

**WARRANTY CLAIMS SYSTEM (WCS) FOR PEODUA SALES SDN.BHD.**

**NOR ROSIDA MOHAMAD TAHRIM**

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

**FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY  
UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**2007**

## **ABSTRACT**

Warranty Claim System is a developed the new system which assists PERODUA Sales Sdn.Bhd. The system allows customer to fix appointment for the purpose of repairing under warranty parts. As a result, it reduces time needed by customer to wait for their uncertain turn. Besides, it helps claims processing as quickly as possible and outlet may carry out any part replacement request for new parts instead of old parts to Support service (HQ). This system can also help Part Department to make any part record without any data redundancy, altogether can help Quality Assurance (QA) make product quality improvement existence of report as references to Quality Assurance (QA). Warranty Claim System (WCS) is developed using ColdFusion programming language, MySQL to create system database and Macromedia Dream weaver MX 2004 to develop user and system interface. The system has been divided into seven chapters in this report. The chapters start from Introduction, Literature Review and Project Methodology, Analysis, Design, Implementation, Testing and Project Conclusion

## **ABSTRAK**

Warranty Claims System (WCS) for Perodua Sales Sdn.Bhd. merupakan system yang baru dibangunkan bagi kegunaan dan kemudahan PERODUA Sales Sdn.Bhd. Dengan adanya system ini, membolehkan pelanggan membuat janji temu untuk tujuan membaiki part dalam jaminan, ini dapat membantu menjimatkan masa pelanggan dari terus menunggu giliran yg belum pasti. Selain itu, sistem ini juga dapat membantu pemprosesan claim dengan lebih mudah dan cepat. Sistem ini juga membolehkan Outlet membuat sebarang permintaan pertukaran part dari part lama kepada part baru kepada Support Service (HQ). Sistem ini juga dapat membantu Part Department untuk membuat sebarang record part tanpa sebarang tindanan data, sekaligus dapat membantu Quality Assurance (QA) membuat penambahbaikan kualiti produk, dengan wujudnya report sebagai rujukan kepada Quality Assurance (QA). Warranty Claims System (WCS) dibangunkan dengan menggunakan teknologi sumber terbuka iaitu bahasa pengaturcaraan ColdFusion dan perisian pangkalan data MySQL. Manakala antaramuka sistem dibangunkan dengan menggunakan perisian Macromedia Dreamweaver MX 2004. Sistem ini terbahagi kepada 7 bahagian dimana bahagian pertama ialah Pengenalan, Kajian Literasi dan Metodologi Projek, Analisis, Rekabentuk, Pembangunan, Pengujian dan Kesimpulan Projek.

## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 Project Background**

Warranty Claim System was built for manufacturing Industry. This system is an enhancement from my practical training at Perodua Company. The system provides the entry of warranty claims to the system. Warranty claims track complaints, causes and corrections of each repair orders. Each claim tracks the necessary documentation for a complete description of the warranty work and the corrective measures and associated costs for correcting the warranty service. This detailed warranty information is logically stored in a database for effective analytical reporting. This new system provides user with information on warranty claims, generate report, information on part replacement and also to get help on backup recovery all of data.

## **1.2 Problem statement(s)**

Many dealerships have difficulty with the reimbursement process of warranty claim administration. The problem is often associated with lack training, high personal income confusion poor documentation. Another problem is difficulties in getting information about warranty claims and to process the claim effectively.

Problem is hardly avoided when developing any system. Some goes to staff in Warehouse department, where they encountered to very frequent data redundancy when inserting data. This is due to the usage of Microsoft Excel when inserting data and mass total of parts daily.

## **1.3 Objective**

The objective of develop a warranty claim system are:

- i) To handle claims quickly and effectively
  - System processes the warranty claim effectively and satisfying the customers while reducing the claims processing cost.
  
- ii) To easily retrieve information of warranty claim
  - Minimize the time when retrieve the information of warranty claim.
  
- iii) To provide report
  - The system provides extensive reports focusing on product component failures. These reports highlight repetitive failures, and failures that cause you to incur high warranty expenses.

- iv) Provide backup and recovery
  - The system also includes the database backup and recovery for database backup purpose.
- v) Easily to monitor part replacement
  - The system can fulfill part warehouse requirement to manage all replacement part systematically.
- vi) To enable customer to make an appointment.

## **1.4 Scope**

### **1.4.1 Scope of System Users**

There are two types of users for warranty claim system (WCS), external user and internal user.

- i) External User
  - Only customers that have been authenticated are allowed to request the appointment.
- ii) Internal User
  - Outlet – Branch/Dealer
    - The outlet handles replies the result of appointment request to customer, and also handle to create the warranty claims and submit to support service (HQ).

#### Support service (HQ)

- **The support service (HQ) was responsible of handling the claims processing and submit the request of replacement part.**

#### Part Department

- **The Parts Department manages the stock of parts and also handling the part replacement.**

### **1.4.2 Scope of System Modules**

- i) **The main functions of the customer module will encompass:**

- a) **Login**

The user has to be authenticated by providing the right username and password before he/she is allowed to access the module.

- b) **Request Appointment**

In this module, customer can request to the nearest outlet to make any appointment regarding on under warranty part changes. Customer only have to send appointments date, time, ic no, email address, types of damages or even complaints.

- c) **View the result of appointment**

Customer can view the result of appointment via email and also at the system.

iii) The main function of the Outlet will encompass:

a) Reply the appointment request

Outlet will approval the proposed appointment date by customers. If the proposed appointment date implies negative, outlet will recommend a new date to customers.

b) Create claims

When customer made any changes on parts under warranty, outlet will create claims by inserting all information related and submit to service support (HQ).

c) Submit claim

When claim is completed, outlet will submit it to service support (HQ) and proceed to the next process.

d) Request replacement Part

Outlet can request to replace new part. And outlet also can view the request status.

iv) The main functions of the support service (HQ) will encompass:

a) Approve claims

Support Service views outlets submitting claims before make any approval. Support Service will approve those claims. Once the claims are valid, service support will make voucher payment or else the claims will be returned to outlet for corrections.

- b) **Generate Payment Voucher (PV)**  
Once the claims are valid, Support Service will make voucher payment or else the claims will be returned to outlet for corrections.
  
- c) **Submit Request**  
Support Service will submit request to Parts Department depends on stock part.
  
- v) **The main function of the Part Department will encompass:**
  - a) **Update quantity Part**  
Parts Department must update part when receives new part and return an old part to vendor.
  
  - b) **Check Stock**  
Before Parts Department approve the request of replacement part, ensure check stock first.
  
  - c) **Approval Request**  
If the requested stock is available, Parts Department will approve the request or else the request will be pending till the stocks arrive.

## **1.5 Project significance**

The system allows to easily managing a significant range of warranty claim transactions without increasing organizational staffing levels. Besides, with this system, it helps user provides a quick and easy means for detailed claim research to complement warranty summary reports. This feature gives customer service personnel at-your-fingertips tools for answering detailed questions on specific claims. The system provides a variety of search criteria to access a complete service history for vehicles and dealers, as well as claim status. This system will be developed as online system.

## **1.6 Expected Output**

The expected output of this project should fulfill the objectives stated earlier in this chapter. At the end of the project, Warranty claim system (WCS) will be developed. The system will provide the below functionalities:

- i) **Authentication of users before access to system allowed.**
- ii) Customer can check their appointment status either approve or reject at the system.
- iii) Report can be quickly generated by the system.
- iv) The process of claim will be effective and efficiently

## **1.7 Conclusion**

As conclusion, when the system is fully implemented it will definitely help the user to control and monitor the warranty claims effectively, and also generate report for warranty claims. Therefore, with this system user can access required updated data and avoid data redundancy concurrently. This system also provides backup recovery function for database security. Finally, the system offers the administrative support that allows to finally streaming warranty department procedures, so can stand by the warranty policies with confidence.

## **CHAPTER II**

### **LITERATURE REVIEW AND PROJECT METHODOLOGY**

#### **2.1 Introduction**

This chapter focuses on literature reviewed project methodology. For the first section, fact and finding, it discussed and reviewed about approaches and related research, references and other findings about this system. Besides, it also states other approaches are used in this project after comparison with previous approaches. In this project methodology section, selected approach methodology is described on the activities that were done at every stage. The requirements are explained for high level project requirements and followed with project schedule and milestones. This chapter gives an overview about the next Chapter 3, Analysis.

#### **2.2 Facts and findings**

Facts and finding done are focused on past research, references, case study and other materials that are related to warranty claim system.

### 2.2.1 Domain

The domain background of this project is product warranty management in manufacturing. According to Bharatendra (2004), when the vehicles put into the market the likelihood of unexpected poor quality and reliability resulting in high warranty cost is not uncommon. Success during product development, manufacturing and assembly is often judged by lack of quality and reliability problems when the vehicle is in the field. With each major automaker spending billions of dollars annually in warranty cost on one hand and with substantially reduce profit margin on the other, warranty modeling is no more luxury but has become a necessity. [1]

According to Majeske (2005), Manufacturing express the duration of warranty coverage using a quantitative definition of product lifetime. When one variable quantifies product life (e.g. time since customer purchase) the product carries a one-dimensional warranty [2].

Automotive warranty database is very rich source information that provides valuable feedback on the product performance in an actual usage conditions. These feedbacks allow the designers and engineers to make improvements in current and forward model vehicle.

The warranty cost for any coverage, depends on the number of claims and cost of repairing each claims.

### **2.2.2 Existing system**

Until now, standard systems have not been available for universal warranty claims processing. Most system for processing warranty claims have been custom-developed solutions that only cope with individual process and have no connection to external system. The existing system led SAP to develop standard warranty claims processing system within the mySAP automotive solution. The system automates and integrates the step that take in partnership with dealer and OEMs to handle claims from dealer.

Most systems currently in use for automatic warranty claims processing are no longer capable of supporting these processes satisfactorily and are lacking front and back-office integration. "Processing warranty claims is a complex business that involves different business partners," said Kerstin Geiger". [3]

With this new project for warranty processing, claims has succeeded in resolving the conflict between the demands of processing highly individual warranty claims and the implementation of a standard solution.

### **2.2.3 Technique**

The sources of information warranty claim system to understand in this topic can be found from research done via internet surfing, articles from magazines, journal and books.

## **2.3 Project Methodology**

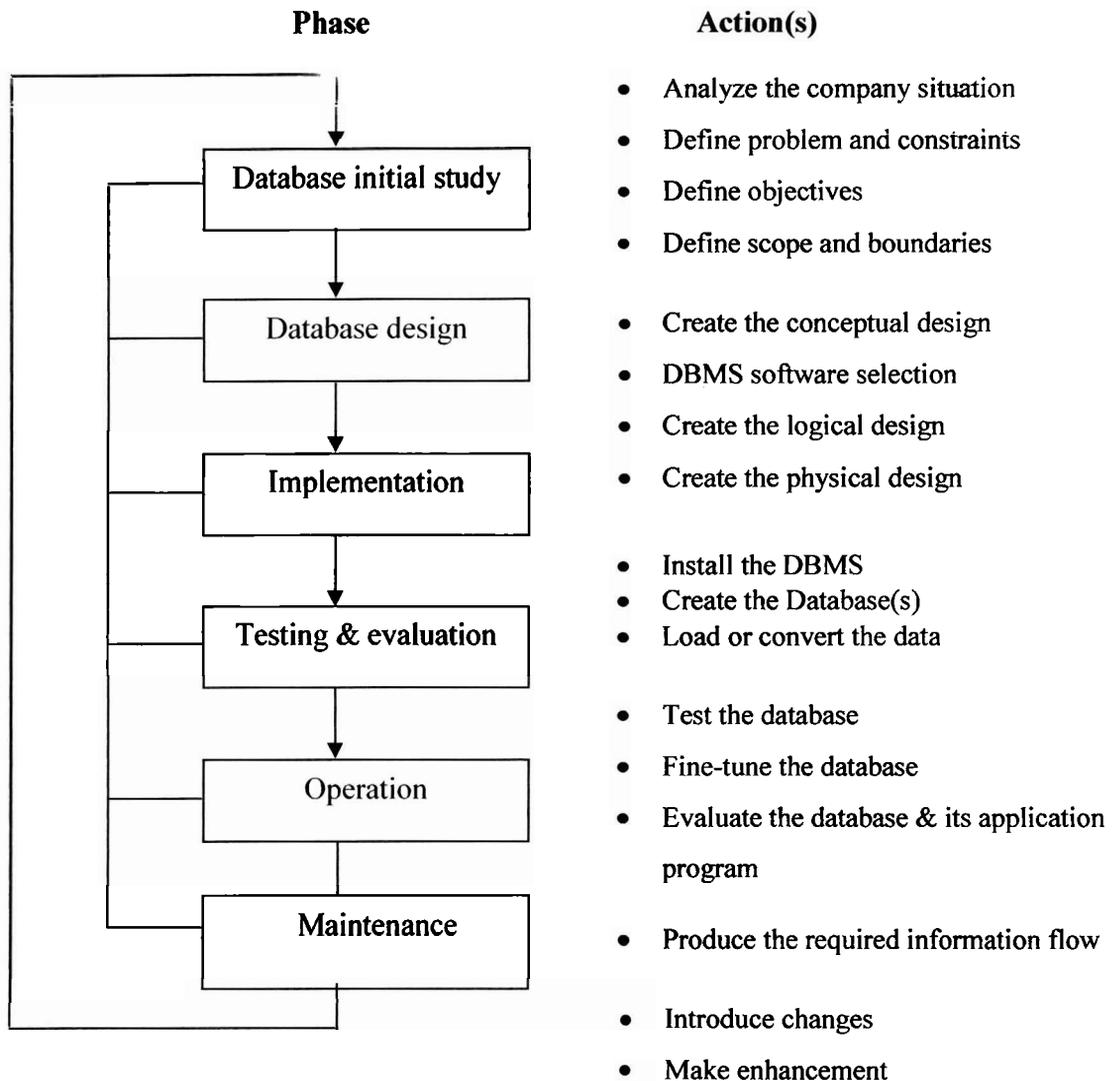
A project approach should be chosen early during the project planning. The approach depends on the formalized requirements and on both the general project plans and the roadmap plan. The approach will be certainly affecting all of the planning for system development therefore it plays a huge part in system development as a foundation of the system. The project approach is not established until the project charter is completed

The definition of software methodology is given as the study of how to navigate through each phase of the software process model (determining data, control, or uses hierarchies, partitioning function and allocating requirements) and how to represent phase products (structure charts, stimulus – response threads and state transition diagram).

### **2.3.1 Database Life Cycle (DBLC)**

Within the larger information system, the most successful databases are subject to frequent evaluation and revision within a framework known as Database Life Cycle (DBLC). The DBLC can be use as the guideline to develop any database project. This system used DBLC because it describes the history of the database within the information. It is iterative rather than a sequential. The DBLC consists of six stages which are:

- i) Database initial study
- ii) Database Design
- iii) Implementation and loading
- iv) Testing and evaluation
- v) Operation
- vi) Maintenance and evaluation



**Figure 2.1: The Database Life Cycle (DBLC)**

**i) Database Initial Study**

The Database initial study stage concerned about four main things which are:

**a) Analyze the Company Situation**

The company situation describes the general condition in which are company operates, its organizational structure, and its mission. To analyze the company situation, the database designer must discover what the company's operational components are, how the function, and how they interact.

**b) Define Problem and Constraints**

The designer has both formal and informal sources of information. If the company has existed for any length of time, it already has some kind of system in place (either manual or computer-based). How does the existing system function, what input does the system require, what document does the system generate, how is the system output used and by whom.

**c) Define Objectives**

A propose database system must be designed to help solve at least the major problems identified during the problem discovery process and to create an efficient library query and management system.

#### d) Define Scope and Boundaries

The system scope defines the extent of the design, according to operational requirements. The database design encompasses the entire organization and knowing the database design scope helps define the required data structures, the type and number of entities, the physical size of the database and others.

#### ii) Database design

Database Design is the second phase on the design of the database model and also the critical DBLC phase. In the process of database design, it will concentrate on the data characteristics required to build the database model. Each of the components of database design is below:

- a) **Conceptual Design** stage that use data modeling to create an abstract of WCS database structure that represents real-world objects in the most realistic way possible. The conceptual design requires four steps like data analysis and requirements, entity relationship modeling and normalization, data model verification and distributed database design.
- b) **DBMS Software Solution** stage which is critical to the information system's smooth operation. Consequently, the proposed DBMS software's advantages and disadvantages should be carefully studied. The end user must be made aware of the limitations of both the DBMS and the database, in order to avoid false expectations.

- c) **Logical Design** is used to translate the conceptual design into the internal model for a selected database management system (DBMS) such as, SQL Server, Oracle and Access. Therefore, the logical design is software-dependent. For example, the logical design for a relational DBMS includes the specifications for the tables, indexes, views, transactions, access authorizations and so on. The right to use the database is also specified during the logical design phase.
  
  - d) **Physical Design** is the process of selecting the data storage and data access characteristic of the database. The storage characteristics are a function of the types of devices supported by hardware, the type of data access methods supported by the system and the DBMS. Its not only affects the location of the data in the storage devices but also the performance of the system.
- iii) **Implementation and Loading**
- a) **Implementation:** In most modern relational DBMSs such as Microsoft SQL Server or Oracle, a new database implementation requires the creation of special storage-related constructs to house the end-user tables. These constructs usually include the storage group, the table space and the tables. The implementation of the logical design would require us to creation of the database storage group, creation of database within the storage group, assigning the rights to use the database to a database administrator and also creation of tables within table spaces.
  
  - b) **Loading:** After the database has been created, the data must be loaded into the database tables. If the data are currently stored in a format different from that required by the new DBMS, the data must be

converted prior to being loaded. Other aspect in implementing and loading the database are:

- **Performance:** Database performance is one of the most important factors in certain database implementation. Important factors in database performance also include system and database configuration parameters such as data placement, access path definition, use of indexes and also buffer size.
- **Security:** Data stored in the company database must be protected from access by unauthorized users. Consequently, we must provide *physical security* which allows physical access to areas by authorized personnel only, *password security* which allows the assignment of access rights to specific authorized users, *access rights* which can be established through the use of database software, *audit trails* which usually provided by the DBMS to check for access violations, *data encryption* used to render data useless to unauthorized users who might have violated some of the database security layers and *diskless workstation* which allows end users to access the database without being able to download the information from their workstations.
- **Backup and Recovery:** Data backup and recovery procedures create a safety valve, allowing the database administrator to ensure the availability of consistent data.
- **Integrity:** Data integrity is enforced through the proper use of primary key and foreign key rules.
- **Company Standards:** Database standards may be partially defined by specific company requirements. The database administrator must implement and enforce such standards.
- **Concurrency Control:** The feature that allow simultaneous access to a database while preserving data integrity. Failure to maintain concurrency control can quickly destroy the database effectiveness.

iv) Testing and Evaluation

Once the data have been loaded into the database, the DBA tests and fine-tunes the database for performance, integrity, concurrent access, and security constraints. The testing and evaluation phase occurs in parallel with applications programming.

Programmers use database tools to prototype the applications during the coding of the programs. Tools such as report generator, screen painter, and menu generators are especially useful to the applications programmers during the prototyping phase.

v) Operation

Database, database management, database users and its application programs constitute a complete information system. The beginning of the operational phase invariably starts the process of system evolution. As soon as the targeted end users have entered the operation phase, problems that could not have been identified during the testing phase begin to surface. In any case, the demand for change is the designer's constant which leads to stage 6 of the database lifecycle, maintenance and evolution.

vi) **Maintenance and evolution**

The database administrator must be prepared to perform routine maintenance activities within the database of the Warranty Claims System for Perodua Sales Sdn.Bhd.. Some of the required periodic maintenance activities include:

- Preventive maintenance (backup).
- Corrective maintenance (recovery).
- Adaptive maintenance (enhancing performance, adding entities and attributes, and so on).
- Assignment of access permissions and their maintenance for new and old users.
- Generations of database access statistics to improve the efficiency and usefulness of system audits and to monitor system performance.
- Periodic security audits based on the system-generated statistics.

## **2.4 Project Requirements**

### **2.4.1 Software Requirement**

This system will be develops using:

- i. Dream Weaver 2004 (Cold Fusion)
- ii. Microsoft Project
- iii. Microsoft Visio
- iv. Adobe Photoshop
- v. Microsoft Word

### 2.4.2 Hardware Requirement

Below are the hardware requirements that will be use for the development of this project. The requirement is for the developer and user use.

<b>Hardware</b>	<b>Minimum Requirement</b>
Computer	Acer
Processor	Celeron M (1.5 GHz)
Thumb drive	Easy Disk /Data Traveler (256 MB)
Hard Disk	40 GB
Random Access Memory	512 MB
Operating System	Windows XP Home Edition

### 2.5 Project Schedule and Milestones

(See Appendix A)

## **2.6 Conclusion**

This chapter states and describes the fact and findings that related to this project, project methodology which is the approaches used to develop the system, project requirement consisting of software and hardware requirement and also project schedule and milestones. The methodology used in developing the system is Database Life Cycle (DBLC) because this methodology is suitable to develop a system like Warranty Claim System. The next chapter explains about analysis phase of the system development.

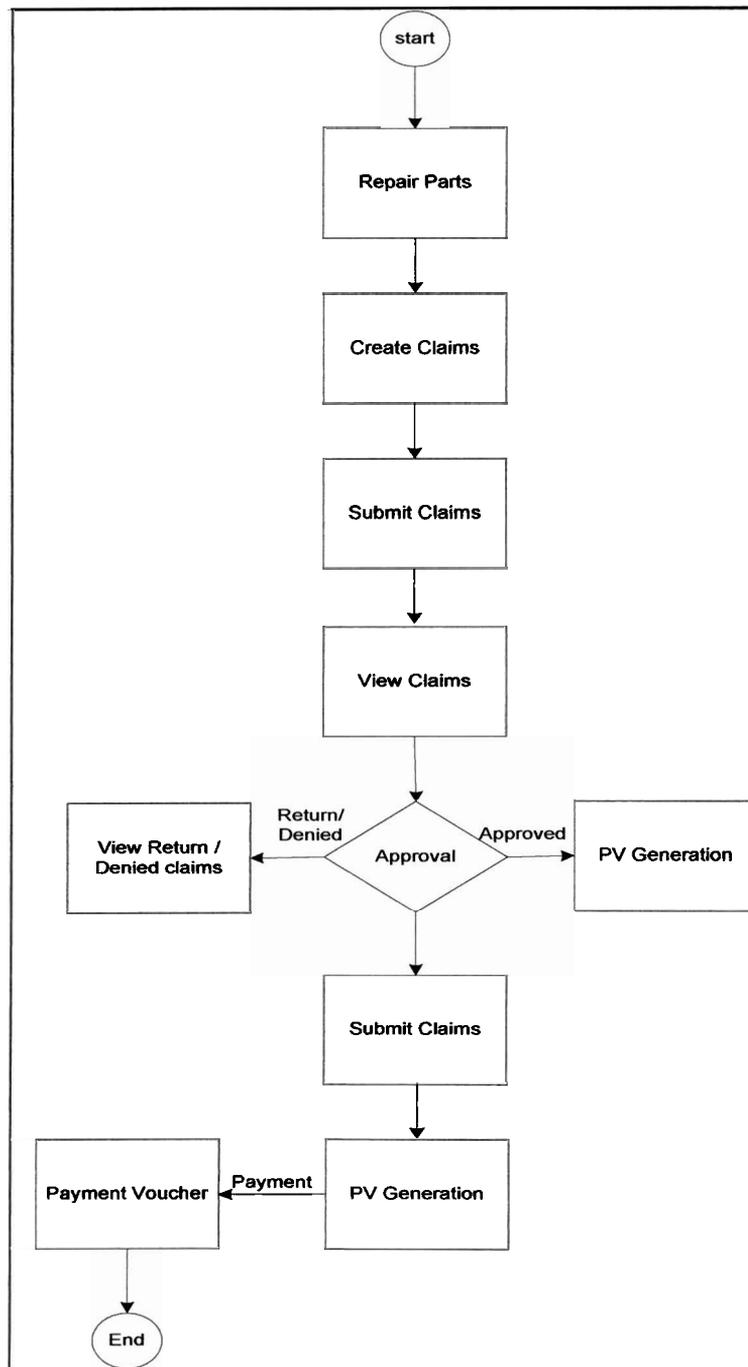
## **CHAPTER III**

### **ANALYSIS**

#### **3.1 Introduction**

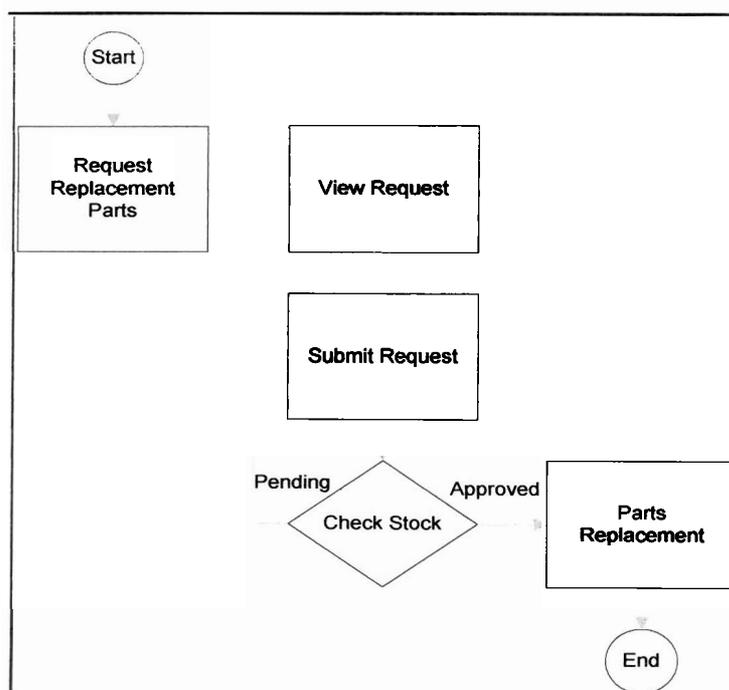
Chapter 3 focuses on the system analysis. After finishing the literature review and define the methodology for project requirement, analysis is the most important chapter in this report. This section will begin with problem analysis. It will discuss and identify the user requirement in current system and propose system to find solution. Requirement analysis will explain about the flow and process to develop this system with the diagram DBLC method. Hardware and software requirement play an essential role in developing the system, without identify the requirement clearly, the system will not function properly in the real environment.

### 3.2 Problem Analysis



**Figure 3.1: Current system business flow for warranty claims processing**

The business flow in Figure 3.2 shows the current system flow for warranty claim system processing. Firstly, customer comes to outlet (branch / dealer) for repair part under warranty without any appointment, sometimes the branch cannot repair the part because doesn't have a stock part and many customers come at the same times. This process may cause waste of time because customers will take long time to go through to outlet in order to repair or check the parts. After repair the parts, Outlet create the claims and submit to support Service (HQ). After that support service (HQ) can view the submitted claims and approval the claims. Once the claim approved support service can generate payment voucher to pay to outlet. In this process not provide any report to quality assurance (QA) references, it may cause lower quality of product or might rise up the cost of producing the product.



**Figure 3.2 Current system business flows for warranty claims processing in parts replacement**