INVENTORY MANAGEMENT AND ASSET TRACKING SYSTEM FOR SOLUTION ASSESSMENT & DEVELOPMENT CENTRE (SADC)

By

Wan Muhamad Muhsin B.Wan Mazlan

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

JANUARY 2008

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CERTIFICATION OF APPROVAL

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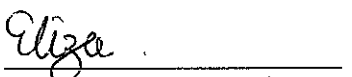
Approved by,



(Ms. Eliza Mazmee bt. Mazlan)
Supervisor

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
JANUARY 2008

CERTIFICATION OF ORIGINALITY

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

WAN MUHAMAD MUHSIN B.WAN MAZLAN

ABSTRACT

SADC is a company under Capabilities Development Division of MDEC. Its tasks are to doing software testing for IT Company under MSC Status to get license before they can market their product. And because many project SADC need to test in a year, shortage of asset can give a greater impact of the company performance. Without an inventory system to cater for the project, the company needs to spent a huge amount of money to buy new assets without knowing that actually the asset are sufficient enough if they can manage wisely. "*Inventory and Asset Management System*" is the best solution for SADC to track their asset movement and which asset are use for a project and how many left to be used for the next project. This system also can help SADC infrastructure engineer to move the hardware such as memory and hard disk to meet the project requirement without losing track of the hardware movement. It is also used to help the company when it comes to audit purposes by giving detail information about the usage of asset and how often the asset are being used. Technician is able to spot the problem quickly if the assets malfunction by referring to the previous project environment and the baseline of the asset.

ACKNOWLEDGEMENT

First and foremost I would like to take this opportunity to thanks to god because give me opportunity to finish this project even do many problem and challenges faces during this one year period of final year project. I also like to express and acknowledge my FYP supervisor Ms Eliza Mazmee, who had been supportive and brilliant advices. Her comment, advices and suggestion have guided me throughout this project.

I also would like to acknowledge Universiti Teknologi PETRONAS (UTP) and all final year research project committee for proper organization and management of this course.

For the last, I want to acknowledge my parent for their endless support and confidence in me throughout my studies in UTP especially during conducting this project. They have given me the strength, motivation and determination in my life. Also for those who I'm not mention, Thanks a lot.

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CHAPTER 1:
INTRODUCTION

1.0 COMPANY BACKGROUND

The MDeC has been incorporated under the Companies Act of Malaysia, owned and funded by the Government. At MDeC, they combine the entrepreneurial efficiency and effectiveness of a private company, with the decision-making and authority of a high-powered government agency.

Their role is to advise Malaysian Government on legislation and policies, develop MSC Malaysia-specific practices, set breakthrough standards for multimedia operations and ensures that companies interested in entering the MSC Malaysia have what they need to succeed. Other than that, MDeC also assist in expediting permit and license approvals, and introduce companies to potential local partners and financiers.

Solution Assessment & Development Centre (SADC)

SADC is a company that focuses on product quality and testing method to help others company system stand stable and improve the quality for client. SADC belongs to MDeC and stays under MDeC "Capacity Development Division". SADC offers a useful resource to help test new software products. Testing and assessing a new software product may sometimes require complicated processes and resources that are limited in nature. It's also a fully furnished test facility ready with network and communication infrastructure, as well as basic test equipment and software tools for conducting application testing. Proven test methodology and stringent quality measures for testing products are employed to enhance the quality of applications.

1.1 BACKGROUND OF STUDY

The main purpose of this project is to create a system that can maintain all the asset in a company and track all available asset. This system also will help infrastructure engineer to record all company assets and centralized it under one system. Because the challenging of time, the revolution of information system, I need to create the good systems which can handle all old and new asset of SADC. The system will start from user login; the login will differentiate between user and admin by their user name. In admin part, admin will have full authorization to manage the entire database, insert new asset, create report and swap hardware between server and workstation. From user side, user can search all available assets, choose which hardware needs to use for the test project and print the check in and check out form that used to confirm with the client amount of hardware being used in client side to avoid misunderstanding. If this project successful, SADC can use it to improve their productivity and avoid hardware misplaced. The other objective for this project is to understand the concept of the system, creating and applying resource learn in UTP as Information & Communication Technology to create the good system which can give experience and ideas in future.

1.2 Problem Statement

Currently in SADC, they still using paper base asset Management that were kept in a cabinet. Every time when they need information regarding an asset, SADC staff need to workout with bunch of paper, search the asset ID, take it from file and misplaced it. This creates a huge problem in future when the assets need to troubleshoot and doing house keeping. Another problem associated also when it comes to test project that need required specification, usually SADC staff will swap the hardware between server and workstation without record it. So after the project completed, the asset will be bring to server room without change it back to previous state. This creates a problem when the assets were malfunction and technician from manufacturer cannot solve the problem because the asset is not according to the baseline.

1.3 Objective and Scope of Study

The aim of this project is to overcome the problem encountered by SADC staff to handle all the company asset. The objectives of this propose system is:

1. To conduct research on similar system that have been used at other companies and used the info gathered as guidelines in developing the new system.
2. To develop a system that maintains and record company assets movement in SADC while assisting respective personnel doing annual audit reporting.

1.3.1 The Relevancy of the Project – Scope of Work.

The project will be conducted by analyzing the current system use by SADC. The fact- finding technique such as distributing questioners and interviewing the manager, infrastructure engineer and targeted users will be conducted. A through research will be carried out on the language to be used in designing and developing the overall system. The project does not focus entirely on the research area but focus on designing and implementing the new Assets Management system. The project will give more concentration on the design and database scheme.

1.3.2 The feasibility of the Project

1.3.2.1 Technical Feasibility

Currently, SADC had their own server room to locate their entire server. SADC also have enough spare servers to install the new system and can just connect it to network line available. This can help SADC to reduce the implementation cost of the system. The system can help SADC to improve their technical way on conduct a test project and track their assets list.

1.3.2.2 Operational Feasibility

The proposed system is believed to eliminate the problem faced by the current manual system. Thus, the proposed system is assumed that it will fulfill user requirement and enhanced SADC in conducting and managing their assets and test project

1.3.2.3 Economic Feasibility

The proposed system after research and analyze the SADC environment is easy to implement and can help SADC to step a head further by having a good system with little budget. All the process only consumes small user effort and also focus on reducing paper consumption.

1.3.2.4 Schedule Feasibility

The system will take about four months to be developed. Until for this stage, we have done the Planning and analysis phase. All the current progress is still following the schedule date and for the implementation phase, programmer will install the system after done with the testing part and finish up all the documentation require.

1.4 Document References

The following document are referred by Mr.Wan Muhd Muhsin in producing the system

- SADC Baseline Form and Asset Detail (refer appendix 1)
- SADC Check In and Check Out Form (refer appendix 2)

CHAPTER 2:
LITERATURE REVIEW AND THEORY

2.0 Inventory and Asset Management System

Definition of **inventory** is "The amount of property on hand at given time, or an itemized listing. A *physical inventory* is one determined by actual physical count of the items. A book inventory is one determined from record maintained in connection with day-to-day business activities. In industrial prospective, inventory typically consist of raw materials, work in process, finished goods and M.R.O (maintains, repair and operating) supplies" [1]

In other hand, **Management** as said refers to "administration, control and supervision. It is an administration of a business concern or public undertaking. Management includes the action of planning, organizing, directing coordinating, controlling and evaluate the use of people, money, materials and facilities to accomplish mission and tasks."[1]

Recently, as the world's technology is increasingly by using many technology features, business also must adapt with it by having a practical, efficient method for managing inventory in order to stay in business and satisfy their customer. It is supported by Neil Jaffre in his article: This functionality is a significant leap forward in how software solutions handle forecasts, particularly when reacting to trends and seasonality. Much of this functionality was not available in the past, because antiquated legacy technology lacked the capacity to store the necessary history or process the data. Now, with newer technology, it is possible to run these algorithms in real time, and analyze the results without the difficulties that are encountered with most legacy systems. Users realize significant time savings, because there isn't a need to manually analyze each item's demand. [2]

A good inventory system is crucial in every business nature, an inventory management system is greatly needed to monitor, track and manage equipments, supplier and asset available. It will provide the business with complete, accurate and up-to-date records of the inventory. Effective and accurate management of loose items, supplier and consumable is critical especially if re-supplier is infrequent and must be controlled and manage. The inventory management system enables the business to spot the critical level or reorder and makes it possible to reorder the item again before it is out of stock. As a result, inventory management system can trim costs and saves time.

2.1 Company Budgeting

By having a good practical and efficient inventory system, it has been confirmed that company can save a lot of their money. According to Greg Steen a Technology professional, entrepreneur, and enthusiast:" By having inventory details at your fingertips it can save you lots of headaches when budget allocation meetings and yearly audits roll around. And, of course, the powers-that-be always seem to want to know who has what and why, and what it will take to do that major upgrade."[3]

Inventory system also can save company budget by reducing paper use to store information, Eli J.Remington said "The lifeblood of any organization is information, and Information on the hands of right people can turn data into knowledge that thrust a company forward. It is important that the right information be available at the precise moment it is needed in order to make profitable decision."[4] So, by having and inventory system the system must be available anytime and everywhere for user to use the data inside. By using paper based system it will increase the company budget as said by Metric Stream Delivers web "paper-based systems may seem to cost less on the surface, there is a huge amount of hidden costs due to the enormous amount of time the organization spends to ensure document control, to chase down bottlenecks in document review and to ensure corrective actions were implemented in a timely manner. From our research, a quality engineer typically spends over 35% of their time on such activities - time that could be spent on higher value added activities for the organization. In addition, lack of ability to identify preventive actions on a large scale, inability to ensure

all corrective actions are always implemented and poor visibility into quality-based metrics affects their ability to significantly reduce cost of poor quality or cost of compliance. As a result, the hidden cost of a paper-based quality system is very high."[5]

Several surveys also had been done regarding this issue [6]. From the survey it conclude that Large organization lose one document every 12 second, 3% of all document are incorrectly filed in the drawer, 7.5% of document are lost forever and the average executive spends three hours per week hunting for mislabeled, misfiled or lost document. The surveys also ask other company worldwide to use and fully utilize all the technology driven to convert the paper-based system into database system that more secure and reliable.

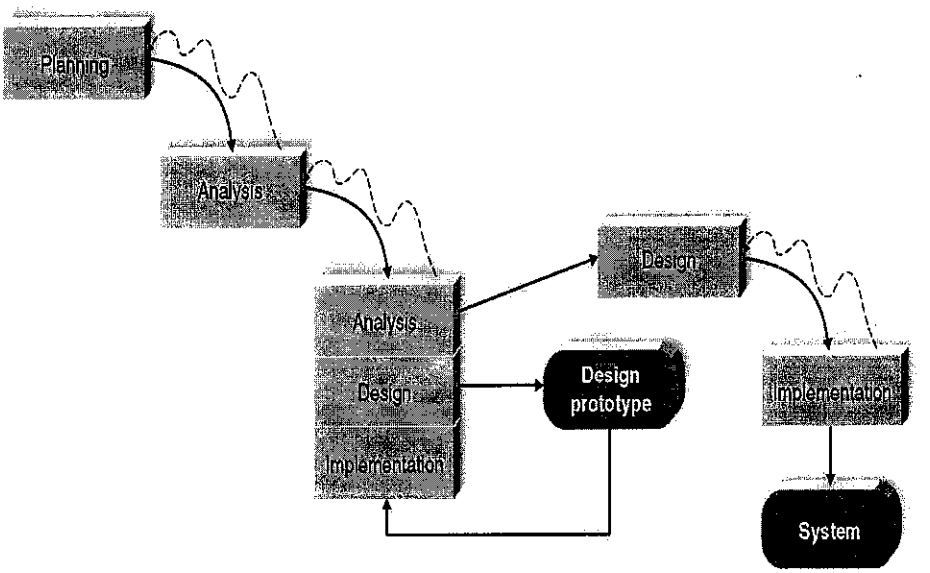
According to Gill brittle, the previous paper-based system was inefficient and time consuming. The amount of time it took to administer the system with filling, collating and distribution was significant. Often people complained they were not receiving the information they needed on time.[7] Once your begin implementing the paperless office, you can improve your firm's speed, security, accuracy and ease of document retrieval, along with eliminating the need for additional physical storage space for client files [7]

CHAPTER 3:
METHODOLOGY / PROJECT WORK

A very good database design is needed in order to organize a big amount of data. Thus the database design is crucial in providing a good data management in more effective and systematic way. This project will deal with large data transaction and need to be organized wisely.

3.0 System Development Life Cycle

In developing the proposed system, I will use RAPID APPLICATION DEVELOPMENT (RAD) model approach in the system development life cycle. I chose to use this model as documentation will be produced at each phase where it fits with other engineering process model. The stages of the model are illustrated in Figure 1 below:



Rapid Application Development (RAD)

FIGURE 1 - Industry Standard Prototyping /

Figure 1 are a process involved for overall system lifecycle, it also show the software process framework and under what phase the system need to be emphasize. For this system lifecycle, developer will use the Rapid Application Development to ensure the detail of the system requirement meets with the System requirement standard document. The relevancy of the software lifecycle with the project is as follow:

3.1 Planning Phase

In this initially phase, all the activities according to the timeline must be planned. This phase will ensure all activities being done along the development of the system are on time. Resources and constraint must be also taken into consideration so that ample time can be allocated to any unexpected incident along the development process. The outcome for this phase is Gantt chart (refer appendix 4) of activities. The important thing in planning is to meet the due date with all or most of the requirement is in the system.

3.2 Analysis Phase

Under analysis phase, a preliminary data gathering will be conducted to gather all the requirement from user side and analyze it to make this project successful in the end. Preliminary information gathering involves the seeking of information in depth, of what research had made. Usually it will be done by interviewing users about their current way of doing thing and what did them aspect for the new system. Mr. Fandi and Mr. Razman that work in SADC is the right staff we need to have an interview with. Mr. Fandi is one of the tester and System consultant will explain in detail what the procedure and Mr. Razman as an Infrastructure engineer explained on how their manage their assets. Please refer to Appendix 3 for the list of question being asked in interview session. For the analysis phase, we will also define the scope of the system and the limitation. After finish with this step, we can start the design process based on the requirement and UML diagram we stated under this phase. In this analysis, all the elements will be put together to make up framework or the system.

3.2.1 Functional Requirements Group 1

Under this section, the report will discuss about functional requirement group one which belong to administrator.

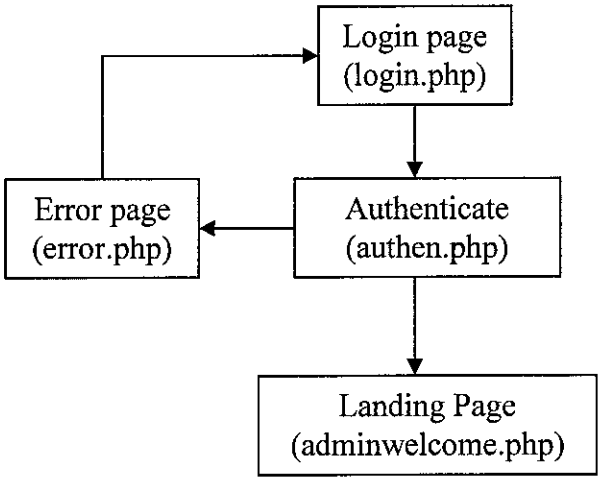
Exhibit 1 - Requirements Group 1(Administrator)

Section/ Requirement ID	Requirement Definition
FR1.0.	**Login** - The system will ask for admin authentication to confirm that only admin can view administrator page.
FR1.1	**Insert asset** – Admin will have full authority to insert new asset or previous asset own by SADC. Admin will insert each detail of the asset. Example : Asset type : Server • Server Asset Number • Manufacturer • Server Model • Server Serial Number • Server Operating System • Memory. • Hard disk • Processor • Raid Card • CD-Rom • Floppy Drive • Server type.

Section/ Requirement ID	Requirement Definition
FR1.2	**Search Asset** – The system shall help the admin to search for asset available in Database. The system will search for an asset according to asset specification and list all the asset type according to search name specify by admin
FR1.2.1	**Search Asset** – The system must display a page according to search type and give brief detail of the asset and two hyperlink that compare the baseline of the system and the current configuration of asset.
FR1.2.2	**Search Asset** (current) – The system will display a page choose by admin. If admin choose to see the current configuration, The page must list all the detail about an asset and what the specification belong to it.
FR1.2.3	**Search Asset** (Baseline) – The system will display a page choose by admin. If admin choose to see the baseline, The page must list all the detail about the baseline of the system. Baseline here means the actual configuration set by manufacturer
FR1.3	**Update Asset** – In search and under current configuration, admin will be granted to make changes and update the asset. Example : If admin have changed the server operating system, admin can only update it after search the server detail and choose current configuration to make changes.
FR1.4	**Swapping hardware** - In search and under current configuration, admin can swap the hardware between asset requested by user to be used in the test project.

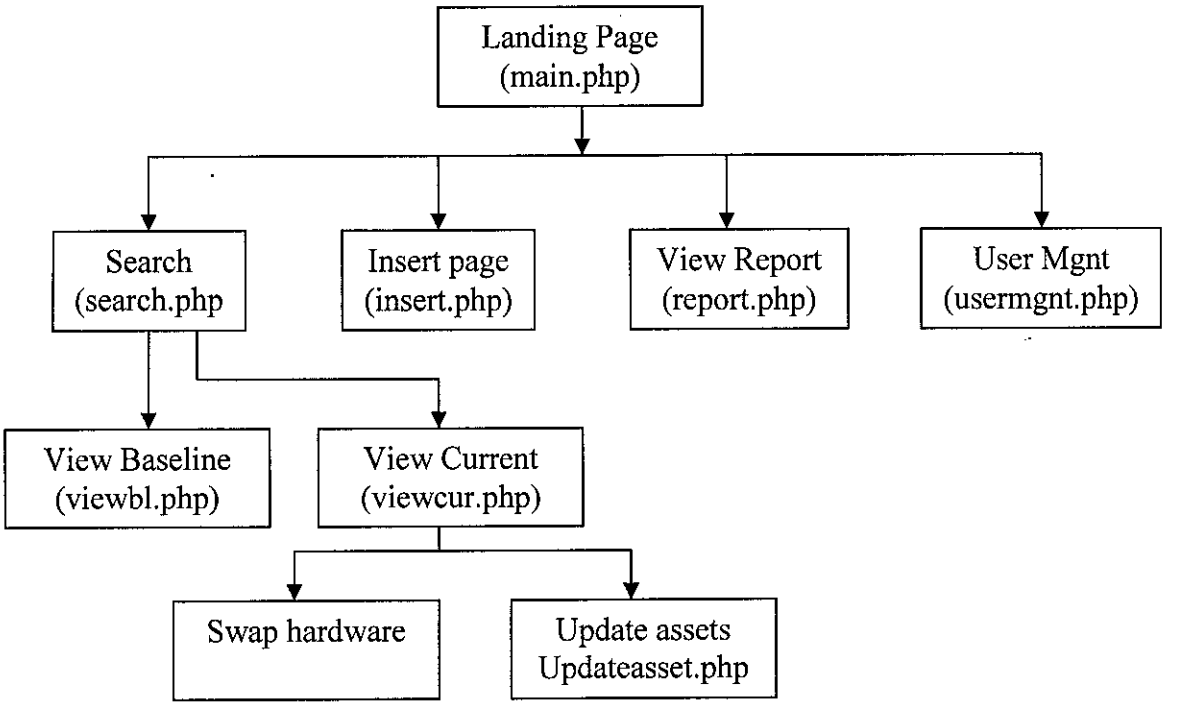
Section/ Requirement ID	Requirement Definition
FR1.5	**Delete Asset** –The system must have a function to delete asset. This delete function will only have under Search Detail Baseline. For this function, The system must have a confirmation page to ensure admin doing only the right thing.
FR1.6	**View Report** – The system must come out with a detail report explaining what happen with the system according to date and time. The system must track each delete and repair activities for audit purpose.
FR1.7	**User Management** – Only admin have the full authorities to register new user, delete existing user, update user and give access either the login name belong to admin or user.

Admin Page Flow



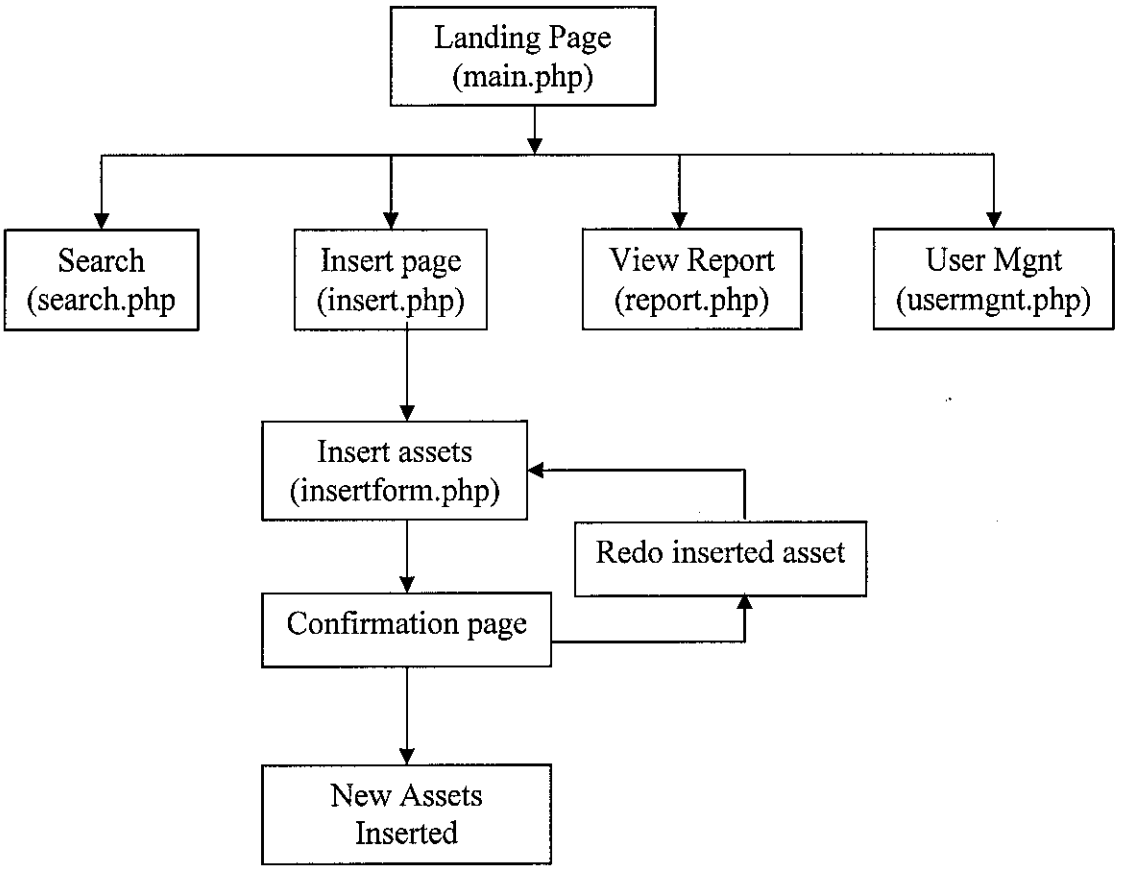
1. Login

   Firstly, admin need to authenticate their self using the login page. Login page will be the first page admin see to lock into the system. After admin key in their login name, password and click login button. The system will go to authen.php to authenticate user. If the login and password matches with the data inside database, the system will give access, but if the login and password is not match, system will redirect admin to the error page and admin need to login again.



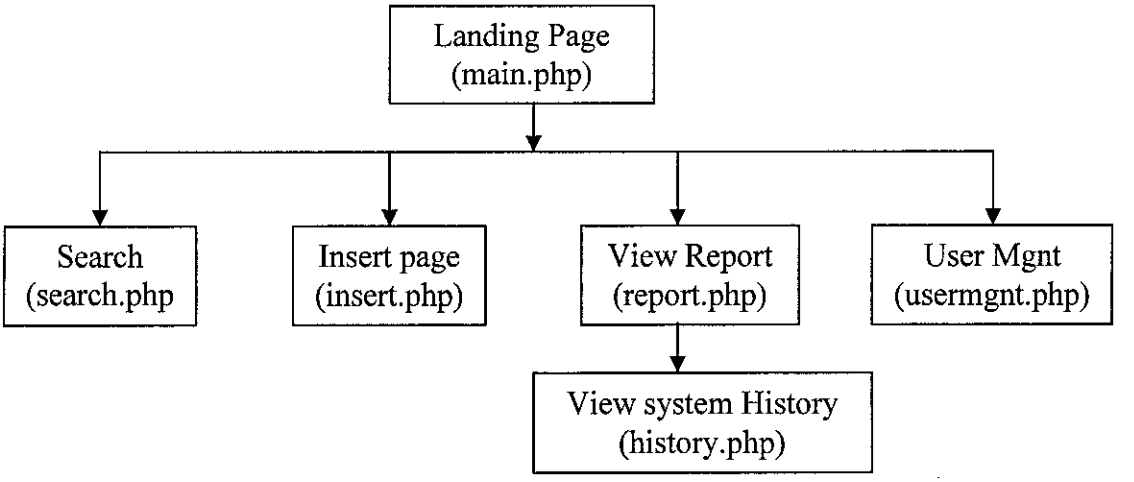
2. Search, Update & Swap.

After login, admin will have 4 options to choose. For the search function, admin will be given a choice either to select server, workstation, laptop, others and document. If admin choose to search for server, admin will be given an option to search under four categories. One text box will be given for admin to insert the search item. Search result will appear after admin click the Search button. Again, admin will be given an option to choose either view baseline or view current specification. Baseline is a factory specification that will not been changed. View current to view the current specification of the assets. With current, admin can view the detail part of the hardware component and have an authority to update the assets or swap the hardware between assets.



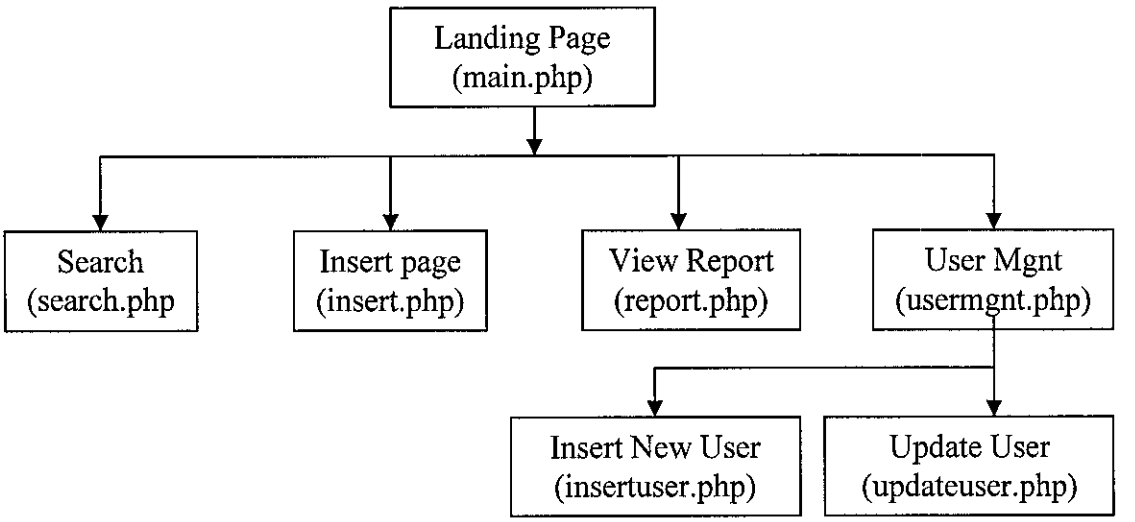
3. Insert New Assets

Under Insert page, admin will have a choice to choose to insert new assets. Admin can choose either to insert server, workstation, laptop, others hardware and document. All of this option will have the same flow as figure above. After admin choose to insert new assets and fill up the form, admin need to click insert button at the bottom of the page. After clicking that button, confirmation page will be popup for admin to final check the new inserted assets, If admin need to make changes, admin can click the redo button and the system will go to previous page (form page) for admin to make changes. After admin satisfied with the new inserts assets, admin will click a confirm button and automatically the system will store the new assets in database.



4. View Report

These functions are use for admin to make a company audit. Each of the assets being update and delete, system will automatically make a log and save it to another table in database.



5. User Management

User management functions are use for admin to manage user that using the system, from here, admin will insert the new user and give category to the user either it will be a new admin or just a regular users. Admin also have full authorities to delete and update user profile under this section.

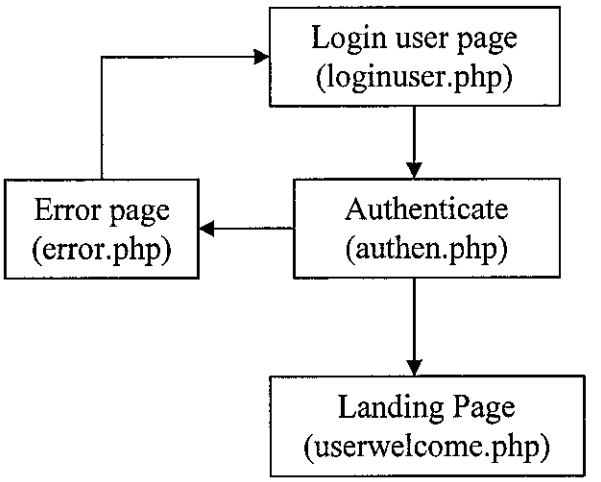
3.2.2 Functional Requirements Group 2

Under this section, the report will discuss about functional requirement group two which belong to users.

Exhibit 2 - Requirements Group 2(Users)

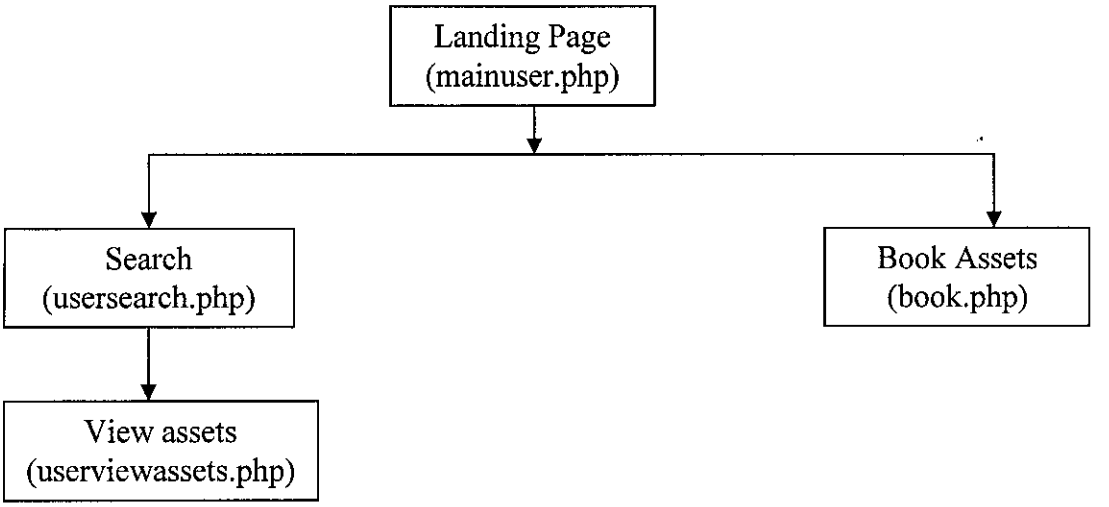
Section/ Requirement ID	Requirement Definition
FR2.0.	Login - The system will ask for user authentication to confirm that only Correct user can use the system.
FR2.1	Search Asset - The system shall only allow users to view the available asset but cannot modified or delete the asset.
FR2.2	Check in - The system should have a function for user to view the asset and select the asset for test project. All the selected asset also must be placed properly in the check in form for user to print it and ask for manager permission.
FR2.3	Check Out – The check out form must be same with check in item and must have a print function for user to print it after done with the project.

Users Page Flow Diagram



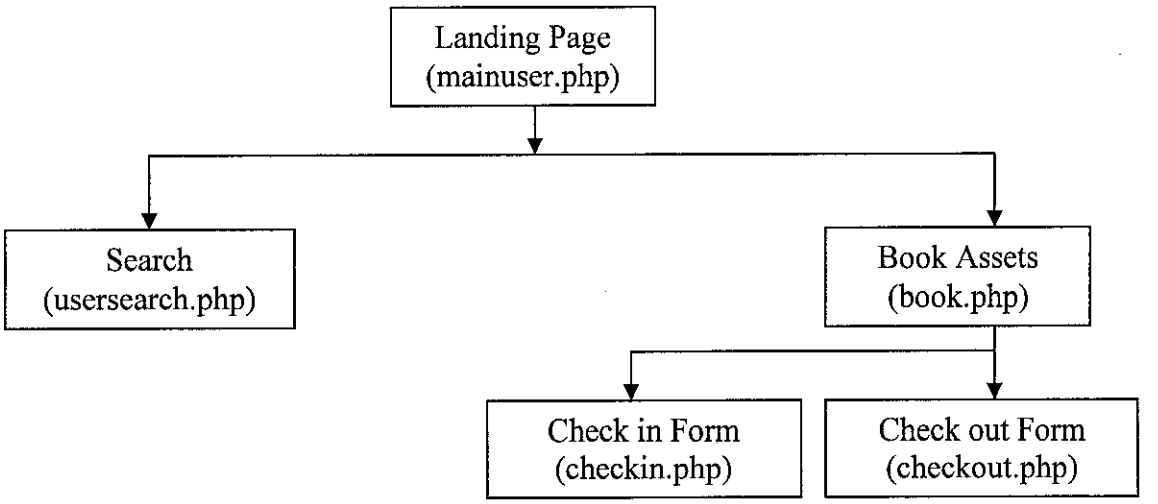
1.0 User Login Page

For users to access into the system, users need to be register by administrator and admin will provide a login name and password for the users. Users must login to the system from login and password provides by admin, If the system had been registered, users will be redirect to the landing page which is mainuser.php. But if the login name and password doesn't match, user need to re-login again and if the problem continue, get help from admin.



2. User Search Assets

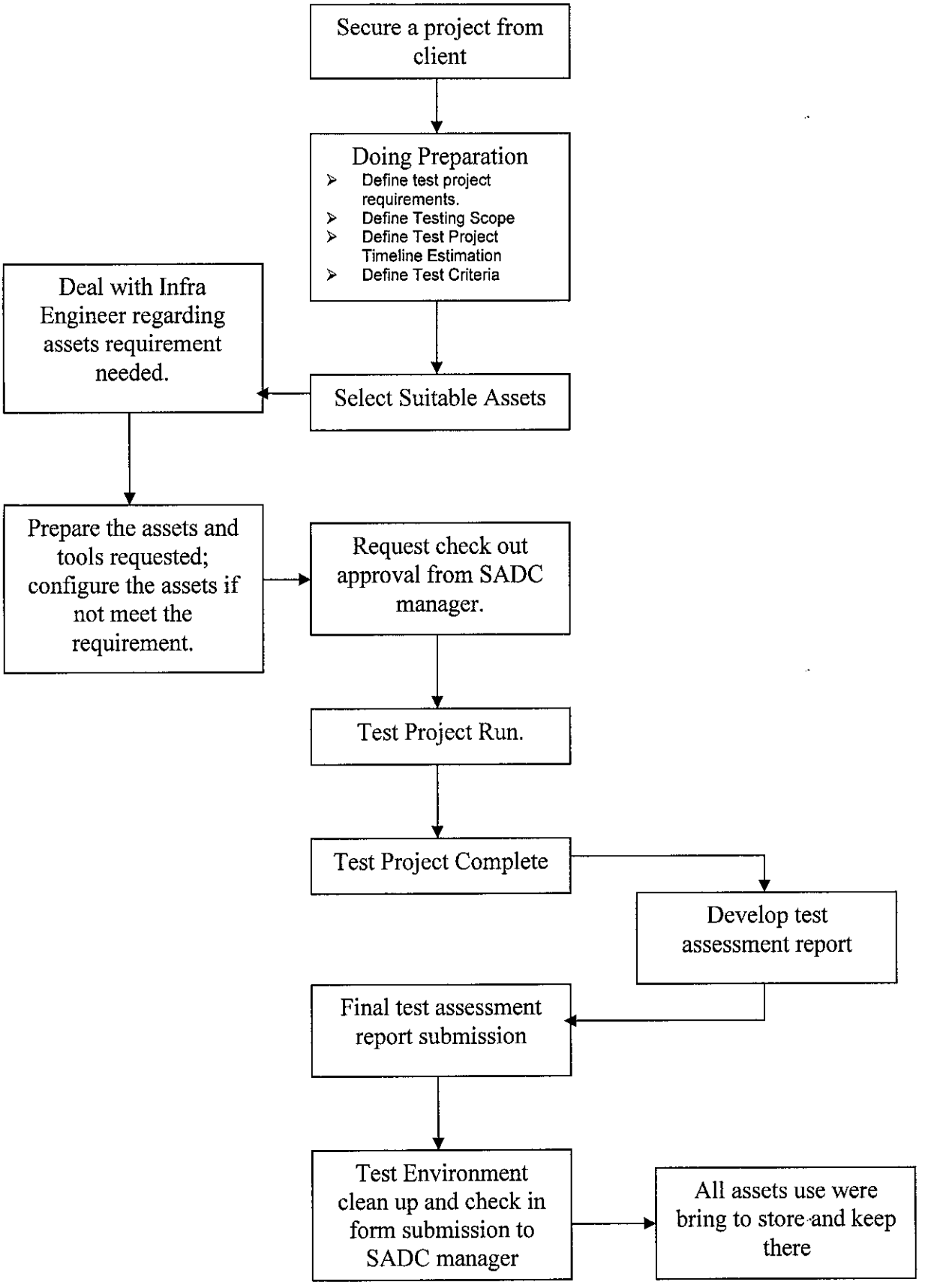
Users search functions are limited. Under users' category, the search function will only give permission to view the current assets. Users cannot update or swap the hardware.



3. Booking assets

Under book asset function, users can book the available asset in database to include with their test project. The output of the booking will be under Check In and Check Out form. This form is use to take the assets out from the office and 1st need manager signature to approve.

3.2.3 SADC Business Process



3.2.4 System Framework & Architecture

This system framework consists of workbench, server and database. Workbench is client sides were all the input data being done by the admin and user can use the input data after admin finish insert it. This way, user can directly use the data given and select it for project. All the data will be store in a database in a server for fast searching and update. The server will handle all request information from user and process it.

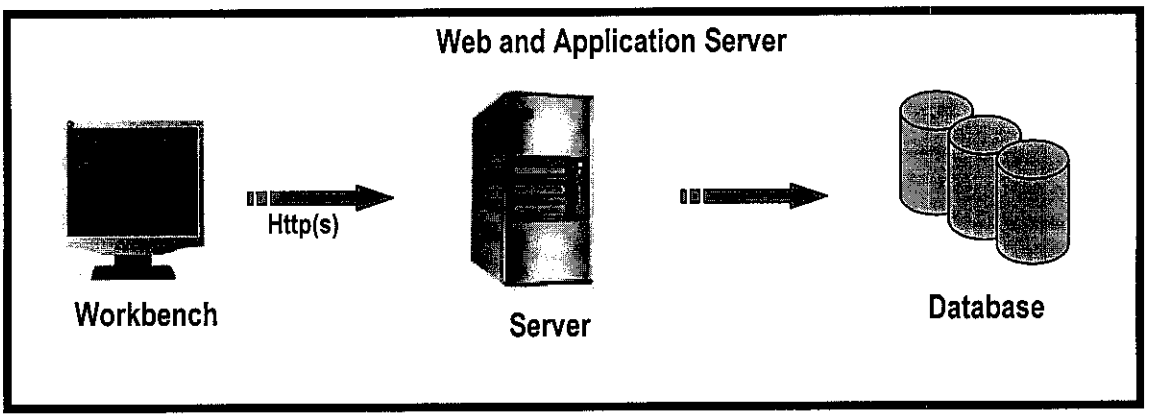


FIGURE 2 – System Framework

For this system, HTML will be used to design an interface. PHP will take part as a language to interpret the function. MySQL as database and Apache will act as a web server.

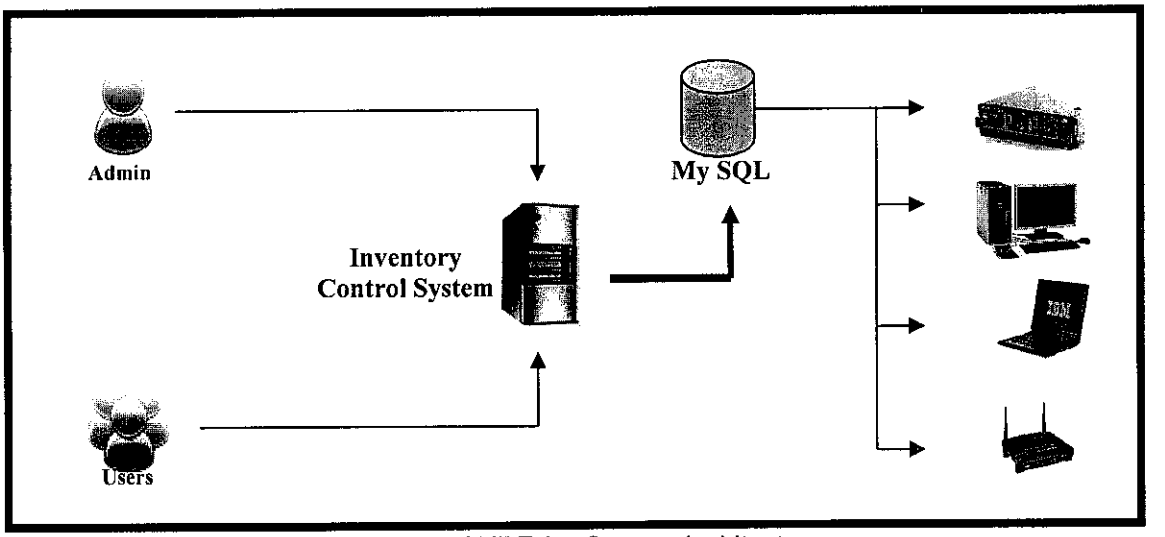


FIGURE 3 – System Architecture

The 1st phase of this system is to develop an insert form that request all the detail of the asset. This form will be categories following their attributes such as server, workstation, laptop and others, others here stand for any hardware that not connected to the big asset. Example: Switch, external CD-RW and tape backup.

The 2nd phases, after all information regarding the asset are on database. It comes on how to manipulate the data. They will be a search function to search the asset; the system will search according to the keyword enter and display the result. From the search result, admin can select and view the detail information about the asset, here admin have the authorities to swap the hardware from one server to another server.

3.2.5 Data Gathering / Data Analysis

Under this section, we will discuss on how the requirement being analyze after requirement gathering. There are 4 modeling that been used in constructing the framework to explain each of the requirement needed in detail which are

1) Activity Diagram
2) Use – Case Diagram
3) Class Diagram
4) Entity Relationship Diagram

❖ **Activity Diagram**

An activity diagram represents the business and operational step-by-step workflows of components in a system it also shows the overall flow of control. Activity diagrams are typically used for business process modeling, for modeling the logic captured by a single use case or usage scenario, or for modeling the detailed logic of a business rule. It illustrates the processes that are performed and how (data) move among them objects. There are several guidelines to create the Activity diagram. Its includes; Set context or scope of activity being modeled (determine scope and title); Identify activities, control flows, and object flows that occur between activities; Identify any decisions that are part of the process being modeled; and Identify any prospects for parallelism in the process. The process starts at "Initial Node" and end at "Final Activity Node". There are also some shapes that define the whole process like Action, Activity, and Merge Node etc. The details of the diagram are illustrated below:

Activity Diagram for SADC Inventory Management System (ADMIN)

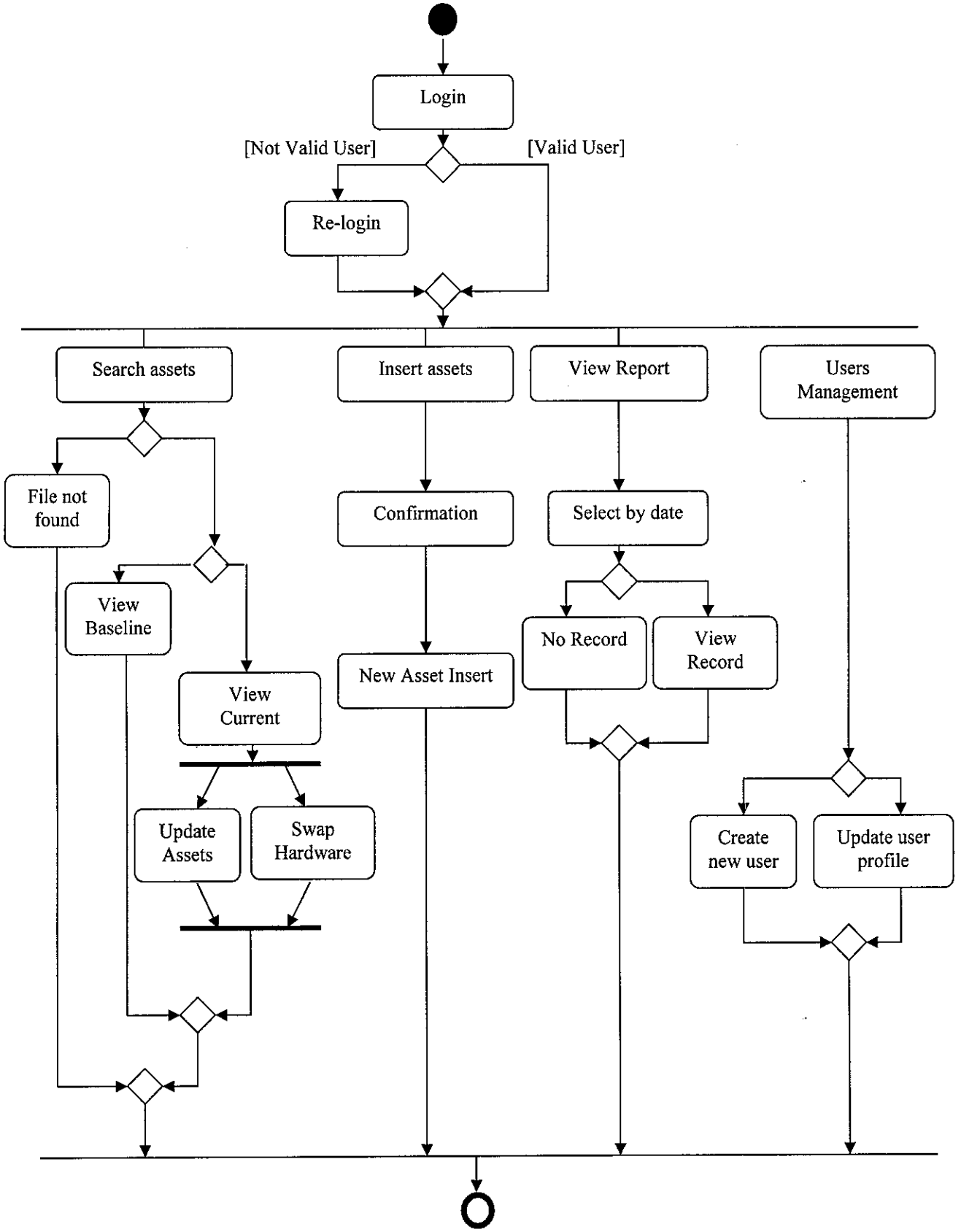


Figure 4 - Activity Diagram (ADMIN)

Activity Diagram for SADC Inventory Management System (USERS)

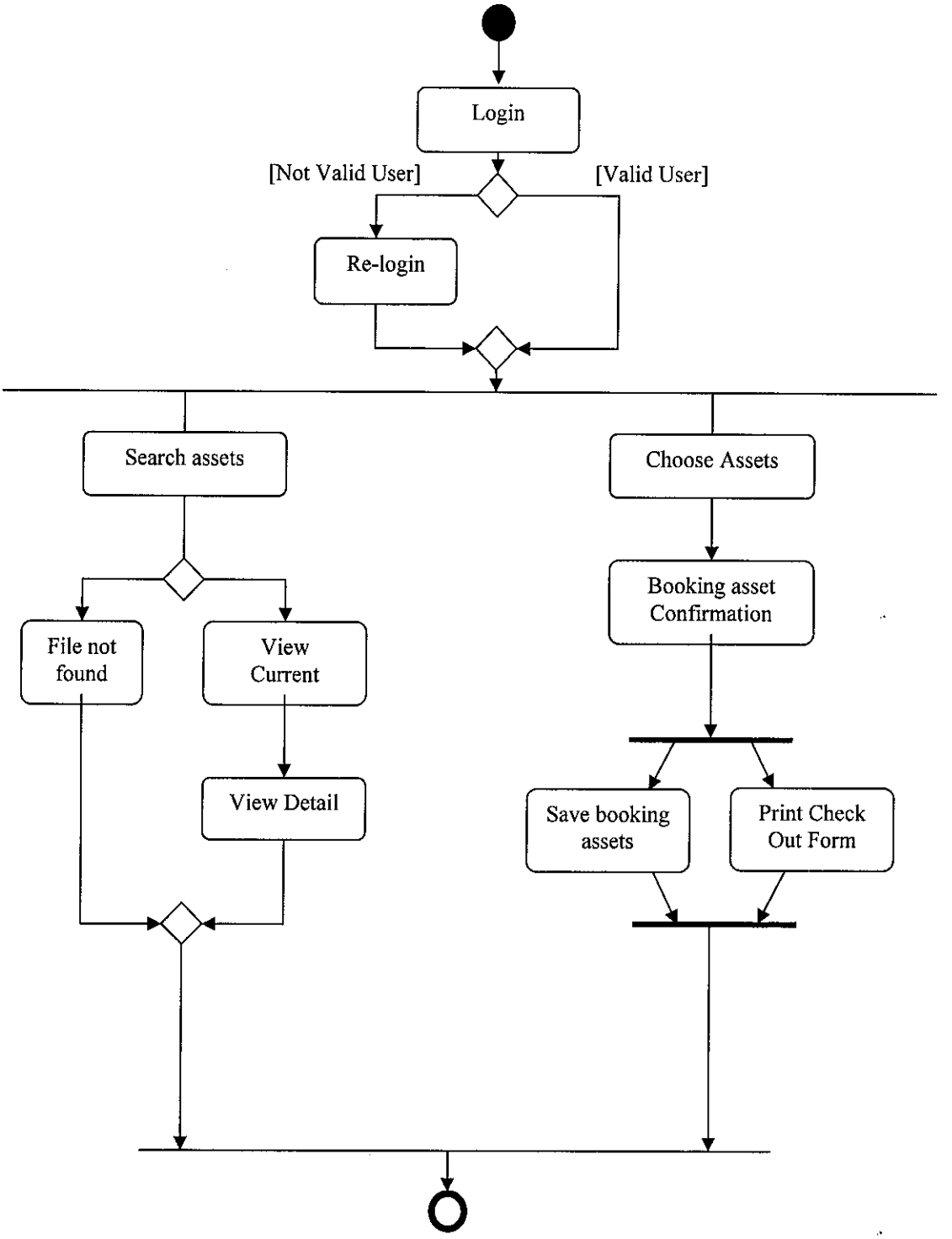


Figure 5 - Activity Diagram (USERS)

❖ **Use – Case Diagram**

Use –Case diagram is a diagram used to capture the functional requirements of a system. It use for describe the interaction between a primary actor—the initiator of the interaction—and the system itself. Use Case is an analysis technique rather than a design technique and it provides high level view of what the system does and who uses the system. System analyst will interview the client to come out with the Use Cases. Use cases modeling usually have two constructs actors and use cases. Actors represent anything that interacts with the system to exchange information. Not a job title but a role related to the system. Actor can be a person or an external system. Use cases are represented by the symbol of stick figure and it's labeled with its role. Use case represents a major piece of system functionality and is labeled with a descriptive verb-noun phrase.

For this system, two main actors are Users and Admin. Administrator will handle most of the activities in the system due to propose of developing this system. Admin will have these following tasks in the system:

- Search Assets
- Update Assets
- Swap Hardware between assets
- Insert new assets
- View system historical data
- Manage user.

For the users function, users are only eligible to search the current asset that being changes by admin and booking an assets for test project. Users also will the print function to print the check in and check out form. The details of the diagram are illustrated below:

Use Case Diagram

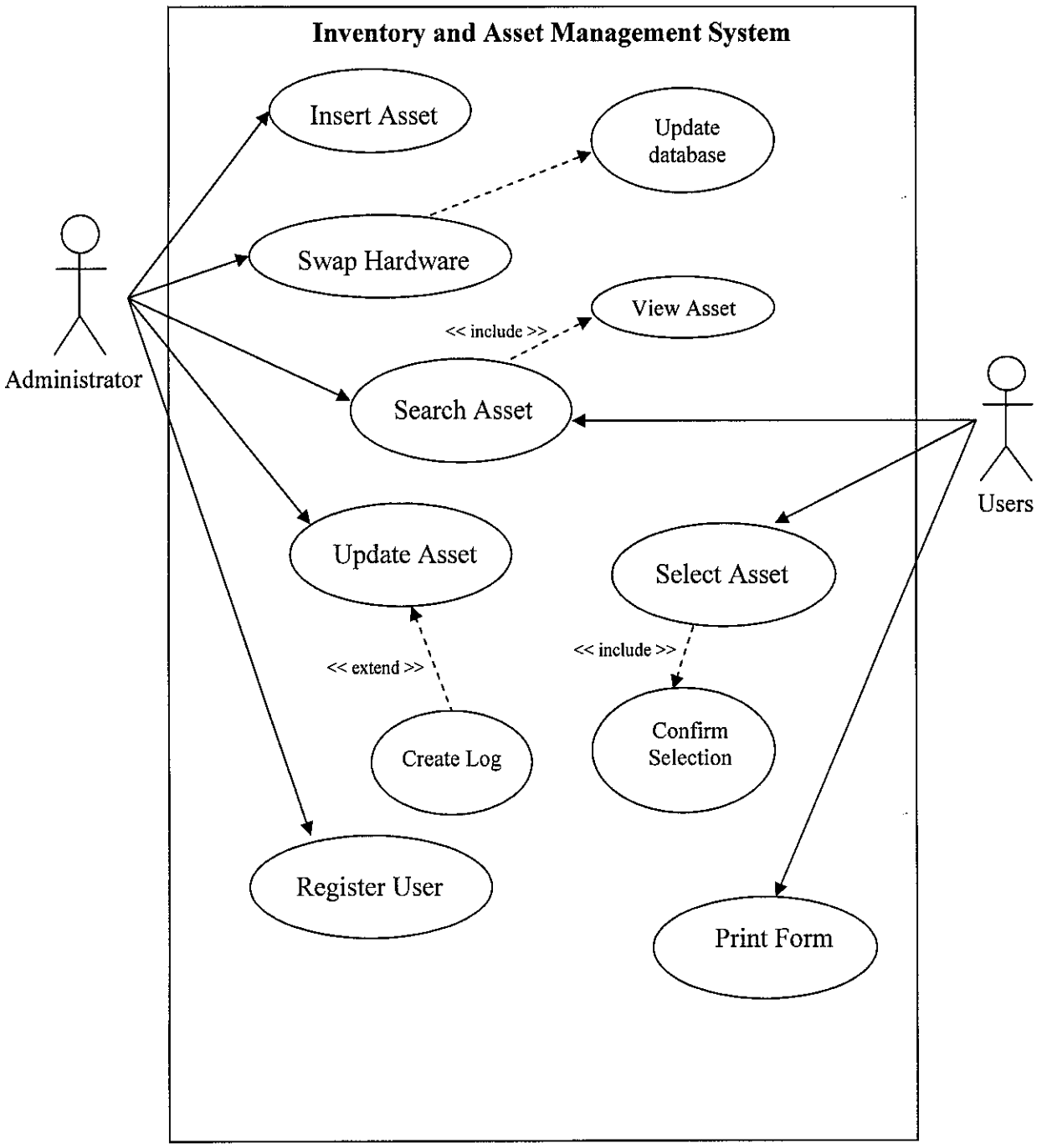


Figure 6 – Use case diagram

❖ Class Diagram

A class diagram is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, and the relationships between the classes. It consists of a group of classes and interfaces reflecting important entities of the business domain of the system being modeled, and the relationships between these classes and interfaces. The classes and interfaces in the diagram represent the members of a family tree and the relationships between the classes are analogous to relationships between members in a family tree. Interestingly, classes in a class diagram are interconnected in a hierarchical fashion, like a set of parent classes (the grand patriarch or matriarch of the family, as the case may be) and related child classes under the parent classes. For inventory and asset management system, the class diagram can be described in the next page:

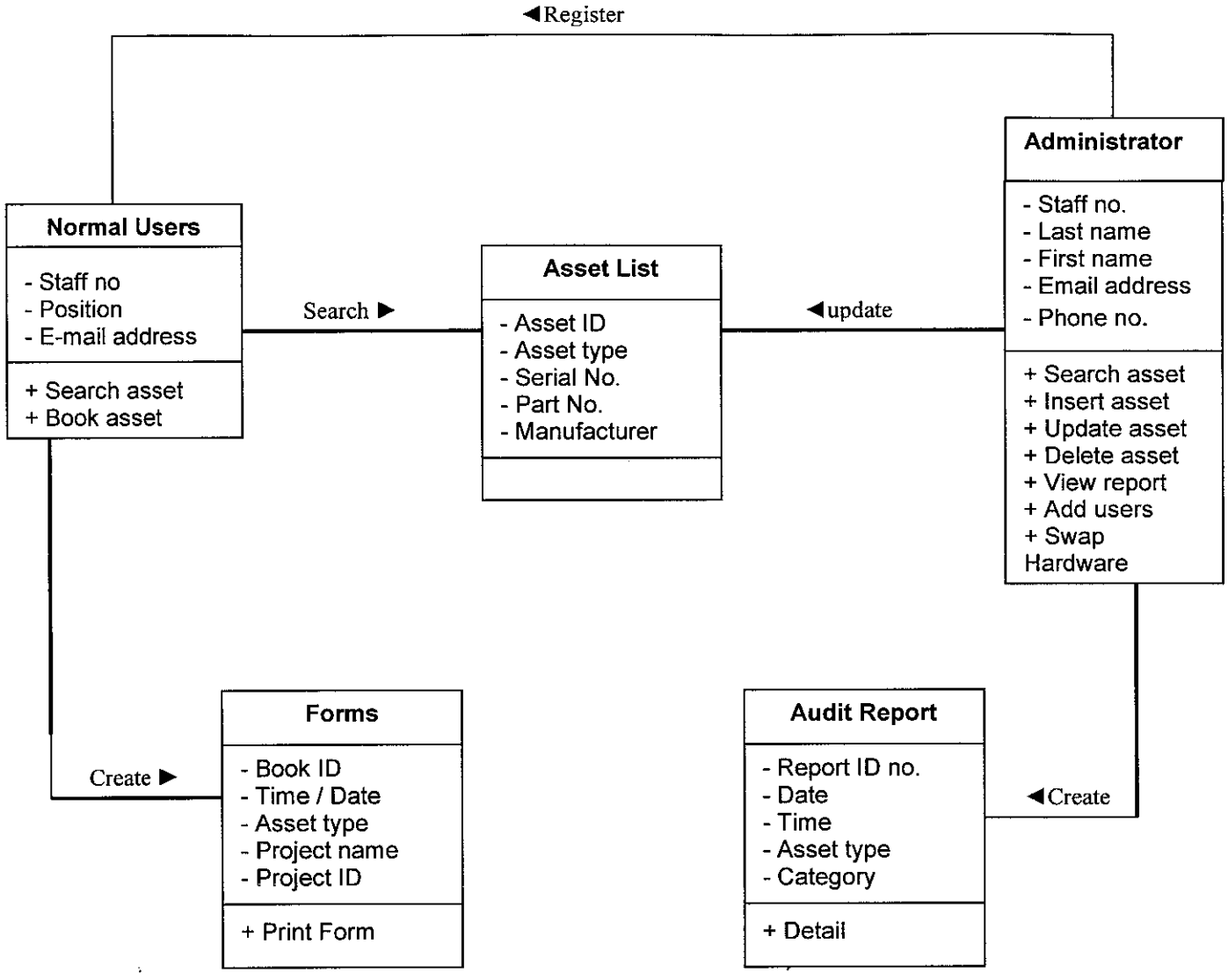


Figure 7 – Class Diagram

Entity Relationship Diagram

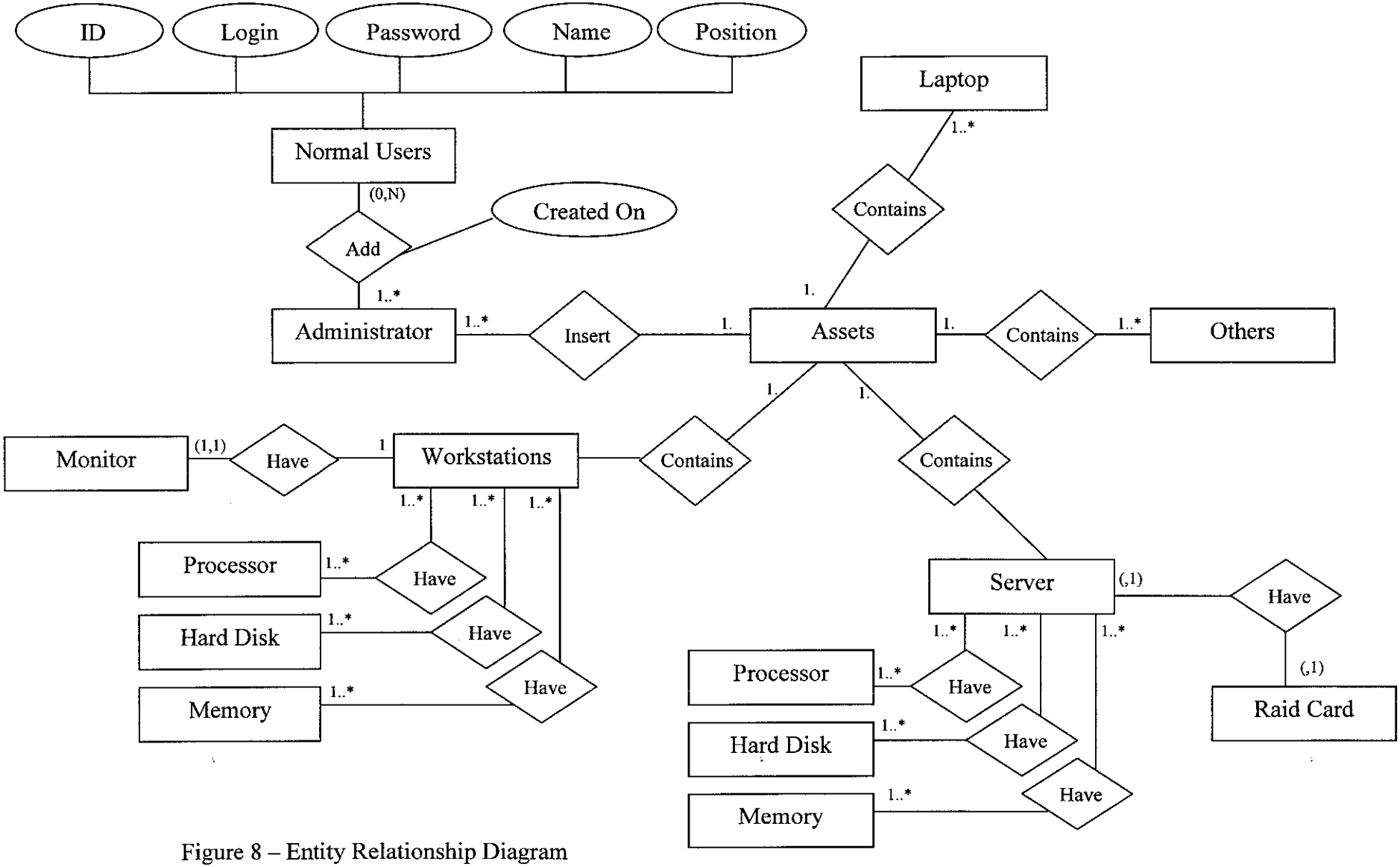
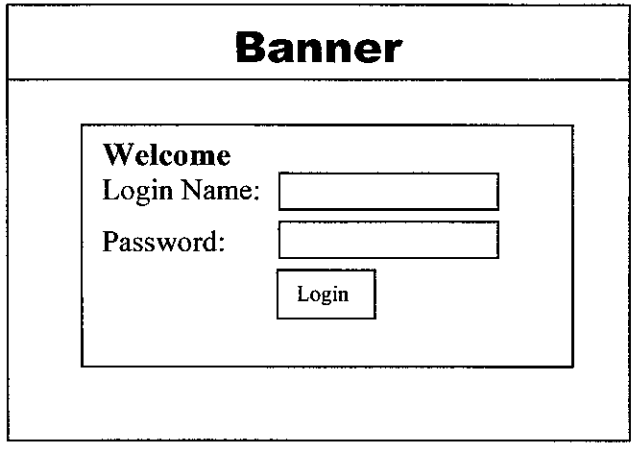


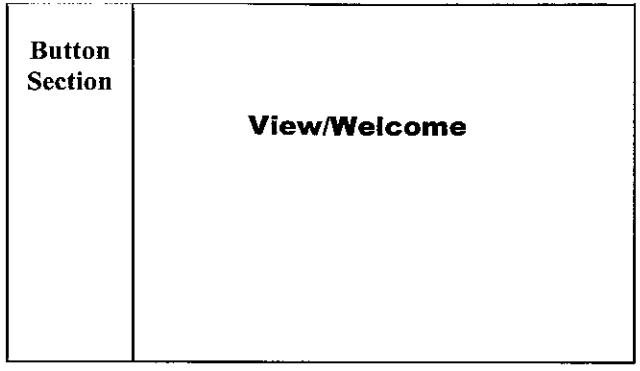
Figure 8 – Entity Relationship Diagram

3.2.6 System Story Board

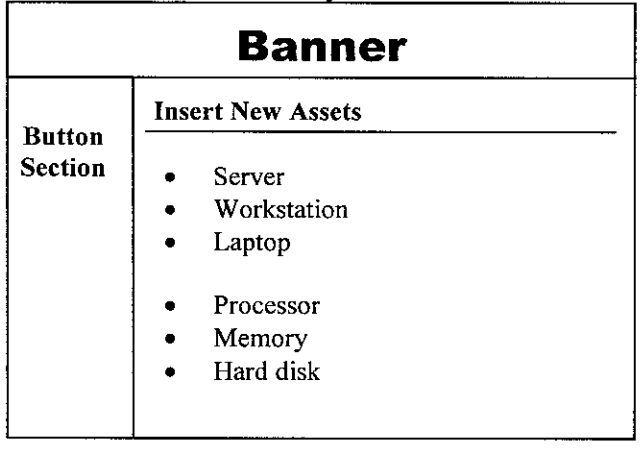
❖ **Admin Insert Function**



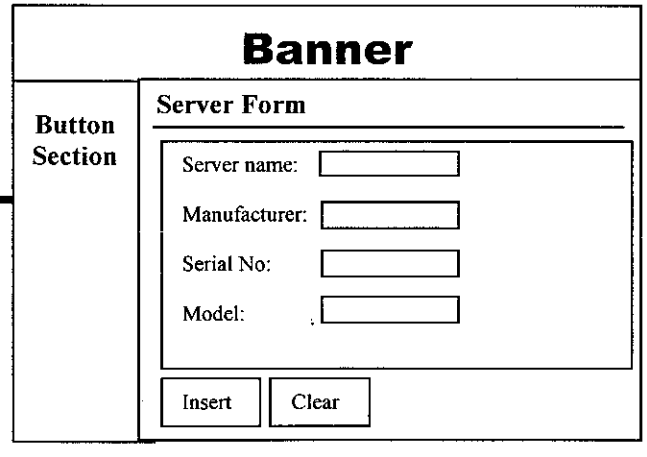
1. Login Page



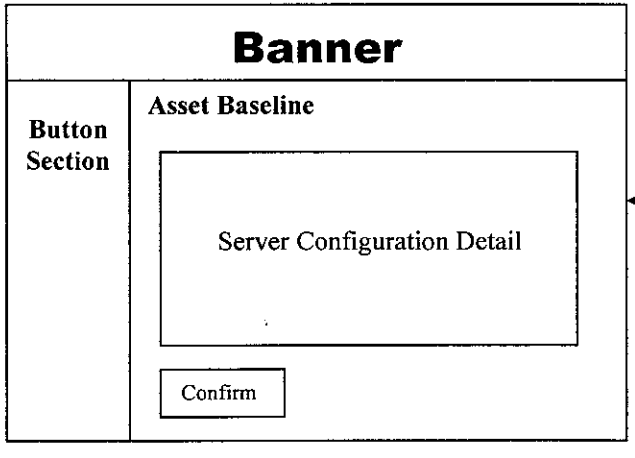
2. Index Page



3. Insert Page

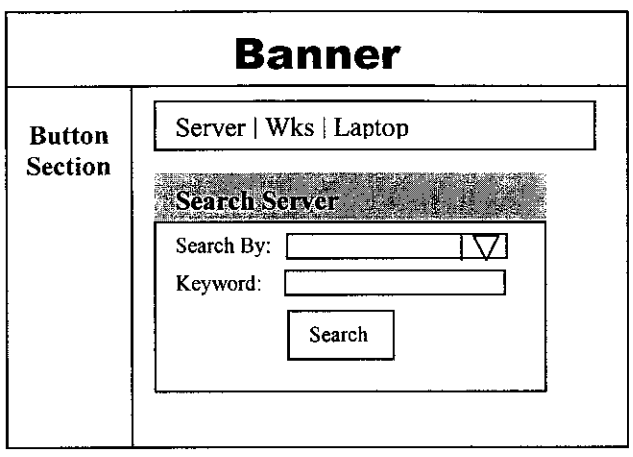


4. Server Form

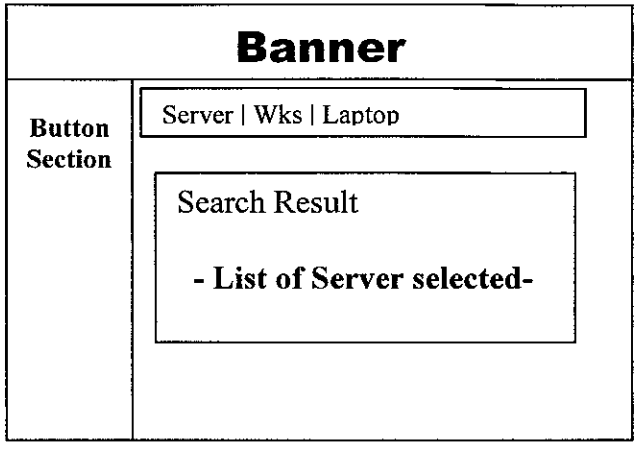


5. Confirmation page

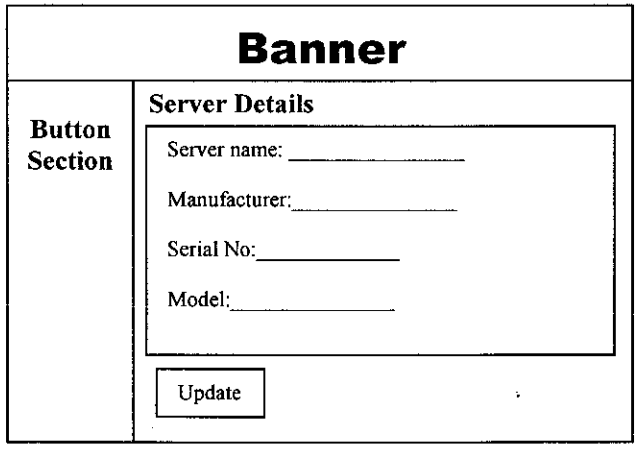
❖ **Admin Search Page**



1. Search Page



2. Search Result



3. Update Server

3.3 Design Phase

During the design phase the project is moved from the architectural baseline and grows it to become a complete system. The design will be refined into a code. Under this phase also, the construction of the database and coding of the system will start and testing will be follow according to function created. The design outputs from the previous phase will serve as system blueprint for the system and to helps programmer to detect problem while develop it.

I have come with an agreement with SADC to minimize their budget to have this system install. After meeting, we have come to a conclusion to use open source product to minimize the budget and a product that easy to maintain and develop. To use the system, the server must run software that acts as an interpreter and middlemen to ensure the system running without having an error and running smoothly. Below is the detail about software needed to design the system and being installed on server.

Operating System	Windows XP Service Pack 2
Database	MySQL 5.0.45 phpMyAdmin 2.10.3
Web server	Apache HTTPD 2.2.4 Openssl 0.9.8e
Language interpreter	PHP 4.4.7
Code reader	Zend Optimizer 3.3.0
File transfer(FTP)	FileZilla FTP Server 0.9.23

Table 1.0: Software Requirement

3.4 Hardware & Tools

For this project, I will use several different tools and technologies to develop a complete system that according to the function discuss.

3.4.1 Software Used

- Crimson Editor – This software is same as notepad to write HTML and PHP command, the different with is all HTML and PHP command will be colored to differentiate which is Variables, value and etc.

- APACHE 1.3 – This is a Web Server use to launch a website and must be integrating with PHP for PHP command working.

- PHP 4 - PHP stands for **H**ypertext **P**reprocessor. PHP is a widely-used general-purpose scripting language that is especially suited for Web development and can be embedded into HTML.

- MySQL - MySQL is an open-source high-performance, multi-threaded, multi-user relational database management system built around a client-server.
- Macromedia Dream Weaver - To build an interactive interface with enhanced features.

- Adobe Photoshop – This program is used to edit photograph, picture and icon.

3.4.2 Minimum Hardware Requirements

- INTEL Pentium 4 1.7GHz
- 40MB Hard Drive
- 128MB RAM
- NIC card.

CHAPTER 4:
RESULT AND DISCUSSION

This chapter will be split into different categories that explain about the output and result of this project. The categories being discuss are:

- System Interface
- Limitation

4.0 SADC Inventory Control System Interface

4.1.1 Login page

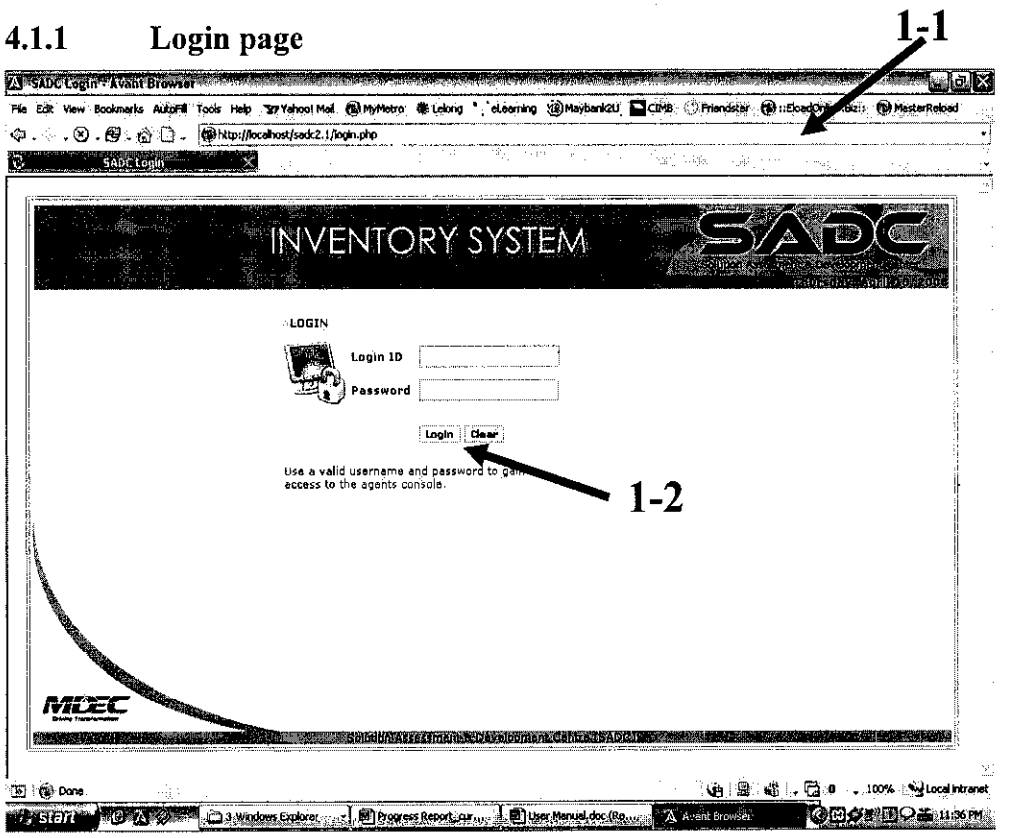


Figure 9 – Admin Login

Step 1 - Access into the system
Tasks:

1. Open any Internet browser such as Internet Explorer
   - 1-1 Type an address http://localhost/sadc2.1/login.php
   - 1-2 Type your Login and password, click "OK"
     - If the Login and Password same as data in database, system will allow the user to login and enter the system. If not, it will directly go to page error!

4.1.2 Landing Page (Administrator)

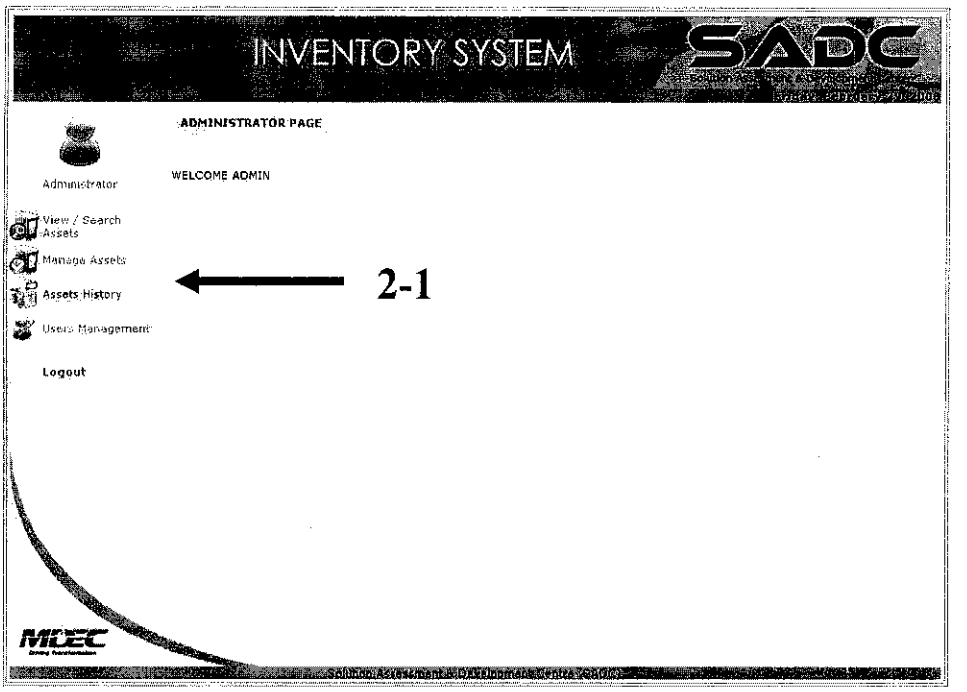


Figure 10 – Admin Landing Page

Step 2 - Working with assets

Tasks:

After admin get full authentication from the system, system will redirect to landing page

2-1 Navigation button

- This button will be available to all pages for admin to navigate from one page to another.

4.1.3 Search page (Administrator)

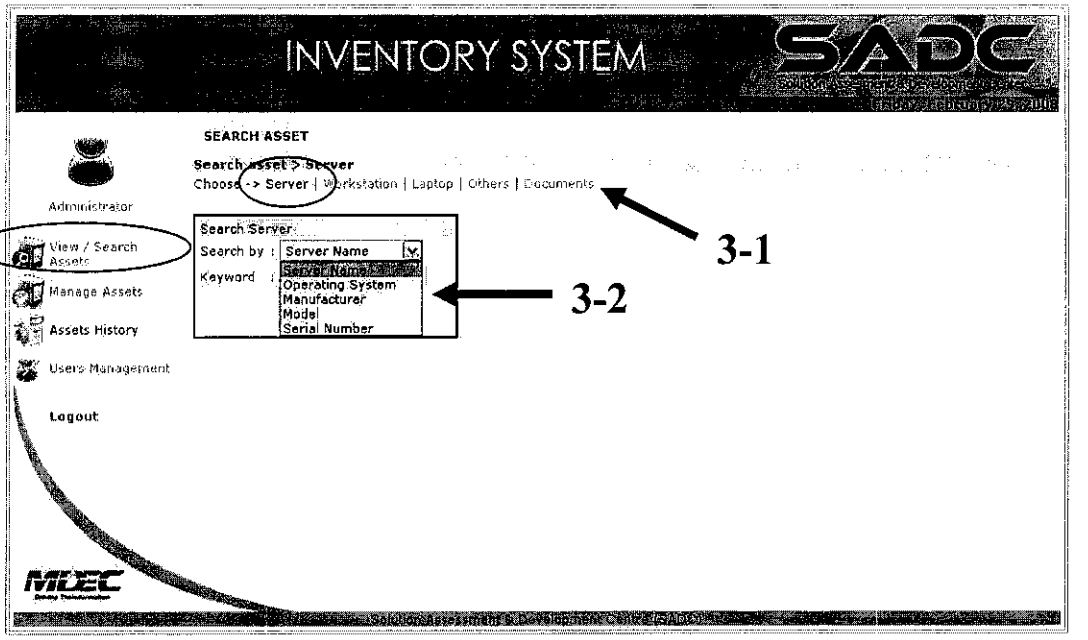


Figure 11 – Admin Search Page

Tasks:

Search function provides admin to search for an asset available in SADC and view the assets detail.

3-1 This section is for admin to choose what type of assets they want to search. Click "Server" if they want to search for server.

3-2 Click the drop down menu and select either want to search by server name, OS, manufacturer, model or serial number and field up the keyword in keyword textbox.

4.1.4 Search Result (Administrator)

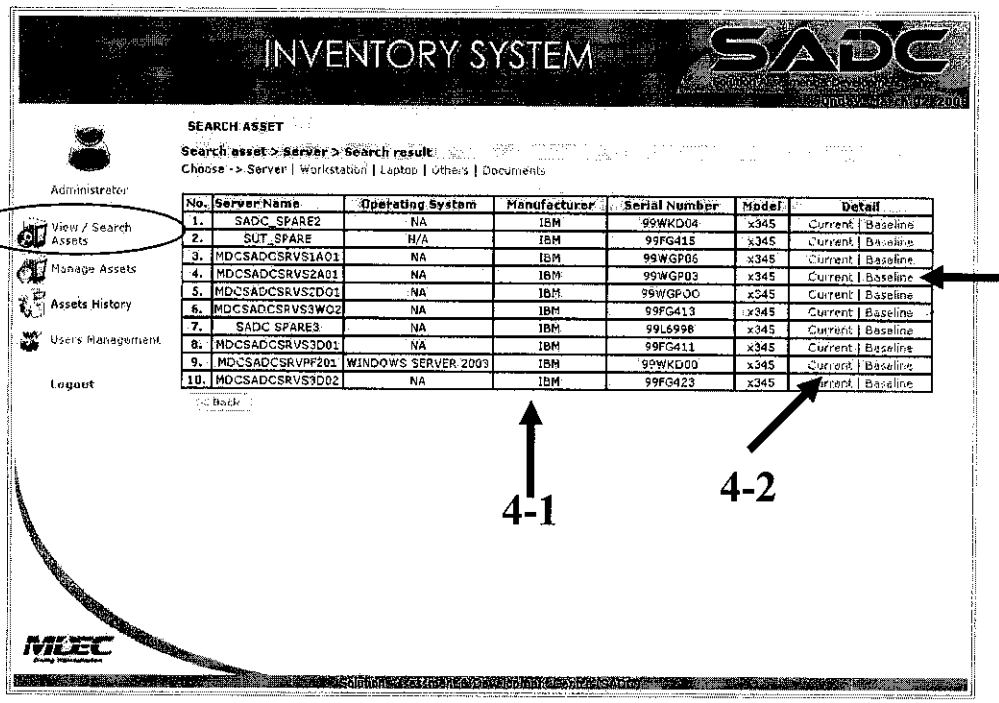


Figure 8 – Search Result

Tasks:

After admin had key in the keyword in search box, the system will search the database according to search by and the keyword inserted.

4-1 Table will show the result being captured from database according to what categories admin want and the text inserted in the text box.

4-2 At the right field of table, under detail column, admin can choose either to view the current specification or the server baseline. The current hyperlink will redirect admin to current server specification where admin can update and swap the hardware inside it.

4-3 The baseline hyperlink will redirect admin to page where admin can view the specification comes from manufacturer.

4.1.5 Current Detail Page

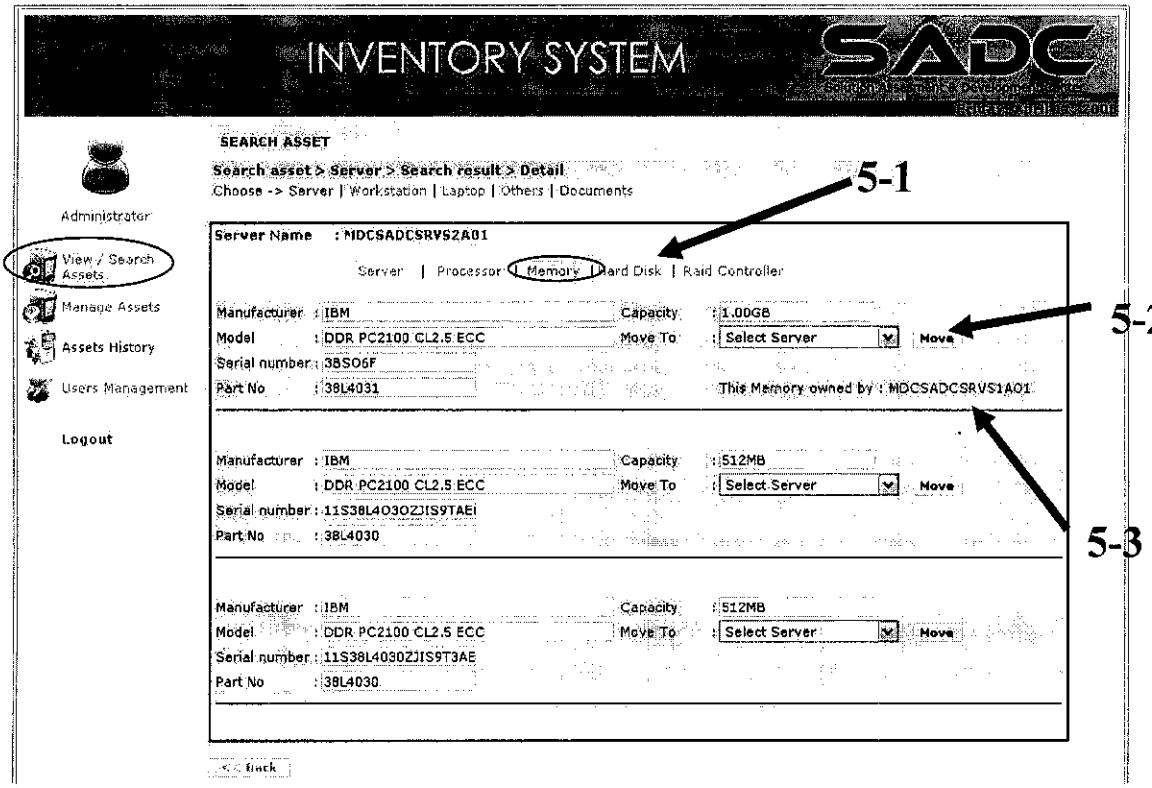


Figure 9 – Search Detail (Current)

Tasks:

Above is the sample of current configuration page. Under this section, admin can swap the hardware between assets.

5-1 This hyperlink use for admin to view the assets detail either to view the server basic information, processor, memory, hard disk and RAID card.

5-2 Click the drop down menu and select the server name to move the hardware. After click move button, popup page will appear said that the "Server has been update"

5-3 The word being colour in red will indicate that the hardware is not own by the server when compare to the server baseline. Example of the word is : " The memory owned by : <server name>"

4.1.6 Insert New Asset Form

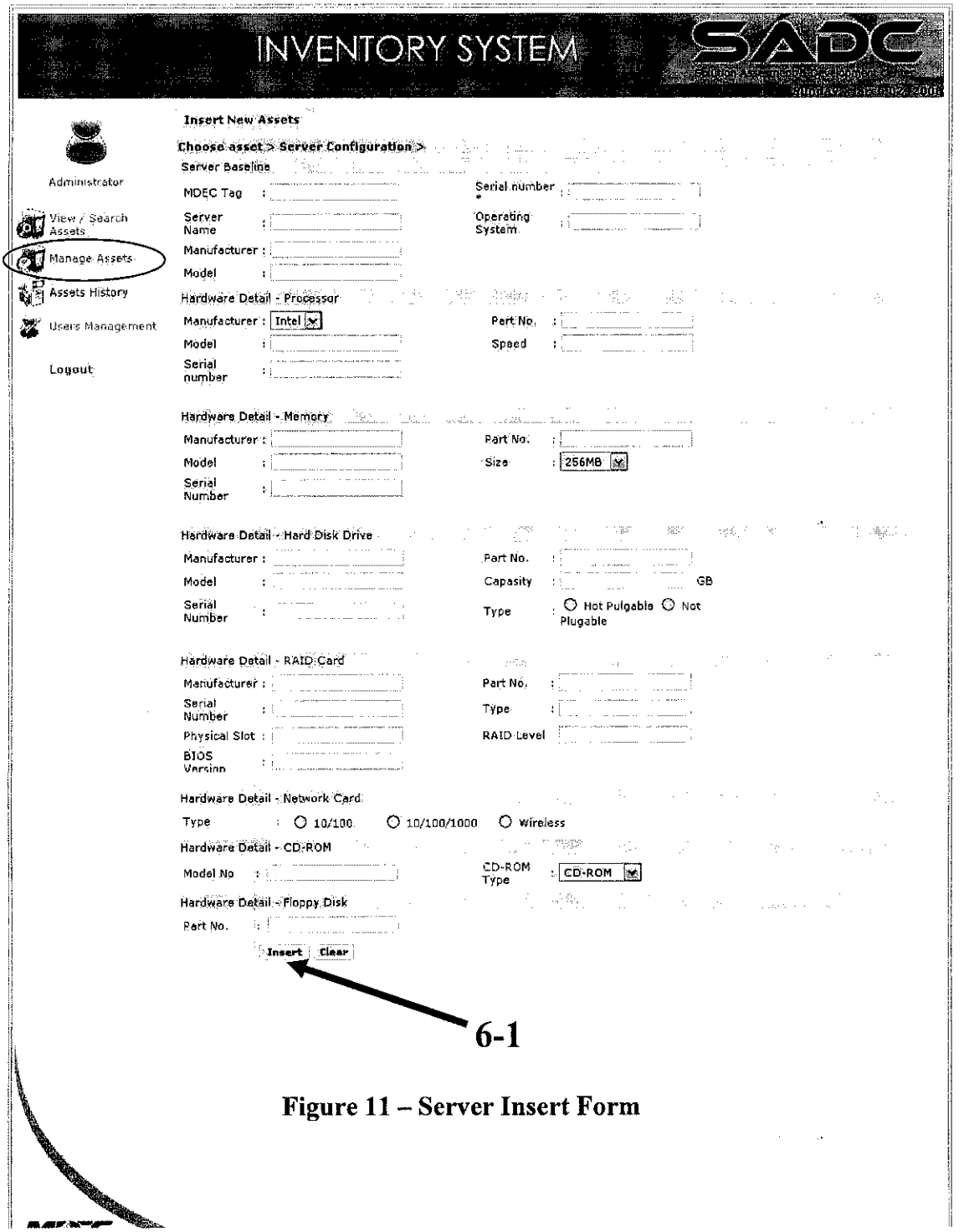


Figure 11 – Server Insert Form

Tasks:

The form in the system created based on the manual form use by SADC currently.

6-1 After fill up all the attributes needs in the form, click the "Insert" button to

Users Management

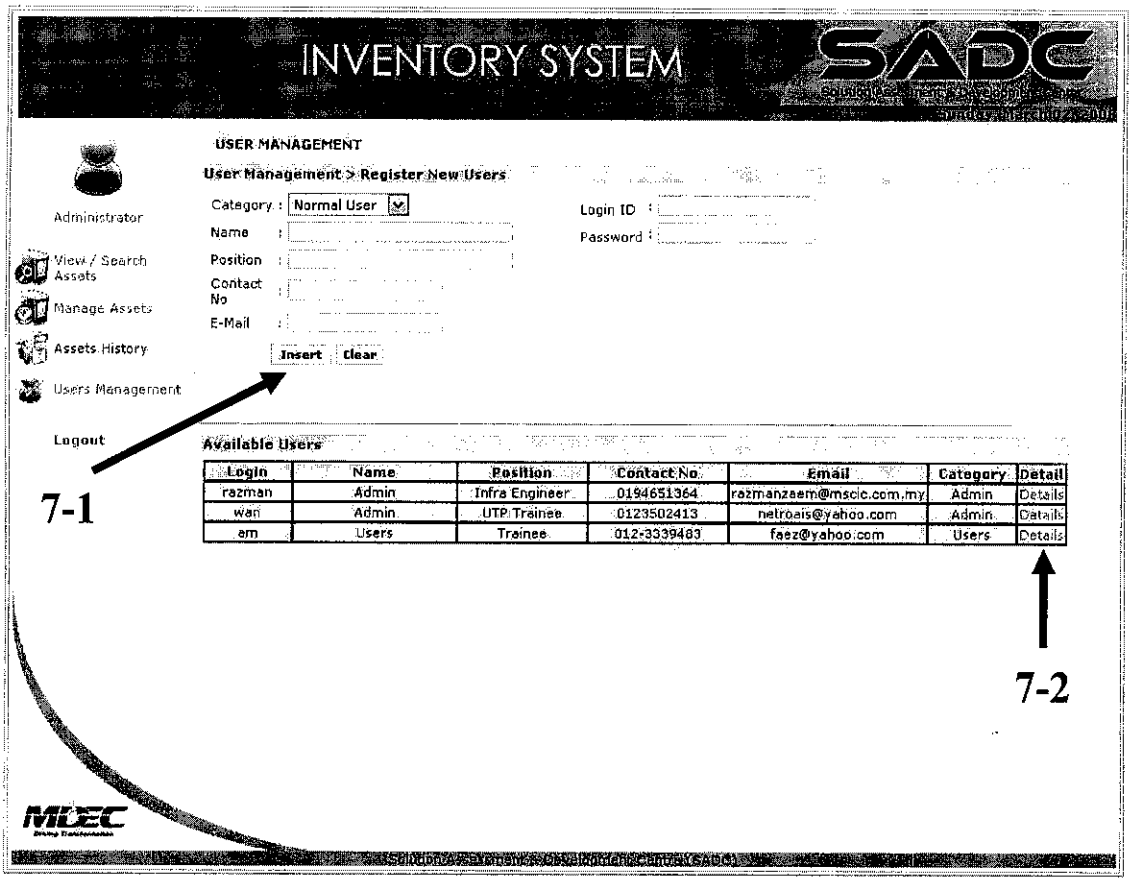


Figure 15 – User Management Page

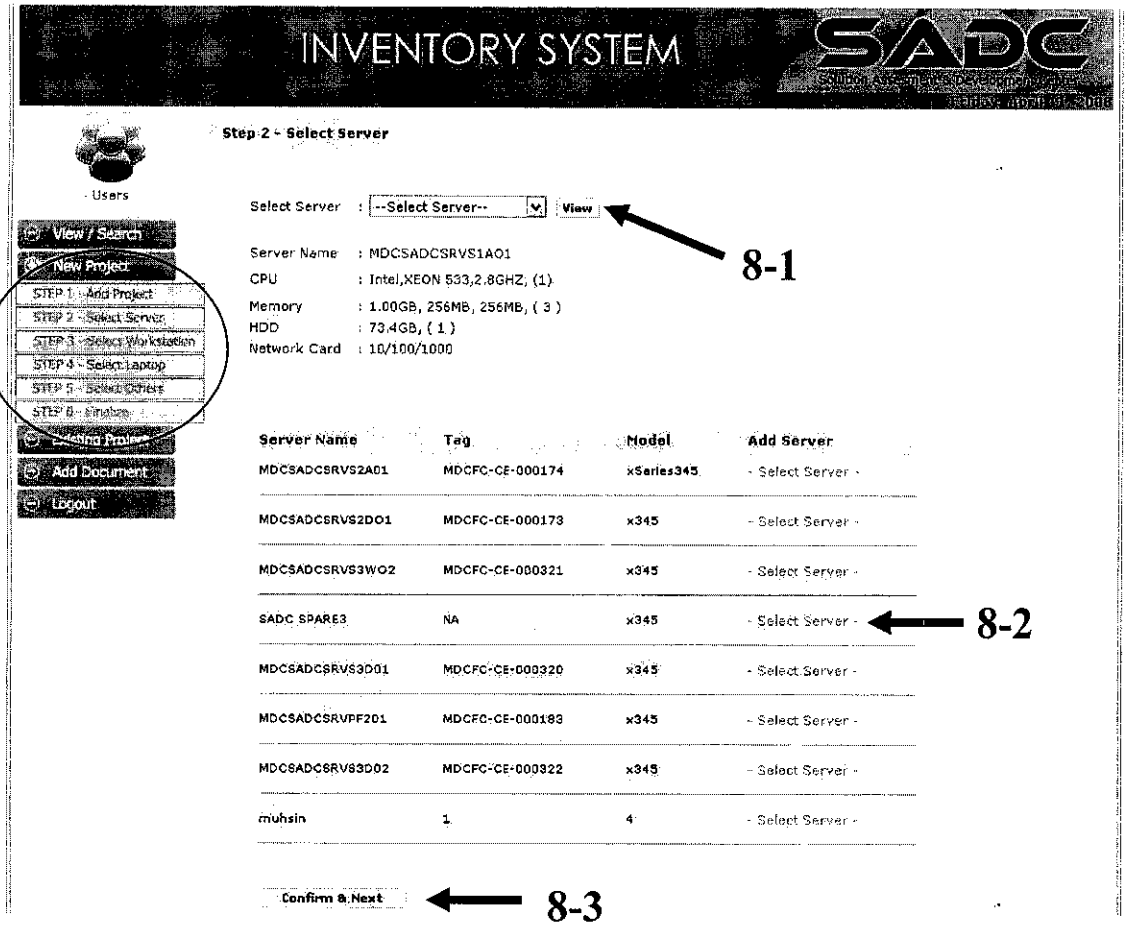
Tasks:

Admin will have a function to add new user. By using this function, admin can limit the user who can access to the system. If users forget their password, admin will use this features to retrieve the password and email it to the users.

7-1 The form use for admin to insert new user that can access the system. After fill up the form, click "Insert" button and the new user will appear in table below. After registered, please test the login name and password at the login page.

7-2 The detail section is for admin to update the existing users, delete users and retrieve users' password.

4.1.8 Add new project (Users)



Tasks:

This section for users to choose assets they want to select for the test project. To guide users to chooses assets, the system being categories into steps.

8-1 This function is use for users to check the assets specification. By having this, users don't need to memorize the assets specification found at View/Search function.

8-2 This section will show list of assets available in SADC. If the assets had being select by other users, It will not display in this section. Users need to click "Select Server" at right column if they want to select the server.

8-3 After finish selecting the assets, click "Confirm & Next" button to continue selecting another type of assets.

Limitation

There will be no system or system architecture that 100% work fine without limitation. For this system, some of the limitation cannot be eliminate and only can be solve in time to time according to the technology changes. Some of the limitations are:

- The system target to be installed only on one server, if the server fail, all the system and database cannot be access.
- SADC staffs still need to do some work manually such as asking for manager approval to check out assets.
- If SADC assign more than two admin to take care of the system, it's hard to maintain the assets location accurately.
- No security features to protect the data on database.
- Users need to send email to admin to inform regarding what assets they need to use in a test project and admin need to manually configure the assets

CHAPTER 5:
CONCLUSION & RECOMMENDATION

5.1 Conclusion

In this report, it briefly explains on how "*Inventory and Asset Management System*" can help SADC to improve their business nature by having an effective and accurate management system. One of these system objectives which are to eliminate paper base by replacing paper base with online systems also can be implied after the system implementation being done.

Currently there are a lot of inventory system outside that focus on administration, control and supervision. Even does all the system have the same main functions, but to track the entire asset into detail and swap the hardware between server and workstation is rarely, because of SADC business nature that needs to fully utilize their hardware, this system flow comes in mind to guide and assist SADC infrastructure engineer to track the hardware into detail. From the surface, the system seem to be simple, but when it comes into detail, The architecture, database design and work flow will be difficult to interpret and implement.

Having a good inventory system is a must to all company either big or small company. Each company must have their inventory system and the functions must go accordingly to their business nature. Starting from the computer technology edge, inventory system has helped many companies to reduce their budget and move forward to compete with their rivalry. There are many article stated regarding this statement and had been proven by IT expert and business analyst.

Later, I intend to wider the scope of the system to help SADC to have centralised data server of all asset and artefacts to help this company stand stronger to achieve their Vision and Mission statement to be the best testing solution company and target for high CMMI level and get rewarded by ISO.

5.2 Recommendation

Since the system is still new for SADC (Version 1), that's a lot of improvement need to be made after the implementation phase. It's important for SADC to secure their assets information and take extra precaution about their database. The recommendation need to be made for the system as below:

- Upgrade the system to be real time system.
- Under admin page, include a function for admin to check the detail of assets used for a project.
- Add extra function to check server/ workstation compatibility before doing swapping.
- Increased the security level for all aspect of the system including the system itself and database.
- Create a script that can backup the data from database weekly or monthly.
- Wider the scope of the system such as software licenses attach to assets such as server, workstation and laptop.
- Have an email function in the system itself for users to send the requirement needed for project, directly to admin.
- Have a system that can create report for auditing without admin manually need to type a word.

REFERENCES

[1]
R.Jerry baker, Lee Buddres and Robert Kuehne. 1994, *Policies and procedure for purchasing and material control,* Prentice Hall, Englewoodcliffs,NJ, <http://www.elmo.shore.ctc.edu/jbaker/gloserry.htm>

[2]
Neil Jaffre. June 2003, *What to Expect: Inventory Management Principles and Technology Special for Just in Time,* <http://distribution.activant.com/press/jaffe-management-principles.html>

[3]
Greg Steen. February 2007, *Group Policy Inventory,* TechNet Magazine <http://www.microsoft.com/technet/technetmag/issues/2007/02/UtilitySpotlight/>

[4]
Eli J. Remington. May 14, 2003, *managing your data in a web based, paperless environement* <http://www.saberlogic.com/pdfs/web-based_art.pdf>

[5]
"Paper-based quality system is more costly than you think" *Cost of a paper environment* MetricStream Delivers <http://www.metricstream.com/insights/paperbased_qltysys.htm>

[6]
Jan/Feb 2000, CimTech information Management and Technology, *The Journal of CimTech*, Volume **33 (1)**

[7]
Grill Britle. 2000, *Information Management and Technology Bank of Scotland* **Vol33 (2)**

APPENDIX 1

EQUIPMENT CHECK-OUT FORM

MSC MALAYSIA
Spearheading Transformation

Equipment Check-Out No.	ECO0003		Equipment Check-In No.	
Equipment for	☐ Showcase ☐ Corporate ☐ Network			☑ Test Project
Test Project Name (if applicable)	MoF-eTreasury-02-2004			
Approved By	Name	Khor Cheng San		
	Date	20th May 2005		
	Time			Initial
Removed By	Name			
	Date			
	Time			Initial

No.	Description of Equipment	Serial number (if any)	Qty	Remarks
1.	IBM xSeries - 345 • CPU: 1 x Intel Xeon (2.8-GHz, 512Kb L2 cache) • Memory: 2048 MB ECC DDR SDRAM • HDD: 3x 36.4 GB (RAID-5) • Network Card: 2 x Integrated 10/100/1000 BaseT Chassis: Rack-mount Configuration (2U) 2 way server	99L6998	1	MDCE1EGSRV01
2.	17" LCD Monitor for SUT monitoring server	23-46638	1	
3.	Standard Keyboard 104 Keys for SUT monitoring server	0191880	1	
4.	PS2 mouse - for SUT monitoring server	NA10603224	1	

Attachment(s) included? ☐ Yes ☐ No If Yes, please refer to next page.

MDEC Driving Transformation
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APPENDIX 2

EQUIPMENT CHECK-IN FORM

Equipment Check-In No.	ECI0003		Equipment Check-Out No.	ECO0003
Equipment for	☐ Showcase ☐ Corporate		☐ Network	☑ Test Project
Test Project Name (if applicable)	MoF-eTreasury-02-2004			
Delivered By	Name	Praveen Pooedath		
	Date	20th May 2005		
	Time		Initial	
Received by	Name			
	Date			
	Time		Initial	

No.	Description of Equipment	Serial number (if any)	Qty	Remarks
1.	IBM xSeries - 345 • CPU: 1 x Intel Xeon (2.8-GHz, 512Kb L2 cache) • Memory: 2048 MB ECC DDR SDRAM • HDD: 3x 36.4 GB (RAID-5) • Network Card: 2 x Integrated 10/100/1000 BaseT Chassis: Rack-mount Configuration (2U) 2 way server	99L6998	1	MDCE1EGSRV01
2.	17" LCD Monitor for SUT monitoring server	23-46638	1	
3.	Standard Keyboard 104 Keys for SUT monitoring server	0191880	1	
4.	PS2 mouse - for SUT monitoring server	NA10603224	1	

Attachment(s) included? ☐ Yes ☐ No If Yes, please refer to next page.

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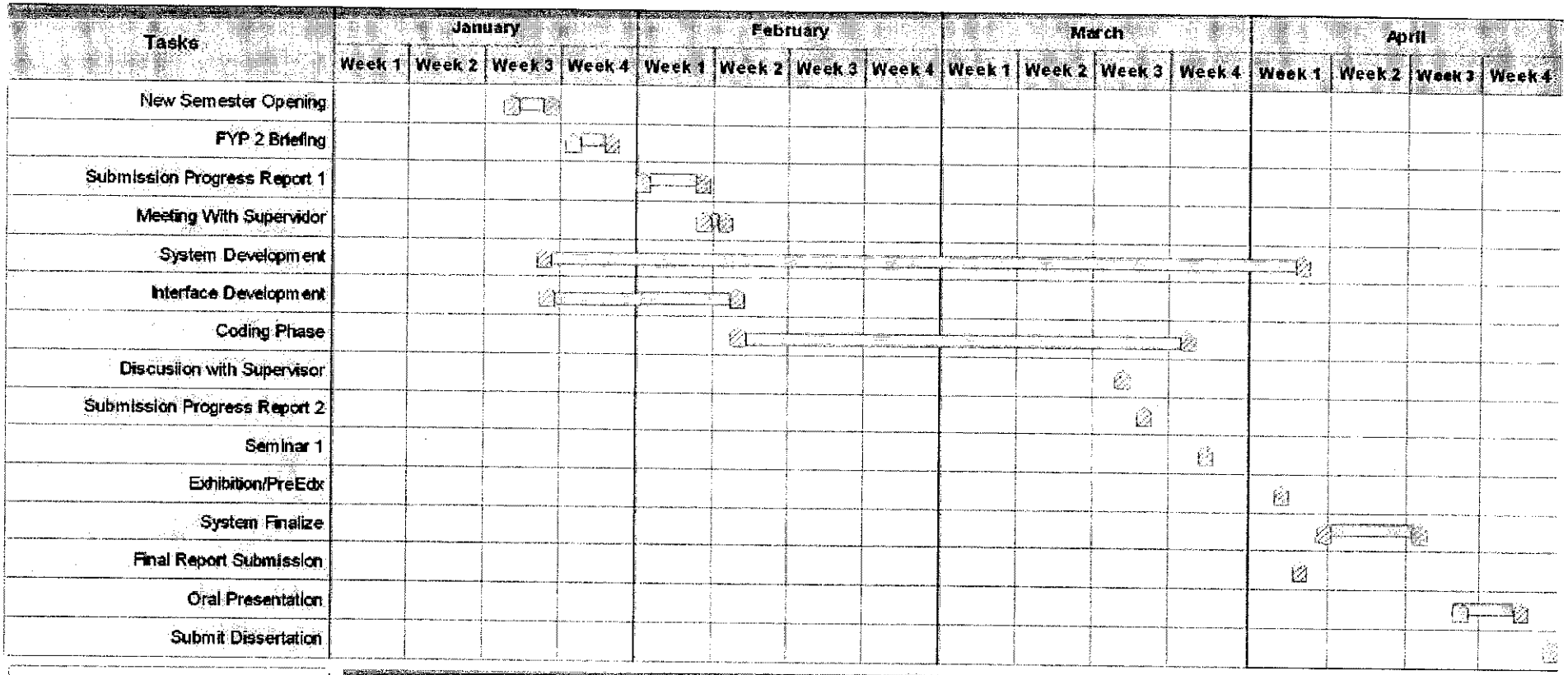
Appendix 3 - Interview Question

1. Could you please explain to me how the current system works?
2. What are the problem that the staff are facing
3. How the company assets being stored?
4. Who is the person in charge of the assets?
5. How the assets being categorized?
6. What the task of each staff?
7. Do you agree to computerize the current system?
8. What the limitation face while in test project?
9. How you retrieve the asset information?
10. For every test project, how much assets being used?
11. How many assets available in the company?
12. How you track each of hardware movement?
13. How you check for the hardware requirement?
14. If I'm creating a system for you, what function to be included?
15. What type of company network topology?
16. Are there any cases of asset loss?
17. What is the procedure of check in and check out?
18. How many test projects running in a time?

Appendix 4 – Gantt chart



KEY

- Milestone marker - start
- Milestone marker - end
- Gantt bar

Key Dates			
22/1	Semester Opening	14/3	Discusiion with Supervisor
30/1	FYP 2 Briefing	21/3	Submission Progress Report 2
6/2	Submission Progress Report 1	28/3	Seminar 1
12/2	Meeting With Supervidor	2/4	Exhibition/PreEdx
26/1	System Development	5/4	System Finallze
26/1	Interface Development	4/4	Final Report Submission
19/2	Coding Phase	21/4	Oral Presentation