manager

Post condition: Recorded customer and policy information in the file.

Basic course of action: 1. The clerk records the final documentation in the system

2. Use case ends.

9) Name: Generate reports

Actor: Underwriter

Description: The underwriter generates reports from the main data recorded by the clerk.

Precondition: There must be a recorded data in the main journal.

Post condition: Reports

Basic course of action: 1. The underwriter needs to generate report in a predefined time interval.

3. Use case ends.

10) Name: Check and approve the entire document and policy by branch manager.

Actor: Branch manager

Description: Branch manager checks all policies as they are right.

Precondition: The supervisor provides all new policies to branch manager.

Post condition: Checked policies

Basic course of action: 1. The branch manager checks and approves the entire policy.

2. The branch manager returns back for correction if there is an error.

3. Use case ends.

SYSTEM USE CASE DESCRIPTION

Identification number: UC 1

Name: Register customer

Descriptions: Register a customer in to the system

Preconditions: The customer must fulfil all required documents to the system.

Post condition: The customer will be register for the service he/she wants

Extends: -

Includes: -

Inherits From: -

Basic course of action:

1 The underwriter input his name and password in to the system through “UI 01 security login screen”

2. The system verifies as the underwriter is eligible to use the system according to business rule “BR 1 log on to the system”

3. The underwriter scanned the customer document into the system and filled required data into the system through “UI 05 fills general customer information” (another use case)

4. The system verifies as the mandatory fields are registered.

5. The underwriter will save the customer document into the system.

6. Use case end

Alternative course of Action A takes in to action **i**f mandatory fields are not registered

A7.The system verifies mandatory fields are not registered.

A8. The system informs the underwriter as mandatory fields are not registered through “UI 23 the mandatory fields are not registered.”

A9. The system let the receptionist register those mandatory fields.

A10.The use case resumes at step 6.

A11. Use case end.

Identification number: UC 2

Name: Create a new policy

Descriptions: The system creates a new insurance policy.

Preconditions: The customer documents must be registered in to the system.

Post condition: The underwriter creates insurance policy.

Extends:

Includes:

Inherits From:

Basic course of action:

1 The Customer wants to get insurance service

2 The underwriter input his name and password in to the system through “UI 01 security login screen”

3 The system verifies the underwriter is eligible to use the system according to business rule “BR 1 log on to the system”

4 The system displays “UI 2 the main menu screen” which shows the list of the system menu.

5 The underwriter indicates to the menu that he wants to register or create policy.

6 The system displays “UI 03 insurance registration selection screen” which shows the list of insurance policy for registration.

7 The underwriter indicates the insurance policy type that he wants to create.

8 The system validates the customer document and the general data, which scanned and registered by the underwriter in to the system, according to the business rule “BR 03 Determine customer document eligibility to register in the system.” (In other use case)

9 The system provide different related policies, which is related to the service that the customer asked according to “BR 04 Providing related insurance policy information”

10 If the customer wants related policy the underwriter choose a kind of insurance policy that the customer wants to add into his service.

11 The system calculates the premium fee, based on the fee published in the service fee catalogue, and applicable taxes. Apply business rules “BR 05 calculates the customer fee” and “BR 06 calculate taxes.”

12 The system displays the fees through “UI display premium fee screen.”

13 The system asks the underwriter as he wants to continue registering the customer.

14 If the customer agrees by the premium, the underwriter indicates as he wants to continue the registration.

15 The system creates the new policy into the system.

16 The system inform the underwriter creation of policy was successful through “UI 38 registration summary”

17 The system ask if the underwriter wants to save and transfer the data to supervisor approval stage via “UI 39 save and transfer data”

18 The use case ends when the Underwriter saves and transfers data to supervisor.

Alternative course of action: Underwriter used invalid user id and/or password.
A.2 The system displays fail message to indicate that the user name and/or the password are not correct via “UI 34 System login error screen.”
A.3 The system gives two more chances to re-enter the user name and password.
A.4 The use case resumes at step three of the basic course of action.
A.5 The system locks the user account after three unsuccessful attempts.

Alternative course of action B takes in to action if the customer doesn’t have the prerequisites
B.6 The system determines the customer document is not right or misses some information.
B.7 The system informs the underwriter, as the customer doesn’t fulfil the prerequisite.
B.8 The system informs the underwriter which document is missing.
B.9 Use case end.

Alternative course of action C takes in to action if the customer does not agree by the premium fee.

C.10 The customer not agrees by the premium fee.

C. 11The use case ends.

Identification number: UC 3

Name: Check the policy

Descriptions: Check as the registered policy is correct and approve it.

Preconditions: The underwriter must underwrite the policy

Post condition: Approval of the policy by supervisor

Extends: -

Includes: -

Inherits From: -

Basic course of action:

1 The supervisor input his name and password in to the system through "UI 01 security login screen"

2 The system verifies the supervisor is eligible to use the system according to business rule "BR 1 log on to the system"

3 The system displays "UI 06 all unapproved policy by the supervisor," which indicates the list of unapproved policy by supervisor.

4 The system asks to approve the correct policy by using the supervisor pin code.

5 The supervisor checks and approved the right policy by using his pin code according to business rule "BR 07 approval of the document by the supervisor" and returns the policy which is wrong, according to business rule "BR 09 Return back the wrong policy"

6 The system verifies the supervisor approval pin code is right according to business rule "BR 08 check the supervisor approval pin code"

7 The system informs the supervisor the approval is successful through "UI 27 successful approval."

8 The system asks the supervisor if he wants to save, print out the approved policy and transfer it to branch manager.

9 The supervisor indicates as he wants to save, print out the approved document, and at the same time transfers it to branch manager.
10 The system prints out the document and at the same time transfer it to branch manager.
11 The use case ends when the supervisor takes the printed out policy.

Alternative course of action A: Supervisor used invalid user id and/or password.
A.2 The system displays fail message to indicate that the user name and/or the password are not correct via "UI 34 System login error screen."
A.3 The system gives the chance to re-enter the user name and password for three times.
A.4 The Use Case resumes at step three of the basic course of action.
A.5 The system locks the user account after three unsuccessful attempts.

Alternative course of action B takes in action if the policy has mistaken.
B.6 The supervisor checks the policy and found mistake.
B.7 The supervisor transfers it to incorrect policy via UI 25 incorrect policy.
B.8 The system displays the mistake to underwriter.
B.9 The use case ends.

Alternative course of action C: Supervisor used invalid approval pin code.
C.7 The system displays an error message "UI 26 pin code error screen".
C.8 The system gives the chance to re-enter the pin code for three times.
C.9 The Use Case resumes at step three of the basic course of action.
C.10 The system locks the user account after three unsuccessful attempts.

Identification number: UC 4
Name: Final approval
Descriptions: The branch manager checks the policy and approves it by using branch manager pin code.
Preconditions: The policy must be approved by supervisor first.
Post condition: The policy approved by the branch manager
Extends: -

Includes: -

Inherits From: -

Basic course of action:

1 The branch manager input his name and password in to the system through “UI 01 security login screen”

2 The system verifies as the supervisor is eligible to use the system according to business rule “BR 1 log in to the system”

3 The system displays “UI 06 all unapproved policy by branch manager” policy which needs to be approved by branch manager.

4 The system asks the branch manager to approve the correct policy by using the pin code.

5 The branch manager checks and approves the policies, which is correct by using his pin code according to business rule “BR 10 Approval of the document by branch manager”. But he returns the policy which is wrong according to business rule “BR 09 Return back the wrong policy”

6 The system verifies the pin code as it is right according to business rule “BR 11 verifies the approval pin code”

7 The system informs the branch manager as the approval is successful through “UI 27 successful approval.”

8 The system asks the branch manager, if he wants to save, or print out the approved policy.

9 If the branch manager indicates as he wants to save and print out the approved document.

10 The system saves the policy in the database in some cases prints out the document.

11. The use case ends when the system saves the policy in the database.

Alternative course of action A: Branch manager used invalid user id and/or password.

A.2The system displays fail message to indicate that the user name and/or the password are not correct through “UI 34 system login error screen.”

A.3 The system gives another chance to re-enter the user name and password for two more times.

A.4 The use case resumes at step three of the basic course of action.

A.5 The system locks the user account after three unsuccessful attempts.

Alternative course of action B: If the branch manager found mistake.

B.6 The branch manager checks the policy and found mistake.

B.7 The branch manager transfers it to incorrect policy through UI 25 incorrect policy.

B.8 The system displays the mistake to underwriter.

B.9 The use case ends.

Alternative course of action C: Branch manager used invalid approval pin code.

C.7 The system displays fail message, to indicate that the approval pin code is not right via "UI 26 pin code error screen."

C.8 The system gives another two more chances to re-enter the pin code.

C.9 The use case resumes at step three of the basic course of action.

C.10 The system locks the user account after three unsuccessful attempts.

Identification number: UC 5

Name: Report generation

Descriptions: The supervisor generates report.

Preconditions: The policies must be documented in the database.

Post condition: Generated report

Extends: -

Includes: -

Inherits From: -

Basic course of action:

1 The underwriter wanted to generate reports.

2 The underwriter input his name and password in to the system through "UI 01 security login screen"

3 The system verifies the underwriter as he/she is eligible to use the system according to business rule "BR 1 log on to the system"

4 The system displays "UI 2 the main menu screen" which indicates the list of the system menu.

5 The underwriter indicates the report title from the menu to generate reports.

6 The system displays “UI 39 report generation selection screen” which indicates several list of reports.

7 The underwriter indicates the report type that he wants to generate.

8 The system will ask the date boundary, which will include in the report through “UI 25 date boundary of the report”

9 The underwriter fill the date in date boundary “UI 25 date boundary of report”

10 The system generates the report and informs the supervisor as the report is generated successfully through “UI 24 report generation is successful.”

11 The system asks the underwriter to save the reports.

12 The underwriter indicates as he/she want to save and transfer it to branch manager for approval.

13 The use case ends, when the reports transfer to branch manager account.

1(2)

Appendix 3

LISTS OF BUSINESS RULES FOR NIB INSURANCE COMPANY

Identifier number: BR 01
Name: Log on to the system
Description: All users must have the user account in order to log in to the system or before starting using the system. If the user makes three times mistakes, the system will close the account for a certain time period.

Identifier number: BR 02
Name: Verify the validity and completion of the customers information
Description: At the time of registering the customer information into the system, the registrar must fill all the necessary information into the system.

Identification number: BR 03

Name: The entire documents have to be full fill before the insurance policy processed.
Description: The entire customer document has to full fill before the underwriter starting processing the insurance policy. For instance, in the case of motor insurance such as car registration book, preformat and other documents, which can describe the car, have to be full filled.

Identification number: BR 04
Name: Provide related insurance policy information
Description: The underwriter must give detail information to customers about the insurance policy, and other related policies which can support that policy. For instance, when the customer asks about fire insurance policy, in addition to fire insurance policy, the underwriter has to explain other related insurance policies, such as burglary and flooding insurance policy.

Identification number: BR 05
Name: Calculate customer fee

Description: The system calculates the premium fee based on the price descriptions, which is in service price catalogue.

Identification number: BR 06
Name: Calculate the tax
Description: The system has to calculate the tax and add the tax fee with the premium fee.

Identification number: BR 07
Name: Approval pin code
Description: The supervisor and branch manager must use the right approval pin code in order to approve the insurance policy. If the supervisor or branch manager makes three times mistakes, the system will close the account for a certain time period.

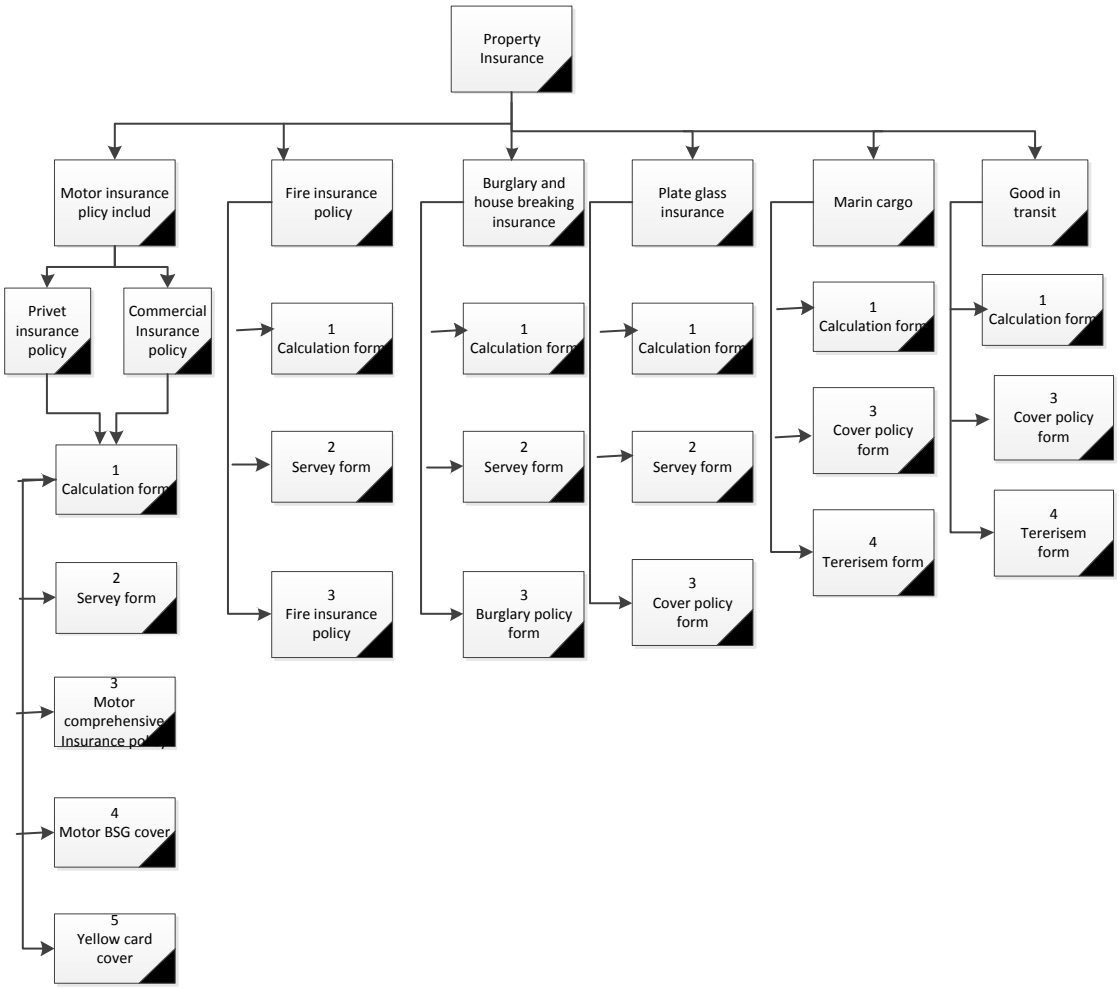
Identification number: BR 08
Name: Approval of the document by supervisor
Description: The entire insurance policy has to be checked and approved by supervisor pin code before it passed to the branch manager.

Identification number: BR 09
Name: Return the wrong policy to underwriter
Description: The system returns back to underwriter the policy which is wrong.

Identification number: BR 10
Name: Approval of the document by the branch manager
Description: Finally all insurance policies have to be checked and approved by branch manager pin code before it is saved in to the system.

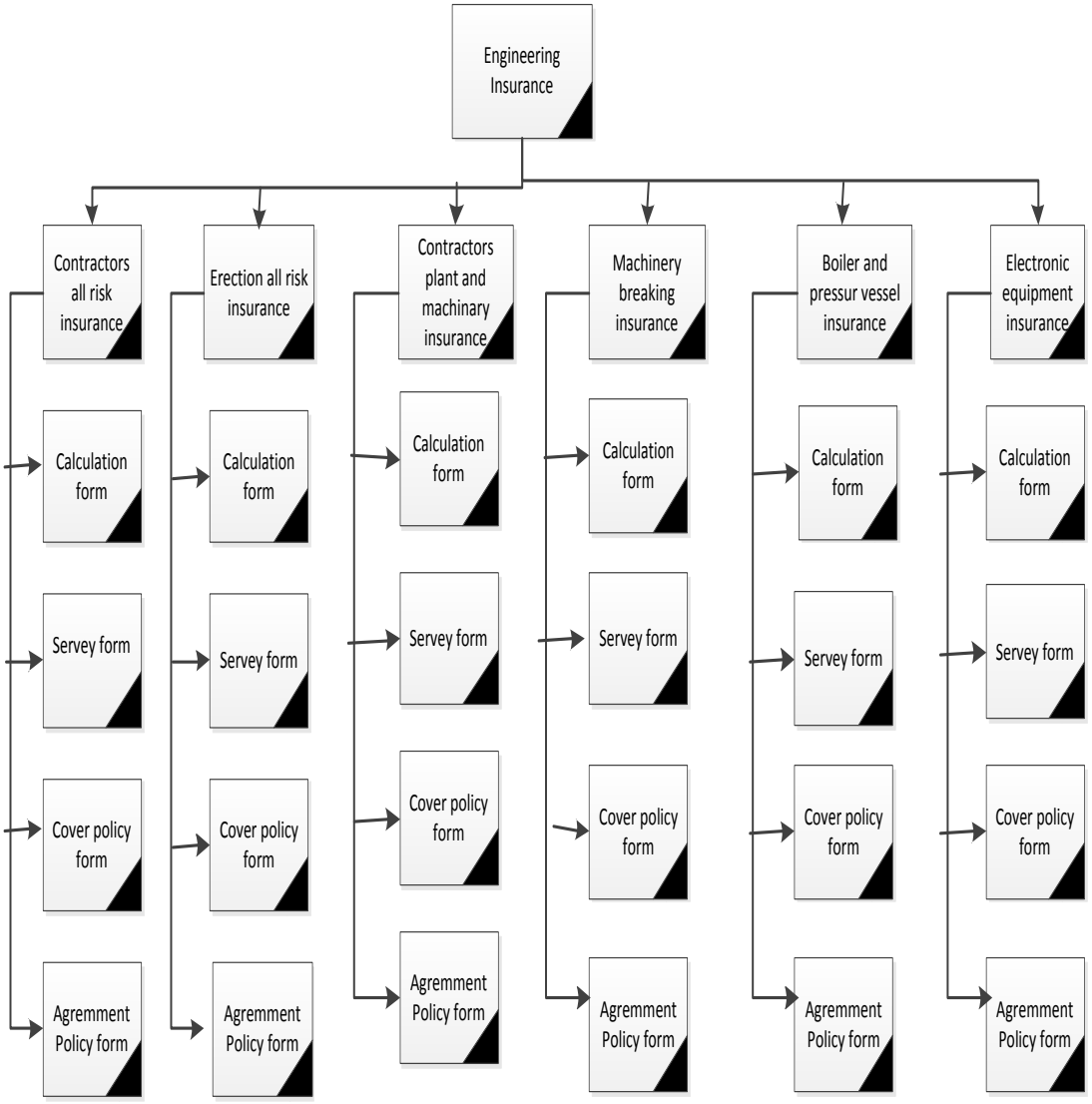
Appendix 4

PROPERTY INSURANCE USER INTERFACE FLOW DIAGRAM FOR NIB INSURANCE



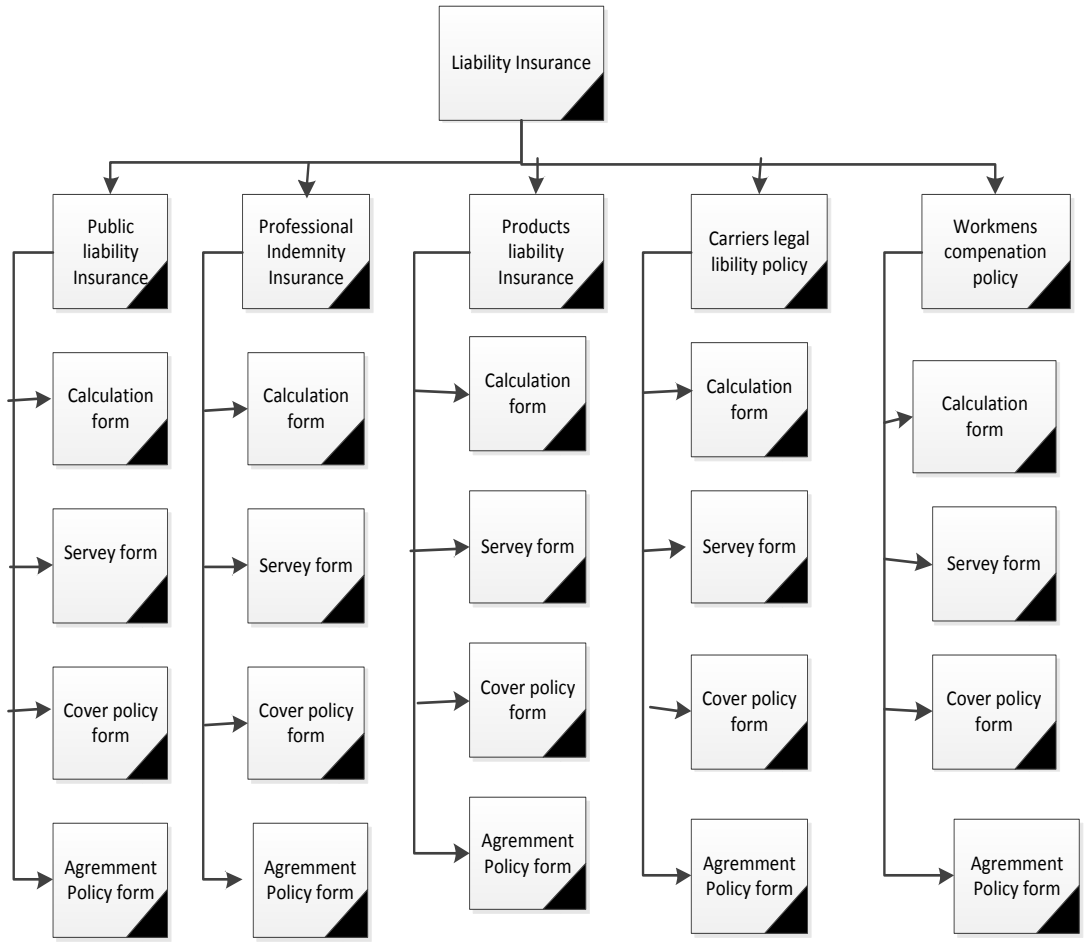
Appendix 5

ENGINEERING INSURANCE USER INTERFACE FLOW DIAGRAM FOR NIB INSURANCE



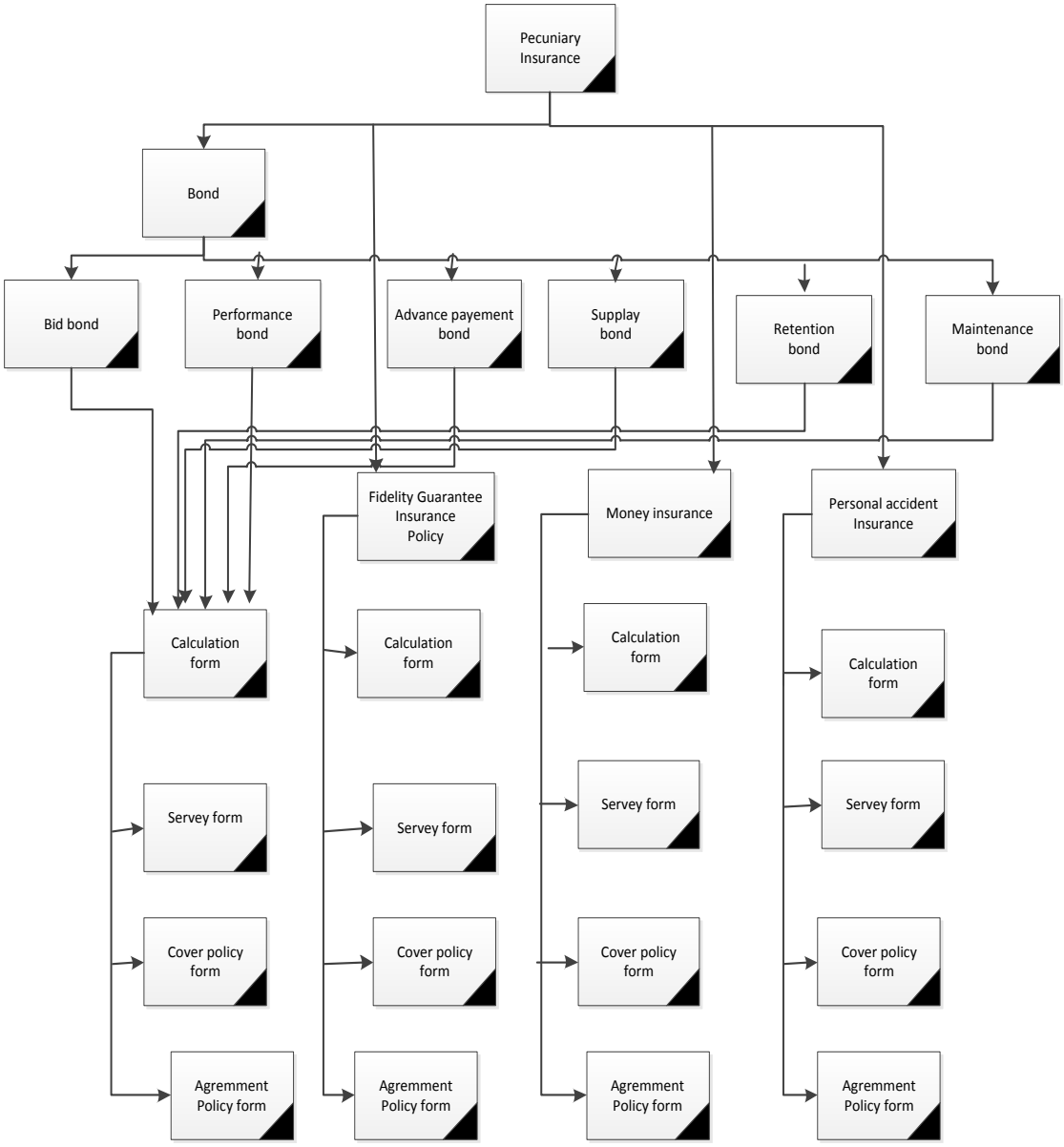
Appendix 6

LIABILITY INSURANCE USER INTERFACE FLOW DIAGRAM FOR NIB INSURANCE



Appendix7

PECUNIARY INSURANCE USER INTERFACE FLOW DIAGRAM FOR NIB INSURANCE



Appendix 8

INTERVIEW WITH MR. SAYYED IBRAHIM

How much is the annual cost of the existing data storing system?

Could you describe the annual cost of the existing system in detail?

What sort of challenges do you see in the existing system?

How do you think that the challenges in the existing system can be solved?

Is there any difference in the workflow since 2007?

How do you see computerized customer data handling system improving the workflow?

What do you think that is going to be the most challenging when upgrades the system?