**FACULTY OF SCIENCE COMPUTER AND INFORMATION TECHNOLOGY**

**BACHELOR DEGREE IN COMPUTER SCIENCE**



# E-Appraisal System

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# ABSTRACT

This project is described about E-Appraisal system in University Malaya. It is a web-based system that enables staffs being evaluated by their supervisor. This system is targeted to academic staff and also technical staff. In addition to the front-end store that serves to provides the staff to insert personal details and supervisor to do evaluation. This system will also provide for the mean of maintaining the site by authorized administrators.

A research has been carried out to the similar existing system, several types of operating system, programming languages and database. After comparing a few tools, Windows XP has been chosen as the operating system for this system. Database will be developed by using Microsoft Access while the programming language environment will be ASP. Functional requirement and non-functional requirement are discussed. Functional requirement is important to show how the system interacts with user and modules involve in the system. Non-functional requirement is important in produced a system with security, usability, reliability and etc. However, hardware and software requirement also play important role.

The system functionality, database and interface has been design and are shown to make the user has a clearer picture of the system.

# ACKNOWLEGEMENT

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# CHAPTER 1 - INTRODUCTION

## 1.1 Project Review

Appraisal is regularly a record on assessment of employee's performance, potential and development needs. The appraisal is an opportunity to take an overall view of work content and look back on what they has been achieved during the reporting period. [Employee Appraisal, 10/09/2004]

E-Appraisal system is an online web based system, which is used to evaluate the performance of staffs in University Malaya. The purpose of an evaluation system is meritorious performance (performance that at least meets expectation) is a necessary to receive a salary raise because differences in performance can justify differences in raises.

In order to step into a greater frontier, the coordination and management play an important role. A good management system will avoid the resource waste phenomena and in parallel enhance the evaluation progress in University Malaya where it can save the time to do the assessment and processing. However most of the universities and organizations are still using traditional evaluation systems (manually evaluated by the supervisor by using a file based system).

Human being has to face the consequences of misfortune. Misfortune can rise in many forms where they lead to some of the loss especially financial losses and time spent. Impact of financial loss that is consequent to an unfortunate event can be reduced by devising a compensatory system. Having realized that the importance of a more advanced technology is needed to be implemented and adopted by the university management, the idea of E-Appraisal system will be the focus of the project. The E-Appraisal system is a web based system that enables all staff in University Malaya to login to the system and fill in their personal information and enables their supervisor to evaluate them. Only authorized supervisor can access to the evaluation page and perform assessment for staff. The main purpose of E-Appraisal system is to provide a more efficient platform for every user in the system to accomplish their tasks.

The proposed system is a client-server system. By using the client-server architecture, sharing of data/resources can be made possible. The server is where the

database resides and also database tools. The client is where the staff surf the Internet using particular web-browser.

## 1.2 Project Motivation

Traditional evaluation systems used the manual method. All staff's personal information will be filled in manually and they will then be evaluated by their supervisor and processed manually. It results in problems as mentioned in 1.2.1. New forms of review may help supervisors, staffs and administrators to gain a mutual understanding of what they mean by "good performance." This may improve the work of everyone involved, while clearing up disputes. However, with the existence of E-Appraisal system these problems can be solved.

### 1.2.1 Problems with traditional evaluation systems

Below are the problems which occur in the traditional evaluation systems:-

- Time consuming and inefficiency - Consume a lot of time since the supervisors have many staffs to evaluate and it may cause missing of evaluation form. They may take a long time to process and generate the evaluation report of the staffs.
- Information delivery failure - The staffs may miss out some information and the supervisors may also miss out some of the part in the form.
- Cost effect - A lot of paper work has to be done and will invariably increases cash flow particularly when processing the evaluation information.
- Accuracy - Information that is produced may less accurate due to human errors.
- Maintenance - Paper based systems are easily prone to damage and also loss.

### 1.2.2 Solution for Current situation

Since the current evaluation systems cause problems, implementing E-Appraisal system can solve these problems. E-Appraisal system provide paperless environment for the whole university to make them easier to do the evaluation. It will generate the report automatically and supervisor can view the reports after it has been generate.

## 1.3 Project Objective

The objectives of the project are as below:-

- To make the evaluation process more efficient and effective compared to the previous system which is carried out manually.
- To eliminate time spent for supervisor to evaluate the staff where they can just login to the system and evaluate them and generate the report.
- To create a paperless environment to decrease the cost of managing the evaluation system in University of Malaya and to make it easier to do evaluation.
- To make the system easy to maintain where it is a web-based application and data are stored in databases.

## 1.4 Project scope

The E-Appraisal system is an interactive online system, which makes easy for the staff's supervisor to do evaluation on them. This system will be using English and Malay language as it premier language. This system is web-based application system and is only for University of Malaya. This system required login ID and password from user. The targeted users of the system consist of staffs in University Of Malaya. Staffs can be divided into two categories which are academic staff and technical staff. The academic staff consists of lecturers, tutors and professors whereas the technical staff consists of non-technical staff which is those who work in office and technical staff who work to support the web based system. All of the academic staffs will be evaluated by their Head Department and also Dean of each faculty. For technical and non-technical staffs, they will be evaluated by Officer. Administrators will maintain the system all of the time.

## 1.5 Expected Outcome

This system can perform some basic function and meet criteria such maintainability, consistency and user friendly. Throughout this evaluation system, superiors should ensure that the employees' positions are objectively evaluated according to their performance. There is greater credibility if the employees participate in the process. It also has a potential to reduce staff dissatisfactory and turnoff. [Job Evaluation, 16/08/2004] The evaluated performance level during the evaluation will be used for justifying personnel actions relative to promotion, transfer, compensation, and salary

adjustments. It provides the university with a structured record of employee performance and also basis for improvements on employee performance. [Performance Appraisal, 02/09/2004]

## 1.6 Project Schedule

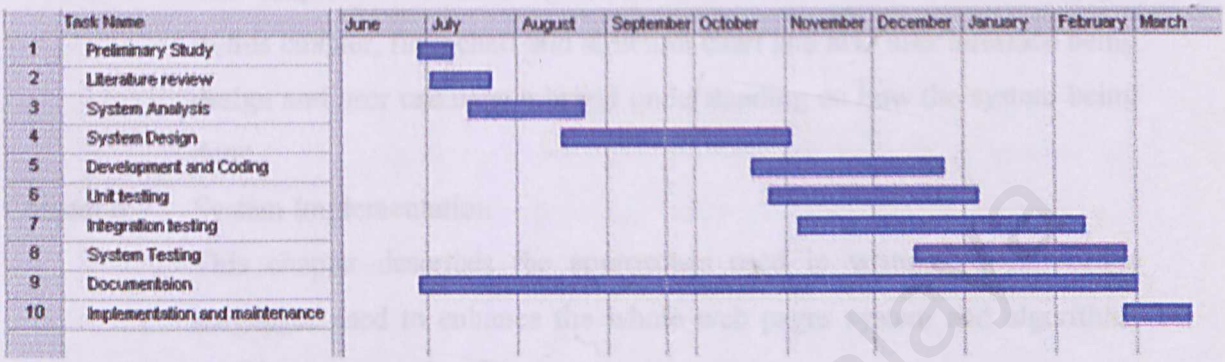



**Figure 1.1: Project Schedule**

## 1.7 Report Layout

Chapter 1: Introduction

This chapter gives an overview of the major phases of the project that includes project scope, objectives, expected outcome and purposes of the proposed system.

Chapter 2: Literature Review

In this chapter, review of the existing system and studies that relevant to the project. Development tools and technologies are also review in this chapter. They include development platform, web server, database management system and programming languages.

Chapter 3: Methodology

This chapter discuss about the software life cycle and methodology used for the system. It emphasizes on the justification on the chosen methodology used. It also discuss about the explanation about the development software and platform chosen to develop the system.

Chapter 4: System Analysis

It aims to describe system analysis of the project include the functional requirement and non-functional requirement. It covers Context data flow

diagram and data flow diagram of the system. This chapter also focuses on hardware and software requirement. Together with this, all these information gives the users a clear and better view of the intended system.

Chapter 5: System Design

This chapter shows the design of the system and also the database design. In this chapter, flow chart and structure chart and also user interface being design and user can have a bright understanding on how the system being done.

Chapter 6: System Implementation

This chapter describes the approaches used in writing codes, scripts languages used to enhance the whole web pages system and algorithms used in implementing the system.

Chapter 7: System Testing

This chapter explains the various type of testing which have been carried out during development of E-Appraisal System namely unit testing, integration testing, system testing and acceptance testing.

Chapter8: System Evaluation

This chapter describes on system's features and strengths, system's limitation and constraints, knowledge gained and lastly the future enhancement will be described.

## 1.8 Chapter summary

This chapter focuses on introduction about the system. Definition of the system is briefly discussed in the project overview section. Project motivation, problems with the traditional system and solution has been discussed here. It also describes the solution for current sites, project scope and expected outcome. Others related topic such project management, project schedule and project layout are discussed too.

# CHAPTER 2 – LITERATURE REVIEW

## 2.1 Domain Study

Review in existing system is important step in order to search for the similar characteristics when compare with the project. The result through research help the author to know some of the existing features that offered by similar system. Therefore the author will be able to study the existing systems and enhance it into more powerful features in the project later. From the research, the author will be able to analysis the strengths and limitations of several methodology and tools. Therefore, the author will have sufficient knowledge in choosing correct methodology and development tools to develop the system.

### 2.1.1 Case Study 1: Department of Veteran's Affair -Electronic Appraisal System

URL:https://vip.vba.va.gov

Retrieved date: 10/9/2004

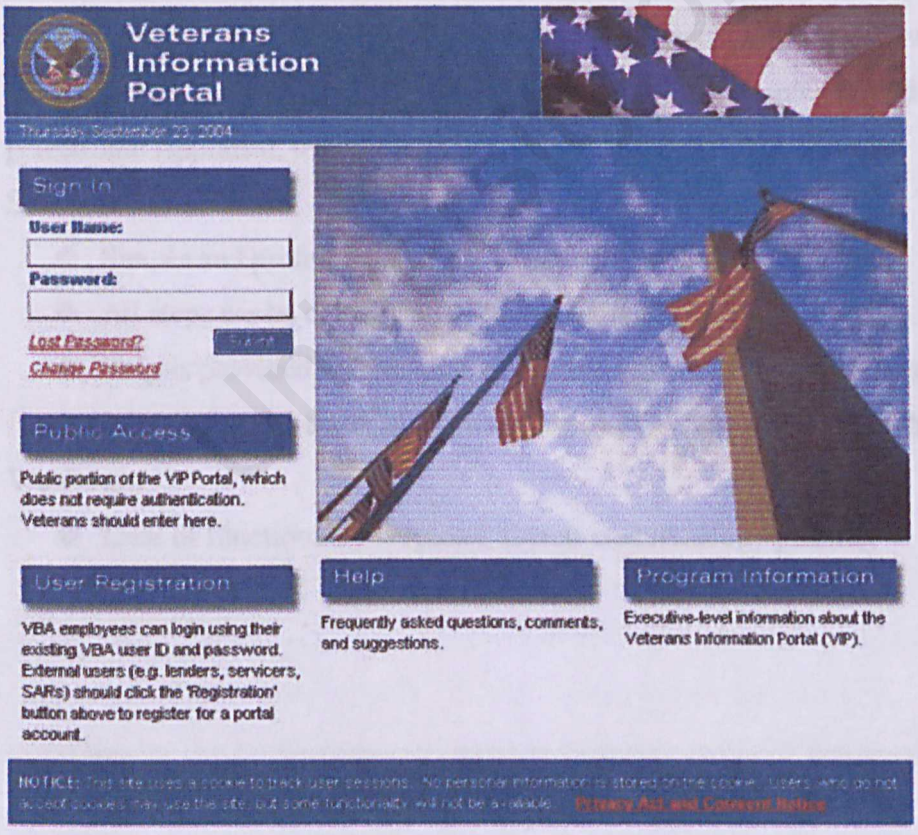



**Figure 2.1: Case Study 2 – Electronic Appraisal System**

Existing study has been done on Department of Veteran's Affair Electronic-Appraisal system. The portal is the interface for Veteran's Affair web-based application. This Department of Veteran's Affair Electronic-Appraisal system (E-Appraisal) is a web based application that allowed appraisers to upload appraisal document online and also allowed only appraisers and Staff Appraiser Reviewers (SARs) retrieve appraisals for online review and hardcopy printing. The user only needs one username and password to access to the menu of the application to which the user has been granted access. The portal manages user validation to any application. The application menu is shown on the left of the portal home page. After they has been login to the page and select E-Appraisal, the user is first being validate. The menu functions are available here and depends whether they are an appraiser or an SAR. If they want to upload form, then they can click upload report. If the form has been uploaded completely, there will be a picture display with instruction to the appraisers regarding notification that the appraisal document already uploaded. In between, appraisers can choose to retrieve appraisals for review from E-Appraisal. The benefits by using e-appraisal system are the appraisal is processed more quickly and efficiency, data is received in virtual real time when appraisal is uploaded into E-Appraisal and appraisals are stored electronically and available online. [Electronic Appraisal, 09/09/2004]

Strengths:

- Simple and professional.
- All steps are be done by click on the links and button.
- Help is provided for frequent ask questions, comments and suggestions.
- Information for about the Veteran information can be found in this web as well

Weakness:

- Lack of functionality – upload, review and hardcopy printing

### 2.1.2 Case study 2: Halogen E-Appraisal

URL:http://www.vmci.nl/halogen/eappraisal.html

Retrieved date: 24/8/2004

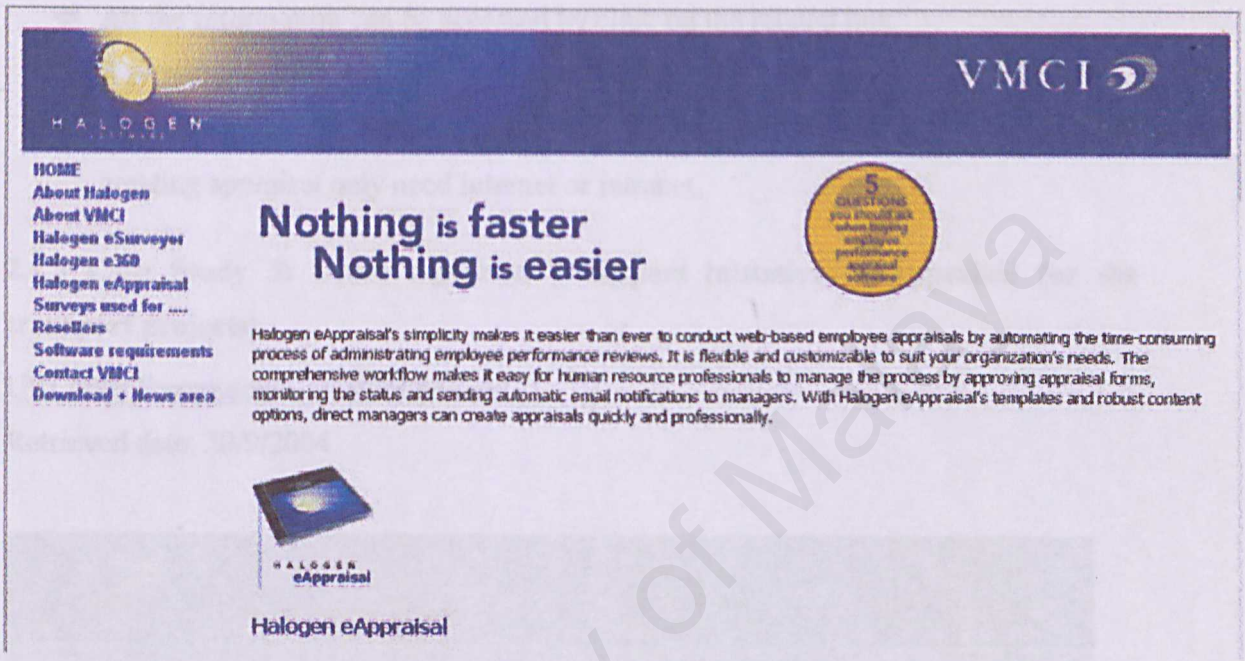



**Figure 2.2: Halogen eAppraisal**

Existing study also has been done on Halogen eAppraisal web application. This is the interface for Halogen eAppraisal. Halogen e-appraisal's simplicity and easier than ever to conduct the web based employee appraisals by automating the time consuming process of administrating employee performance review. It is flexible and customized to suit organization's needs. It is easy for human resource to manage the process by approving appraisal form and monitoring the status. It can reduce the administrative burden of conducting performance review. It enable direct managers create appraisals quickly and professional. [Halogen Appraisal, 16/08/2004]This system provides the benefits of using appraisal where it can eliminate time spend on searching for past appraisal. Besides, it makes the performing employee appraisal easy, efficient and cost effective. It enables high productivity and reduced completion

time as a result of intuitive user interface. It can be written outside the office environment via internet access.

Strengths:

- ❖ It is simple and easy to navigate.
- ❖ All the information can be accessed by click on the related link.
- ❖ It provides facility for online submission and application.
- ❖ It provides functionality such easy monitoring and easy appraisal creation where creating appraisal only need internet or intranet.

### 2.1.3 Case Study 3: South Ayrshire Transport initiative (E-Appraisal for the transport projects)

URL:http://www.south-ayrshire.gov.uk/

Retrieved date: 20/9/2004

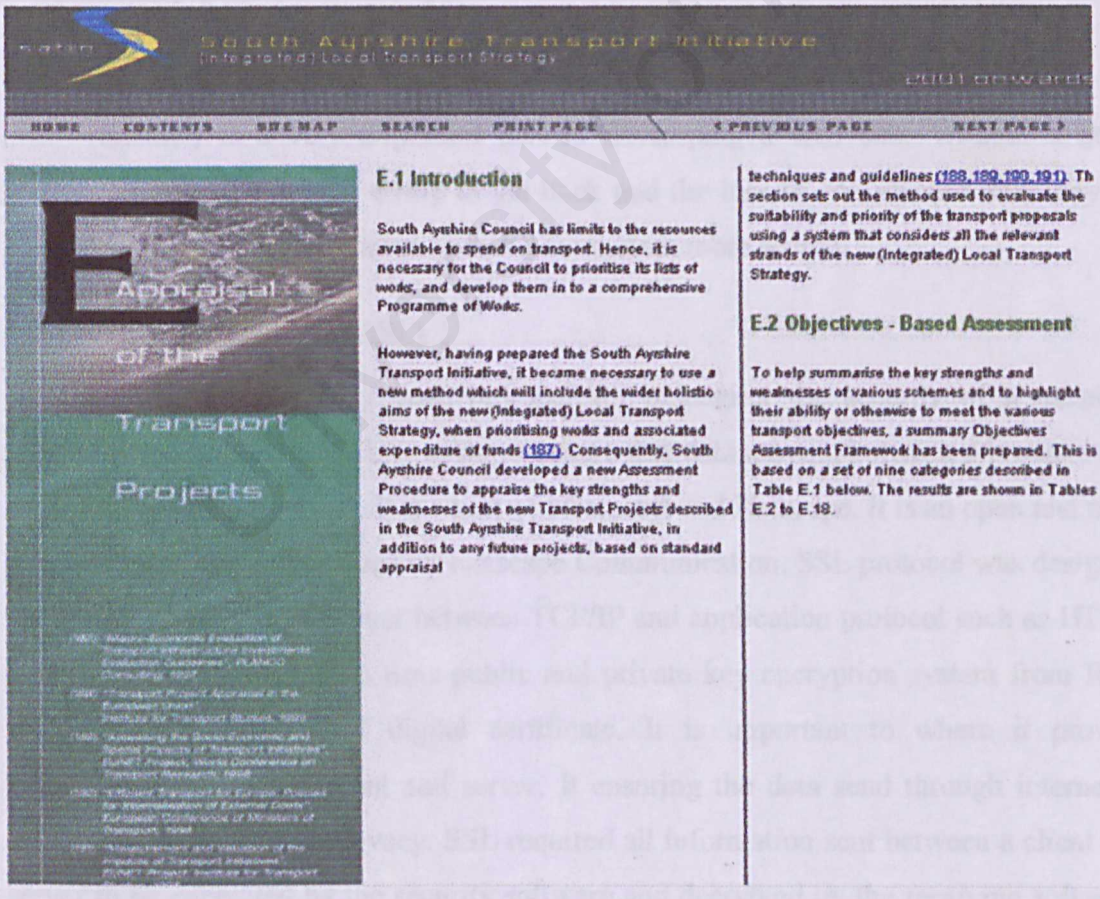



**Figure 2.3: South Ayrshire Transport initiative**

This is a South Ayrshire Transport initiative web based application. This system are aim to use a new method which will include the wider holistic aims of the new (Integrated) Local Transport strategy when prioritizing works and associated expenditure of funds. As a result, South Ayrshire has developed a new assessment procedure to appraise the strengths and weaknesses of the new transport project based on standard appraisal techniques and guidelines. [South Ayrshire Transport initiative, 10/09/2004]

Strengths:

- Easy to navigate
- Search function provided
- Information can be found in this web application.

Weaknesses:

- It is not a web-based system for it does not provide any facilities for online submissions or applications. Users can only view for information.
- Static – not a web-based application

### 2.2 Security Network Architecture

Security is a very important part in developing a web site. Without a good security system, the system easily to get hack and the loss of confidential data may be happened. SSL is a consideration in make our system more secure.

#### 2.2.1 Secure Socket layer (SSL)

SSL is a commonly used protocol for managing the security of a message transmission on Internet. SSL is using to ensure that data moving between a browser and a server are remains private. It is a part of Microsoft and Netscape. It is an open and non-proprietary protocol developed by Netscape Communication. SSL protocol was designed to provide a data security layer between TCP/IP and application protocol such as HTTP, Telnet, NNTP or FTP. SSL uses public and private key encryption system from RSA which include the use of digital certificate. It is important to where it provide authentication between client and server. It ensuring the data send through internet is secure and securing data privacy. SSL required all information sent between a client and server to be encrypted by the security software and decrypted by the receiving software. As we know that, confidential is important for both parties to any private and transaction.

It is useful where every email that we sent, every website that we visit and every data that leaves the computer may be seen more just the intended recipient unless it is being securely encrypted. [Secure Socket Layer, 10/09/2004]

The advantage of the SSL Protocol is that it is application protocol independent. A "higher level" application protocol (e.g. HTTP, FTP, TELNET, etc.) can layer on top of the SSL Protocol transparently. The SSL Protocol can negotiate an encryption algorithm and session key as well as authenticate a server before the application protocol transmits or receives its first byte of data. All of the application protocol data is transmitted encrypted, ensuring privacy.

### 2.3 Web Server

Web server increasingly become feature sets bundled with an operating system. The choice web server will ultimately depend on which platform has been selected. The universality of TCP/IP networking means that we can mix other server but this may not be the best use of our resources. The platform on operating system chosen for the web server should be one that we are already familiar. Web server use SSL to support encryption that can be protected against unwanted access. All the products handle security admirably except for apache, whose public domain version does not support SSL.

#### 2.3.1 Internet Information Server (IIS)

It is a group of Internet Servers (including web or Hypertext Transfer Protocol (HTTP) server and File Transfer Protocol (FTP) server) with additional capabilities for Microsoft's Windows NT and Windows 2000 server operating system. IIS is a Microsoft's entry to compete in the Internet server market that is also addressed by Apache, Sun Microsystems, O'Reilly and others. With IIS, Microsoft includes a set of programs for building and administering web sites a search engine and a support for writing web-based applications that access databases. Microsoft points out that IIS is tightly integrated with the Windows NT and 2000 servers is a number of ways, resulting in faster web page serving.

### 2.3.2 Personal Web Server (PWS)

Personal Web Server is an abbreviation for PWS, is a server program for individual PC users who want to share web pages and other files from their hard drives. PWS is a scaled-down version of Microsoft's more robust web server, Internet Information Sever (IIS). PWS can be used with a full with limited traffic. PWS offers:

**Integration:**

The PWS turns a Windows 95/98/NT based personal computer into a low volume web server, make it as easy to share HTML and FTP files over internet and the Internet it is share and print files over a network. The software is fully integrated into Windows 95/98/98SE/ME/NT taskbar and control panel, allowing users to start and stop HTTP and FTP services wherever or change general options. Microsoft also designed PWS to complement its larger and fully compatible web server products such Microsoft IIS.

**Easy to install, use and manage:**

It is design to install easily in minutes and includes an intuitive HTML-based administration utility that also supports full remote administration. It supports both user level and local security ensuring flexible and effective protection of sensitive corporate information. Users can set up the PWS to support WIN NT challenge/Response encrypted PWS transmission.

**Standards-based technology**

PWS fully supports existing standards such as CGI and includes the open Internet Server API (ISAPI) extension to the WIN 32 API that is up to 5 times faster than CGI based-application. This enables any user to take advantage of ISAPU scripts and CGI scripts.

### 2.3.3 Apache

The keys to Apache's attractiveness and popularity are instead of the qualities listed above and its extensionality, its freely distributed source code and active user support for the server. Among the most notable features are its cross-platform support, protocol support (HTTP), modularity (API), security, logging and overall performance and robustness. Apache runs on Windows 95/98/NT and the entire major variants of UNIX. Apache distributes a set core of modules that handle everything from user authentication and cookies type correction on URLs. Apache overall security,

performance, robustness are unquestionable. Many of the most accessed sites on the world run Apache. Apache offers neither browser-based maintenance capability nor GUI configuration/administration tools. Apache's robust design and extensibility, coupled with its freeware status and the availability of its source code to the public, make Apache a good choice for enterprise-level web sites and for individuals ad workshop that use UNIX a combination of UNIX and NT platform.

### 2.4 Operating system

An operating system (OS) is a set of computer programs that control the computer hardware and acts as an interface with application programs. An operating system is the program that loaded into the computer by a boot program, manages all the other programs in a computer. An operating system is the software that provides the interface between the hardware of a computer system and applications programs that are used on it. It performs a basic task such as recognizing input from the keyboard, sending output the display screen and keeping tracks of files and directory. OS make sure the different program running at a same time which does not interfere with each other. Besides, it provides security to ensure only authorized user can access the system. In addition, user can interact directly with the operating system through a user interface such as command language or Graphical User Interface (GUI). The most popular operating systems currently are UNIX, LINUX, Windows 98, Windows 2000 and Windows XP.

#### 2.4.1 UNIX

UNIX is a powerful operating system originally developed by AT&T for mini computers. UNIX can be used on many computer system types and platforms, from personal computers to mainframe system. It is compatible with different types of hardware and users have to learn only one operating system. The high degree of portability is one of the reasons for UNIX's popularity. It provides a high flexibility in choosing the hardware manufacturer. UNIX also makes much easier to move programs and data among computers to share resources. UNIX is considered to have a complex user interface with strange and arcane commands.

Feature made UNIX a hit from the start:

- Multitasking capability

- Multi-user capability
- Portability
- UNIX programs
- Library of application software

### 2.4.2 LINUX

LINUX is a free Unix-type operating system (it looks like UNIX but doesn't come from the same source code base). LINUX is only the kernel of the operating system, the part controls hardware, manages files, separates processes and so forth. LINUX includes true multitasking, virtual memory, shared libraries, demand loading, memory management, Internet networking and other features.

### 2.4.3 Windows 98

Windows 98 is an improved version of Windows 95 with many end user productivity features, improved support for newer hardware devices, and additional enhancement. Several improvements were made in Windows 98 to improve end user productivity. It also shortens the time takes for software application loaded from hard disc drive and system shut down also speeded up. In addition, it made simple access to Internet and providing better system maintenance and diagnostics. It also support for the latest graphics, sound and multimedia technologies and ability to add or remove peripheral devices.

### 2.4.4 Windows 2000

Windows 2000 (W2K) is a commercial version of Microsoft's evolving Windows operating system and formerly known as Windows NT 5.0. Windows 2000 is designed to appeal to small business and professional users as well as to the more technical and larger business market for which the NT was designed. There are four products included in Windows 2000 product line namely: Windows 2000 Professional, Windows 2000 Server, Windows 2000 Advanced Server and Windows 2000 Datacenter Server. Windows 2000 is reported to be more stable than Windows 98/NT systems. A significant new feature is Microsoft's Active Directory which enables a company to set up virtual private networks to encrypt data locally or on the network and to give users access to shared files in a

consistent way from any network computer. This operating system also designed to provide high reliability, interoperability, with high-level security and significant enhancements for laptop users, application support, hardware support and many more.

### 2.4.5 Windows XP

Windows XP is the latest version of the Windows desktop operating system for the PC and is the most important version of Windows since Windows 95. Windows XP is built on the Windows 2000 kernel but brings a new, more personalized look to the desktop that will also make it easier for users to scan or import images and to acquire music file on the Web and transfer them to portable devices. Windows XP comes in a Professional version and a Home Edition version. American Institutes for Research conducted usability evaluations of Microsoft's Windows 2000 Professional and Windows XP Professional operating systems in June 1999 and July-August 2001, respectively. The results of the studies suggest that, overall, the Windows XP interface is an improvement over the Windows 2000 interface.

## 2.5 Database management System

A database management system (DBMS) or database manager is a program that lets one or more computer users create and access data in a database. The DBMS manages user requests as well as requests from other programs so that users and other programs are free from having to understand where the data is physically located on storage media and in a multi-user system, which else may also be accessing the data. It also ensures the integrity of data (making sure it continues to be accessible) and security (making sure only those with access privileges can access the data).

### 2.5.1 SQL Server 2000

Microsoft SQL server 2000 is a single process, multithread relational database server primarily intent for transactional processing. SQL Server 2000 provides agility to company data management and analysis, allowing organization to adapt quickly and gracefully to derive competitive advantage in a fast-changing environment. From a data management and analysis perspective, it is critical to turn raw data into business intelligence and take full advantage of the opportunities presented by the Web. It is based

on the client/server architecture, which divides processing into two components: a frond-end or client component, that run on a local workstation and a back-end or server component, which runs on a remote computer.

### 2.5.2 My SQL

MySQL is also called as My Ess Que Ell. MySQL is a database management system (DBMS) that can be vast amount of information in a corporate network. MySQL is an open source relational database management system (RDBMS) that uses Structured Query Language (SQL). It is provided by MySQL AB where MySQL AB is a commercial company that builds its business providing services around the MySQL database. My SQL is a very fast, multithreaded, multi user and cross platform database. It is available as open source software. This means that anyone can study the source code and modified it (in certain conditions) to fit their needs. It can download for free with non-commercial purchase only. In order to embed MYSQL into a commercial application, users must buy a commercially licensed version with a very cheap price.

The MySQL, relational databases system was first released in Jan 1995. It is fully multi-treaded using kernel threads, provides application program interface (APIs) for C, C++, Eiffel, java, Perl, Python and TCI allows for operator and function support in the SELEXT and WHERE parts of queries.

For the graphic aspect, MySQL not allow the storage of graphical data. It is also not able to store very large database (VLDB) such as up to multi-terabytes. It only support up to 50,000 records. Besides, MySQL does not support database partitioning and LDAP. Advantage is very fast, reliable and easy to user. In the aspect of implementation of ANSI standard does neither transaction nor preserve referential integrity which means tables, can be explicitly locked and unlocked for transaction access. And there are a lot of supports from web sites for MySQL such as "Basic email support", "External email support", "login support" and "External login support". MySQL is also available in both Windows and Linux platform. And now, there are Graphical user interface add on for MySQL to make life easier for the administration top control the database.

### 2.5.3 Microsoft Access

Microsoft Access helps novice database users and experienced programmer alike build powerful, customizable solutions that integrate easily with the web and enterprise data source. Capture sales records. Track inventory. Access makes it easier than ever to build powerful database solutions and access and analyze important information.

Access gives developers the tools they need to build powerful, sophisticated Microsoft SQL Server database solutions within the familiar Access interface. Developers can now use XML data within their solutions using the new XML support in Access. The benefits of using MS Access:

1. Perform Sophisticated Data Analysis

   Transform the way you analyze data. Easily create and publish interactive spreadsheets and use Microsoft PivotTable and Microsoft PivotChart views to present important information dynamically in different ways.

2. Easily Fix Your Work or change it back

   Now you can undo and redo multiple actions for maximum productivity when creating forms, reports, data access pages, macros and module.

3. Turns form and reports into web pages

   Share your data on the web using the tools you already know. Save your form or report as a data Access Page, which allows users to view and edit live data within their browser.

4. Get Valuable tools on the web

   Visit the Office Tools on the web site to download templates, tools, tips, and updates that help you work faster. Take advantages of powerful, new publishing tools that enable you to export both data and formatting for display on the web, using Internet standard such as Extensible Markup Language (XML)

5. Interact with your data on web

   Build powerful Data Access Pages that enable you easily open, view and update data within a web browser in the office or on the road.

6. Accelerate Access Web Development

   The powerful, streamline Data Access Pages makes it even easier to publish interactive forms and reports on the web, take advantages of enhancement such as

multiple select, multiple undo and redo options and improved control sizing.

7. Easily manage SQL Server objects

   Create SQL Server-specific objects for your solutions using graphical Query Designer and Stored Procedure Designer - without being a SQL Server expert.

8. Seamlessly integrate SQL Server Data

   New tools improve the ability to access information from corporate-level, back end databases such as SQL Server. Access Database Projects allow you to create true client/server applications using the familiar Access interface.

## 2.6 Data Access Technology

### 2.6.1 RDO: Remote Data Objects

This is a very wrap pen around ODBC. It was built specifically with database in mind, but it also usable in J++. RDO is very easy to use in comparison to programming to the ODBC API directly, but doesn't loss all that much in the speed category. There is a ton of legacy code in place using this technology- it is fast and reliable.

### 2.6.2 ADO: Active X Data Objects

Each version of RDO seen to improve performance and add new features, but ADO still cannot be compared on a one to none basis RDO. RDO has a few features that will never be in ADO (ODBC handles for example, can't added because of OLEDB being in between ADO and ODBC) and ADO has some really cool features with persistent record sets, filters, sorts (without going back to the server) and others that RDO never had .Unlike RDO, which was based on ODBC, ADO is based on OLEDB. This provides a level of flexibility that with more than just a few headaches. ADO is now competitive, if not faster in speed compare to RDO lend has a very robust features ser. It is nowhere near RDO in reliability but Microsoft has made and continues to make a substantial investment in ADO and OLEDB.

### 2.6.3 ODBC: Open Database Connectivity

ODBC provides a way of gaining cross-platform access to database information. It is quite fast and allow moist if the main stream standard SQL statements regardless of

what the back-end experts for syntax. The major short coming for ODBC and that it is very much oriented to tabular data and doesn't deal with non-standard data such as a directory structure or a multi sheet database.

### 2.6.4 OLEDB

OLEDB is an attempt at having an open standard to communication with both tabular and non-tabular data OLEDB uses what is called a provider. A provider is like an ODBC driver except that it is relatively self describing. That is, it is able to fill the application which uses it what kind if function ability it support.

OLEDB is the foundation under ADO. It is very fast indeed when not used with ADO, but since it deals with a number if items that aren't compatible with VB, OLEDB being used directly by the programmers. It is far more of pain to program in that ADO, but it is much faster that by itself than when used in conjunction with ADO.

## 2.7 Programming environment and Languages

### 2.7.1 ASP

ASP is active server pages which is a technology developed to take text scripts in an HTML context and run them on the web server to create dynamic interactive pages. Its limited is where it has to be run in IIS (Internet Information Services) and Microsoft Personal Web Server. ASP can help as in dynamically edit, change or add content of a web page. It responds to user queries or data. Besides, it can access any data or database and serves different pages to different browsers which is anything that we do with CGI. It provides security where ASP code cannot be viewed from browser. It is very powerful where it is fast implementation, easy application scalability and customize web page to make it more useful for individual users. [Introduction to ASP, 23/07/2004]

### 2.7.2 Java Script

Java Script is one of the scripting (programming) languages used to add interactive to web pages. Java Script is a compact object based scripting language for developing client and server Internet application. It is a secure script where it cannot be write to hard disc. Java Script is a language that can make a web page dynamic where

user not just click on it but interact with it. Besides, on small size of the program, user will get quick response as the interaction take place in user's browse without involving server. Java Script allows scripting if events, objects and actions to create Internet application thru action that fires it. The most important features that Java Script can add to a web site design are the capacity to introduce dynamic interactivity into pages. The script of dynamic interactivity implies change in response it an action. Some languages are interpreted and some are compiled. Java Script as an interpreted language. Web browser such as Netscape Navigator and Internet Explorer acts as a translator between Java Script and the native language that the computer user. The process involves the browser parsing (interpreting) the Java Script code and then creating an equivalent machine language and having the computer execute the interpreted code. Java Script can be developed by using any of the web page development tools such operating system, Macromedia, Microsoft FrontPage and others. Not any will these tools generate Java Script, but they will do it for either or both of the major browsers.

### 2.7.3 VB Script

VB Script is a command language that embedded in an HTML document. VB Script is a member of Microsoft VB family of development products which known as a scripting language for HTML pages. VB scripts are very familiar to VB programming language which means VB scripts are easy to learn by VB programmer. VB Script is a scripting language which can enhance HTML. It is a script that provides web authors a way to write small scripts that would execute on user's browsers instead of on server. Besides, users don't need to send their data to sever until it has been verified to be corrected. It can improve performance of the browsing session by performing data checks locally and reduce network bandwidth either over the Internet or Intranet. Microsoft had tool safety and security of client machines consideration information into account where creating VB Scripting. Potentially dangerous operations that can be done in VB have been removed from VB Scripting including the capability to access dynamic link libraries directly and to access the file system. One of the coolest features of VB Script is its programming capabilities of VB Script to decide what should appear on the page and how it should appear.

| Java | Java Script | VB Script |
|---|---|---|
| Programming Language | Scripting Language | Scripting Language |
| Object oriented | Object Oriented | Not Object Oriented |
| Strongly Typed | Loosely typed | Loosely Typed |
| Not support for Functions | Support Functions | Support Functions |
| Interacts with browser as applet | Support Functions | Extension to HTML |
| Secure | Secure | Secure |
| Derived from C/C++ | C/C++ based | Subset of VB |
| Supported by all 3 browser | Supported by all 3 browser | Presently supported by only Internet Browser |
| Steeper learning curve if not familiar with C/C++ | Easy to learn | Based on Basic |

**Table 2.1 Different Features of Java, Java Script and VB Script**

### 2.7.4 JSP (Java Server Page)

Java Server Page (JSP) is a technology for controlling the content or appearance of Web pages through the use of servlets, small programs that are specified in the Web page and run on the Web server to modify the Web page before it is sent to the user who requested it. Java Server Page (JSP) is a template for a web page to that uses Java code to generate an HTML dynamically. JSP has been referred as the Servlet Application Program Interface (API) by the developer of Java. JSP is comparable to ASP technology. There are some similarities between ASP and JSP. Firstly, they both make use of simple server-side scripting to provide access to Web server information and functionality. They both using object oriented scripting and started out with similar styles of delimiting this scripting from a page's content. Difference between ASP and JSP is a JSP calls a Java program that is executed by the Web server, meanwhile an ASP contains a script that is interpreted by a script interpreter (such as VBScript or Jscript) before the page is sent to the user. Advantages of JSP are:

The dynamic part is written in Java, not Visual Basic or other MS-specific language, so it is more powerful and easier to use.

It is portable to other operating systems (platform independent) and non-Microsoft Web servers. It is able to reuse component by using Javabeans and EJB.

### 2.7.5 ASP.NET

ASP.NET builds on the .NET Framework's programming classes, providing a Web application model in the form of a set of controls and infrastructure that make it simple to build Web applications. Developers are exposed to a set of ASP.NET controls that encapsulate common HTML user interface elements such as text boxes, drop-down menus, and so on. These controls actually run on the Web server, however, and simply project their user interface as HTML to a browser. On the server, the controls expose an object-oriented programming model that brings the richness of object-oriented programming to the Web developer. ASP.NET also provides infrastructure services such as session state management and process recycling that further reduces the amount of code a developer must write and increase application reliability. In addition, ASP.NET uses these same concepts to enable developers to deliver software as a service. Using ASP.NET Web Services features, ASP.NET developers can write their business logic and the ASP.NET infrastructure will be responsible for delivering that service via SOAP.

## 2.8 Methodology

Software development is a methodology used to develop computer software. Software development life cycle is important to provide guidance for project management. Process model is a general tools used to organize a project into small activities. It helps project manager or the team to decide what work should be done and in what sequence to perform the tasks.

There are many types of development model in software engineering:

- Waterfall Model
- Rapid Prototyping
- Spiral Model
- V Model
- Code-and-Fix Model

### 2.8.1 Waterfall Model

It is a software life-cycle or product life cycle model. It sometimes referred as linear sequence model or the software life cycle. It is a process in which one phase have to be completed before proceed to the next phase. Waterfall model encourage the development team to specify the business functionality of the software prior to develop a system. It breaks the project into small activities which starting with requirement and end with retirement. If there are any errors found during design phase, software developers can backtrack from the design and up to analysis and hence to requirements and make necessary corrections there. The drawback of the waterfall model is difficulty to accommodating change underway. It is inflexible to partitioning the project into distinct stages. So it makes difficulty to response to changing of customer requirements. Therefore, this model is only appropriate if only when the requirements are well-understood.

### 2.8.2 Rapid Prototyping

Prototyping is a model used for understanding the requirements for user interface, examining feasibility of a proposed design approach and exploring system performance issues.

### 2.8.3 V Model

V model is a variation of the waterfall model that demonstrates how the testing activities are related to analysis and design. Coding forms the point of the V, with analysis and design on the left, testing and maintenance on the right. V model does not run into the problem that the software is impossible to be tested because system test, integration test, and unit test are planed ahead. For example, when we plan the requirement, we also plan for system testing. Therefore, when the system is built, we have a whole set of test cases for system testing.

### 2.8.4 Spiral Model

Spiral model is an idea being used to minimize the risk. A simplified looking at it is a waterfall model with each phase preceded by risk analysis. It emphasis on the alternative and constraints supports the reuse of existing software and the incorporation

of software quality as a specific objective. In spiral model, process is represented as spiral rather than sequence of activities with backtracking.

Each loop in the spiral is split into 4 sections:

- Objective setting
- Risk assessment reduction
- Development and validation
- Planning

In each spiral, it identifies potential risk and plan for the next phase based on the identified risk. There is no fixed specification such as design or analysis. It has been carried out until the errors are being validated. Prototyping may be used in one spiral to resolve requirements uncertainty and hence reduce risks. A common problem in software in software development is determined when the products of a specific phase have been adequately tested. But it can be used only for large-scale, in-house products. Developers have to be competent in risk analysis and risk resolution. This model is failed if risks are inaccurate defined.

### 2.8.5 Code-and-Fix Model

This life cycle is implemented without requirement or specification nor attempts at design. Developers are simply throwing code together and rework it as many times as necessary to satisfy the client. This life cycle is absence of requirements, specification and design. It is the easier way to develop software. [Schach, 2005 ]. The cost of changing software is relatively small if the change is made during requirements, analysis or design phase but it is very costly if the changes made after the software has been delivered and installed.

## 2.9 Authoring tools

### 2.9.1 Microsoft Visual Interdev 6.0

It is fact the second release this development tools, but the version number was changed to full into line with to rest of visual studio suits. In Microsoft Visual Interdev can divide into 3 sections that is Rapid Application Development, Database tools and

Teamwork-Based development. Rapid Application development is the breaking down if the development process into smaller stages. Visual Interdev has many tools to assist you at each stage. The first set of tools is its editors for HTML pages. It has an improved HTML editor which let write HTML by hand, as well as a WYSIWYG editor to add in content. The latter has been specially designed for developer not to compromise the formatting of their source code. This is a big plus for those who won't to near a WYSIWYG for fear of their code getting scrambled. The editor supports all the latest specifications such as Dynamic HTML and cascading style sheets.

A watch inserted into a program, on script allows you to examine the state of variable at the program. It is one of the most useful features in the IDE (Integrated Development Environment). This mean that you have access to all the tools you need to build your web application from within the same interface. You can switch from HTML pages to Java, C++ or database project. The link view and file management broken links. You can also construct HTML navigator bar from simple site navigator diagram.

The database tools not only support server database but also can work with the client Internet Explorer data-binding techniques. You can design and modify your databases firm within Visual Interdev using variety of tools. They can type in a word processor environment whilst the developers take over of the underlying code. Microsoft personal web server is included with Visual Interdev letting developers create web application on their own Win NT/96/98 based machine without such as IIS installed. Visual Interdev also integrate with Visual Source safe that provides a safe environment for multiple authors on a project. It checks files in and out so that any one user has access to a file at a time. This stops anyone making modifications on an out of date document and then publishing over a more recent file.

### 2.9.2 Microsoft FrontPage

Microsoft FrontPage 2000 is a web authoring tool which translates normal words into HTML tags. It is an easy to use application where amateur and the professional users can use. For first time users, they can just type in plain text and the program will convert all these texts into HTML tags where it is then regarded as HTML source codes.

### 2.9.3 Adobe Photoshop

Adobe Photoshop is used to design the user interfaces of the background for the web page and picture edit. Adobe Photoshop is the most popular image-editing available for Macintosh and Windows-based computers. Besides that, Adobe Photoshop is also ideal for professional graphic designing as it has layers can be edited without modifying the whole picture. Re-modifying the whole picture could be a tedious process without Adobe Photoshop. It also provides some shortcut keys that are easier and save time for user and for those who are dislike to user mouse.

### 2.9.4 Microsoft Visual Studio.Net

Microsoft Visual Studio.NET is a visual programming environment for creating Web services based on use of the Extensible Markup Language (XML). Visual Studio.NET provides a visual interface for identifying a program as a Web service, forms for building a user interface (including support for mobile device interfaces), and features for integrating existing application data and for debugging. Visual Studio.NET comes with the .NET Framework, including the Common Language Runtime and several programming languages such as Visual Basic, Visual C++ and Visual C#.

### 2.9.5 Seagate Crystal Report

Seagate Crystal Report is a powerful stand-alone report creation. It provides a report-writing module that enables you to add your own applications. As a developer using C, C++, Visual Basic, ASP, ASP.NET, object Vision, Turbo Pascal, Visual DBASE, Delphi or any programming languages that can access a DLL, you can add sophisticated report generating and printing capabilities to your applications without the time consuming task for writing your own code.

## 2.10 Data Gathering Techniques

Effective and appropriate techniques have been used to gather needed information for this project. A research method such as internet research, document review and research on sample thesis and reference books has been used

### 2.10.1 Internet Research

Internet research is the most common, effective and fastest way to gather information for this project. Required information can be found through search engine such as www.google.com, www.yahoo.com and etc.

### 2.10.2 Document Review

By reviewing to the relevant documents, information can be gained and this helps a lot in defining the project scope, functional and non functional requirement of this E-Appraisal system.

### 2.10.3 Research on sample thesis and reference books

Research on sample thesis and reference books have been done to search for related information and learnt about the techniques to write and structure a thesis report. This is useful also to clarify strengthens and weaknesses of E-Appraisal system compared to the similar systems

## 2.11 System Architecture -- Client-server Architecture

Client-server architecture is a versatile, message-based and modular infrastructure that is intended to improve usability, flexibility, interoperability and scalability as compared to centralized mainframe, time sharing computing. Client-server is a computational architecture that involves client processes requesting service from server processes. Client-server maintains a distinction between processes and network devices. Client-server architecture reduces network traffic by providing a query response rather than total file transfer. It improves multi-user updating through a GUI front-end to shared databases. As a result of the limitations of file sharing architectures, the client/server architecture emerged. This approach introduced a database server to replace the file server.

### 2.11.1 Two-tier architecture

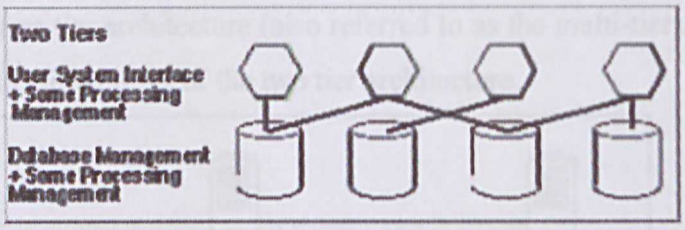



**Figure 2.4: Two-tier architecture**

Two-tier architecture is intended to improve usability by supporting a forms-based, user friendly interface. It also improves scalability by accommodating up to 100 users (file server architectures only accommodate a dozen users), and improved flexibility by allowing data to be shared, usually within a homogenous environment. Two-tier architecture requires minimal operator intervention and is frequently used in non complex, non time critical information processing systems.

Two-tier architecture consists of 3 components distributed to 2 layers which are client (requestor of services) and server (provides of services). The 3 components are:

- User system interface: such as session, text input, dialog and display management services)
- Processing management: such as process development, process enactment, process monitoring and process resource services.
- Two-tier design allocates the user system interface excluding to the client. In places database management or the server and splits the processing management between client and server, creating 2 layers.

Most of the application portion of process is in the client environment. The database management server usually provides the portion of the processing related to accessing data. Client commonly communicates with the server through SQL statements, or a call-level interface. Two-tier architecture design is very effective for network programming as well as for GUI programs in which you can allocate functionality to the host. Traditionally, GUI code lives on the client host, and the so-called business logic lives on the server host. This allows user feedback and validation to occur on the client when turn around is quick; in the process, precious network and server resources are preserved. Similarly, logic lives on the server, where it is secure and can make use of the server side.

### 2.11.2 Three-tier Architecture

The three tier architecture (also referred to as the multi-tier architecture) emerged to overcome the limitations of the two tier architecture.

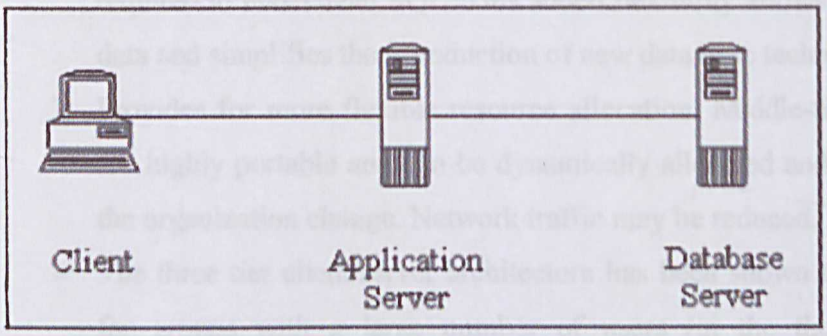



**Figure 2.5: Three-tier architecture**

**Three-tier architectural design**

Sometime it also referred to multi-tier architecture. The components of three-tiered architecture are divided into three layers:

- presentation layer,
- functionality layer,
- and data layer

Each of these layers must be logically separate. Presentation logic represents the user interface, for displaying data to the user and accepting input from the user. Business logic is for data validation, ensuring the data is correct before being added to the database. Data Access Logic represents the database Communication for accessing tables and indices, packing and unpacking data. The three-tier architecture attempts to overcome some of the limitations of the two-tier scheme by separating presentation, processing, and data into separate distinct entities. Although three-tier systems can be implemented using a variety of technologies, the calling mechanism from client to server in such a system is most typically the remote procedure call, or RPC (remote procedure call).

The advantages of three-tier architecture are:

- Unlike in most two-tier implementations, the three-tier presentation client is not required to understand SQL. This added flexibility allows a firm to access legacy data and simplifies the introduction of new data base technologies.
- Provides for more flexible resource allocation. Middle-tier functionality servers are highly portable and can be dynamically allocated and shifted as the needs of the organization change. Network traffic may be reduced.
- The three tier client/server architecture has been shown to improve performance for groups with a large number of users (in the thousands) and improves flexibility when compared to the two tier approach.

**2.12 Chapter Summary**

Domain studies of the existing system are important to help the author to gain in-depth information about the system. Research on existing system is to have a better understanding on the requirements of the system provide clear idea to help author to gain brief idea on how to build this web based system.

Development tools and technologies for the project were gathered and analyzed. Security network architecture has been review for the Secure Socket Layer. The author has studied about three types of Web servers namely APACHE, personal web server (PWS) and Internet Information Server (IIS). Information for operating system has been gathered. Five types of operating systems are analyzed: UNIX, LINUX, Windows 98, Windows 2000 and Windows XP. Each operating system has its own features. For database management system, information has been gathered on SQL Server 2000 and MySQL and Microsoft Access. For data access technology, the author has gathered information on RDO, ADO, ODBC, and OLEDB.

Programming languages which have been studied include Java Server Pages (JSP), Active Server Pages (ASP), Java Script, JSP, VB Script and ASP.Net. Some of the methodology techniques also being analyzed such waterfall model, rapid prototyping, V model, Spiral model and code-and fix model. For authoring tools, five types of tool have been studied namely Microsoft Front page, Microsoft Visual Studio.NET and Visual InterDev 6, Adobe Photoshop and Seagate Crystal Report.. Data has been gathering

through some techniques such internet research, document review and research on sample. All information is gathered from sources like books and Internet. System architecture for Two-tier architecture and three-tier architecture also discussed. All the chosen development tools and programming languages will be discussed in next chapter.

# CHAPTER 3 - METHODOLOGY

## 3.1 Project development life cycle

In order to develop a system in an organized an effective way, it is necessary to follow a sequence of steps to accommodate a computer set of tasks, which is generally called a process. A process is referred to a series of steps involving activities, constraints and resources that help in produce user intended output.

## 3.2 Methodology chosen for the project

### 3.2.1 Waterfall Model with Prototyping

Waterfall model can be amended with prototyping to improve understanding. This model is simple to use. It is suited to develop large and complex system. This development is to proceed linearly through the phases of requirement analysis, system design, program design, coding, unit and integration testing, system testing, acceptance testing, operation and maintenance.

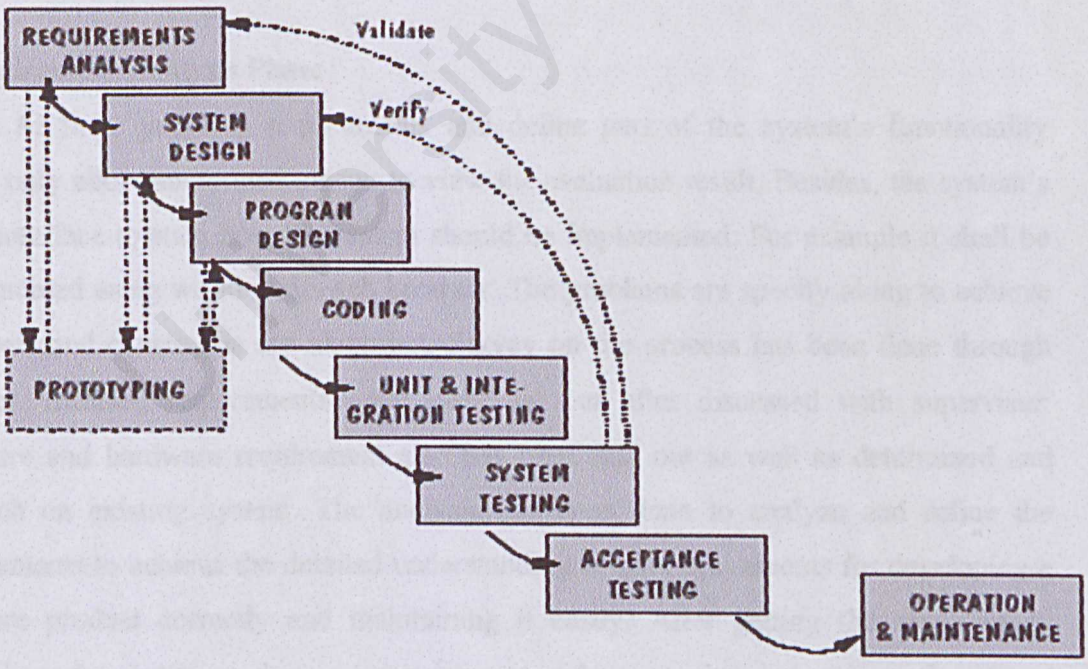



**Figure 3.1: Waterfall with prototyping model**

Advantage of waterfall model:

- Enforced discipline through documents
  Cannot perform a phase without the previous phase and it will then checked by SQA group.
- It shows the concrete evidence of progress.
- Testing carried out during all phases of life-cycle.
- A schedule can be control to with deadline for each stage to ensure it delivered within time period and product can be proceed through development phase.
- It can also control budget to ensure it didn't over budget and documentation.
- It has measurement value where the management knows where project is at and what is to be done.
- It produced software where its components can be used in other project.

It tend to be a well-understood system over poorly understand system components. It is also easy to separate one stage from another. Each phase of development proceeds in strict order, without any overlapping or iterative steps.

**1 Requirement Analysis Phase**

At first, gathering requirements and define part of the system's functionality where only allow authorized person to view for evaluation result. Besides, the system's users interface to state how the system should be implemented. For example it shall be implemented using world-wide-web browser. The problems are specify along to achieve the goals and constraints are identified. Survey on the process has been done through internet. Besides, requirements have been list out after discussed with supervisor. Software and hardware requirement also has been find out as well as determined and research on existing system. The analysis has been done to analyze and refine the requirements to achieve the detailed understanding of the requirements for developing a software product correctly and maintaining it easily. After getting the requirement, analysis and negotiation done on requirements where requirements are analyzed and conflicts resolved through negotiation. Negotiation is important because different people will have different opinion. In this phase, it must be clearly communicates system with

end user where it is complete, unambiguous and understandable. Context diagram and also data flow diagram has been drawn to show the functionality provide by the system. The hardware and software requirement also determined at this stage.

**2 System Design Phase**

In this phase, flow chart and structure chart is designed to show the overall view in which how the data is passes and the system is communicate with each other.

**3 Program Design Phase**

In system design phase, the system specification is translated into software representation. It is derived in which satisfy software requirement. This design phase can be divided into three level which are architecture level, high level and low level.

Design phase consist of architecture design, interface design and database design. By the end of this phase, software engineer should be identified relation between hardware, software and the associated interface.

**4 Coding Phase**

Start writing the code for the system based on the system design.

**5 Units and Integration Testing Phase**

Testing is important in where to verify each unit meets its specification and find out any errors in the system. If it is failed, then system prototype has to be redefined or program stage reprocessed. Once successfully, all program units are tested in separate module. It will then integrate and tested together to ensure that the complete system meets the software requirements and to make sure they work properly when joined with others. System is being test to ensure the functions and interactions specified initially have been implemented properly.

**6 System Testing Phase**

In this phase, validation and verification testing is important where validation is needed to ensure that the system has implemented all of the requirements so that the system function can be traced back to a particular requirements in the specification. While verification is to ensure that each function work correctly as needed.

**7 Acceptance Testing**

Besides test by developers, it is also important to test by customer of the E-Appraisal system to make sure it meets their understanding of requirement, which may be different of understanding of developers.

**8 Operations and Maintenance Phase**

In this phase, software is installed and put in practical use. Software is updated to satisfy user's need, adapted to accommodate changes in external environment. Maintenance is carried out to correct any errors that didn't detect in the previous early stages. It also needs to enhance efficiency of system and improve system units. It used to collect, analyze and priority of user trouble. Maintenance needed because of new system installation and document changes (user's manual).

Prototyping is incorporate into waterfall model because it is vital to test out the functionality of its models of development. There are two types of prototyping namely requirements prototyping and design prototyping. Requirements prototyping is to ensure that the requirements are feasible and practical if there is not revisions are made at the requirements stage. While design prototyping helps the developers assess alternative design strategies and decide which is best for a particular project. [SE Model, 13/08/2004] Process gets into the implementation stage. This stage and prototype will also allow potential user to test out the system and necessary modification can be made before being implemented. Another reason why with prototyping approached was it offered a menus of making the development process visible compare to other. Throughout this model, system interface built and tested as a prototyped. So user understands what the system will look like. Prototyping is useful for validation and verification. Validation is to ensure the system has implemented all requirements and building the correct product according to specification while verification is to check the quality of implementation. [SE Model, 13/08/2004]

Prototyping is a sub-process that enhances understanding. A prototype is a partially developed product or a simple simulator of the actual system that enables customers and developer to examine some aspect of the proposed system and decide whether it is evitable or appropriate for the finished product.

Benefits of waterfall model with prototyping:

- Simplicity of explanation
- Systematic and organized
- More other models are establishment of it
- It makes explicit which intermediate products are necessary to begin the next stage of development

Important of Prototyping:

- To ensure the system meet the requirement
- To help the developers and assess alternative design strategies and make best decision for particular project.
- To ensure the requirements are consistent, feasible, and practical.
- To help user to understand the system
- To help designer to know the interaction between user and the development system.

### 3.3 Conclusion tools and technologies

After reviewing the tools and technologies needed to be used to develop the E-Appraisal system, suitable tools have been chosen. The tools include development software as well as platform on which the system is going to develop.

#### 3.3.1 Chosen development platform

After do the investigation on platforms, Windows XP has been chosen as a platform used for E-Appraisal system because Windows XP Professional is an improvement on Windows 2000 Professional and it is stable to use. Here are the some advantages to use Windows XP:

- *Easier and faster to use compare with the earlier version of Windows*

  Windows XP make to easier to find information and programs and faster establish of tasks such as customizing computer settings, using and printing files and documents.

- *Perform faster startup performance*

  It is average 34% faster than Windows 2000 and 27% faster than Windows 98 SE.

- *Stability*

  Windows XP delivers a new level of stability, so that user can focus on their job. For example, if one the program was crashes, the other program can still running.

- *Security*

  Security is one of the significant factors to reduce cost by avoiding the productivity losses caused by viruses, worms or hackers. A good security also can reduce loss of revenue due to unplanned outages.

- *Memory and Performance*: In systems which include the recommended memory requirement of 128 megabytes of RAM, Windows XP is consistently superior to previous versions of Windows.

### 3.3.2 Chosen Software Architecture

Three-tier architecture was chosen in this project due to its most practical and suit the system's tremendously. It has many advantages compare with two-tier architecture

- Separating of the functionality and data layer make it easier to implement.
- The added modularity makes it easier to modify without affecting other tiers.
- The ability to support transaction by a huge number of users on the server at the same time

### 3.3.3 Chosen Web server

Internet Information Server (IIS) has been chosen as a web server for this project because of:

- Easy to install and uninstall
- Accessible since all kind of browser can work with it
- Provides capabilities for secure transaction with the Secure Socket Layer(SSL) support and also authentication
- Windows-based Web authoring and development tools are supported
- Integration with existing industry-standard database
- Allows for hosting multiple sites
- Offers a superb platform for building sophisticated Internet applications

### 3.3.4 Chosen Database management

Microsoft Access has been chosen to develop the E-Appraisal system. This is due to following advantages: [Good reason for using Access Advantage, 12/08/2004], [Good Reason for using Access Advantages, 12/08/2004]

- The entire database that mention can support for both windows and LINUX platform.
- Time consuming - It can save time where it is simple to learn.
- Efficiency - Efficient support for data management.
- Availability - Availability to use in anywhere.
- Cost-effectiveness – It is set up for electronic data transfer and remote trouble-shooting. Most of the support can be handled without a site visit.
- Scalability - Scalability and high performance
- Reliability - Reliable distribution data and transaction
- Staff development – Enhance staff availability to build and maintain database.
- Affordability – Already own it as part of Microsoft Office
- Familiarity – Already familiar with Microsoft Windows and Office programs like Word pay off it lower learning time for Access.
- Ease of use- Even new user can easily create customize tables, queries, forms and reports.
- Power – It advanced user to build customized and powerful programs which integrate in Microsoft Windows Application.

### 3.3.5 Chosen Programming language and environment

Web authoring tools

Microsoft Visual Interdev being chosen as web application tools for this project because although it is considered difficult over than other tools such as Microsoft FrontPage, it offers considerable advantages as it is very powerful and has many features which make it exciting for web development. Furthermore, Microsoft Visual Interdev boasts strong links with SQL server which makes it very easy to set up databases combining ASP and Microsoft Access.

Web Technology

ASP was chosen over other web technologies in this system. The main reason is ASP is easy to learn but powerful. Besides, it comes free with Windows XP option pack and thus earns the financial burden. Furthermore, ASP provides confidentiality for specific code from users of the internet.

### 3.4 Chapter Summary

This chapter briefly describes about project development life-cycle, methodology used and also tools and technologies used to develop the system.

# CHAPTER 4 – SYSTEM ANALYSIS

## 4.1 System Requirement analysis

Requirement analysis is an important process to determine the system being built meets the customer's requirements. There are two types of requirement which are functional requirement and non-functional requirement.

## 4.2 Functional Requirement

Functional requirement is a statement of service or functional that a system should provide the system reacts to particular inputs and how the system should behave in particular situation [Sommerville, 2001]. Briefly, a functional requirement describes an interactive between the system and its environment. [Pfleegrer, 2001] This E-Appraisal system consists of 3 modules which are login module, evaluation module and maintenance module.

- **Login Module**

  This module is designed only for authorized user to login to the system.

  i. This module should enable only authorized user can login and being validated when they enter their username and password.

  ii. This module is for staffs to login to enter their personal details, for supervisor to login to do evaluation on staffs and for administrators to login to do maintenance on the system.

- **Evaluation Module**

  This is the part for supervisors to evaluate staffs based on their performance

  i. The system should provide evaluation form for supervisors to evaluate staffs based on their performance.

  ii. This evaluation form should be generated automatically after being evaluated by their supervisors.

  iii. This system should provide facility where supervisor can view the result of the evaluation on the staffs.

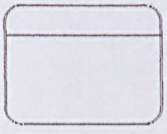
- **Administrator module**

  Database management facility is provided in this part. Only authorized administrator has the right to modify the data in database

  i. Login facility is provided for authorized administrator to login to the database management facility to modify the data.
  ii. Add new data facility is provided for administrator to add in new staff
  iii. Delete existing data facility is provided for administrator to delete existing data.

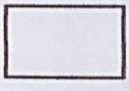
### 4.3 Context Data Flow Diagram

The context data flow diagram for the system actually depicts the flow of the E-Appraisal System. The system interacts with three entities which are the Administrator, Staff and also Supervisor. Please refer to the diagram of Figure 4.1 for the diagram of Context Data Flow Diagram of the E-Appraisal system for further information on the process flow.

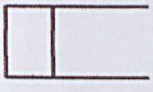


System name

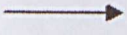
Process



External entity – the boundary of the system



Data store sometime called database or files.



Data flow out of the system



Data flow into the system

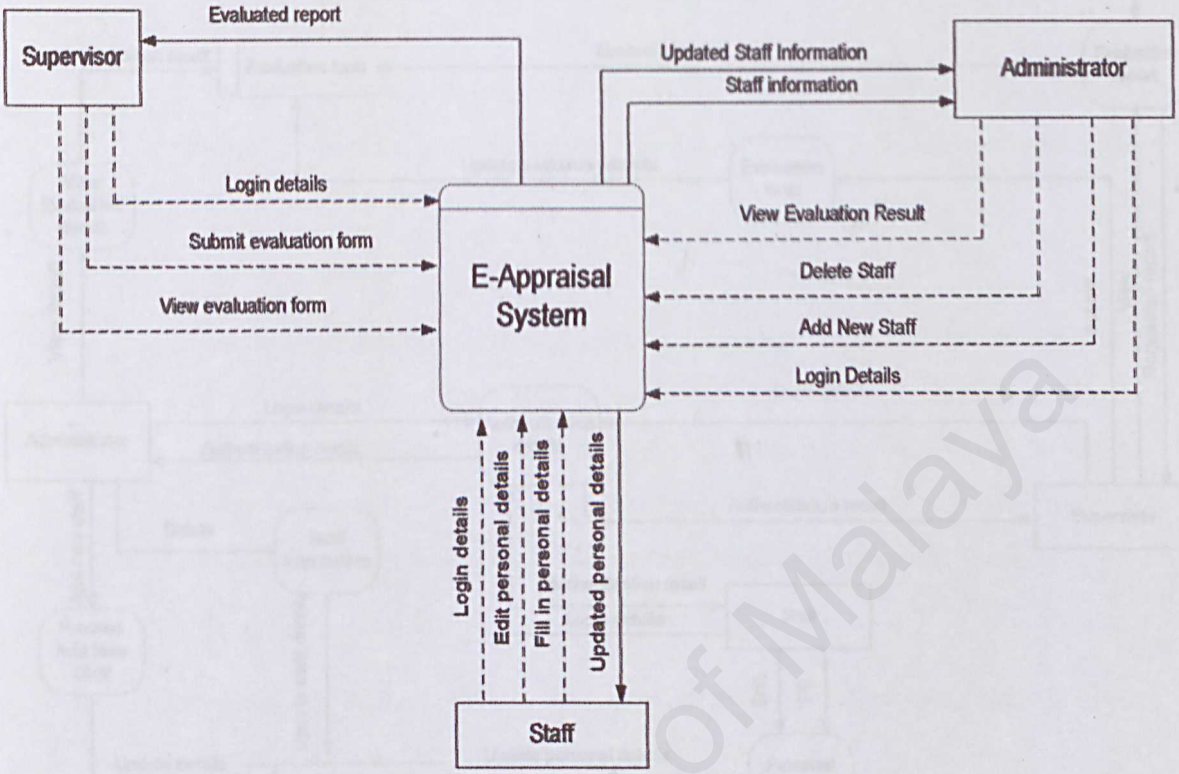



**Figure 4.1: Context Data Flow Diagram of the E-Appraisal system**

**Data Flow Diagram**

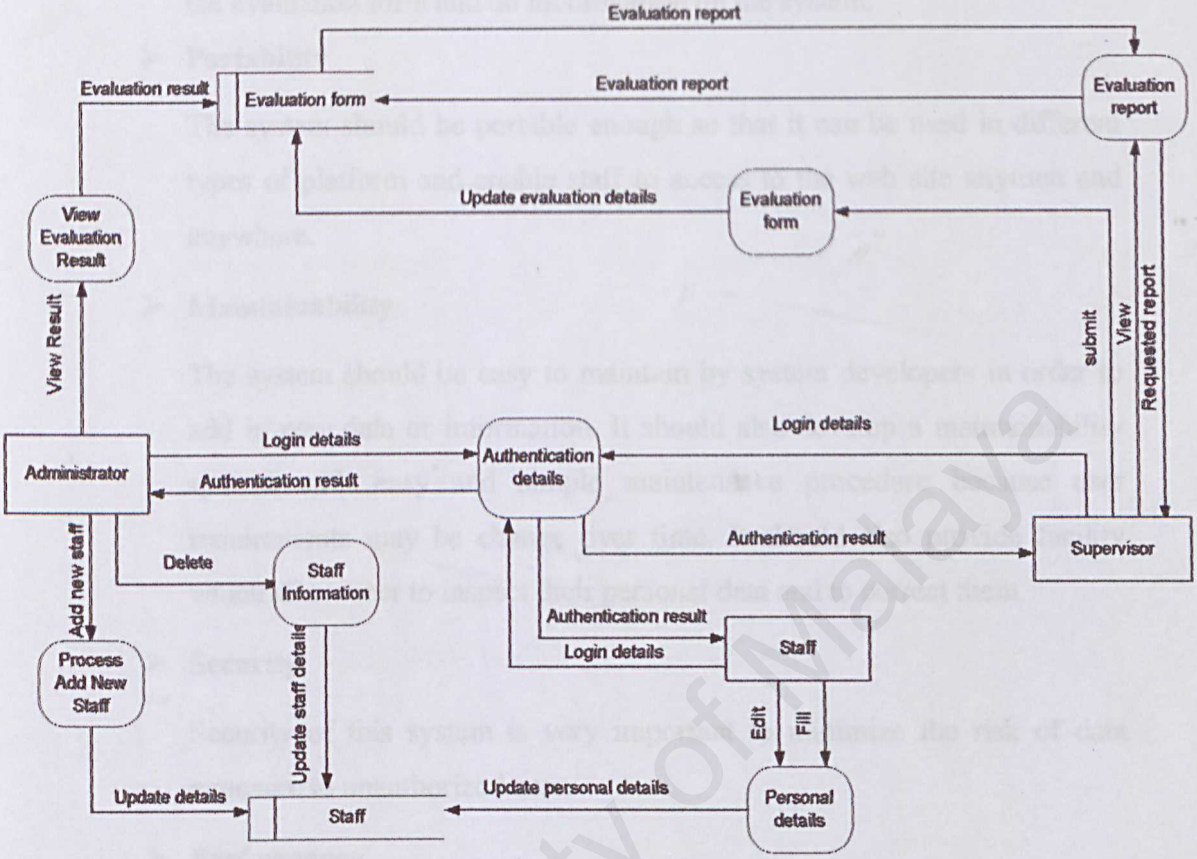



**Figure 4.2: Data Flow Diagram**

## 4.4 Non-functional requirement

Non-functional requirement are the constraints under which a system must operate and the standards and restrictions, which must be met by the delivered system. These requirements are as important as functional requirement. These non-functional requirements are: [Schach, 2005]

- **Reliability**

  Data and information provided by the system must be reliable. It is an important factor for a system because reliability is the core objective to be achieved by a system. The system should convince the user with reasonable explanation that the information or recommendation it provides

is reliable. It should also posses only authorized user can enter and access the evaluation form and do modification on the system.

- **Portability**

  The system should be portable enough so that it can be used in different types of platform and enable staff to access to the web site anytime and anywhere.

- **Maintainability**

  The system should be easy to maintain by system developers in order to add in new data or information. It should also develop a maintainability system with easy and simple maintenance procedure because user requirements may be change over time. It should also provide facility which allow user to inspect their personal data and to correct them.

- **Security**

  Security of this system is very important to minimize the risk of data exposure to unauthorized user.

- **Performance**

  This system should provide ability to generate an accurate analysis report. It should also be able to handle the respondents at a same time.

## 4.5 Hardware and software requirement

### 4.5.1 Hardware requirement

| Server | Client |
|---|---|
| ▪ Intel Pentium III 450Mhz and above (or equivalent)<br>▪ Memory 128MB RAM or above<br>▪ 20GB Hard Disk or above<br>▪ Network card NIC 10/100<br>▪ 56K Modem<br>▪ other standard peripherals | ▪ Intel Pentium III 450Hz and above(or equivalent)<br>▪ Memory at least 128 MB RAM and above<br>▪ 2.0GB Hard Disk or above<br>▪ Network card NIC 10/100<br>▪ 56K Modem<br>▪ other standard peripherals |

**Table 4.1: Hardware requirement**

### 4.5.2 Software Requirement

| Server | Client |
|---|---|
| ▪ Microsoft Windows XP<br>▪ Microsoft Visual Interdev<br>▪ Seagate Crystal Report<br>▪ Internet Explorer 6.0 | ▪ Microsoft Windows 98 or later<br>▪ Internet Explorer 5 and above |

**Table 4.2: Software requirement**

## 4.6 Chapter summary

System requirements are important for developer to gain better understanding about what functions are required and have to be implemented in the system. Two types of requirements are discussed which are functional requirements and non-functional requirements.

Functional requirements for the system basically focus on three main module of the system namely login module, evaluation module and administrator module. Each

module with their detailed functional requirements is discussed. Data flow diagrams are also discussed in this chapter in which DFD is a tool that depicts the flow of data through a system. Non-functional requirements which have been discussed are reliability, portability, maintainability, security and performance.

Besides that, software and hardware required for developing the E-Appraisal also discussed in this chapter.

# CHAPTER 5 – SYSTEM DESIGN

## 5.1 System Architecture

System architecture becomes essential when a number of subsystems are being integrated. Integration is not simply concerned with the communication between the subsystems but also any conflicting assumptions inherent in each system. There are few system architectures available now which are: Two-tier architecture and Three-tier architecture. This project will be a web-based system. Therefore there are architectures that listed below which best suit the system.

E-Appraisal system will be developed based on client-server architecture. By using the three-tier architecture, sharing of data and resources can be made possible. This three-tier architecture consists of presentation layer, application layer and data layer. For data layer, where the central database resides will be responsible for processing of staffs details, reports, monitoring performance and many more. The coding and all scripting will be stored in application layer while user interface will be stored in presentation layer. Three-tier architecture being used because of some advantages:

- Having separate software entities allows for the parallel development of individual tiers by application specialists.
- Reusable logic reduces subsequent development efforts, minimizes the maintenance workload, and decreases migration costs when switching client applications.

## 5.2 System functionality design

The system is divided into a number of subsystems where the subsystem is in an independent unit. Structure chart is used to depict the high level extraction of a specified system. Objective of this system is to improve the system quality and make the maintenance task easier.

### 5.2.1 Structure chart for E-Appraisal System

The system structure chart is divided into three major module named login module, evaluation module and administrator module. The details of each module are represented in the following structure chart:

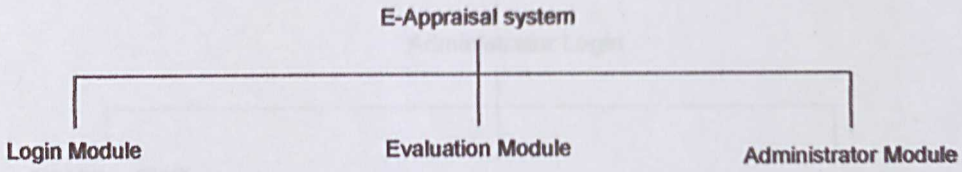



**Figure 5.1: Structure chart for E-Appraisal system**

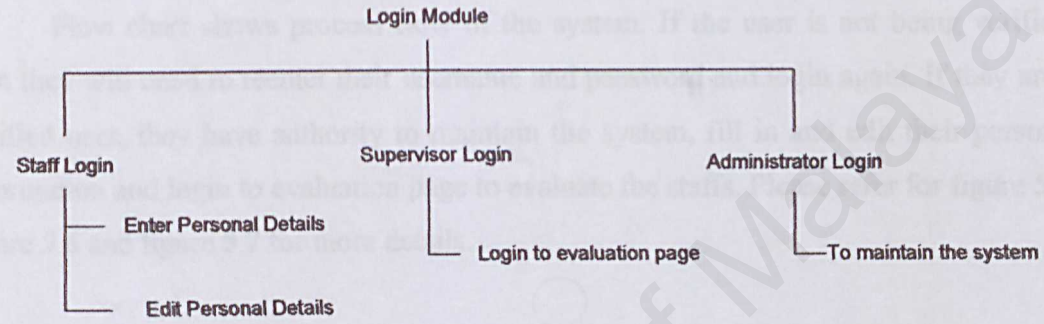



**Figure 5.2: Structure chart for Login Module**

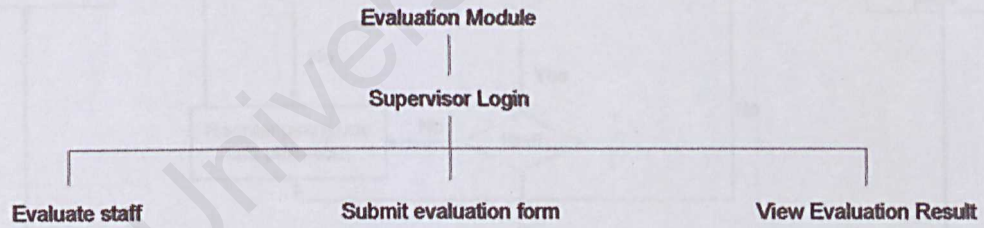



**Figure 5.3: Structure chart for Evaluation Module**

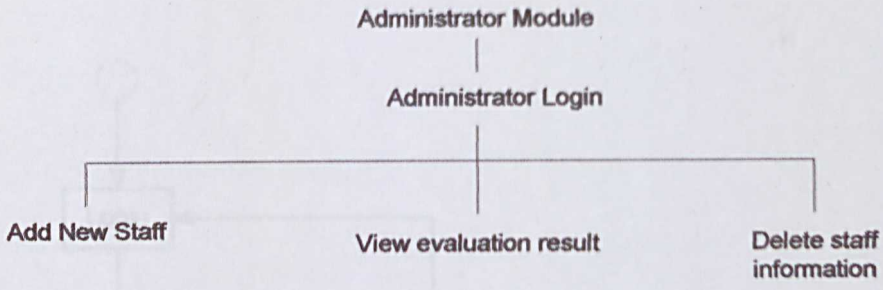



**Figure 5.4: Administrator Module for E-Appraisal system**

### 5.2.2 Flow Chart

Flow chart shows process flow of the system. If the user is not being verified, then they will need to reenter their username and password and login again. If they are a verified user, they have authority to maintain the system, fill in and edit their personal information and login to evaluation page to evaluate the staffs. Please refer for figure 5.5, figure 5.6 and figure 5.7 for more details.

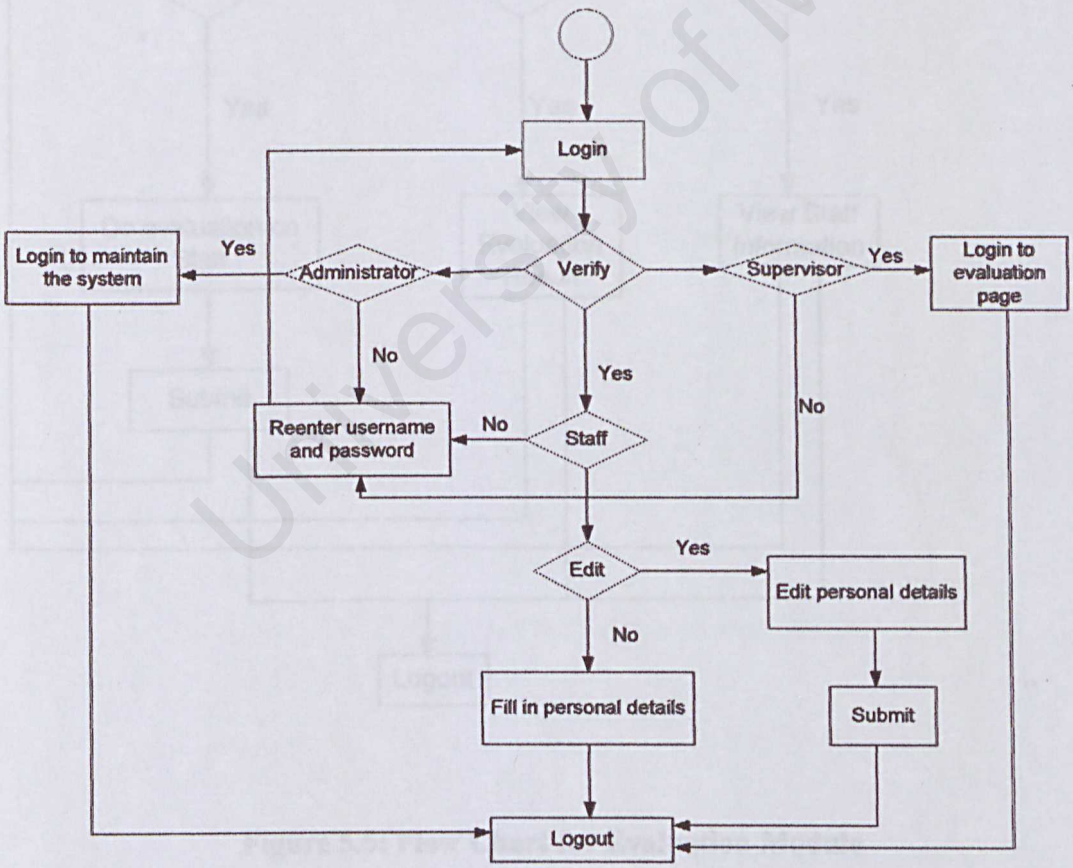



**Figure 5.5: Flow Chart for Login Module**

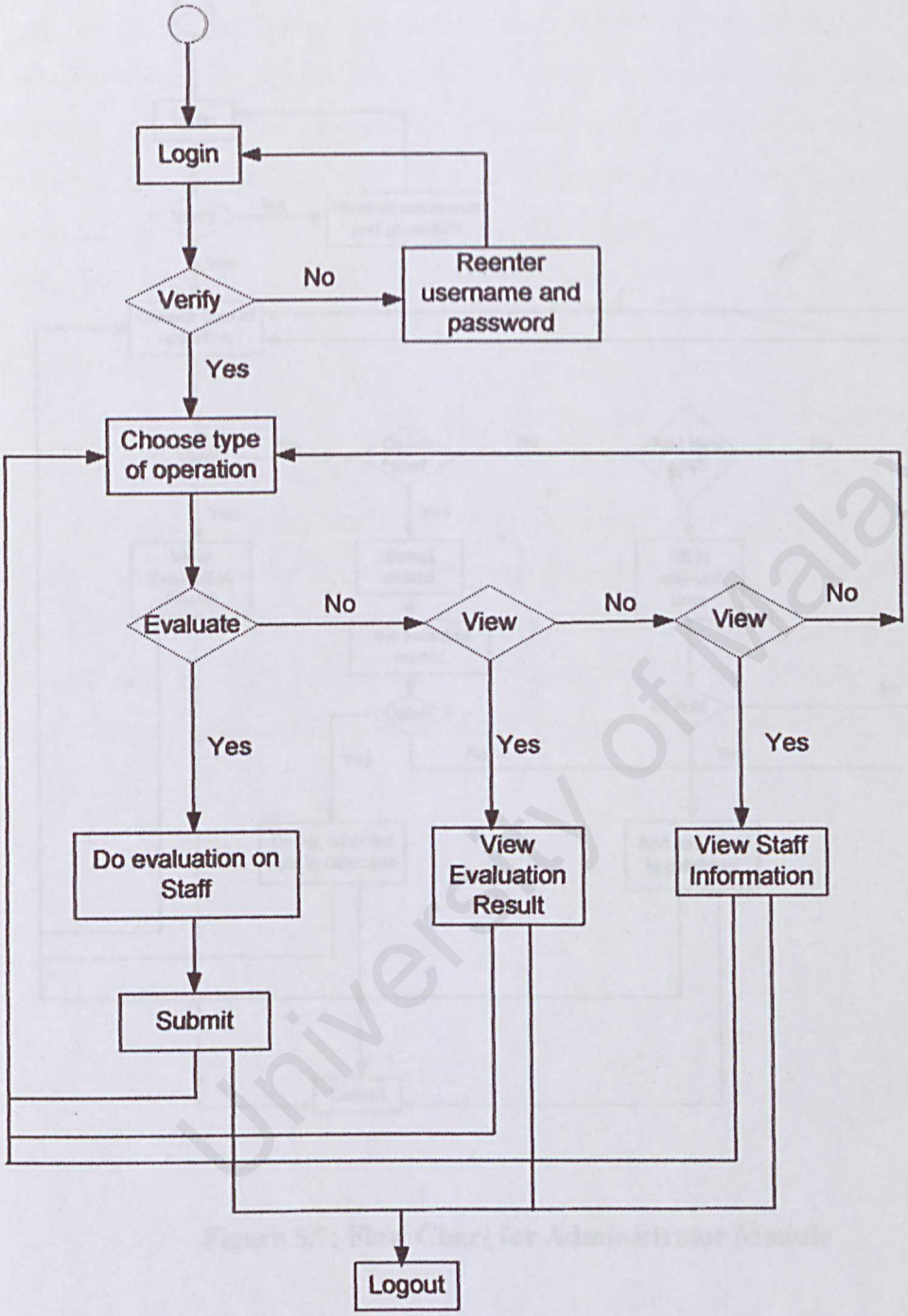



**Figure 5.6: Flow Chart for Evaluation Module**

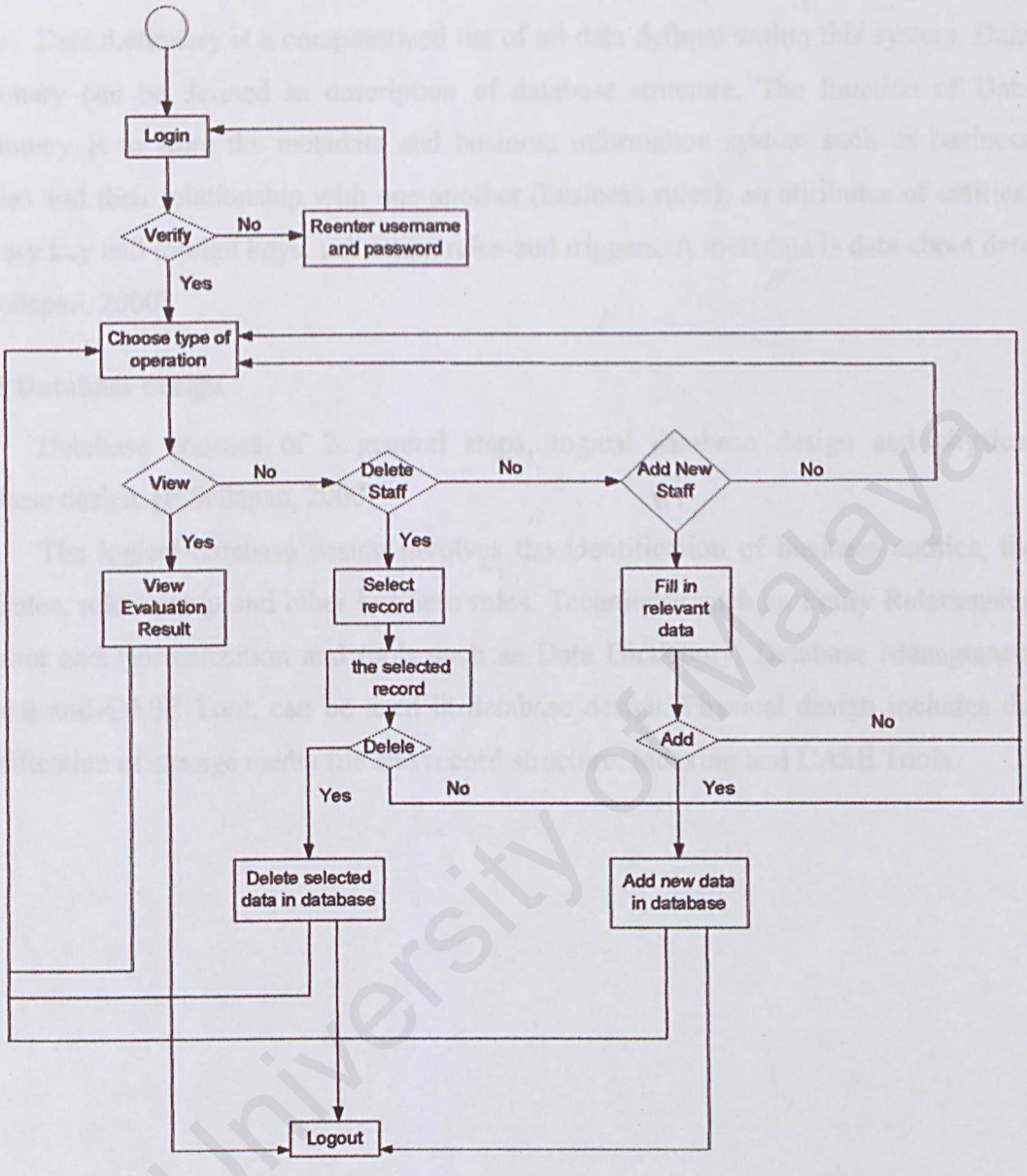



**Figure 5.7: Flow Chart for Administrator Module**

### 5.3 Data Dictionary

Data dictionary is a computerized list of all data defined within this system. Data dictionary can be defined as description of database structure. The function of Data Dictionary is to store the metadata and business information system such as business entities and their relationship with one another (business rules), an attributes of entities, primary key and foreign keys, validation rules and triggers. A metadata is data about data. [P.Sellapan, 2000]

#### 5.3.1 Database design

Database consists of 2 general steps, logical database design and physical database design. [P.Sellapan, 2000]

The logical database design involves the identification of business entities, the attributes, relationship and other business rules. Techniques such as Entity Relationship diagram and Normalization and tools such as Data Dictionary, Database Management System and CASE Tool, can be used in database design. Physical design includes the identification of storage media file and record structure, indexing and CASE Tools.

**Entity Relationship Data Model**

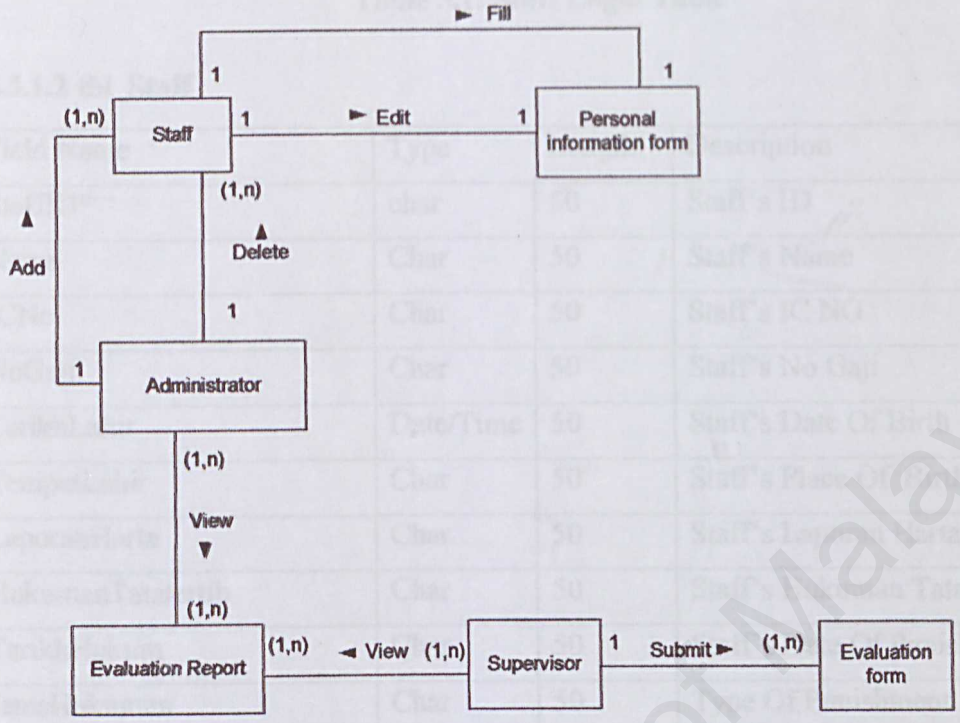



**Figure 5.8: Entity Relation Diagram**

It defines field name, type, length and description. Database of Appraisal has been namely in this system and this database contained table as below:

* is the primary key

**5.3.1.1 tbl_Login**

| Field | Type | Length | Description |
|---|---|---|---|
| StaffID* | Char | 50 | Staff's ID |
| Password | Char | 50 | Staff's Password |
| UserRole | Char | 225 | Staff's UserRole |
| Name | Char | 50 | Staff's Name |
| ICNo | Char | 50 | Staff's IC No |
| TarikhLahir | Date/Time | 50 | Staff's Date of Birth |
| Alamat | Char | 50 | Staff's Address |

| | | | |
|---|---|---|---|
| EndDate | Date/Time | 50 | Staff's End Of Accessing Date |

**Table 5.1: Staff Login Table**

**5.3.1.2 tbl_Staff**

| Field Name | Type | Length | Description |
|---|---|---|---|
| StaffID* | char | 50 | Staff's ID |
| Name | Char | 50 | Staff's Name |
| ICNo | Char | 50 | Staff's IC NO |
| NoGaji | Char | 50 | Staff's No Gaji |
| TarikhLahir | Date/Time | 50 | Staff's Date Of Birth |
| TempatLahir | Char | 50 | Staff's Place Of Birth |
| LaporanHarta | Char | 50 | Staff's Laporan Harta |
| HukumanTatatertib | Char | 50 | Staff's Hukuman Tatatertib |
| TarikhHukum | Char | 50 | Staff's Date Of Punishment |
| JenisHukuman | Char | 50 | Type Of Punishment |
| Cuti | Char | 50 | Holiday taken by Staff |
| Period | Char | 50 | Holiday Period |
| Faculty | Char | 50 | Faculty of the staff |
| NamaSkim | Char | 50 | The scheme name of staff |
| NamaJawatan | Char | 50 | Staff's Position |
| GredJawatan | Char | 50 | Gred of the position |
| TarikhLantikPertama | Date/Time | 50 | Tarikh Lantik Pertama of the staff |
| SandangSekarang | Date/Time | 50 | Position hold by the staff now |
| TarikhSah | Date/Time | 50 | Confimation Date of the staff |
| JawatanTadbir | Char | 50 | Jawatan Pentadbiran of the staff |
| Tempoh | Char | 50 | For how long the staff hold the post |
| TarafPerlantikan | Char | 50 | Tarikh Perlantikan of the staff |
| KelayakanAkademik | Char | 200 | Kelayakan Akademik of the staff |
| BidangPengkhususan | Char | 50 | Bidang Pengkhususan of the staff |
| Kurniaan | Char | 200 | Kurniaan from the staff |

| | | | |
|---|---|---|---|
| TahunSPM | Char | 50 | Year of taken SPM |
| PeringkatSPM | Char | 50 | Level of SPM |
| GredSPM | Char | 50 | Gred of SPM |
| Kursus | Char | 200 | Course attend by the staff |
| Sebab | Char | 200 | Suggestion of course needed |
| BidangKerja | Char | 50 | Suitability of working field |
| TempatKerja | Char | 50 | Suitability of working place |
| Persekitaran | Char | 50 | Suitability of working environment |
| KurangSesuai | Char | 200 | Reason of not suitable |
| Sumbang | Char | 200 | Distribution to work |
| SumbangNilai | Char | 200 | Distribution of work out of working period |

**Table 5.2: Staff Information Table**

**5.3.1.3 Staff_Evaluate**

| Field Name | Type | Length | Description |
|---|---|---|---|
| StaffID* | Char | 30 | Staff's ID |
| Jum1 | Char | 30 | Total given by Pegawai Penilai |
| Jum2 | Char | 30 | Total given by Pegawai Penilai Semula |
| Perakuan | Char | 100 | Perakuan from Pegawai Penilai |
| Perakuan2 | Char | 200 | Perakuan from Pegawai Penilai Semula |
| NaikPangkat1 | Char | 100 | Suggestion of arise in post by Pegawai Penilai |
| NaikPangkat2 | Char | 100 | Suggestion of arise in post by Pegawai Penilai Semula |
| Anugerah1 | Char | 100 | Suitability giving award to staff from Pegawai Penilai |
| Anugerah2 | Char | 100 | Suitability giving award to staff from Pegawai Penilai Semula |
| Anugerah | Char | 100 | Suggestion Award from Pegawai Penilai |

| | | | |
|---|---|---|---|
| Ulasan | Char | 200 | Assessment from Pegawai Penilai Semula about award giving |
| Sesuai | Char | 200 | Suitability of the working place |
| Sebab | Char | 200 | Suggestion of improvement and reason |
| Keseluruhan | Char | 200 | Overall assessment from Pegawai Penilai |
| Keseluruhan2 | char | 100 | Overall assessment from Pegawai Penilai Semula |

**Table 5.3: Staff Evaluation Table**

## 5.4 Interface Design

*Staff and Supervisor login*

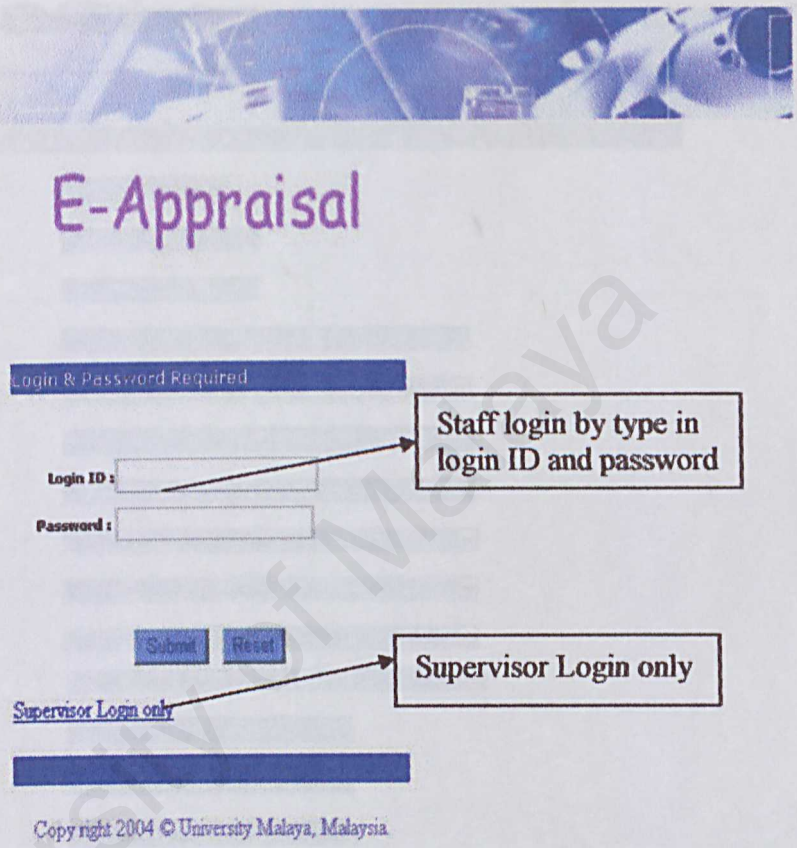



**Figure 5.9: Staff and supervisor login page**

*Staff inserts personal info*

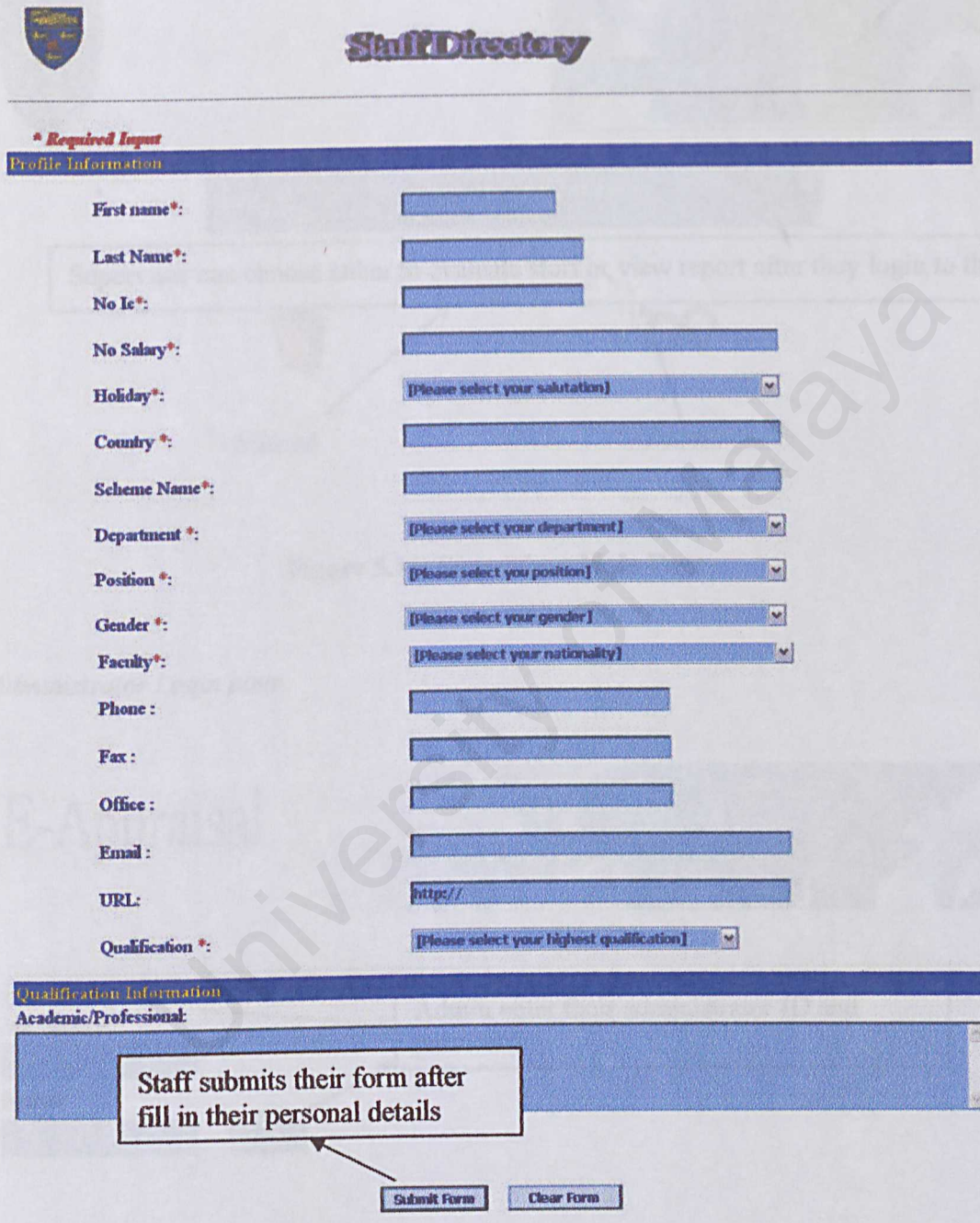



**Figure 5.10: Staff insert information page**

*Supervisor Main page*

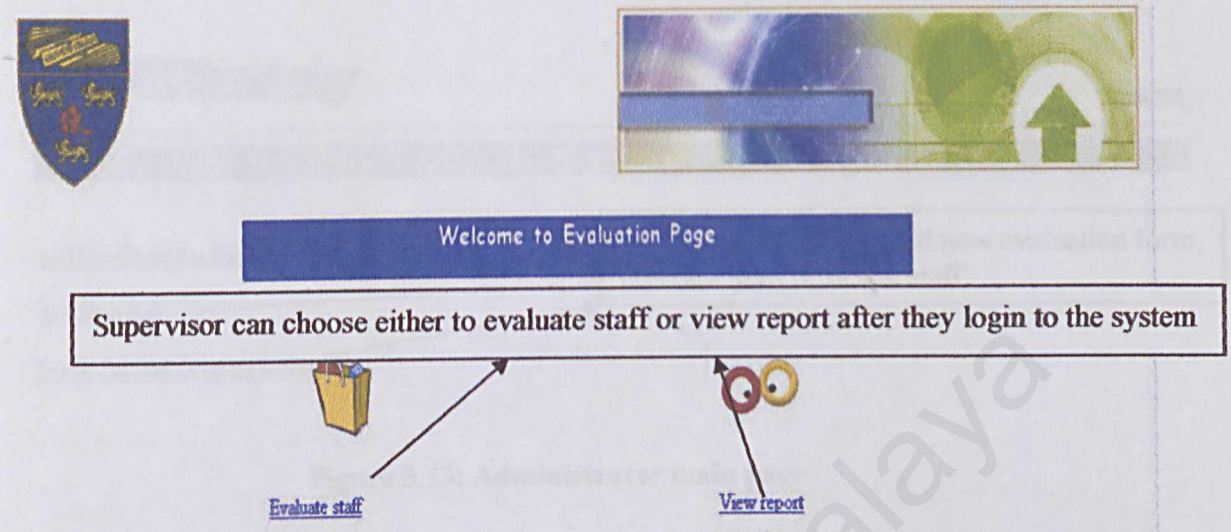



**Figure 5.11: Supervisor Main Page**

*Administrator Login page*

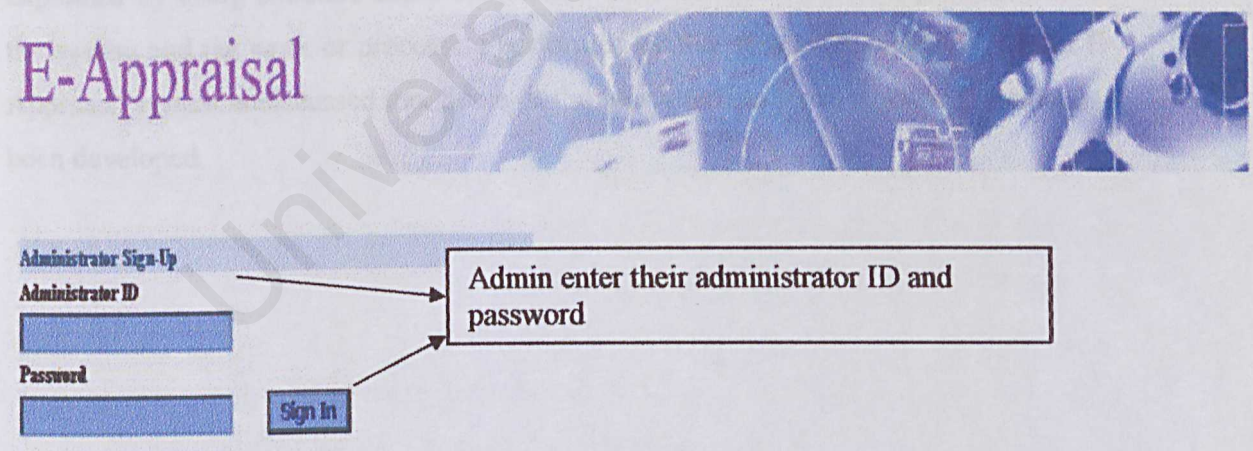



**Figure 5.12: Administrator login page**

*Administrator main page*

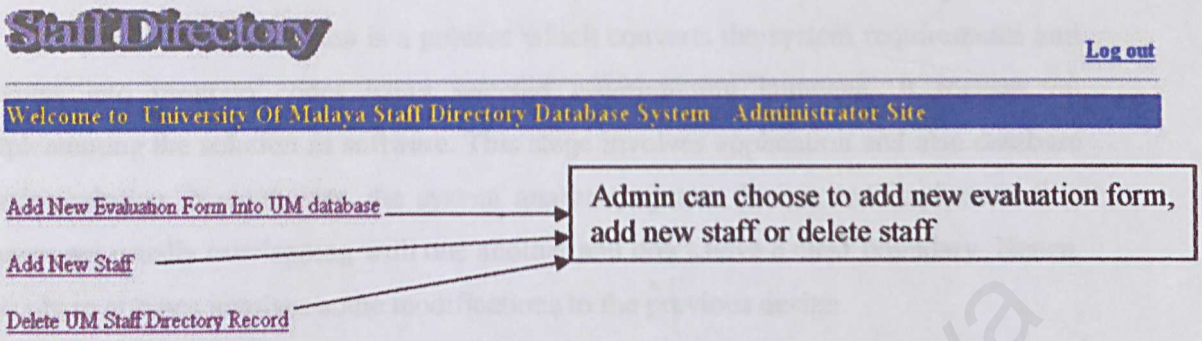



**Figure 5.13: Administrator main page**

## 5.5 Chapter summary

System design is an important phase in developing a system. System architecture for E-Appraisal system is discussed in details in this chapter in which the adapted architecture is 3-tier client/server architecture.

Furthermore, system functionality design for E-Appraisal is depicted and explained by using structure chart. Flowcharts are used to describe the process flow of the system and the work or processing performed by that system Database design for E-Appraisal system is discussed too. Some of the user interface for E-Appraisal system has been developed.

# CHAPTER 6 – SYSTEM IMPLEMENTATION

## 6.1 Introduction

System implementation is a process which converts the system requirements and designs into program codes using selected programming language. It focuses on implementing the solution as software. This stage involves application and also database implementation. Nevertheless, the system analysis, system design and implementation phases are usually overlapping with one another and don't have a clear boundary. Hence, this phase at times involves some modifications to the previous design.

## 6.2 Development Environment

Development environment has a certain impact on the development of a system. Appropriate hardware and software will speed up the system and also determine the success of a project. The platform development will include setting up the Windows XP, and configure the IIS server. Servers and development tools installation are the very beginning steps off with any development work. When using Microsoft's products, it is essential to know the sequence of products installation to ensure smooth execution without the system errors. Hard disc is formatted to ensure a more stable and secured transaction across the platform. Below are the hardware and software tools involve.

## 6.3 Hardware in Development Environment

Hardware and software form a tightly coupled cohesion that operates to perform programmed tasks. Without software, the faster or most powerful computer will also able to inoperative in the corner. Below are the software tools that utilized in the development environment:

- Operating system – Microsoft Windows XP
- Web server – Microsoft internet information Services 5.0
- Database management system – Microsoft Access
- Web development tool – Microsoft Visual Studio and Microsoft FrontPage.
- Web Browser – Microsoft Internet Explorer 6.0
- Image design tools – Adobe Photoshop 7.0

- Documentation – Microsoft Word XP

### 6.3.1 Configure Internet Information Server (IIS)

After installing the IIS, the virtual directory was created so that user can access the application. The users can acces the application through the following address : **http://SeverName/AppraisalSystem/main_page.htm**

### 6.3.2 Database Connection

The database connection is an important step that must be done before start the coding of E-Appraisal pages that need to retrieve or insert data into database. All important information such as database server bane which is needed to access the database must be specified correctly. After the configuration, the coding can directly connect to the server and communication with database. The connection string is written in every page that needs the database connecting. Below is the sample coding:

Here is the code written in each page which needs the database connectivity:

```
set DataConnection=server.CreateObject("ADODB.Connection")
Dim ConnectionString
ConnectionString ="Provider=Microsoft.Jet.OLEDB.4.0;Data Source=" & Server.MapPath("E-Appraisal.mdb")
DataConnection.open ConnectionString
```

## 6.4 System Coding

System coding is referred as converting the prior system design into a workable and functional system. This mainly involved software programming and preliminary testing. Programming is the process of transforming the structure shorts, logical and physical data flow diagram. The coding style is a very important attribute to determine the readability and maintainability of the source codes. With a clear and systematic coding style, it helps programmers to see the codes easier in order to help them in maintaining and also debugging the system.

Follows are the coding style being applied:

- Use meaningful variables and label name so that reference can be done more easily. For example, the variable "StaffID" is referring to the Staff ID text box.

```
<tr>
  <td width="120" height="32" ><p align="right"><font face="verdana" font
size="2"><b>
  StaffID :</b></font></p></td>
  <td height="32" width="371">
      <font face="verdana" color="black" size="3" align="right">
            <strong>
            <input type="text" name="txtStaffID" style="FONT-SIZE: smaller;
            WIDTH: 167px; FONT-STYLE: normal; HEIGHT: 23px" size="1"
            face="times new roman" width="150" height="10" >
            </strong>
      </font>
  </td>
 </tr>
```

- For security and user role control where by using session and user role. If the user access to add new staff page is not admin, then it will go to login page where not allow the user access the page. They have to login to the page first before they can do any function in the system.

```
if session("UserRole") <> "admin" then
          Response.Redirect("Login_page.asp")
    end if
```

- This is the part that allows the user to search for the staff by using StaffID. If it is not end of file of the system. It will search for the staff that user request for.

```
<%
 if not rstID.BOF then
      rstID.movefirst
      do until rstID.EOF
            if mode = 1 then
            if rstID.Fields("StaffID") = Request.QueryString("StaffID") then
                  Response.Write "<OPTION value=" & rstID.Fields("StaffID") & "
selected>" & rstID.Fields("StaffID") & "</OPTION>"
            else
                  Response.Write "<OPTION value=" & rstID.Fields("StaffID") &
">" & rstID.Fields("StaffID") & "</OPTION>"
            end if
            else
                  Response.Write "<OPTION value=" & rstID.Fields("StaffID") &
">" & rstID.Fields("StaffID") & "</OPTION>"
            end if
      rstID.movenext
      loop
end if
 %>
```

### 6.5 Coding Principle

- **Reuse**

  Reuse is an important principle as a method for improving product quality throughout the development the system process. It can reduce the coding time as well as the testing and documentation time.

- **Readability**

  Readability is important for the ease of the future use and enhancement. Several strategies are used in preserving readability in codes, including meaning variables and labels name, comment and proper identification.

- **Robustness**

  Robustness is another important principle. System has robust interface to prevent interface errors from corrupting the system and also it has the ability to checks on

the systems input to ensure correct data is provided in order to protect system integrity.

### 6.6 Coding Approach

Coding the program is the process of writing the program instructions that implement the program design which translate the design specifications into a machine-readable format. If design is performed in a detailed manner, then coding can be accomplished mechanically.

There are properly two types of coding approach which are top-down and bottom-up. The bottom-up coding is based on coding the lower-level modules initially and leaving the high level modules merely as skeletons that are used to call the lower modules. Whereas, top-down approach is the reverse of the bottom-up approach.

For this E-Appraisal system, it was developed and coding is done modularly by using bottom-up approach. Each lower-level function and procedure was developed individually which are then be integrated into appropriate high-level modules accordingly. The advantages of this approach are:-

- Testing can be carried out on some of the functions as soon as it is completed.
- Critical functions can be coded first to test their efficiency.
- Faults are easier to be detected.
- Increase the development process as the lower-level modules or functions can be built independently and simultaneously without waiting or delaying the others.

### 6.7 Module Implementation

There are mainly three modules in the E-Appraisal System - Login, Evaluation and Maintenance. Each module gives user different services as list as follow.

- Login module

  Authorized user can login to the system by key in their SaffID and password. The login page will be redirecting to the page of Admin main page where they can choose to add new staff, delete staff or view evaluation result if admin login to the system. For Staff, they can have two options where they are allowed to fill in their personal details and editing the details. As for Supervisor,

they can view staff information so that they are able to evaluate the staff base on the information and they can view the valuation result after the staff being evaluated.

- Evaluation Module

This module is accessible only by supervisor – Pegawai Penilai and Pegawai Penilai Semula. In this module the super can choose to evaluate staffs, view their personal information to enable them to evaluate the staff base on staff personal details. Besides, they can also view the evaluation result which has been generated after the staffs being evaluated. There is a limitation for Pegawai Penilai Semula where they can only evaluate the staffs after the Pegawai Penilai has evaluated the particular staff.

- Maintenance Module

This module only accessible by administrator where the administrator can add new staff, delete staff and view the whole evaluation report to make decision whether to rise their salary or not, promotion of arising in position, to give awards and etc.

### 6.8 Activity Module Coding

**Main Page** of the system is Main_page.htm

| Login | Staff | Supervisor | | Administrator |
|---|---|---|---|---|
| | | Pegawai Penilai | Pegawai Penilai Semula | |
| Login_page.asp<br>Login_page_validate.asp<br>Staff_login_invalid.htm | Staff_main.asp<br>Staff_add_info.asp<br>Staff_add_validate.asp<br>Staff_edit.asp<br>Staff_Edit_success.asp | Super_main.asp<br>Super_Search.asp<br>Supervisor_evaluation.asp<br>Super_evaluate.asp<br>Super_evaluate_unsuccess.asp<br>Super_View.asp | PPSemula_main.asp<br>PPsemula_Evaluation.asp<br>PPsemula_Evaluate.asp<br>PPsemula_Evaluate_unsuccess.asp<br>PPsemula_search.asp<br>PPSemula_view_report.asp | Add_New_Staff.asp<br>Add_New_validate.asp<br>Add_New_Unsuccess.asp<br>Admin_main.asp<br>Admin_StaffDelete.asp<br>Staff_DeleteMsg.asp<br>Admin_View.asp |

**Table 6.1 Activity Module Coding**

## 6.9 Chapter Summary

This chapter describes the approaches used in writing codes, scripts languages used to enhance the whole web pages system and algorithms used in implementing the system. The design of the algorithm is important to make sure a stable system to be developed and minimized the problems occur in future enhancement. Error checking is important as well to make sure that the system runs smoothly and without showing unnecessary error messages.

# CHAPTER 7 - TESTING

## 7.1 Introduction

After coding the program components, system is conducted where codes are usually examined the spot faults and the faults are eliminated right away. Testing is a process to uncover different types of errors that exist while executing the system and to test the system reliability. System testing is the major quality control measure during prototype. It is a verification and validation process. Verification refers to the set of activities that ensure the software correctly implements a specific function while validation refers to a different set of activities that ensuring the software has been built traceable to user requirements.

Testing is performed to ensure that the programs are executed correctly and confirms to the requirements specified.

The objectives of testing are stated as below:-

- To uncover different types of errors that exist while executing the system and to test the system reliability
- A good rest case is one that has a high probability of finding an as-yet-undiscovered error.
- A successful test is one that uncovers an as-yet-undiscovered error.

A test is considered successful only when a fault discovered or a failure occurs as a result of our testing procedures. However testing cannot show the absence of defects, it can only show that the software defects are present. Fault identification is the process of determining what faults caused the failure and correction or removal is the process of making changes to the system so that the faults are removed.

## 7.2 Test Case Design

Before testing is done, a method should be chosen to follow. These methods provide a systematic approach to testing. More important, methods provide a mechanism that can help to ensure the completeness of tests and provide the highest likelihood for uncovering errors in software. [Sommerville, 2001]

There are two types of test case design were used in the system: white-box testing and black-box testing.

### 7.2.1 White-Box Testing

White-box testing sometimes called glass-box testing or clear box testing is a test case design method that uses the control structure of the procedural design to derive test cases. The objective is to exercise all program statement.

By using this white-box testing method, the developers can derived test cases that:-

- Guarantee that all independent paths within a module have been exercised at least once.
- Exercise all logical decisions on their true and false sides.
- Execute all loops at their boundaries and within their operational bounds.
- Exercise internal data structures to ensure their validating.

This testing was carried out at the early stages of the testing process to ensure that the internal operation of the system performs according to specification.

### 7.2.2 Black-Box Testing

Black-box testing, also called behavioural testing or functional testing focuses on the functional requirements of the software. This is an approach to testing where the test are derived from the program or component specification (program is considered as "black-box") That is, black-box testing enables software engineer to derive sets of inputs conditions that will fully exercise all functional requirements for a program.

Black-box testing attempts to find errors in the following categories:

- Incorrect of missing function
- Interface error
- Errors in data structure or external database access
- Behaviour or performance errors
- Initialization and termination errors

## 7.3 Stages of Testing

The testing process is implemented and carried out throughout the development of E-Appraisal System. The stages involves in testing stages are unit testing, integration testing and also system testing. Figure 7.1 depicts the flow of stages in the testing.

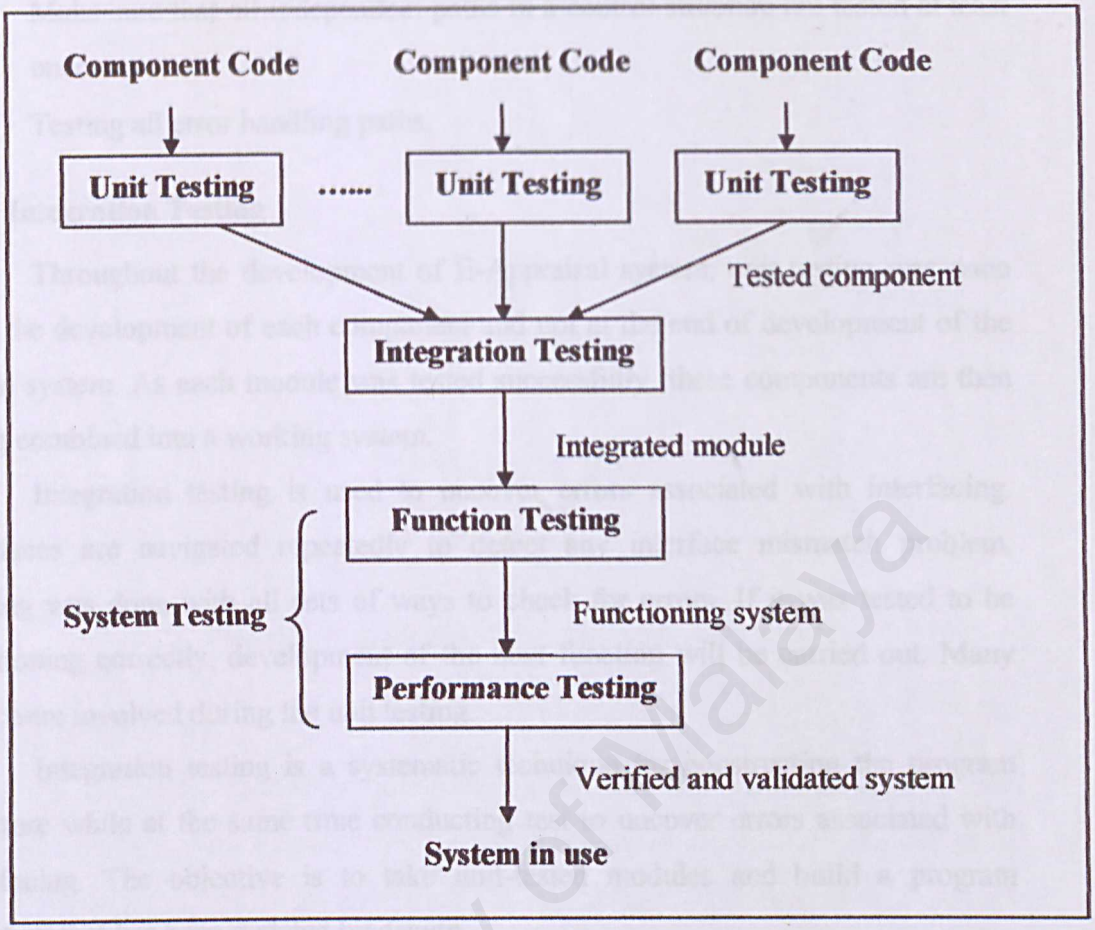



**Figure 7.1: Flow of stages in testing**

### 7.3.1 Unit Testing

Unit testing is a testing process to verify that the component functions properly with the types of input expected from studying the component's design. Unit testing focuses verification effort on the smallest unit of the software design which is the software component or module [Sommerville, 2001]. Unit testing tests individual components to ensure that they operate correctly. These components include functions and subroutines. Each component is tested independently without other system components.

The unit testing includes:

- Testing the interface to ensure that the information flows properly into and out of the program unit.
- Testing the boundary conditions to ensure that the component is operating correctly at boundary values.

- Make sure that all independent paths in a control structure are tested at least once.
- Testing all error handling paths.

### 7.3.2 Integration Testing

Throughout the development of E-Appraisal system, unit testing was done after the development of each component and not at the end of development of the whole system. As each module was tested successfully, these components are then being combined into a working system.

Integration testing is used to uncover errors associated with interfacing. Interfaces are navigated repeatedly to detect any interface mismatch problem. Testing was done with all sets of ways to check for errors. If it was tested to be functioning correctly, development of the next function will be carried out. Many tests were involved during the unit testing.

Integration testing is a systematic technique for constructing the program structure while at the same time conducting test to uncover errors associated with interfacing. The objective is to take unit-tested modules and build a program structure that has been dictated by design.

The bottom-up integration was used during the integration of modules. This approach facilitates that each component at the lowest level of the system hierarchy is tested individually first. Then the next components to test are those that call the previously tested ones. This approach is followed repeatedly until all components are included in the testing. Bottom-up integration testing, as its name implies, begins construction a testing with atomic modules, where errors are easier to isolate and correct. In addition, interfaces are more likely to be tested completely.

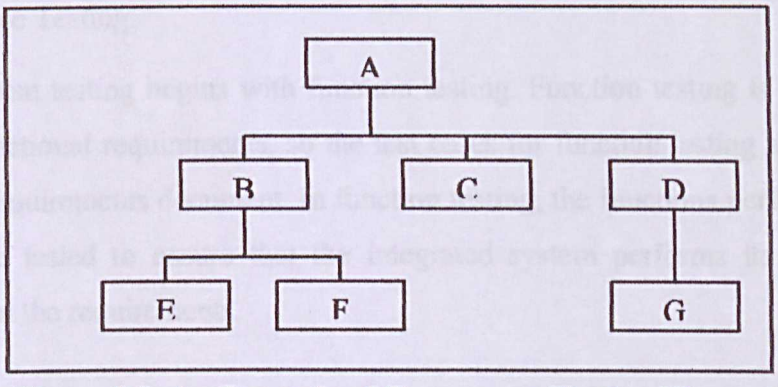



**Figure 0.2: An Example of Component Testing Hierarchy**

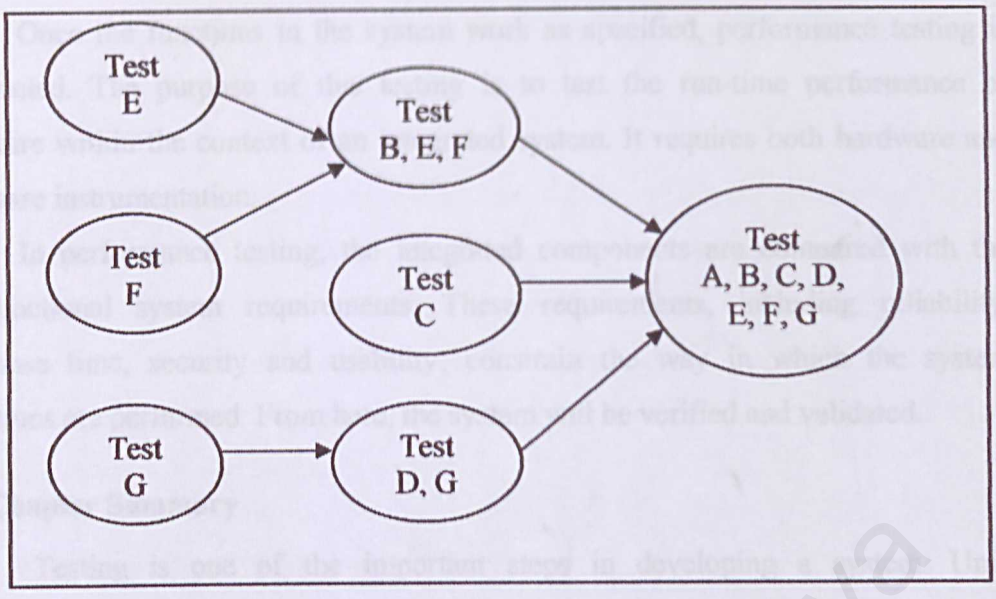



**Figure7.3: Bottom-up Testing Approach**

### 7.3.3 System Testing

Final testing procedure done is system testing. The sub-systems are integrated to make the entire system. System testing is a series of different tests whose primary purpose is to fully exercise the computer-based system. Although each test has a different purpose, all work to verify that system elements have been properly integrated and perform allocated functions.

System testing is done to find errors that result from unanticipated interactions between sub-systems. Besides that, system testing is to ensure that the system does what the users want it to do. Testing is performed to ensure that the programs are executed correctly and confirms the requirements specified.

There are several types of system testing that are worthwhile for a software system. For this project, two types of system testing are used: Function testing and Performance Testing.

System testing begins with function testing. Function testing is based on the system functional requirements, so the test cases for function testing are developed from the requirements document. In function testing, the functions performed by the system are tested to ensure that the integrated system performs its functions as specified in the requirements.

Once the functions in the system work as specified, performance testing is conducted. The purpose of this testing is to test the run-time performance of software within the context of an integrated system. It requires both hardware and software instrumentation.

In performance testing, the integrated components are compared with the nonfunctional system requirements. These requirements, including reliability, response time, security and usability, constrain the way in which the system functions are performed. From here, the system will be verified and validated.

### 7.4 Chapter Summary

Testing is one of the important steps in developing a system. Unit, integration and system testing has been carried out the E-Appraisal system. Unit and integration testing concentrate on functional verification of a component and incorporation of a component into a program structure. System testing validates software once it has been incorporated to larger system. Validation testing is done throughout the testing. These testing approaches lead to delivering a quality system to users. The objective of a system will only achieve after al the thorough testing don by different user aspects.

# CHAPTER 8 – SYSTEM EVALUATION

## 8.1 Introduction

In this chapter, the system evaluation will be discussed. Evaluation is the ultimate phase of developing a system and an important phase before delivery the system to the end users. Evaluation is a process that occurs continuously, drawing on a variety of sources and information. There were many techniques to evaluate that used to evaluate the final system. In this chapter, system's limitation and lastly the future enhancement will be described.

## 8.2 Problem Encountered and Solution

While completing the E-Appraisal System, there are many problems did affect the smoothness of the development process. However after further thoughts, reconsideration of system design and architecture and further literature research, the problems are eventually been overcame. Some of the problems that encountered during the E-Appraisal System are as follow:-

### 8.2.1 Selecting System Development Tools

There are many potential development tools available to develop a web portal system currently as stated in the earlier chapters. Choosing a suitable technology and tool was a critical process as all tools have their strengths and weaknesses. Therefore, in order to search for the best combination development tools, the system requirements and some information finding methods are analyzed.

### 8.2.2 Lack of Knowledge during System Coding

Problem has been arises during system coding as I was inexperience in ASP programming language. These programming languages and concepts were never taught before and to implement such as application requires a fair grasp of the languages. This programming language was seemed to be different from the traditional programming languages. Hence, time has been spent and efforts to figure out how to write the languages.

Although it cause a lot of time to learn the new technology, but choosing to program in ASP proved to be a wise move. Most of the problems were manageable through the Internet for related materials such as online ASP tutorial, MSDN help.

Besides reference books for ASP that available in the market also helped a lot. Discussion with friends especially seniors using the same technology was a great help. A more efficient method was through trail and error during the coding phase.

### 8.2.3 No End User Evaluation

The developed E-Appraisal system did not manage to be evaluated by the end users (The UM Staff) due to insufficient time. Therefore, valuable feedbacks were not received although the testing had been done thoroughly in development site. However, the functionalities for certain modules were approved in order to provide the same functionalities in the real life management system. Feedbacks from supervisor have been taking into consideration to improve the system.

## 8.3 System Strengths

Following are the features and strength that can be found in E-Appraisal system:-

### 8.3.1 Wide Accessibility

E-Appraisal system is a client server application. E-Appraisal also acts as a web-based portal system that provides wide accessibility to all users. The users can access this system without geographical barrier at anytime. Client-server are only requires the installation of a web browser to access the E-Appraisal system and all web browser are available across all platforms. Therefore, users can access this system from anywhere without any difficulties.

### 8.3.2 User Friendly and Good GUI Design

The graphic interface of design of the system was designed to let the users feel comfortable and easy-to-use. The GUI ensured the interfaces are simple, attractive, organized and easy to use. Thus users should find it easy to use. Besides that, it also will provide an easy way for novice users to learn to use the system effectively in shortest time possible.

### 8.3.3 Confidentially and Integrity of Information

E-Appraisal system provides confidentiality and integrity of information to certain level of users when using the system. The system protects confidentiality and integrity of information by providing only restricted access to certain functionalities

in E-Appraisal system to authoritative users. Each type of users has different level of access control to the system. For example, add new staff can only be accessed admin.

### 8.3.4 Significant Validation on Input Data

Check for the validation of data filled and prompt the user of invalid data being input and ask for validation. For example, if the staff login with wrong StaffId, then it will go to invalid page to request for the staffed again and if the user didn't fill in StaffID and password, warning message box will prompt up to request the user to key in StaffID and password.

## 8.4 System Limitation

### 8.4.1 No Encryption and Decryptions

Currently there is no password encryption and decryption to enhance the security of E-Appraisal system. As a result, unauthorized access by certain parties such as hackers may be occurred. Hackers may access the data if they successfully hack into the system.

### 8.4.2 Lack of Utilities

All critical functionalities that needed in the system can be obtained in E-Appraisal system. However, it is still lack of utilities such as email server, chat room, reports and online help. That is providing better coverage of all aspects in order to increase the system usability for users.

### 8.4.3 Language Limitation

Although E-Appraisal System supports both communication language which are Malay and English, but it is only used Malay language in evaluation page while other pages are used in English language.

## 8.5 Future Enhancement

System development is a dynamic process and changes must be expected. For this system, there can still have some improvements. However, one can hardly create a perfect system and E-Appraisal is no exception.Future enhancement can be done to make the system more advance and easy to use. There are some suggestions for future enhancements that could extend after developed the system.

### 8.5.1 Encryption and Decryption

Pass Encryption and decryption can be used to enhance the security of E-Appraisal system. User password is protected and secured because once user registered as a user in the portal, their password will be encrypted and store in database. It may be decrypted when it is retrieved. By using this method, hackers will not easily hack into the system and access the actual data easily as the data has been encrypted.

### 8.5.2 E-Mail Server

Setting up an email server and mailing option within the portal will open up a lot of options for users. It will enable all the users contact each other easily through electronic mailing.

### 8.5.3 Chat Room

Chat room utility can be provided in E-Appraisal system for interactive messaging. Users can communicate with all the users that are currently online in E-Appraisal in real time. Users like supervisor can chat with the staff if their personal information is vague.

### 8.5.4 Online Help

Online help function should be added into the system to provide a guide to the beginner user on how to operate each module in the system easily and effectively

### 8.5.5 Reports

Due to time constraints, there are no reports in the system. Therefore, the report module in E-Appraisal needs to be enhanced to be generated so that users can view the reports according to their needs.

### 8.5.6 Multilanguage

The current E-Appraisal system is only limited to Malay language in evaluation page and English language in other pages. It needs to be enhances so that optional language such as English and Malay can be selected when user login into the system.

## 8.6 Knowledge Gained

During the development of the E-Appraisal system, a lot of knowledge was gained. The following are some of the knowledge:-

- ***Knowledge on learning new programming language***

  From this project, the author gained the knowledge on the new technology, namely ASP. The author also have the chances to develop the system using the programming languages supported by ASP namely VB script as the server side scripting and JavaScript as the client scripting language.

- ***Setting up server***

  The author has the opportunity to setting the operating system and manages to set the IIS.

## 8.7 Review on Goal

At the final stage of the project, there were certain expectations on what would be achieved. The following is the expectation that achieved.

### 8.7.1 Expected Achieved

In overall, the system had fulfilled the expectation stated by the project. The basic foundation of the system was designed and implemented. It was eligible for future growth and implementation. The E-Appraisal System has met the criteria like reliability, user friendliness and security.

### 8.7.2 Objective Acheived

The project had successfully created a system that provides evaluation of staff, adding and editing details for staffs. It is easier for supervisor to do evaluation on staff just base on their personal information. It can safe a lot of time to do evaluation. Finally, it could be concluded that the objectives of establishing the web site had been achieved.

## 8.8 Chapter Summary

Evaluation of a system is indeed needed to ensure its objectives and intended functions have been achieved. This chapter covers all the aspect of evaluating application software. At the end of evaluation, comes the conclusion of this thesis project.

# CONCLUSION

Overall, this project has achieved and fulfilled the objectives and requirements as an online E-Appraisal system that provides the opportunity for staff to fill in and edit their personal information and for supervisor to do evaluation on staff online.

A lot of research and studies was done during literature review in order to gain the information needed for the development of this project. The information gathered includes knowledge on e-appraisal system, development methodologies, and development tools, all these information were analyzed to determine the suitability of the project scope, system functionalities, development methodology, and development tools to be implemented and used in this project.

Throughout the development of this system, a lot of knowledge was gained such as knowledge in setting up Windows XP and Internet technologies. Programming in ASP, VBScript and JavaScript proved to be a valuable experience.

Above all, this project gives the author an opportunity to build a full application from scratch. From this project, the author has gained invaluable knowledge and experience during the progress of it.

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# USER MANUAL

# Table of Contents

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# CHAPTER 1 - INTRODUCTION

## 1.1 About this manual

This is the user manual that gives some simple instruction and guide for the user. This manual can helps user used the system more easily. Every function in the system will be described in this manual. By using this manual, users will not get lost and will be able to use the system accurately.

## 1.2 E-Appraisal System

**E-Appraisal system** is an online system for staff to fill in their personal information and editing their information, for supervisor (Pegawai penilai and Pegawai Penilai Semula) to evaluate staff and for admin to maintain the system. It contains 3 modules: Login module, Evaluation module and Maintenance module. The following chapter will show a complete user manual for these three modules.

## 1.3 Hardware and software Requirement

The requirements of this application are:-

**i. Hardware Requirement:**

- Intel Pentium III 450Hz and above(or equivalent)
- Memory at least 128 MB RAM and above
- 2.0GB Hard Disk or above
- Network card NIC 10/100
- 56K Modem
- Other standard peripherals

**ii. Software Requirement:**

- Microsoft Windows 98 or later
- Internet Explorer 5 and above

The suitability of the tools being selected is solely based on the compatibility issues being taken into consideration during the design phase. Hence, the selection of the tools is deemed the most suitable to run the system as a web based system.

# CHAPTER 2 – GETTING STARTED

There are several steps that are needed before getting started using the E-Appraisal System. Those steps are:

- Connect to the network (with internet ready)
- Type the URL address of E-Appraisal in the browser's address bar and press **Enter.**
- A successful connection will display the main page of E-Appraisal System showed as follow:

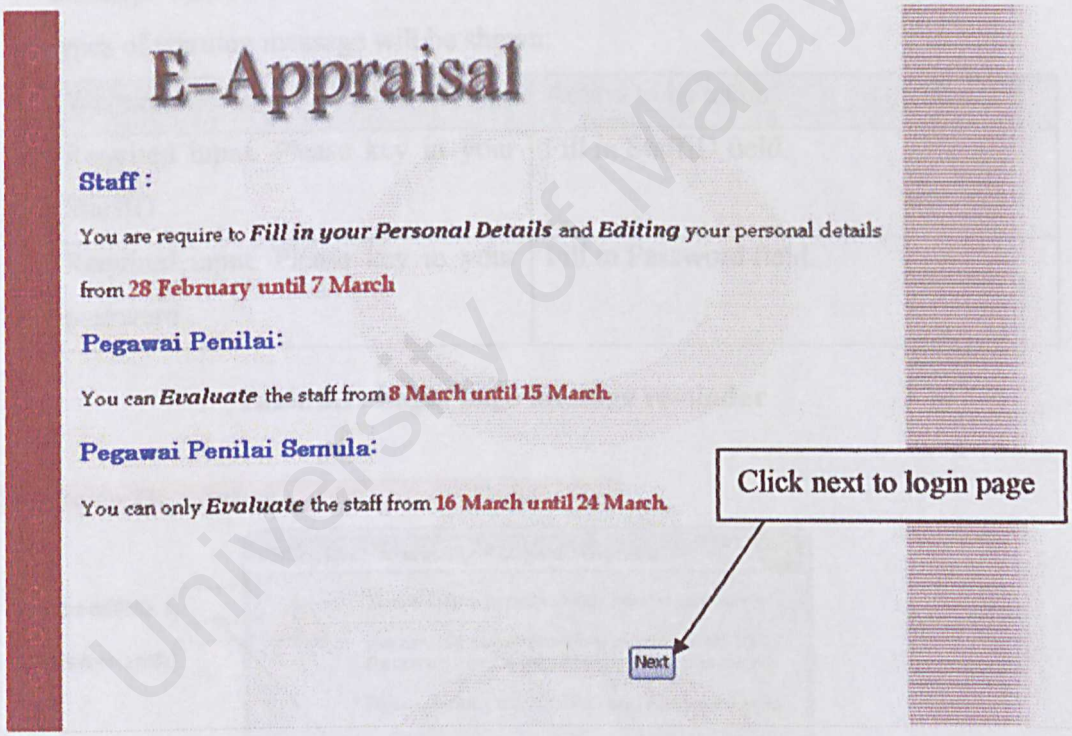



**Figure 2.1: E-Appraisal System Main Page**

- Staff, Pegawai Penilai and Pegawai Penilai Semula can only login to the system in a given date following the instruction in E-Appraisal main page.
- Users will go login page by click on **Next** button

# CHAPTER 3 – LOGIN MODULE

## 3.1 Login Module

- User will click the **NEXT** button in the main page to the login page.
- Login from staff, super and admin main page by fill in valid **StaffID** and **Password**.
- Only authorized user will be allowed to login to the page.
- If click on Submit button without fill in StaffID and Password, the warning message will be shown to ask user to fill in both required information. Two types of warning message will be shown:

| Warning Message | Action to be taken |
|---|---|
| Required input. Please key in your StaffID | Fill in StaffID field. |
| Required input. Please key in your password. | Fill in Password field. |

**Table 3.1: Login page message reminder**

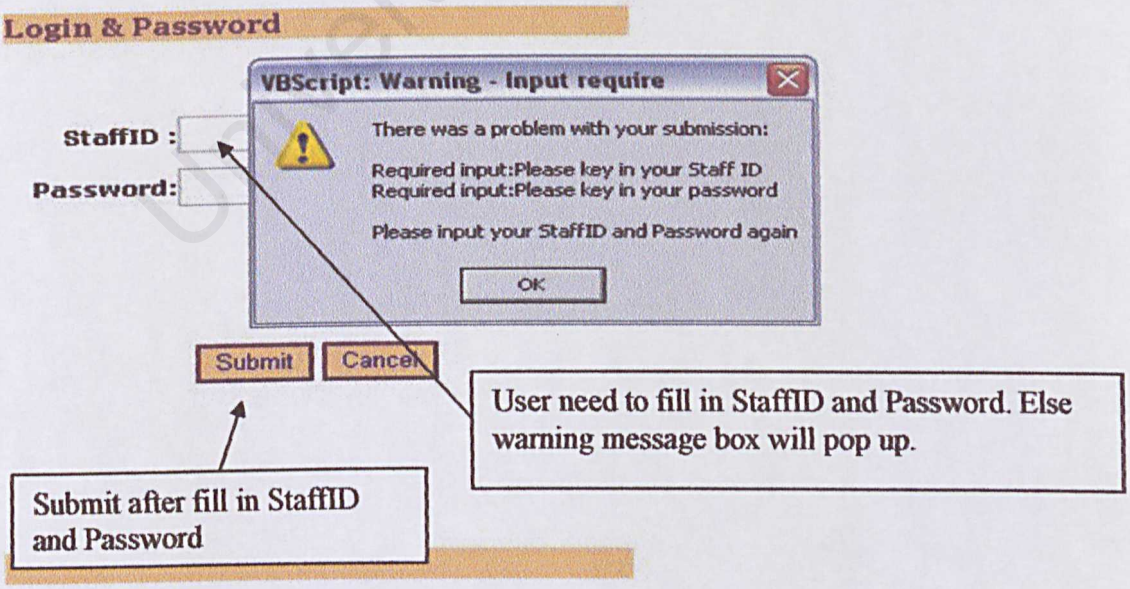



**Figure 3.1: E-Appraisal System Login Page**

- If user input invalid StaffID or password, an invalid page will be display to request users to login again.

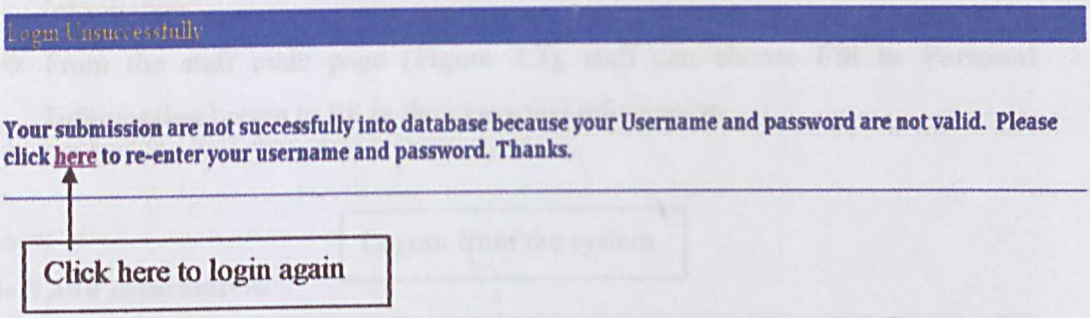



**Figure 3.2: Login Unsuccessfully Page**

- User can only login to the system in the given period (Stated in main page). If the period already expired and the user chooses to login again, it will go to Login Unsuccessfully page just as shown in Figure 3.2.
- Once user succeeded login to the system, Staff can add and edit their personal information, supervisor will come across evaluation module while admin will come across maintenance module.

### 3.2 Staff Fill In Personal Profile

- Once the staff succeeded login to the system, they have to fill in their personal information.
- From the staff main page (Figure 3.3), staff can choose **Fill in Personal Information** button to fill in their personal information.

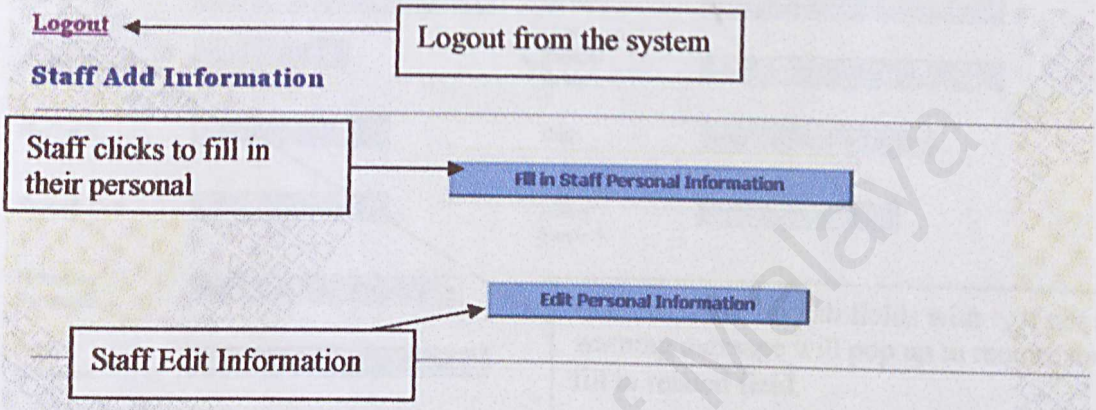
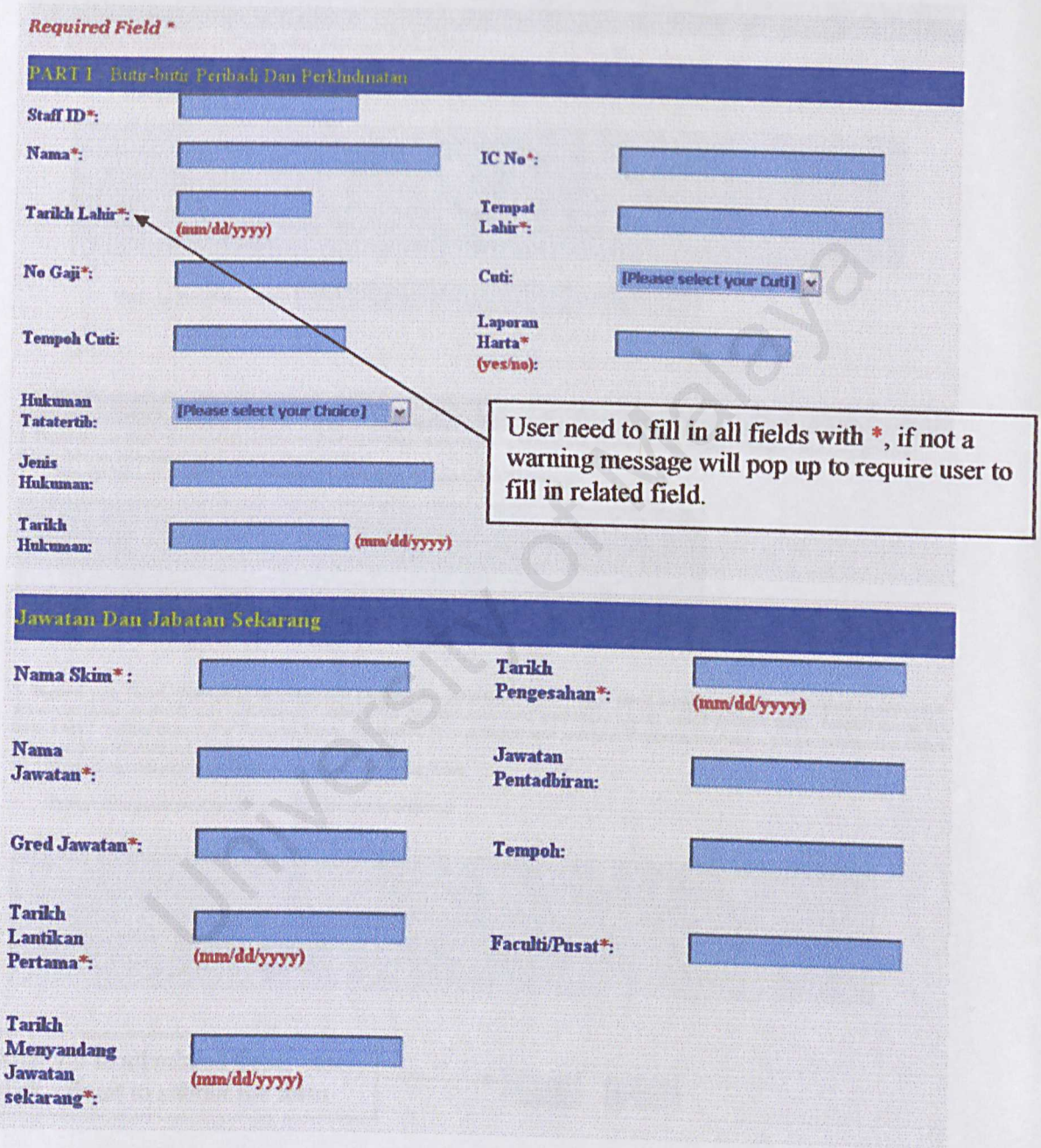



**Figure 3.3: Staff Main Page**

❖ Once the staff Click **Fill In Staff Personal Information**, fill in information page will be display. Staff can now fill in the related field.



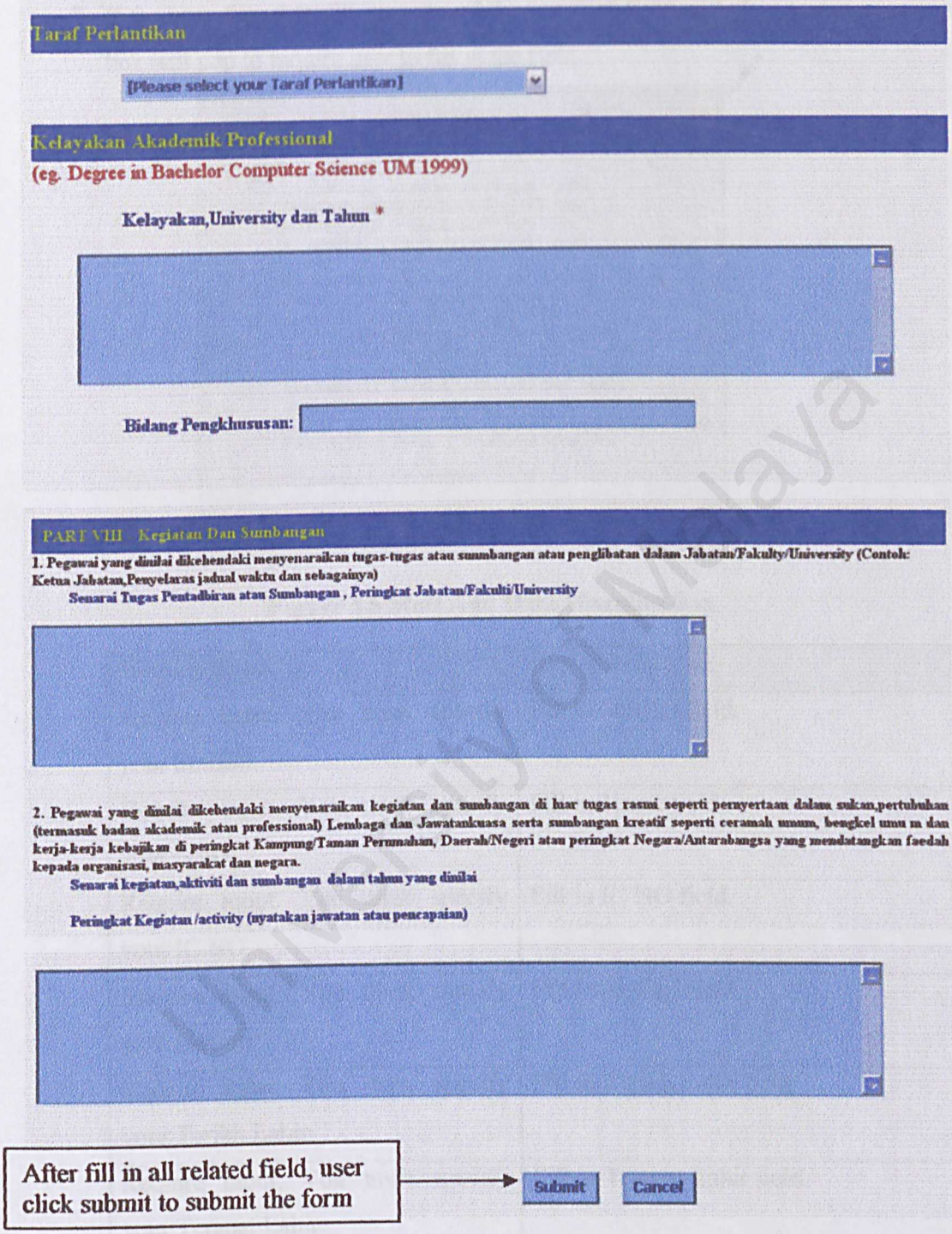



**Figure 3.4: Staff fills in Personal Information Page**

❖ If the user forget to fill in some of the required field with *, warning message box will pop to require user to fill in the field.


**Figure 3.5 Staff Add Data Warning Box**

| Warning Message | Action to be taken |
|---|---|
| Require input. You must specify your StaffID | Fill in StaffID field. |
| Require input. You must specify your Name | Fill in Name field. |
| Require input. You must specify your IC NO | Fill in IC NO field. |
| Require input. You must specify your NoGaji | Fill in NoGaji field. |
| Require input. You must specify your Tarikh Lahir | Fill in Tarikh Lahir field. |
| Require input. You must specify your Tempat Lahir | Fill in Tempat Lahir field. |
| Require input. You must specify your Laporan Harta | Fill in Laporan Harta field. |
| Require input. You must specify | Fill in Faculty field. |

| | |
|---|---|
| your Faculty | |
| Require input. You must specify your Nama Skim | Fill in Nama Skim field |
| Require input. You must specify your Nama Jawatan | Fill in Nama Jawatan field. |
| Require input. You must specify your Tarikh Pengesahan | Fill in Tarikh Pengesahan field. |
| Require input. You must specify your Gred Jawatan | Fill in Gred Jawatan field. |
| Require input. You must specify your Tarikh lantik Pertama | Fill in Tarikh lantik Pertama field. |
| Require input. You must specify your Tarikh Sandang Sekarang | Fill in Tarikh Sandang Sekarang field. |
| Require input. You must specify your Kelayakan | Fill in Kelayakan field. |

**Table 3.2: Message Reminder for Necessary Field to Fill In**

- If the staff fills in information successfully, a successful page will display to tell the staffs that their information has been enter successfully into database.

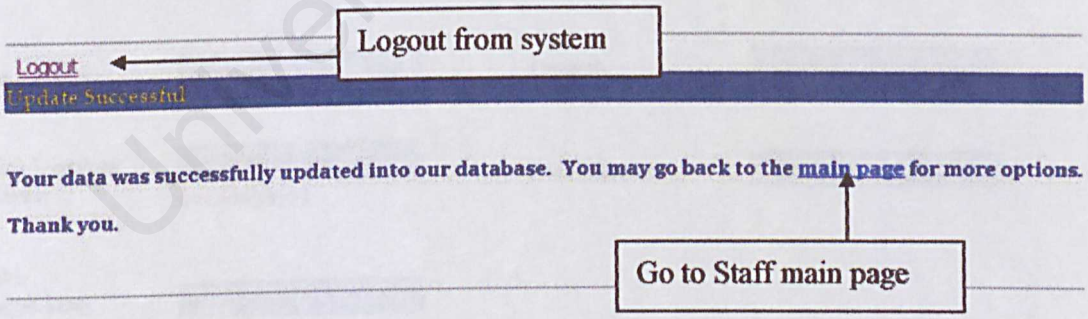
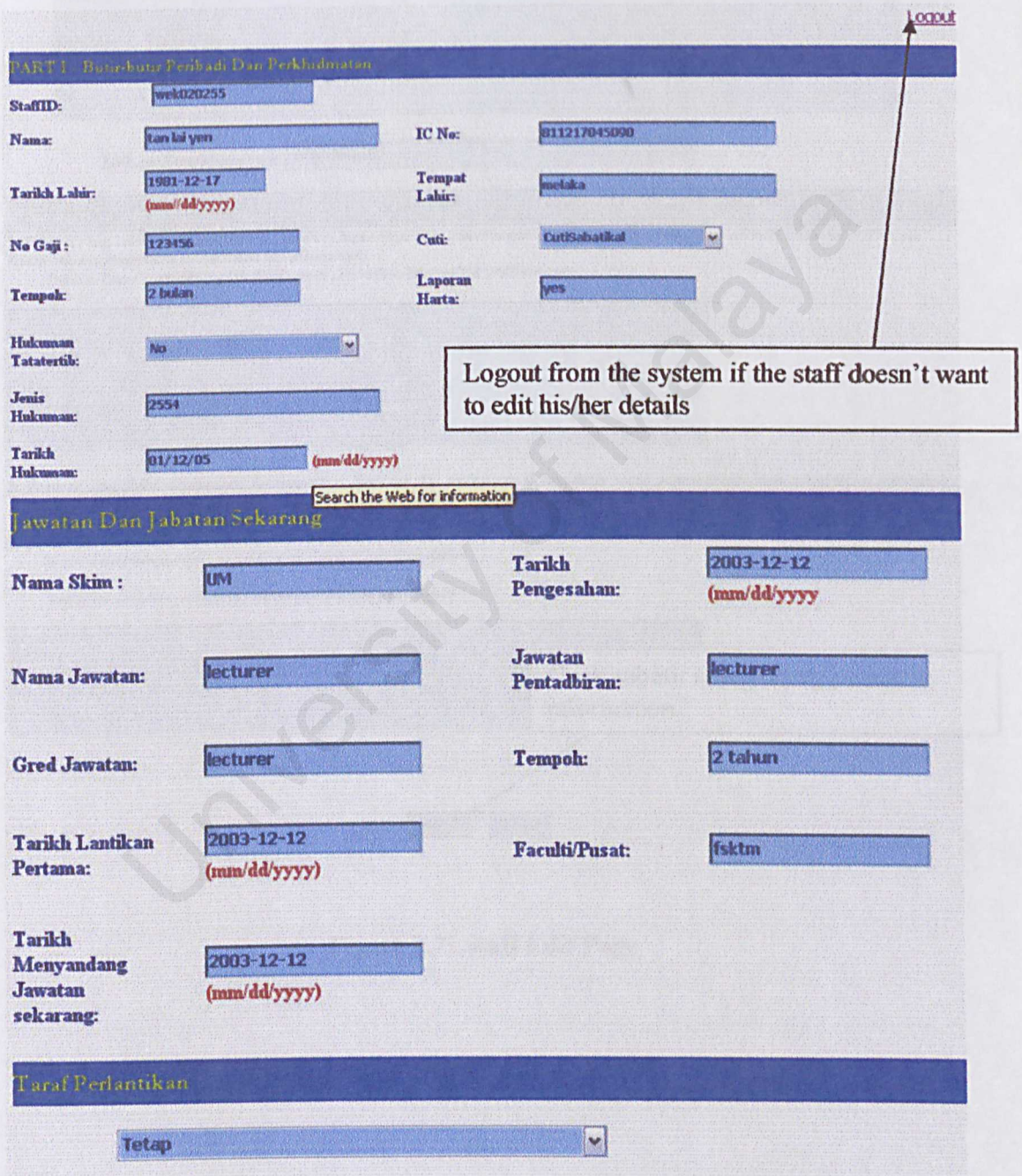



**Figure 3.6: Staff Add Information Successfully Page**

### 3.3 Staff Editing Personal information

- After fill in personal details, staff can edit their personal details in the given period by click on **Edit Personal Information** button (Figure 3.3) in staff main page.



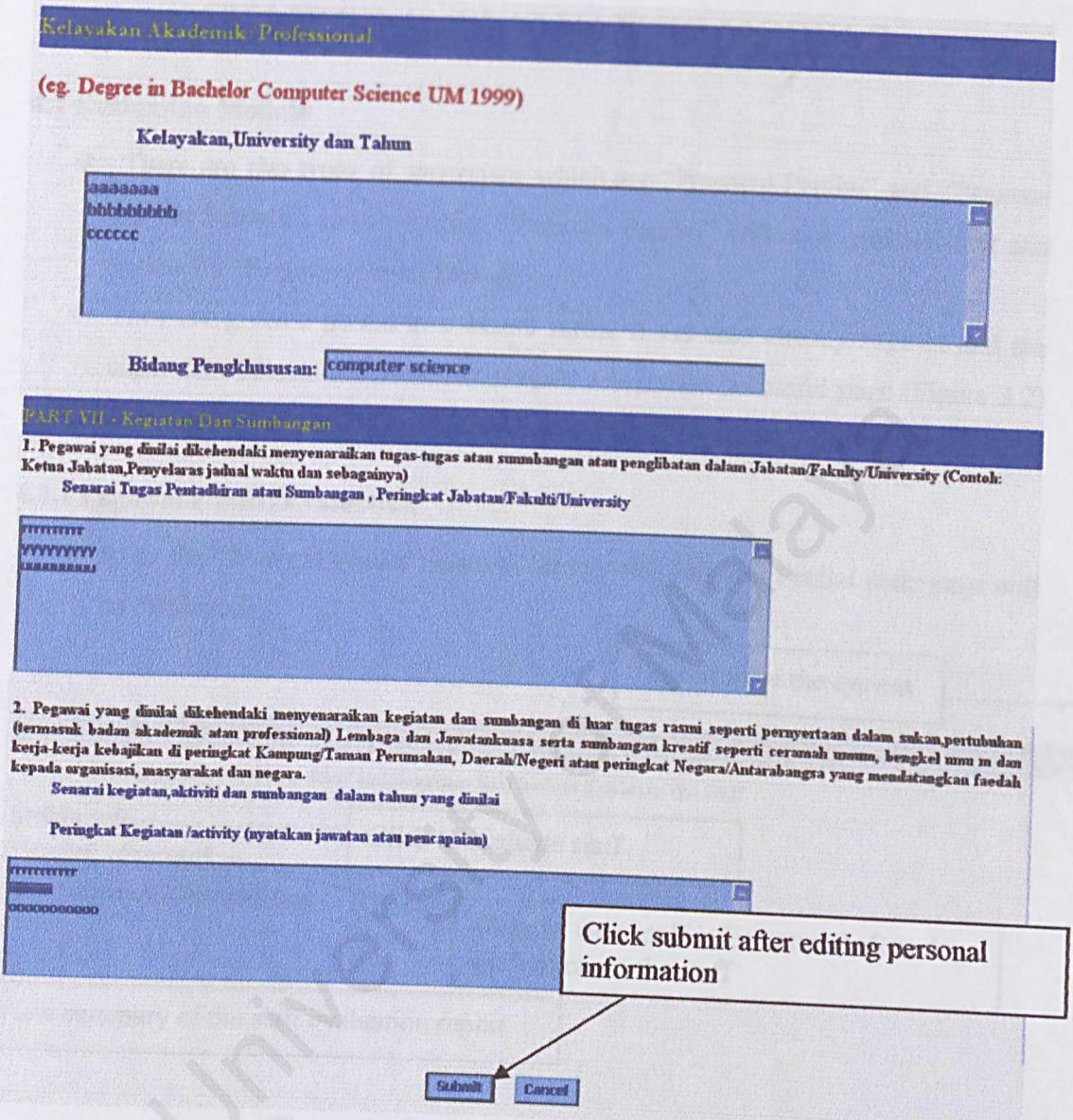



**Figure 3.7: Staff Edit Page**

# CHAPTER 4 – EVALUATION MODULE

## 4.1 Evaluation Module

- There are two types of supervisor which are "Pegawai Penilai" and "Pegawai Penilai Semula". In this system, "Pegawai Penilai" will do evaluation first and follow by "Pegawai Penilai Semula".
- They are given a period to evaluate staffs. If the date already expired and the supervisor tries to access to the system, a login unsuccessful page (Figure 3.2) will display.

### 4.1.1 Pegawai Penilai Evaluation

- After the "Pegawai penilai" login to the system, Pegawai Penilai main page will be displayed.

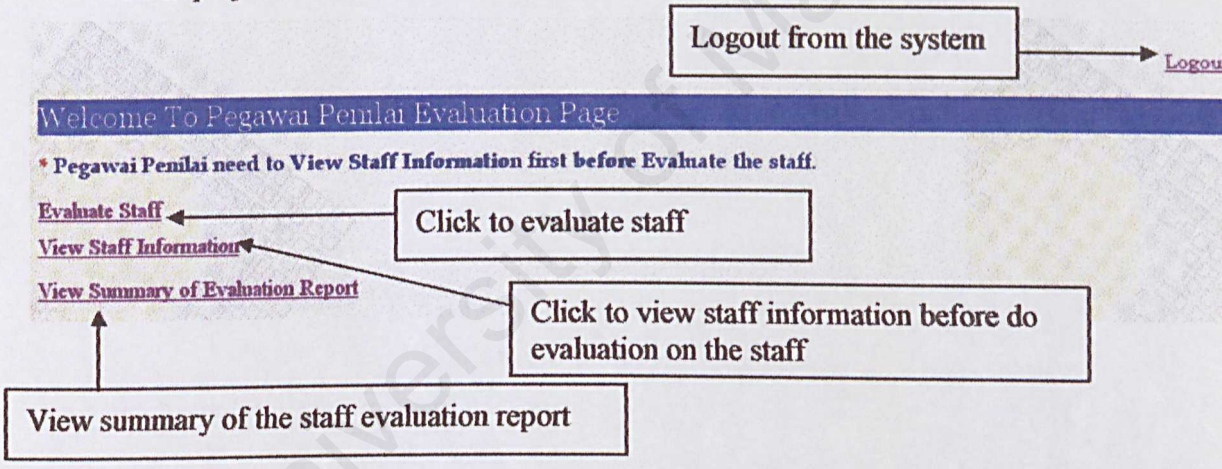



**Figure 4.1 Pegawai Penilai Main Page**

- Pegawai Penilai needs to view staff information first before they can evaluate the staff. After click on **View Staff Information** link in Pegawai Penilai main page (Figure 4.1), they will be able to search for staff and view their information.

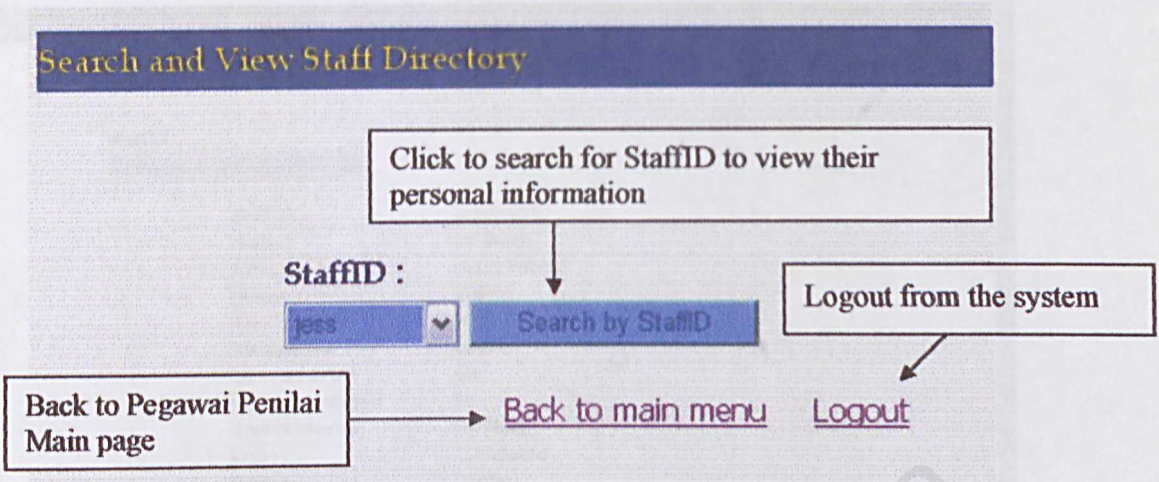



**Figure 4.2: Search for StaffID in View Staff Information Page**

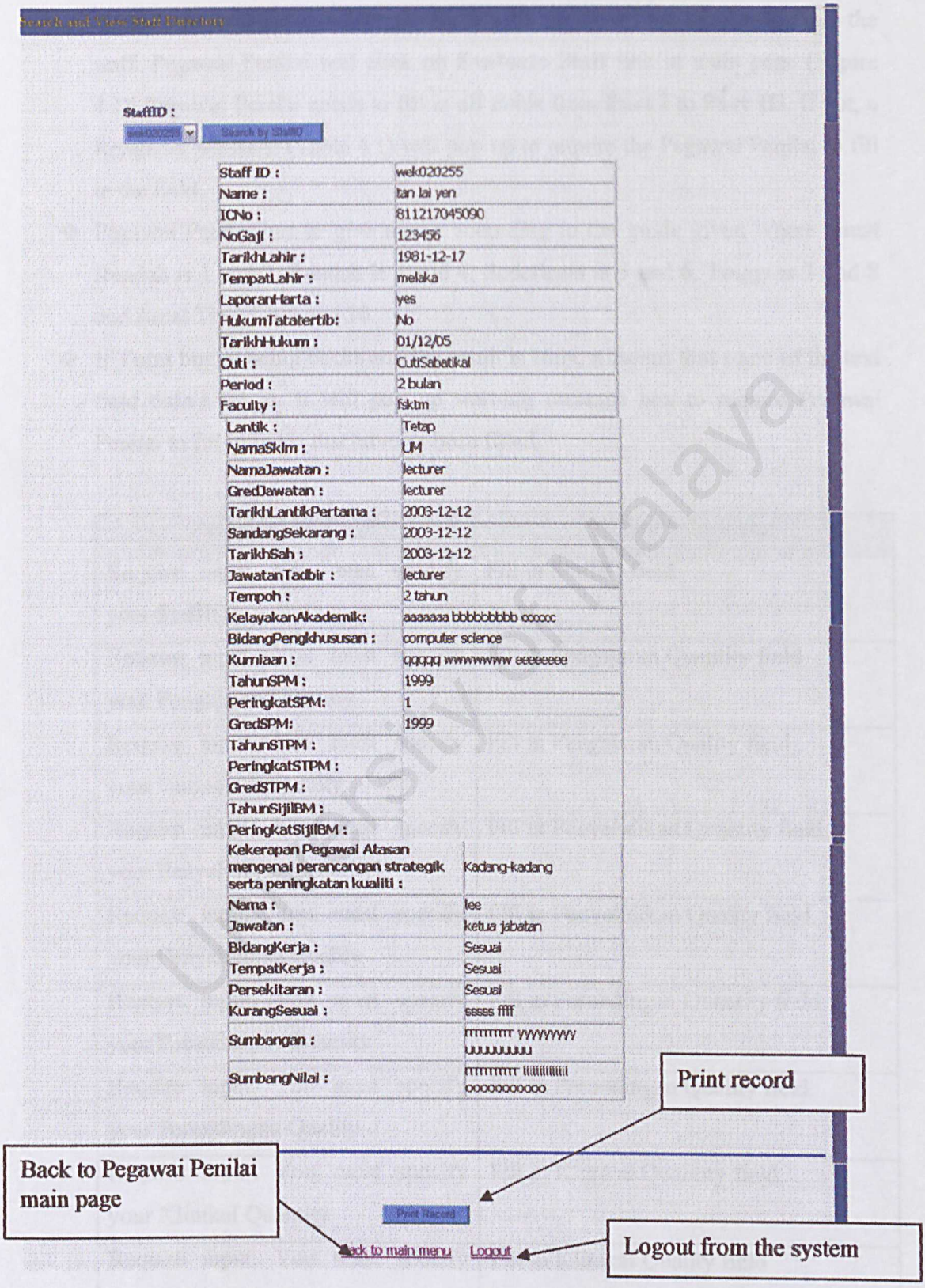



**Figure 4.3: View Staff Information Page**

- After view the staff information, Pegawai Penilai now can start to evaluate the staff. Pegawai Penilai will click on **Evaluate Staff** link in main page (Figure 4.1). Pegawai Penilai needs to fill in all fields from **Part I** to **Part III**. If not, a Reminder Message (Table 4.1) will pop up to require the Pegawai Penilai to fill in the field.
- Pegawai Penilai has to give marks according to the guide given where Amat Rendah is 1 and 2, Rendah is 3 and 4, Sederhana is 5 and 6, Tinggi is 7 and 8 and Amat Tinggi is 9 and 10.
- If **Total** button being clicks and the result is NaN, it means that some of the text field didn't fill in. It will pop up warning message box to require Pegawai Penilai to fill in fields that haven't been filled.

| Reminder Message | Action to be taken |
|---|---|
| Require input. You must specify your StaffID | Fill in StaffID field. |
| Require input. You must specify your Pengajaran Quantity | Fill in Pengajaran Quantity field. |
| Require input. You must specify your Pengajaran Quality | Fill in Pengajaran Quality field. |
| Require input. You must specify your Penyelidikan Quantity | Fill in Penyelidikan Quantity field. |
| Require input. You must specify your Penyelidikan Quality | Fill in Penyelidikan Quality field. |
| Require input. You must specify your Perundingan Quantity | Fill in Perundingan Quantity field. |
| Require input. You must specify your Perundingan Quality | Fill in Perundingan Quality field. |
| Require input. You must specify your Klinikal Quantity | Fill in Klinikal Quantity field. |
| Require input. You must specify your Klinikal Quality | Fill in Klinikal Quality field |

| | |
|---|---|
| Require input. You must specify your Pentadbiran Quantity | Fill in Pentadbiran Quantity field. |
| Require input. You must specify your Pentadbiran Quality | Fill in Pentadbiran Quality field. |
| Require input. You must specify your Pengetahun | Fill in Pengetahuan field. |
| Require input. You must specify your Kebolehan | Fill in Kebolehan field. |
| Require input. You must specify your Keputusan | Fill in Keputusan field. |
| Require input. You must specify your Keberkesanan | Fill in Keberkesanan field. |
| Require input. You must specify your Masalah | Fill in Masalah field. |
| Require input. You must specify your Integriti | Fill in Integriti field. |
| Require input. You must specify your komitment | Fill in Komitment field. |

**Table 4.1: Reminder Message For Necessary Fields to Fill By Pegawai Penilai**

StaffID:

Logout

Logout from system

| Amat Rendah | | Rendah | | Sederhana | | Tinggi | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

## PART I - Staff Evaluation

### 1) PENGETAHUAN DAN KEMAHIRAN

| | Pegawai Penilai |
|---|---|
| **1)Pengajaran dan Penyelidikan** | |
| a) Quantity | |
| b) Quality | |
| **2)Penyelidikan/Penerbitan/Penyuntingan/Penterjemahan/Perundingan/Rekaan** | |
| **a) Penyelidikan/P** | |
| i) Quantity | |
| ii)Quality | |
| **b) Perundingan/Rekaan/Ciptaan** | |
| i)Quantity | |
| ii)Quality | |
| **c) Klinikal** | |
| i) Quantity | |
| ii) Quality | |
| **3. Pentadbiran/Sumbangan/Penglibatan dalam Jabatan/Fakulty / University. Kegiatan Penilaian dan lain-lain** | |
| a) Quantity | |
| b) Quality | |

Mark necessary to be given from **Part I** to **Part III**

## PART III- Penilaian Saksiah(Aspek Individu)

### 1) Pengetahuan Dan Kemahiran

| Kriteria | Pegawai Penilai |
|---|---|
| **1. PENGETAHUAN DALAM BIDANG KERJA-**<br>Kebolehan dan Kemahiran Pegawai dalam bidang profession, organisasi dan tugasnya. | |
| **2. KEBOLEHAN MENGELOLA -**<br>Kebolehan mengatur, membahagi dan mengedalikan pelaksanaan tugasnya untuk mencapai objective organisasi, bahagian atau unitnya. | |
| **3. KEBOLEHAN MEMBUAT KEPUTUSAN -**<br>Kebolehan membuat keputusan selaras dengan objecktif organisasi, bahagian atau unitnya dalam tempoh masa yang ditetpakan. | |
| **4. KEBERKESANAN KOMUNIKASI-**<br>Kebolehan menyampaikan maksud secara lisan dan tulisan dalam memeri arahan dan pendapat serta mambantu mewujudkan kefahaman mengenai dasar, matlamat dan strategi organisasi. | |
| **5. KEBOLEHAN MENYELARAS MASALAH-**<br>Kebolehan mengenalpastikan masalah dan isu-isu yang rumit dalam bidang pengurusan dan profesionnya dan mengemukakan pelbagai alternatif serta menyelesaikan secara berkesan | |

### 2) Kuality Peribadi

| Kriteria | Pegawai Penilai |
|---|---|

| | |
|---|---|
| **1. Integriti** - Jujur, amanah dan berakhlak dalam menjalankan tugas tanpa menyalahgunakan kuasa dan kedudukan | |
| **2. Komitment** - Kesungguhan, ketekunan, dedikasi dan bertanggungjawab dlaam melaksanakan tugas. | |
| **3. Ikram, Adil dan saksama** - Bertimbangrasa, mesra, adil dan saksama semasa melaksanakan tugas dalam urusan dengan pelajar, rkaan sejawat, orang luar/pesakit di mana berkenaan. | |
| **4. Berdisiplin** - Mempunyai daya kawal diri dari segi mental dan fizikal, termasuk mematuhi p+eraturan, menepati masa dan janji kesabaran serta kemas dan bersih. | |
| **5. Kepimpinan** - Kebolehan mengerak dan mendorong pegawai bawahan atau kumpulannya ke arah pencapaian objektif jabatan serta tegas dan boleh menjadi teladan. | |

**3) Jalinan Hubungan dan kerjasama**

| Kriteria | Pegawai Penilai |
|---|---|
| **1. Jalinan Hubungan dan Kerjasama** - Kebolehan, kebijaksanaan, dan keberkesanan pegawai dalam mewujudkan suasana kerjasama yang harmoni dan mesra di peringkat organisasi. Kebolehan menyesuaikan diri dan mesra dna kecekapan menjalinkan hubungan antara organisasi, swasta serta orang awam dalam atau luar negeri. | |

**4) Potensi**

| Kriteria | Pegawai Penilai |
|---|---|
| **1. Berwawasan Dan Mempunyai Perspektif Menyeluruh** - Berpandangan jauh dan berkeupayaan membantu untuk merangka arah haluan masa hadapan sesuai dengan keperluan organisasi . Kebolehan melihat masalah secara menyeluruh dengan memberi perhatian kepada perkara-perkara penting semasa mengambil tindakan | |
| **2. Penganalisisan, Peka Dan Inovasi** - Kebolehan menemukakan cadangan tindakan yang sesuai, mempunyai kesedaran dan kepekaan terhadap hakikat sebenar berdasarkan maklumat dan realiti keadaan serta proaktif, berdaya kreatif dan inovasi dalam menjalankan tugasnya. | |
| **Jumlah markah Keseluruhan** | |
| Click to total up the marks → | Total |

## PART IV - Perakuan Pergerakan Gaji

**Pegawai Penilai** [Please select your Choice]

PART IV - Perakuan Pergerakan Gaji

**Pegawai Penilai** [Please select your Choice]

## PART V - Kesesuaian Kenaikan Pangkat dan Penganugerahan Khidmat Cemerlang, Bintang Dan Pingat serta Pemberian Penghargaan

**1. Kesesuaian Kenaikan pangkat**

**Pegawai Penilai** [Please select your Choice]

**2. Penganugerahan Khidmat Cemerlang:**

**Pegawai Penilai** [Please select your Choice]

**3. Penganugerahan Bintang, Pingat dan Pemberian Penghargaan: (Diisi oleh pegawai Penilai dan Pegawai Penilai Semula)**

**a) Pegawai penilai dikehendaki, jika sesuai, menyesyorkan jenis penganugerahan bintang kebesaran, pingat dan penghargaan bagi Pegawai yang Dinilai.**

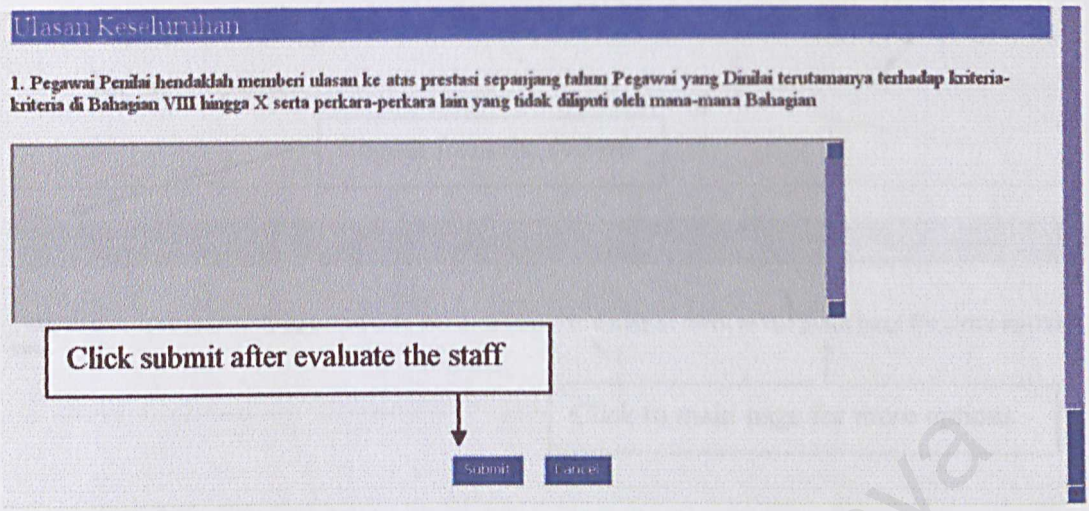



**Figure 4.4: Pegawai Penilai Evaluation Page**

- If Pegawai Penilai fill in StaffID that already exist in database, an incorrect page will be displayed to require Pegawai Penilai to evaluate staff again by using different StaffID

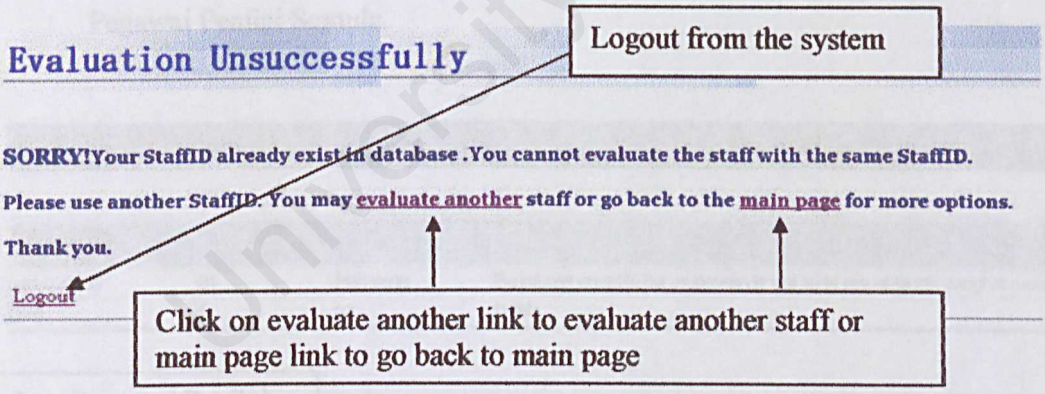



**Figure 4.5: Pegawai Penilai Evaluation Unsuccessful Page**

❖ If Pegawai Penilai successfully evaluates the staff, a successful page will be displayed. The Pegawai Penilai can choose to go back to main page (Figure 4.1) for more options.

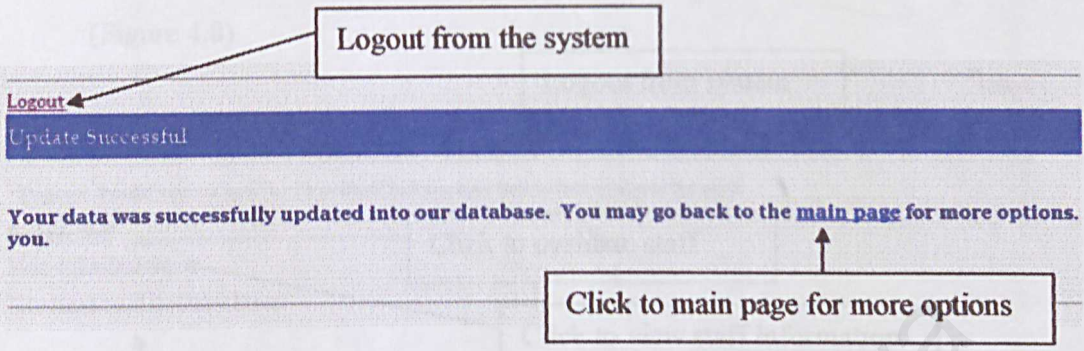



**Figure 4.6: Pegawai Penilai Evaluation Successful Page**

❖ After evaluate the staff, Pegawai Penilai can go to main page to view report on staffs that have been evaluated by click on **View Summary of Evaluation Report** link in main page (Figure 4.1). Pegawai Penilai only can view report regarding the staffs being evaluated and they can't view evaluation result from Pegawai Penilai Semula.

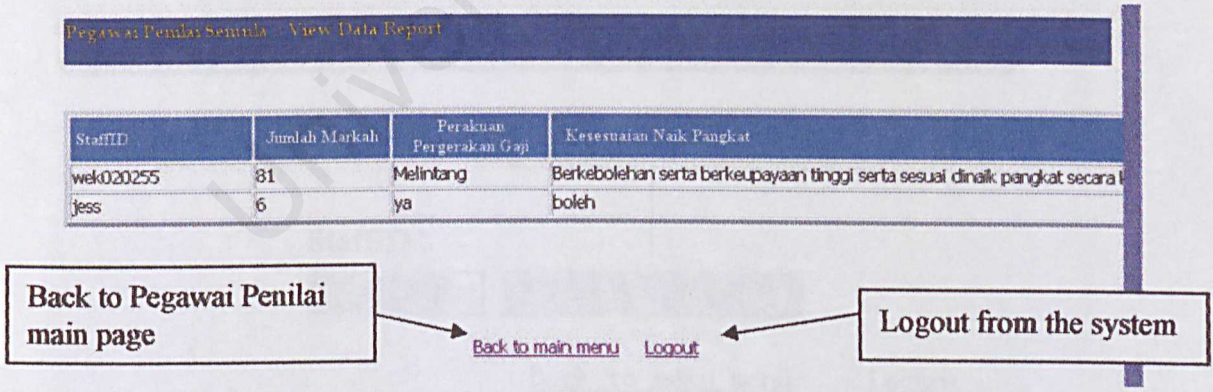



**Figure 4.7: Pegawai Penilai View Report Page**

### 3.4.2 Pegawai Penilai Semula

- After Pegawai Penilai Semula login to the system, they can choose to evaluate staff, view staff information and also view the Evaluation report in main page (Figure 4.8).

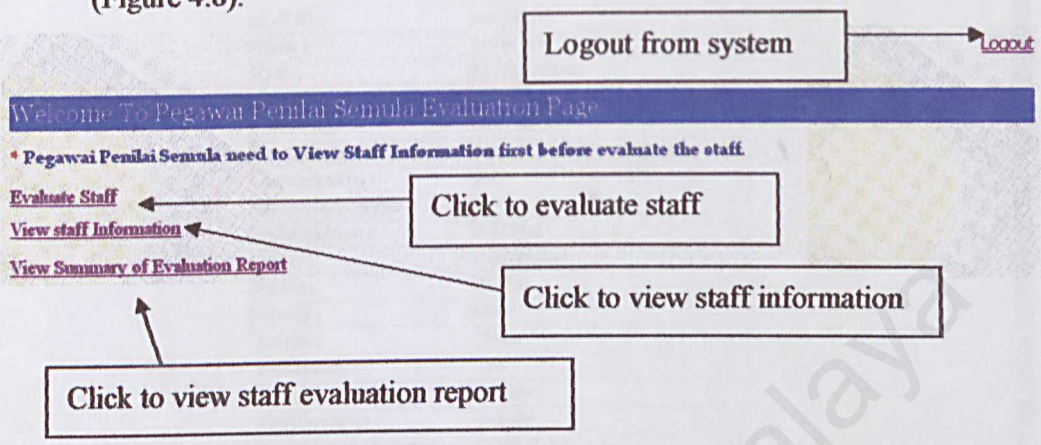



**Figure 4.8: Pegawai Penilai Semula Main Page**

- Before Pegawai Penilai Semula can evaluate the staff, they have to view staff personal information first by click on **View Staff Information** link in main page (Figure 4.8).

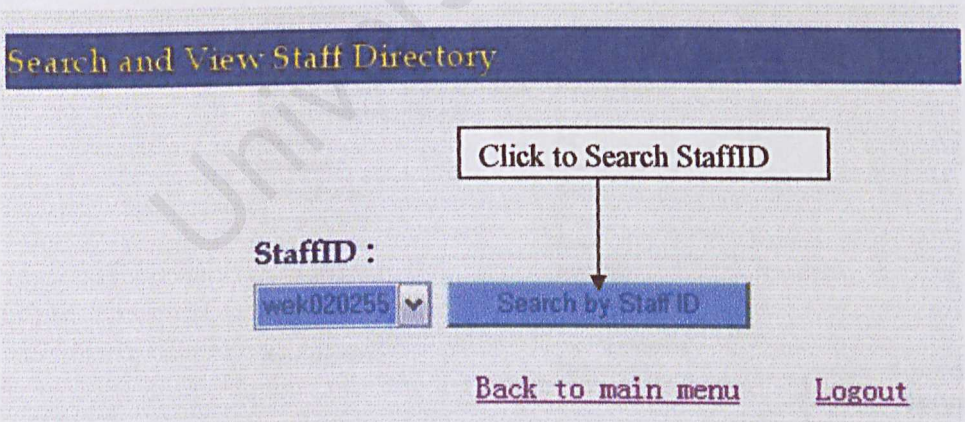



**Figure 4.9: Pegawai Penilai Semula Search for StaffID**

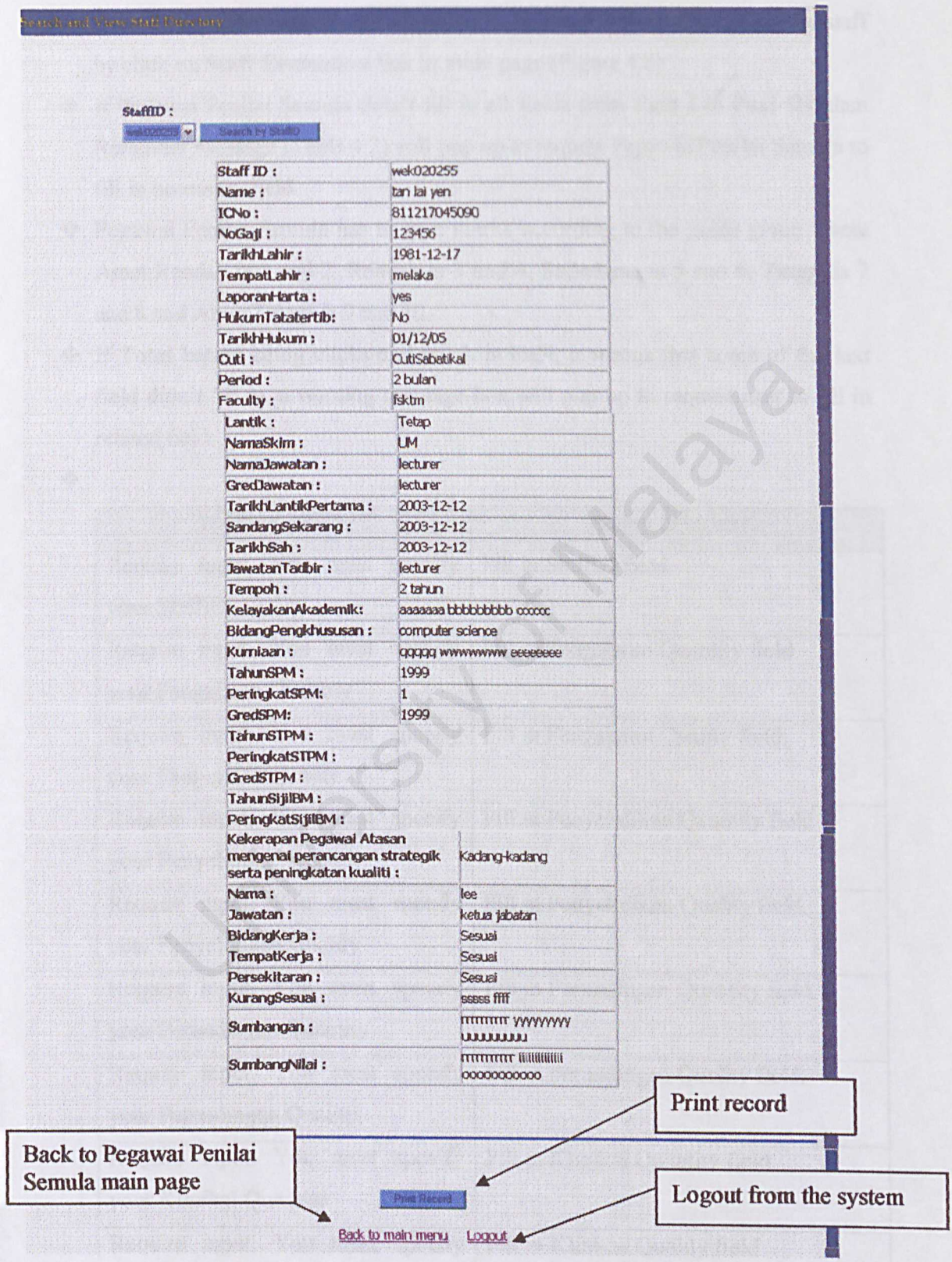



**Figure 4.10: Pegawai Penilai Semula View Information Page**

- After view the information, now the Pegawai Penilai Semula can evaluate staff by click on **Staff Evaluation** link in main page (Figure 4.8).
- If Pegawai Penilai Semula didn't fill in all fields from **Part I** to **Part III**, then Reminder Message (Table 4.2) will pop up to request Pegawai Penilai Semula to fill in necessary field.
- Pegawai Penilai Semula has to give marks according to the guide given where Amat Rendah is 1 and 2, Rendah is 3 and 4, Sederhana is 5 and 6, Tinggi is 7 and 8 and Amat Tinggi is 9 and 10.
- If **Total** button being clicks and result is NaN, it means that some of the text field didn't fill in, a warning message box will pop up to request user to fill in related field.
-

| Warning Message | Action to be taken |
|---|---|
| Require input. You must specify your StaffID | Fill in StaffID field. |
| Require input. You must specify your Pengajaran Quantity | Fill in Pengajaran Quantity field. |
| Require input. You must specify your Pengajaran Quality | Fill in Pengajaran Quality field. |
| Require input. You must specify your Penyelidikan Quantity | Fill in Penyelidikan Quantity field. |
| Require input. You must specify your Penyelidikan Quality | Fill in Penyelidikan Quality field. |
| Require input. You must specify your Perundingan Quantity | Fill in Perundingan Quantity field. |
| Require input. You must specify your Perundingan Quality | Fill in Perundingan Quality field. |
| Require input. You must specify your Klinikal Quantity | Fill in Klinikal Quantity field. |
| Require input. You must specify your Klinikal Quality | Fill in Klinikal Quality field |

| | |
|---|---|
| Require input. You must specify your Pentadbiran Quantity | Fill in Pentadbiran Quantity field. |
| Require input. You must specify your Pentadbiran Quality | Fill in Pentadbiran Quality field. |
| Require input. You must specify your Pengetahun | Fill in Pengetahuan field. |
| Require input. You must specify your Kebolehan | Fill in Kebolehan field. |
| Require input. You must specify your Keputusan | Fill in Keputusan field. |
| Require input. You must specify your Keberkesanan | Fill in Keberkesanan field. |
| Require input. You must specify your Masalah | Fill in Masalah field. |
| Require input. You must specify your Integriti | Fill in Integriti field. |
| Require input. You must specify your komitment | Fill in Komitment field. |

**Table 4.2: Warning Message for Necessary Field to Fill in By Pegawai penilai Semula**

StaffID: [redacted] Logout

Logout from the system

| Amat Rendah | | Rendah | | Sederhana | | Tinggi | | Amat Tinggi | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

## PART I - Staff Evaluation

### 1) PENGETAHUAN DAN KEMAHIRAN

| 1)Pengajaran dan Penyelidikan | Pegawai Penilai |
|---|---|
| a) Quantity | [redacted] |
| b) Quality | [redacted] |
| **2)Penyelidikan/Penerbitan/Penyuntingan/Penterjemahan/Perundingan/Rekaan** | |
| **a) Penyelidikan/Penerbitan/penyunting** | |
| i) Quantity | [redacted] |
| ii)Quality | [redacted] |
| **b) Perundingan/Rekaan/Ciptaan** | |
| i)Quantity | [redacted] |
| ii)Quality | [redacted] |
| **c) Klinikal** | |
| i) Quantity | [redacted] |
| ii) Quality | [redacted] |
| **3. Pentadbiran/Sumbangan/Penglibatan dalam Jabatan/Fakulty / University. Kegiatan Penilaian dan lain-lain** | |
| a) Quantity | [redacted] |
| b) Quality | [redacted] |

Mark necessary to be given from **Part I** to **Part III**

## PART III- Penilaian Saksiah(Aspek Individu)

### 1) Pengetahuan Dan Kemahiran

| Kriteria | Pegawai Penilai |
|---|---|
| **1. PENGETAHUAN DALAM BIDANG KERJA-**<br>Kebolehan dan Kemahiran Pegawai dalam bidang profession, organisasi dan tugasnya | [redacted] |
| **2. KEBOLEHAN MENGELOLA -**<br>Kebolehan mengatur, membahagi dan mengedalikan pelaksanaan tugasnya untuk mencapai objective organisasi, bahagian atau unitnya | [redacted] |
| **3. KEBOLEHAN MEMBUAT KEPUTUSAN -**<br>Kebolehan membuat keputusan selaras dengan objecktif organisasi, bahagian atau unitnya dalam tempoh masa yang ditetpakan. | [redacted] |
| **4. KEBERKESANAN KOMUNIKASI-**<br>Kebolehan menyampaikan maksud secara lisan dan tulisan dalam memeri arahan dan pendapat serta mambantu mewujudkan kefahaman mengenai dasar, matlamat dan strategi organisasi. | [redacted] |
| **5. KEBOLEHAN MENYELARAS MASALAH-**<br>Kebolehan mengenalpastikan masalah dan isu-isu yang rumit dalam bidang pengurusan dan profesionnya dan mengemukakan pelbagai alternatif serta menyelesaikan secara berkesan | [redacted] |

### 2) Kuality Peribadi

| Kriteria | Pegawai Penilai |
|---|---|

| | |
|---|---|
| **1. Integriti** - Jujur, amanah dan berakhlak dalam menjalankan tugas tanpa menyalahgunakan kuasa dan kedudukan | |
| **2. Komitment** - Kesungguhan, ketekunan, dedikasi dan bertanggungjawab dlaam melaksanakan tugas. | |
| **3. Ikram, Adil dan saksama** - Bertimbangrasa, mesra, adil dan saksama semasa melaksanakan tugas dalam urusan dengan pelajar, rkaan sejawat, orang luar/pesakit di mana berkenaan. | |
| **4. Berdisiplin** - Mempunyai daya kawal diri dari segi mental dan fizikal, termasuk mematuhi p+eraturan, menepati masa dan janji kesabaran serta kemas dan bersih. | |
| **5. Kepimpinan** - Kebolehan mengerak dan mendorong pegawai bawahan atau kumpulannya ke arah pencapaian objektif jabatan serta tegas dan boleh menjadi teladan. | |

**3) Jalinan Hubungan dan kerjasama**

| Kriteria | Pegawai Penilai |
|---|---|
| **1. Jalinan Hubungan dan Kerjasama** - Kebolehan, kebijaksanaan, dan keberkesanan pegawai dalam mewujudkan suasana kerjasama yang harmoni dan mesra di peringkat organisasi. Kebolehan menyesuaikan diri dan mesra dna kecekapan menjalinkan hubungan antara organisasi, swasta serta orang awam dalam atau luar negeri. | |

**4) Potensi**

| Kriteria | Pegawai Penilai |
|---|---|
| **1. Berwawasan Dan Mempunyai Perspektif Menyeluruh** - Berpandangan jauh dan berkeupayaan membantu untuk merangka arah haluan masa hadapan sesuai dengan keperluan organisasi . Kebolehan melihat masalah secara menyeluruh dengan memberi perhatian kepada perkara-perkara penting semasa mengambil tindakan. | |
| **2. Penganalisisan, Peka Dan Inovasi** - Kebolehan menemukakan cadangan tindakan yang sesuai, mempunyai kesedaran dan kepekaan terhadap hakikat sebenar berdasarkan maklumat dan realiti keadaan serta proaktif, berdaya kreatif dan inovasi dalam menjalankan tugasnya. | |
| **Jumlah markah Keseluruhan** | |
| Click to total up the marks → | Total |

## PART IV - Perakuan Pergerakan Gaji

**Pegawai Penilai** [Please select your Choice]

PART IV - Perakuan Pergerakan Gaji

**Pegawai Penilai** [Please select your Choice]

## PART V - Kesesuaian Kenaikan Pangkat dan Penganugerahan Khidmat Cemerlang, Bintang Dan Pingat serta Pemberian Penghargaan

**1. Kesesuaian Kenaikan pangkat**

**Pegawai Penilai** [Please select your Choice]

**2. Penganugerahan Khidmat Cemerlang:**

**Pegawai Penilai** [Please select your Choice]

**3. Penganugerahan Bintang, Pingat dan Pemberian Penghargaan: (Diisi oleh pegawai Penilai dan Pegawai Penilai Semula)**

**a) Pegawai penilai dikehendaki, jika sesuai, menyesyorkan jenis penganugerahan bintang kebesaran, pingat dan penghargaan bagi Pegawai yang Dinilai.**

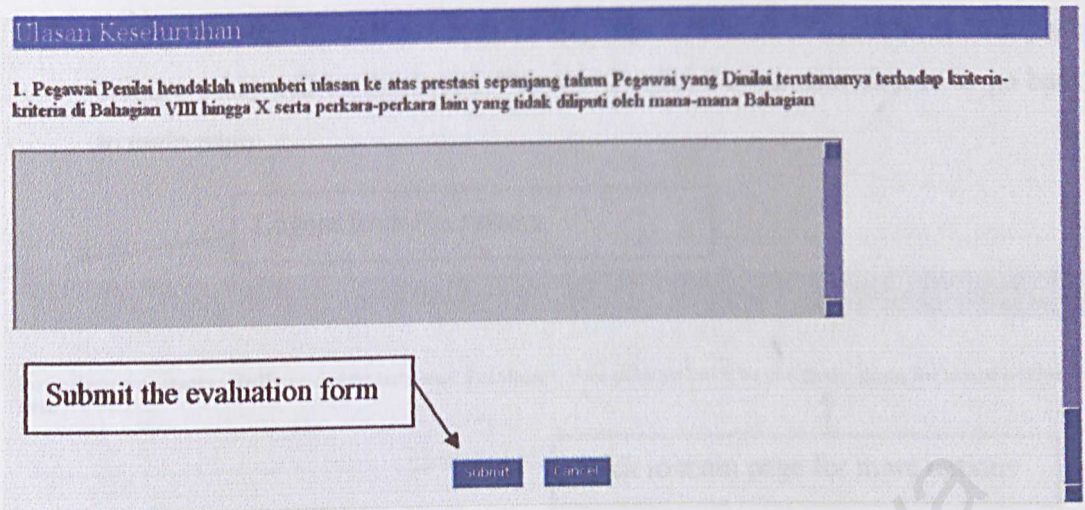



**Figure 4.11: Pegawai Penilai Semula Evalution Page**

- If the Pegawai Penilai Semula evaluate staff that haven't being evaluated by Pegawai Penilai, an unsuccessfull evaluation page (Figure 4.11) will display to require Pegawai Penilai Semula to evaluate other staff because Pegawai Penilai Semula can only evaluate staff that has been evaluated by Pegawai Penilai.

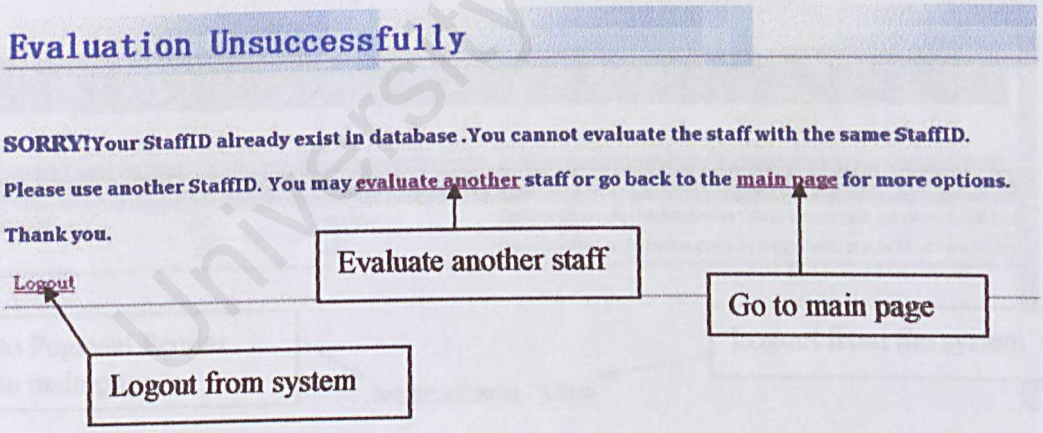



**Figure 4.11: Pegawai Penilai Semula Evaluation Unsuccessful Page**

❖ If Pegawai Penilai Semula successfully evaluates the staff, a successful page (Figure 4.12) will be displayed. Pegawai Penilai Semula can choose to go back to main page.

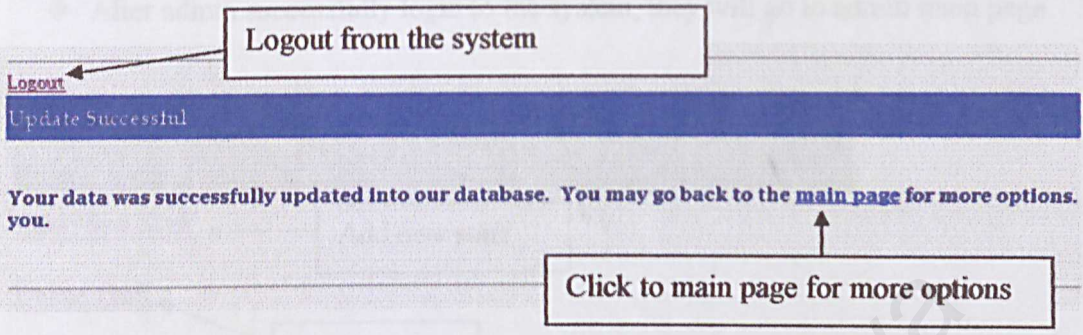



**Figure 4.12: Pegawai Penilai Semula Evalution Successful Page**

❖ After Pegawai Penilai Semula evaluate the staff, they can view the evaluation report of the staffs that have been evaluated by click on **View Summary of Evaluation Report** link at Pegawai Penilai Semula main page (Figure 4.8).

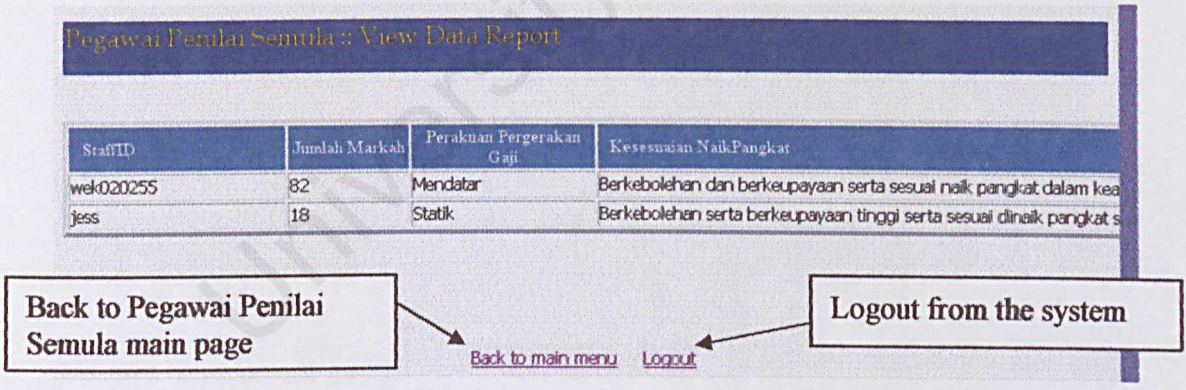



**Figure 4.13: Pegawai Penilai Semula View Evaluation Report Page**

# CHAPTER 5 – MAINTENANCE MODULE

## 5.1 Maintenance Module

- After admin successfully login to the system, they will go to admin main page

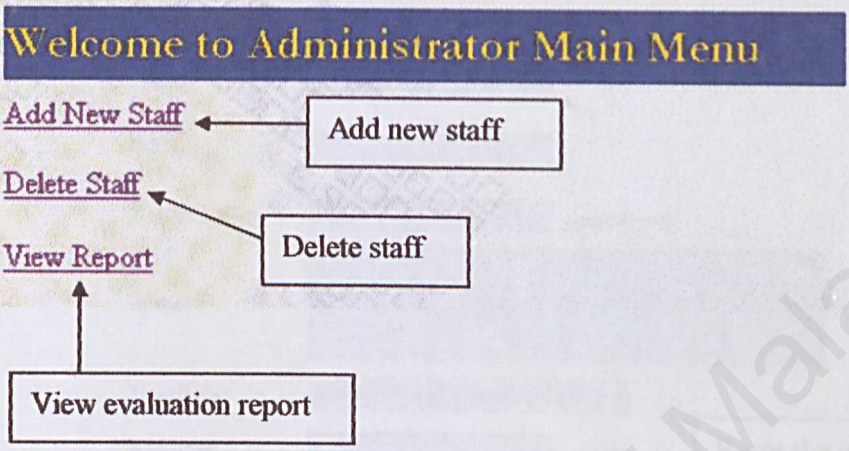



**Figure 5.1: Administrator Main Page**

❖ Admin has to add a new staff to enable the staff to fill in their personal information by click on **Add New Staff** link in main page (Figure 5.1).

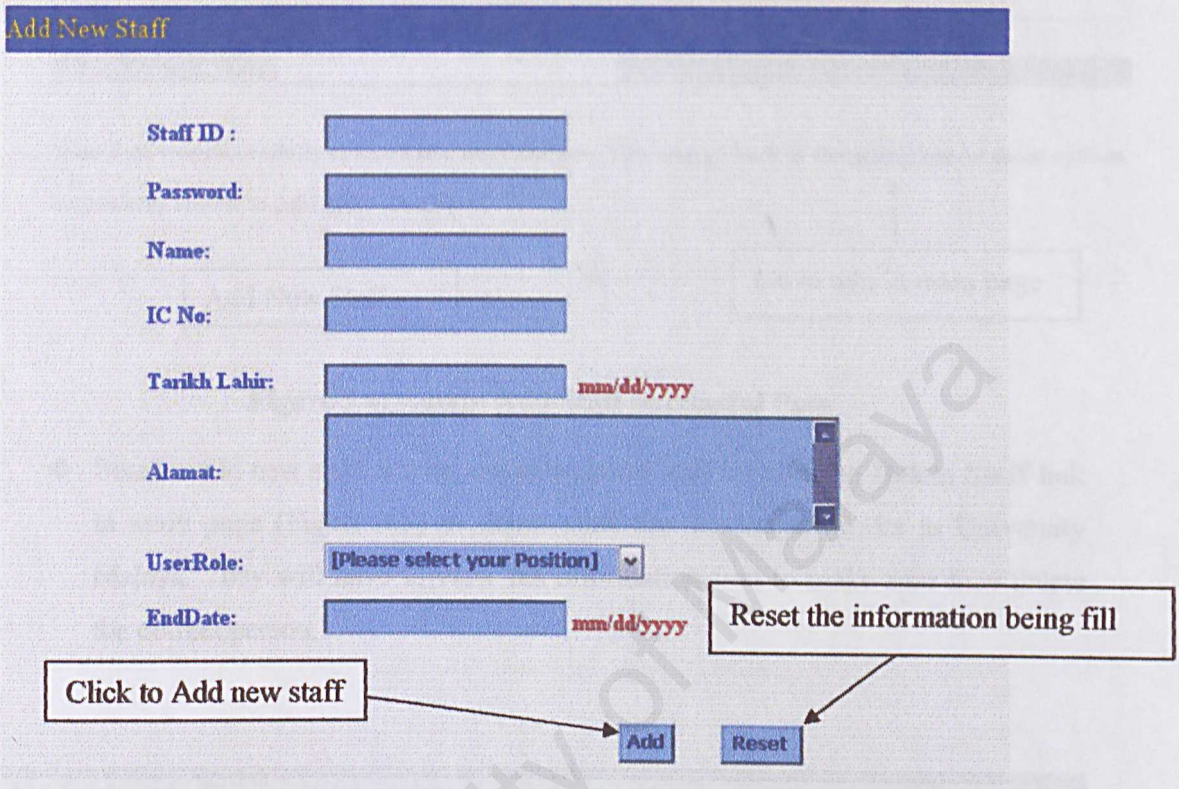



**Figure 5.2: Admin Add New Staff Page**

❖ If the admin add staff with StaffID already exists in database, an unsuccessful page will be displayed to notify admin. Admin has to add new staff by using another StaffID.

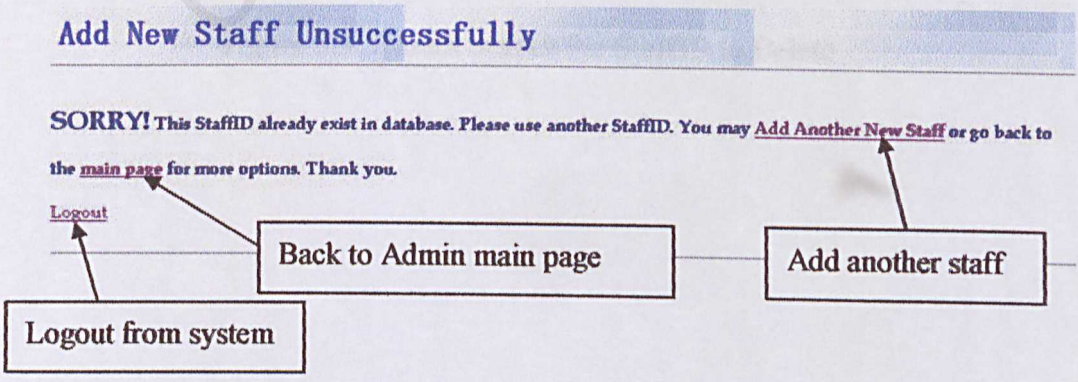



**Figure 5.3 Admin Add New Unsuccessful Page**

- If admin successfully adds data into database, a successful page will display to notify admin that data has added into database.

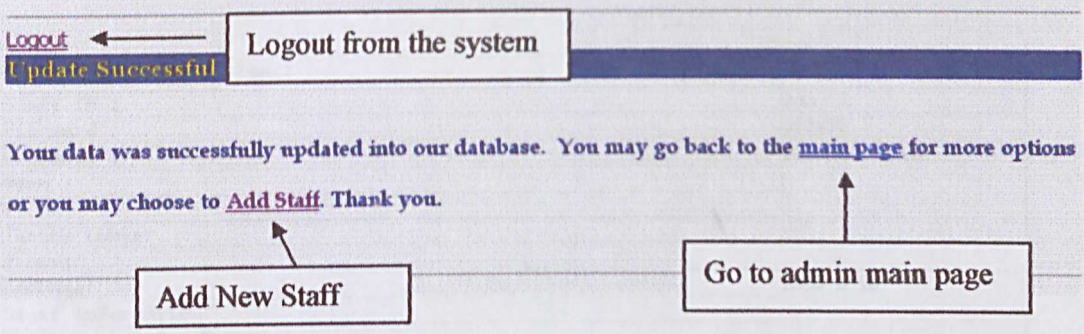



**Figure 5.4: Admin Add Staff Successful Page**

- Besides add new staff, admin can also delete staff by click on **Delete Staff** link in main page (Figure 4.8) to delete staff that no longer works in University Malaya. They will have to view the information first to make sure they delete the correct person.

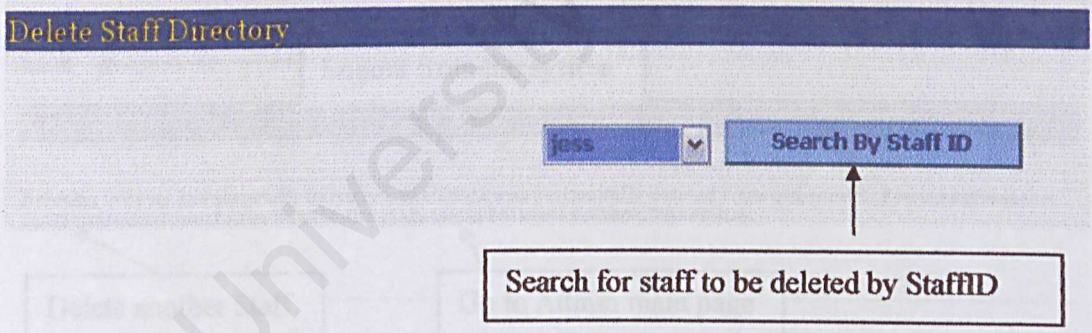



**Figure 5.5: Admin Search for StaffID to Delete**

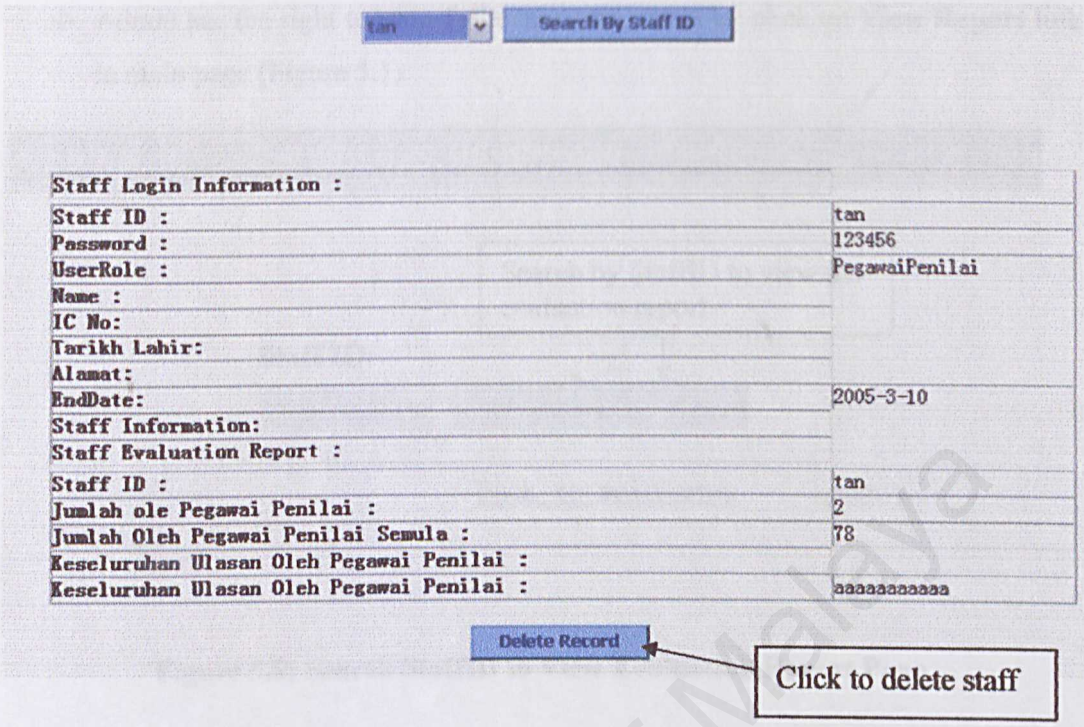



**Figure 5.6: Admin Delete Staff Page**

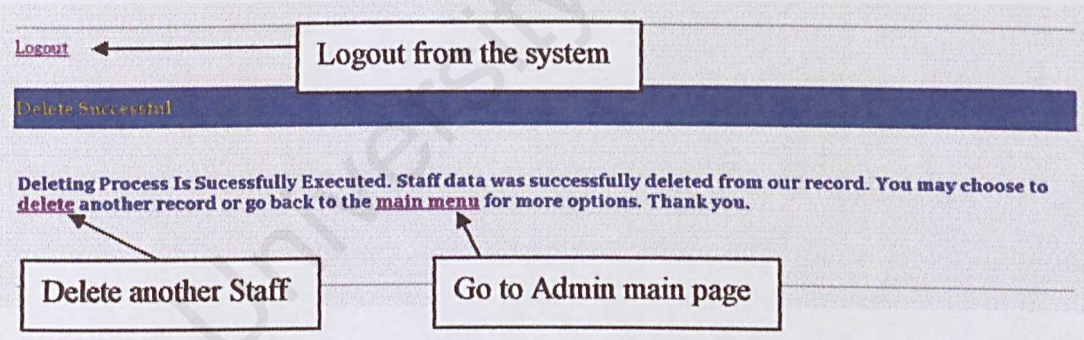



**Figure 5.7: Delete Successful Page**

❖ Admin has the right to view full evaluation report by click on **View Report** link in main page (Figure 5.1)

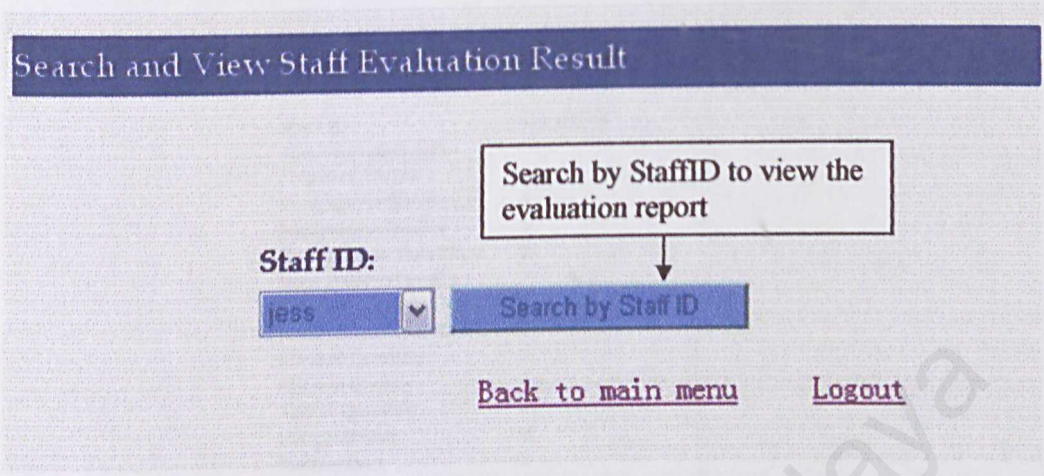



**Figure 5.8: Search StaffID to View Evaluation Report Page**

Search and View Staff Evaluation Result

**Staff ID:**

Search by Staff ID

| | |
|---|---|
| **Staff ID :** | wek020255 |
| ***Penilaian daripada Pegawai Penilai :*** | |
| **Pengajaran Quantity :** | 8 |
| **Pengajaran Quality :** | 9 |
| **Penyelidikan Quantity :** | 8 |
| **Penyelidikan Quality :** | 7 |
| **Perundingan Quantity:** | 8 |
| **Perundingan Quality :** | 9 |
| **Klinikal Quantity :** | 8 |
| **Klinikal Quality :** | 7 |
| **Tadbir Quantity :** | 7 |
| **Pengetahuan :** | 9 |
| **Kebolehan :** | 7 |
| **Keputusan :** | 8 |
| **Keberkesanan:** | 7 |
| **Masalah :** | 8 |
| **Integriti :** | 9 |
| **Komitment :** | 8 |
| **Disiplin :** | 7 |
| **Kepimpinan :** | 8 |
| **Jalinan:** | 9 |
| **Wawasan :** | 7 |
| **Analisis :** | 8 |
| **Jumlah :** | 81 |
| **Perakuan:** | Melintang |
| **Kenaikan Pangkat:** | Berkebolehan serta berkeupayaan tinggi serta sesuai dinaik pangkat secara keutamaan |
| **Penganugerahan :** | TidakSesuai |
| **Cadangan Anugerah :** | aaaaaaaaaa |
| **Ulasan :** | aa |
| **Ulasan Keseluruhan :** | aaaaaaaaaa |
| ***Penilaian Daripada Pegawai Penilai Semula :*** | |
| **Pengajaran Quantity :** | 8 |

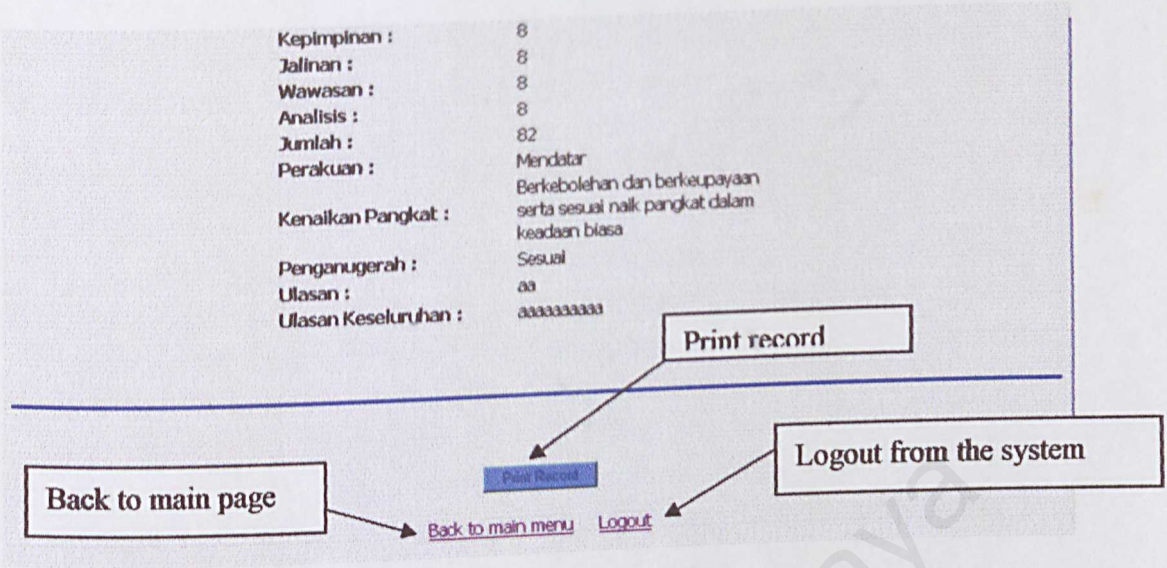



**Figure 5.9: Admin View Evaluation Report Page**