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JUDUL: **RFID BASED SYSTEMATIC STUDENT'S ATTENDANCE MANAGEMENT SYSTEM**

SESI PENGAJIAN: **2010/2011**

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RFID BASED SYSTEMATIC STUDENT'S ATTENDANCE MANAGEMENT SYSTEM

HANISAH BINTI HAMID

This thesis is submitted as partial fulfilment of the requirement for the award of the Bachelor of Electrical Engineering (Electronics)

Faculty of Electrical and Electronic Engineering

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25 NOVEMBER 2010

SUPERVISOR'S DECLARATION

" I hereby declare that I have checked this project and in my opinion, this project is adequate in terms of scope and quality for the award of the degree of Bachelor of Electrical Engineering (Electronics)".

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I hereby declare that the work in this project is my own except for quotations and summaries which have been duly acknowledged. The project has not been accepted for any degree and is not concurently submitted for award of other degree.

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DEDICATION

Specially dedicated to my beloved parents, Hamid bin Ismail and Saadiah binti Arifin who's been with me through all the years and those people who have guided and inspired me throughout my journey of education.

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ABSTRACT

Most educational institutions' administrators are concerned about student irregular attendance. Truancies can affect student overall academic performance. The conventional method of taking attendance by calling names or signing on paper is very time consuming and insecure, hence inefficient. Therefore, computer-based student attendance management system is required to assist the faculty and the lecturer for this time-consuming process. For this project, RFID based systematic student's attendance management system can provide much convenient method to take attendance, but some prerequisites has to be done before start using the program. Although the use of RFID systems in educational institutions is not new, it is intended to show how the use of it came to solve daily problems in our university. Assisted by the System Development Life Cycle (SDLC) methodology, the system has been built using the web-based applications such as JSP, MySQL and Apache to cater the recording and reporting of the students' attendances. NetBeans IDE 6.1 is used for developing the overall system, MySQL as the database and Java act as the scripting programming language. RFID Based Systematic Student's Attendance Management System was built using open source software and it will reduce the cost of development process. The system can be easily accessed by the lecturers via the web and most importantly, the reports can be generated in real-time processing, thus, providing valuable information about the students' commitments in attending the classes.

ABSTRAK

Kebanyakkan pentadbir institusi pendidikan prihatin tentang kehadiran pelajar yang tidak menentu. Gejala ponteng di kalangan pelajar boleh menjejaskan prestasi akademik pelajar secara keseluruhan. Kaedah konvensional dengan memanggil nama atau menandatangani di atas kertas sangat memakan masa dan tidak selamat, disamping tidak cekap. Oleh itu, sistem pengurusan kedatangan pelajar berasaskan komputer adalah di perlukan untuk membantu fakulti dan pensyarah untuk memudahkan proses yang memakan masa ini. Untuk projek ini, sistem pengurusan kehadiran pelajar yang sistematik berasaskan RFID ini boleh menyediakan banyak kaedah mudah untuk mengambil kehadiran, tetapi beberapa pembangunan sistem mesti dilakukan sebelum mula menggunakan sistem ini. Walaupun penggunaan sistem RFID di institusi pendidikan bukanlah hal yang baru, projek ini bertujuan untuk menunjukkan bagaimana penggunaan teknologi RFID ini dapat membantu untuk menyelesaikan masalah seharian di universiti. Dibantu oleh metodologi kitaran pembangunan system (SDLC), sistem ini telah dibina dengan menggunakan aplikasi berasaskan web seperti JSP, MySQL dan Apache untuk proses catatan dan laporan kehadiran pelajar. Netbeans Ide 6.1 digunakan untuk membangunkan keseluruhan sistem, MySQL sebagai pangkalan data dan Java sebagai skrip bahasa pengaturcaraan. Sistem ini dibina dengan menggunakan perisian dari sumber terbuka dan ini dapat mengurangkan kos proses pembangunan. Sistem ini boleh dicapai dengan mudah oleh pensyarah melalui web dan yang paling penting, laporan dapat dihasilkan dalam pemprosesan masa nyata, dengan demikian, sistem ini dapat menyediakan maklumat berharga untuk membina komitmen mahasiswa dalam menghadiri kelas.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

DDL	Data Definition Language
DML	Data Manipulation Language
GUI	Graphical User Interface
JSP	Java Server Pages
RFID	Radio Frequency Identification
SDLC	System development life cycle
UML	Unified Modeling Language
UMP	Universiti Malaysia Pahang

CHAPTER 1

PROJECT INTRODUCTION

1.1 Introduction

The two major problems faced by organizations are time consuming manual attendance and wastage of electrical power. Our project is going to solve these problems by using RFID technology. Radio Frequency Identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. So the RFID is a wireless identification. Normally the RFID system comprises of two main parts are RFID Reader and RFID Tag.

Radio Frequency Identification (RFID) is one of the automatic identification technologies more in vogue nowadays. There is a wide research and development in this area trying to take maximum advantage of this technology, and in coming years many new applications and research areas will continue to appear. This sudden interest in RFID also brings about some concerns, mainly the security and privacy of those who work with or use tags in their everyday life. [1]

RFID has for some time, been used to access control in many different areas, from asset tracking to limiting access to restricted areas. Although the use of RFID systems in educational institutions is not new, it is intended to show how the use of it came to solve daily problems in our university.

Nowadays, there are so many institutions that have been growing in Malaysia whether private or government. One of that is University of Malaysia Pahang (UMP). Universities in Malaysia still using old method to take student attendance by giving attendance sheet to be sign out by student. After that, lecturers have to analyze it manually to know who absent and attend to the class. This will make lecturer have a lot work to do.

In a developing country like ours, lot of latest technology that has been developed such as RFID, wireless, Bluetooth, robot and so on. Therefore, these technologies can be adopted to improve our daily routines so take our life more comfortable and easy. All universities should try adopting these technologies to improve their quality of student and management. Besides not being left behind in latest development, it will produce more quality and discipline graduates and they know to use advanced technology in the future. Attendance taking in universities should be done in more advanced method with using the latest technology. The attendance system was developed to help lecturers to manage student attendance in more effective method.

As for system development and implementation, it should be able to help the lecturers to managing their student attendance systematically. The system must have database that contains student information and it must be able to help lecturer to manipulate data, update database, alert lecturers accordingly, and also nice interface to make it easier to use. Finally, the attendance system must be user friendly for commercial purpose. This thesis will focus on UMP regulation about attendance to class, and implement it to develop the system that will do all the attendance management automatically by using RFID technology.

1.2 Problem Statements

Most of the universities still use old method to take attendance student by giving attendance sheet to student and student only needs to sign that paper. By use this method, many students will cheat by asking their friends to help them to sign their attendance if they absent. With this method, lecturers have to analyze and record the attendance list manually to know who absent and come to class. If the attendance sheet lost, the lecturers have to take attendance again and this will give opportunity to students to cheat their attendance. This would impose the lecturer and data that given also inaccurate.

At University of Malaysia Pahang, the attendance of all students present in a given class was recorded. To carry out this registration, each lecturer has an attendance register that must be filled in for every class held. At the beginning of each lesson the lecturer was required to fill in the attendance sheet with all the information concerning the lesson. After that, the attendance sheet handed out so that all students will sign the sheet. When all students have signed, the lecturer collects the sheet and checks the attendance of each student. The purpose of the attendance sheet is to verify whether the student has already exceeded the maximum number of absences allowed for each subject.

This procedure, besides being troublesome for lecturer, also affects students as time is expended on signing, verifying and submitting the attendance sheet manually. Therefore, a system that can manage and help the lecturers to take attendance easily has to be developed. This system must be created based on UMP regulation for attendance contains information about all students from a lecturers section. The system can be easily accessed by the lecturers via the web. This system must be able to manipulate and manage the data of the student attendance so that the lecturers do not have to analyze the student attendance manually. They only have to transfer the data, and the system will analyze all the data automatically.

Each reader was located in each classroom will uniquely identify the physical location of the classroom so the server will know which class the student is trying to attend. All processing power has to be on the server and not on the readers or else the latter will have to be loaded with the entire information on classes, lecturers, students and schedules. Moreover, these loading processes will have to be carried out every semester.

1.3 Goal of the Project

Goal of the project that has been developed was to generate a system that can use RFID technology to take the student attendance systematically based on capacity concept wave radio. RFID systems use radio waves to transmit information from an integrated circuit tag through a wireless communication to a host computer [2]. These systems consist of three components are the tag (transponder), the reader (interrogator) and the host computer (controller). The reader communicates with the tags in its wireless range and collects information about the objects to which tags are attached [3].

The goals that RFID systems should reach regarding security and privacy are maintaining data security, preventing counterfeiting, preventing illegitimate access, preventing unwanted recognition and tracking, and coping with denial of service [4]. Therefore, the use of RFID can be more expanded. This system can analyze automatically the student attendance by recording the student attendance and summarizing the percentage of attendance every student for one semester. By using this method, the student attendance will take fast and efficiently recorded. The use of open source software has many advantages in terms of the programming language is easy to understand and learn in addition can reducing the cost of system development.

1.4 Objective of the Project

The main objective of this project is to automate the whole system of students' attendance registration using RFID. In addition, this system can help the lecturers to manage and analyze student attendance according to UMP regulation for attendance.

1. To develop an attendance system for UMP that more effective and efficient with RFID implementation.
2. To build the graphical interface using JAVA & JSP Server and MySQL from Open Source software.
3. To record the RFID tags from the RFID reader and stored in system database.
4. Examine the attendance management system and web-based application that was developed.

1.5 Scope of the Project

In order to achieve the objective of the project, several scopes have been outlined. The main scope of this project is to verify the regulation for attendance of UMP. It also includes database, monitoring and interface. The interface is to connect the RFID with the database, manage the attendance of student according to the regulation, and help lecturers to take actions automatically. Other scopes of this project are:

1. This attendance system was developed for UMP student attendance only.
2. Users of this system are administrator, lecturers and students of UMP only.
3. Administrators can update, add or delete students and lecturer's data, view attendance record, and can block the use of the system.
4. Analyze student absences each semester according to the percentage absences from UMP regulation of attendance.

1.6 Project Interest

This system development was very important to every university to take attendance easily and systematically. With this system, percentage of student attendance will increase because opportunity they to cheat very limit. They also will come to class more early because time that they come to class will be recorded by the system. All students have to wear their matrix card to take attendance and this way will make them more discipline about their dressing to class.

From this systems development, various parties will get benefits. UMP student attendance would be also more efficient and accurate in managing student attendance. Other than that, with RFID technology usage can increase name and UMP standard in Malaysia eye and regional in areas of technology. Technology is one key component and able linking to world global. With the existence of RFID technology, hoped it will be able helps in implement this system perfectly.

1.7 Conclusion

By knowing the problems and requirements required by the organization, a system was successfully developed. Development of the system will be based on problems be addressed and which can meet the needs of the organization. Apart from the analysis of problems and research needs, objectives and scope project was set to give a preliminary and a more functional clearly to ensure the smooth running of the system has been developed.

However, the development of more effective systems should be based on objectives and scope of the project was determined. Overall, this chapter was describing the early stages carried out before a more thorough study is done to develop this system. This chapter also discussed the information should be recorded and the process flow for the development of systems to be built.

1.8 Outline of the thesis

This thesis consists of 5 chapters. First chapter is about introduction and background of the system development. Problem faced by lecturers when take attendance in traditional method. Chapter one also consist of the project objectives and goal of the project.

Chapter two consist of theories that be used to develop the software, and also about the software used. Bench warming to choose the best software to develop the program was also explained in chapter two.

Chapter three was explained about the selection of appropriate methodology in the development of this system. It will explain the methodology done to develop the system, UMP regulation for attendance and also how the database and the GUI (Graphical User Interface) were created.

Chapter four consists of result of the system development. The prototype of the system was created and also discussion about the system developed.

Finally, chapter five concludes the system that was used, and recommendation about the future research for the system.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

In the process of system development, literature reviews conducted to understand the theory, methods and technologies associated with systems that have been developed. Background research on the organization and comparative studies of existing systems is also done to more understand the system requirements before the system was developed.

RFID based systematic student's attendance management system that has been developed was using RFID technology. Through this chapter, the technology that will be used will be discussed briefly.

2.2 Studies on technology, equipment and techniques used to solve problems

This section will briefly describe the research done on the technology, equipment and techniques have been used in the development of this system.

2.2.1 Radio frequency identification (RFID)

RFID stands for Radio Frequency Identification, which is a wireless communication technology that is used to uniquely identify tagged objects or people [5]. RFID systems have been widely used in many application areas, such as inventory control, product tracking through manufacturing and assembly, parking lot access and control, container or pallet tracking, ID badges and access control, equipment or personnel tracking in hospitals, etc. [6]

RFID systems use radio waves to transmit information from an integrated circuit tag through a wireless communication to a host computer [7]. These systems consist of three components that are the tag (transponder), the reader (interrogator) and the host computer (controller). The reader communicates with the tags in its wireless range and collects information about the objects to which tags are attached [8]. Compared to other automatic identification technologies, like optical barcode systems, RFID has several advantages, such as tag data can be read automatically without line of sight, thought some materials, simultaneously tag reading and from a range of several meters [9]. RFID has the following main components and figure 2.1 was shows the basic components of RFID systems and concepts.

- RFID Tag / Transponder
- RFID Reader
- RFID Antenna
- PC /Database

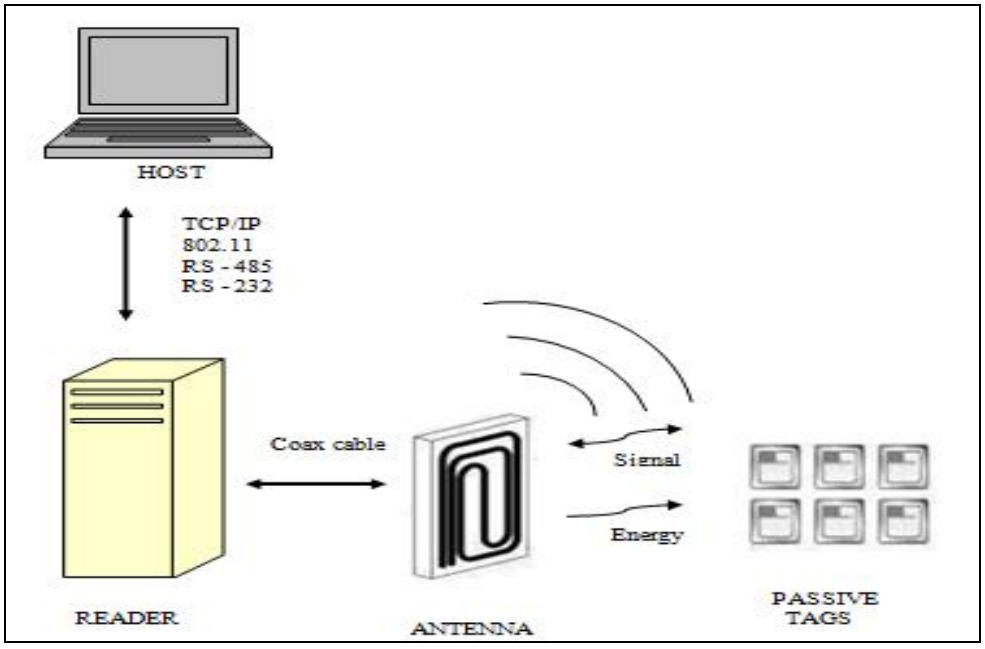

Figure 2.1: The basic components of RFID systems

However, there are three types of RFID tag that are active tags, passive tags and semi-active tags.

2.2.1.1 Active RFID Tag

An RFID tag is an active tag when it is equipped with a battery that can be used as a partial or complete source of power for the tag's circuitry and antenna. Some active tags contain replaceable batteries for years of use, others are sealed units. (Note that It is also possible to connect the tag to an external power source.) [10]

The major advantages of an active RFID tag are:

- It can be read at distances of one hundred feet or more, greatly improving the utility of the device
- It may have other sensors that can use electricity for power.

The problems and disadvantages of an active RFID tag are:

- The tag cannot function without battery power, which limits the lifetime of the tag.
- The tag is typically more expensive, often costing $20 or more each
- The tag is physically larger, which may limit applications.
- The long-term maintenance costs for an active RFID tag can be greater than those of a passive tag if the batteries are replaced.
- Battery outages in an active tag can result in expensive misreads.

Active RFID tags may have all or some of the following features:

- longest communication range of any tag
- the capability to perform independent monitoring and control
- the capability of initiating communications
- the capability of performing diagnostics
- the highest data bandwidth
- active RFID tags may even be equipped with autonomous networking, the tags autonomously determine the best communication path.

2.2.1.2 Passive RFID Tag

A passive tag is an RFID tag that does not contain a battery, the power is supplied by the reader. When radio waves from the reader are encountered by a passive RFID tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag. The tag then sends the information encoded in the tag's memory. [10]

The major disadvantages of a passive RFID tag are:

- The tag can be read only at very short distances, typically a few feet at most. This greatly limits the device for certain applications.
- It may not be possible to include sensors that can use electricity for power.
- The tag remains readable for a very long time, even after the product to which the tag is attached has been sold and is no longer being tracked. [10]

The advantages of a passive tag are:

- The tag functions without a battery, these tags have a useful life of twenty years or more.
- The tag is typically much less expensive to manufacture
- The tag is much smaller (some tags are the size of a grain of rice). These tags have almost unlimited applications in consumer goods and other areas.

2.2.1.3 Semi-Active RFID Tag

Semi-active tag is a similar tag to active tags that have their own power supply such as battery. The difference is the tag uses battery power only to switch on the microchip circuit inside and not to transmit the signal wave to the reader. Radio waves frequency is emitted as a passive tag with reflect the transmitted wave that was sent from reader.

2.2.1.4 RFID Reader

An RFID reader is a device that is used to interrogate an RFID tag. The reader has an antenna that emits radio waves; the tag responds by sending back its

data. A number of factors can affect the distance at which a tag can be read (the read range). The frequency used for identification, the antenna gain, the orientation and polarization of the reader antenna and the transponder antenna, as well as the placement of the tag on the object to be identified will all have an impact on the RFID system's read range.[10]

2.2.1.5 RFID Antenna

Generally, the antenna has been designed and is available in various forms but serve to obtain data from individuals or objects that pass through the antenna. When the inclusion of RFID tags print antenna, the tag was will be able to mark the activation of the antenna and microchip that will generate accumulated in the tag. The next process happens is that it will send information to the microchip was generated by printing antennas. This means that there are interactions between the tag and antenna.

2.2.2 Unified Modeling Language

UML will be used to model the process of problem solving analysis and design of the system. This is because UML will show a representation with use suitable diagrams. And indirectly will helps to increase understanding and to continue development of system. There are several advantages of using UML in the development of this system. Among them, it supports the construction of systems and applications as well as an object-oriented modeling standard and fixed. In addition, it also enables users to perform modeling system with the development of model. While advantages of using others UML are independent of programming language and development process can support the entire systems development life cycle, supporting the concept stages of development such as collaboration, frameworks and components. Figure 3.4 was shows a representation of the UML diagrams.

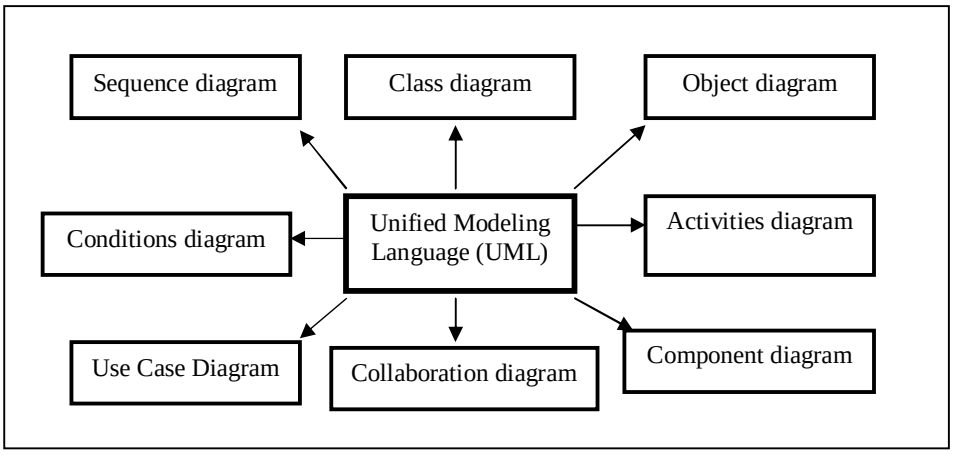

Figure 2.2: Diagrams representation in UML

2.3 Software Development Requirements

This part will explain about Java programming language and Java Server Pages (JSP). Students are needs to provide justification for the software and hardware needed for the implementation of the project include the need for software development and software needs to operate.

2.3.1 Java Programming Language

Essentially, the Java programming language similar to C + + programming language and it can act in a variety of diverse applications, especially stand-alone application or web-base. Besides functioning as a programming language, application development environment and development, it also acts as the launch environment (deployment). In addition, java development technology offers features that are important in the development of programming such as the compiler, interpreter, documentation generator, class file package, and others.

However, if viewed from the perspective of the benefits, the Java programming language is expressly provides many advantages. Among them are the use of OOP in full and this supports the use of object-oriented design (OOD), easy to build and learn program Java is widely used and supported programming for web development service. In addition, the use of the Java programming language also supports socket programming using TCP port and UDP port, support TCP / IP for on-line programs and also supports internet systems and websites as well as the ability to support multiple platforms running operating systems like Windows and Linux and also a variety of platforms such as micro machines, mini or mainframe.

Table 1: Comparison between JSP & Java and Visual Basic

JSP & JAVA	**Visual Basic**
• Runs on everything (Cross Platform)	• Pretty much just runs on windows environment
• Less expensive to acquire	• More expensive to acquire
• solid electronic reference HTML	• electronic docs $extra; few/poor examples
• can do self-training easily	• mixed adoption in colleges/universities

As a conclusion, Java is the most user friendly Graphical User Interface application to be used in this development of system. Java provides most simple coding type compared to other programming such as Visual C++ and also Visual Basic. Therefore it was the most suitable Graphical User Interface application for the development of this system.

2.3.2 Java Server Pages (JSP)

Java Server Pages technology (JSP) is a continuation of JavaTM Servlets technology. Servlets are an independent platform, which is one hundred percent Java module "server-side" is included in the framework of a web server and can be used to increase server capacity to minimize overhead, maintenance and supply needs. JSP is one of the functional programming languages to generate HTML, XML or other document which has been implemented on the server-side as security so that users can view the source code for application development.

JSP and Servlets technology provide an interactive selection of several types of dynamic web programming platform that offers free, upgrade the performance, ease of management, can be expanded into the business and most importantly, it is easy to use. In addition to the dynamic nature of web development, JSP also allows web-based application development. JSP files will be stored in the form. jsp and it is able to combine the tag - HTML tag with Java syntax. Form JSP file will be compiled by a Java compiler to be JSP Servlets. JSP compiler can also generate a Servlet in Java code first and then will be compiled by a Java compiler or directly compiling to the servlet byte code.

Among the advantages of using JSP as compared with other programming languages is involved as part of a dynamic database connectivity and network extension API written in Java that has been unknown. In addition, the JSP is written in Java and was processed on the server and will allow the JSP does not depend on the specific operating system. JSP is a free platform to any dynamic web applications and server component. JSP can be written in a variety of operating systems other than Windows platforms such as Linux, Macintosh, Solaris and others. It can run on any web server and can be accessed by any the browser.

2.3.3 MySQL

MySQL has a strong integration with Windows NT and has a user-friendly interface. It allows storage structure information in various formats. In addition, the manipulation of information can also be done. Search information in MySQL can be displayed in a variety of different reporting formats. MySQL output can reduce cost of ownership and administrative expenses. It is equipped with OLAP (Online Analytical Processing) and data mining to analyze the extensive amounts of data. MySQL uses Transact-SQL ANSI-92 standards.

In general, there are two classification tasks Transact-SQL, namely:

i) Data definition language (DDL) to tag all the objects in the database such as MySQL data bases and tables.

ii) Data manipulation language (DML) to select the insert, update and delete data in database objects.

- The study found that organizational size of the database offered by Microsoft Access is 1 Gigabyte is not enough. While MySQL provides 1048516 Terabyte and is very adequate.
- Microsoft Access to accommodate the reach of more than 25 users. If more than 25 users to access the database simultaneously, data corruption might occur.

Table 2: Comparison between MySQL and Microsoft ACCES

MySQL	Microsoft ACCESS
• Capable to manage huge amount of data and even more	• Only can manage small amount of data
• MySQL is cross platform	• Only be deployed in Microsoft Windows
• Multi-User Application and many more	• Single-User Application
• Open source and free (if not using for commercial purpose)	• Expensive (Cost hundred dollars)

The MySQL database has become the world's most popular open source database because of its consistent fast performance, high reliability and ease of use. It's used on every continent by individual Web developers as well as many of the world's largest and fastest-growing organizations to save time and money powering their high-volume Web sites, business-critical systems and packaged software including industry leaders such as Yahoo!, Alcatel-Lucent, Google, Nokia, YouTube, and Zappos.com.

2.4 Related Work

This section describes previous projects regarding attendance records. Attendance records are necessary to determine and validate student eligibility during the class or examination day. Thus, many researchers have been discovered in this area to improve and replace the traditional way using paper with the current RFID technology. In relation, there are many kinds of development that are related to RFID utilization to maximize potentials and application in the daily life.

Zhang Yongqiang and Liu Ji [6], designed a wireless fingerprint-based attendance system to record and obtain the attendance data using finger prints or known as biometric. Man and Kyng [7] designed a time management and access monitoring system using microprocessor card to monitor students' or staffs' movement with the records that are kept in the database for administrator reference in campus, office or certain area. All data captured by this system could be accessed by teachers; headmaster and parents by fully utilizing Mykad features via the Internet and intranet facilities.

However Jonathan Sidi, Syahrul N. Junaini and Lau S. Ling (2007) proposed a system that was capable to record students' attendance using interactive input, generating reports, viewing students' and lecturer' profiles, and providing students timetable [8]. The system records attendance using barcode scanner. In addition, the system generates automatically, the lecturers are able to count students attendance easily and quickly. In another spectrum, Pala and Inanc [9] applied RFID technology for check in and check-out at parking lots quickly without need to stop car and it definitely avoids traffic jam during parking hours. This type of system is used in detecting vehicles through internet facilities by comparing the previous information in the database.

Based on a literature, it indicates that most of the implementation of attendance system are using computer integrated with RFID or other devices.

2.5 Summary

Based on studies done on the existing system, there are some problems that could be improved. The developed system has some aspects of the improvements to the existing weakness especially for the management of the attendance system that used at present. With the technology and equipment that have been studied, the development of this system was more simple and realistic. In chapter 3, the discussion will be more focused on system development methodology. This section covers the methodology of selected studies, comparative research methodology, and the selected research methodology in detail and analysis of system requirements.

CHAPTER 3

DEVELOPMENT METHODOLOGY

3.1 Introduction

Early planning is very important to launch the system development work and ensure the success of a system. A software tool should be developed in phases to the development of software development tasks were carried out on a systematic approach. These phases are also functions as a systems development life cycle. The methodology is a combination paradigm, rules, policies, procedures, regulations, standards, techniques, tools, languages and other methods used to analyze and details the requirements and system design. The selection of appropriate development methodology can help simplify the process of system development. Among the major activities that must be addressed during the planning system is carried out to identify the life cycle of the system, methodology, methods, techniques and appropriate equipment or software used and the analysis of system requirements specification.

3.2 The System overview

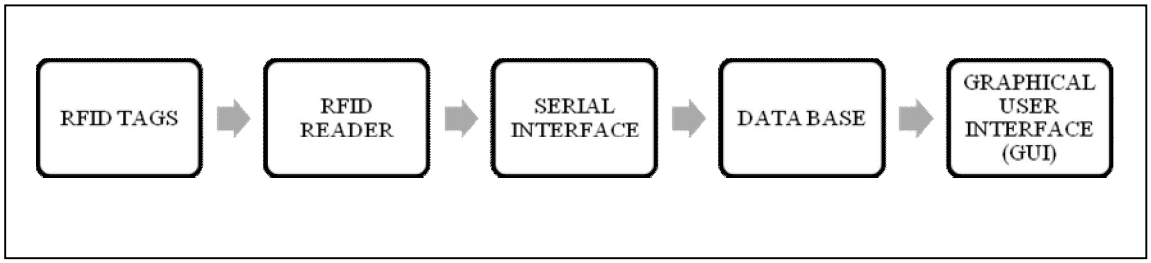

Figure 3.1: Block diagram of the reader and transponder of RFID system

Figure 3.1 was show block diagram of the reader and transponder of RFID system. RFID based Systematic Student‘s Attendance Management System consist of software and hardware as illustrated in figure above. In overall, this system only uses the RFID tags and reader as hardware part to transfer data to computer. Hardware set was setup without hard programming. But, for the software, all functions need to be programmed.

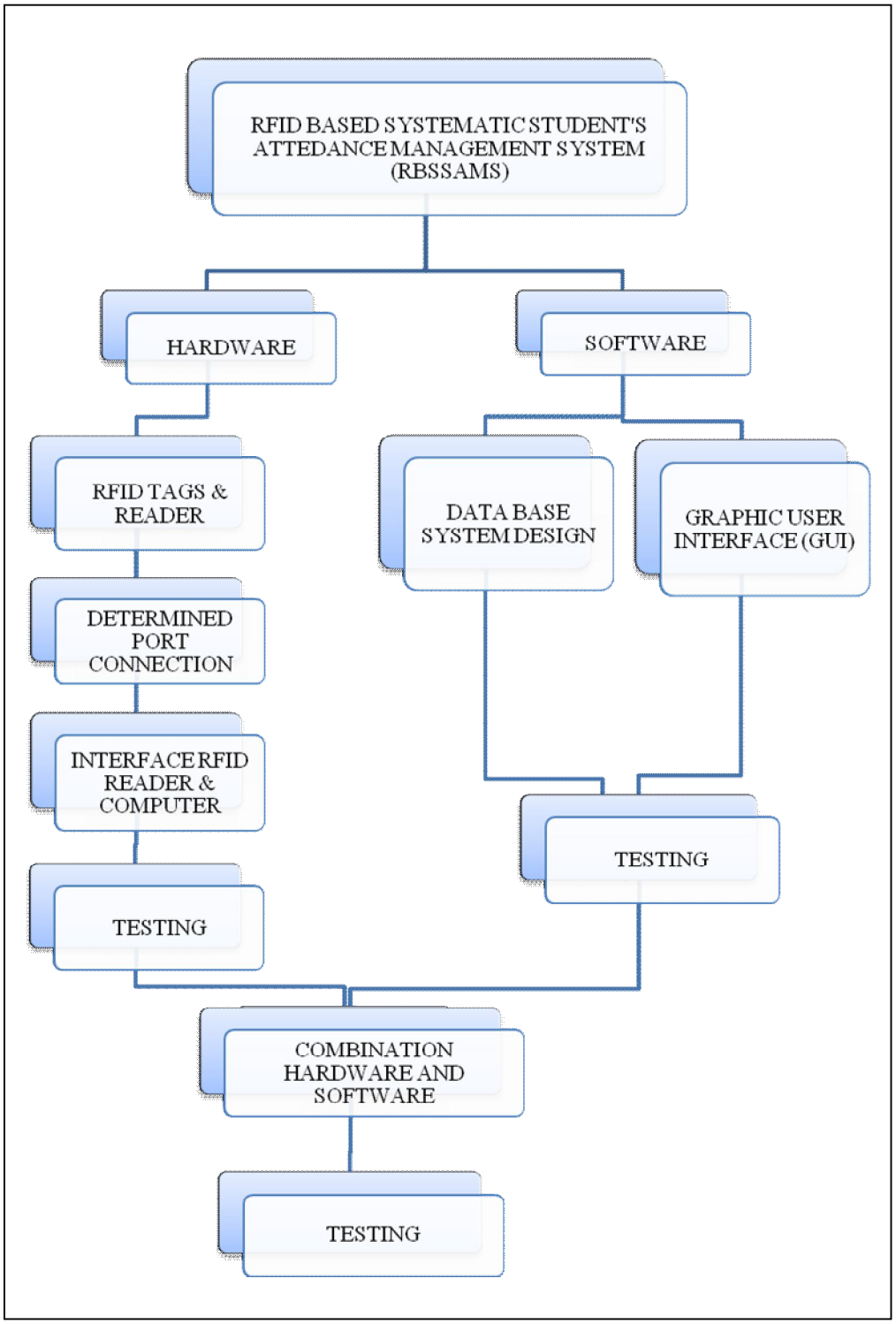

Figure 3.2: The design flow of the system

The system development was focused separately in terms of

i) Hardware Design
ii) Software Development.

Figure 3.2 was illustrated the design flow. The figure depicts that the hardware and software were developed separately, and were tested before combined to fully implement the system. There were three testing altogether. The test of hardware was carried out to ensure that the setup was successful. The software was tested to ensure that all functions work as intended. In the final test, the system was already integrated into the portable hardware, and it was aimed at testing all functions on RFID reader. The design and development of hardware and software are described in the following subsections. They involve RFID tag, RFID reader and lastly software part.

3.3 Summary of the project

Implementation and works of the system was summarized into the flow chart as shown in figure 3.3 below:

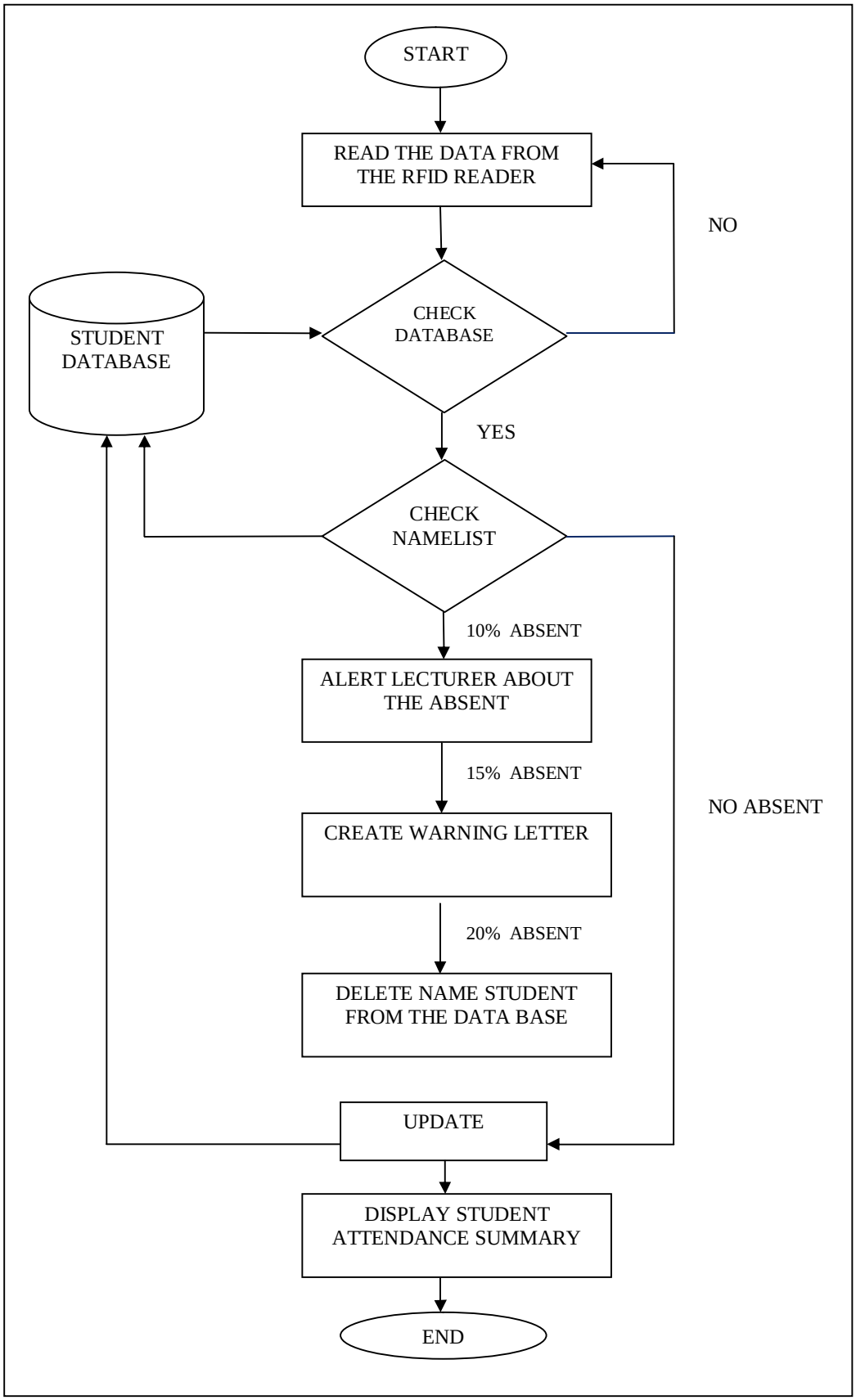

Figure 3.3: Flow Chart of the system

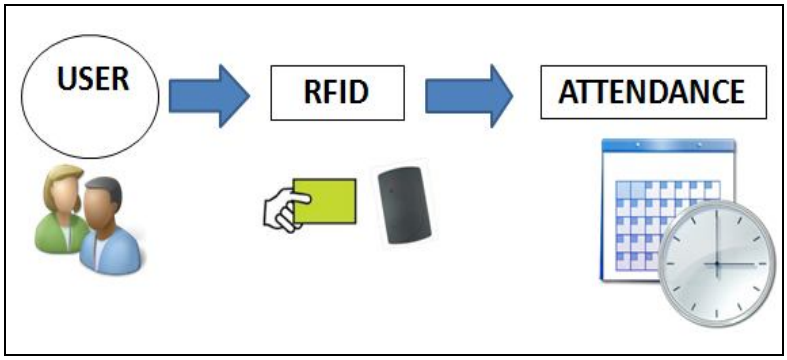

Figure 3.4: Block Diagram of the system

As can be seen from the flowchart, initially, this system will extract the data sent by the RFID. When student scan their ID card on the RFID Reader, the RFID Reader will read the ID of each student who scan their ID Card. This system will compare the RFID ID from the scanner with the RFID ID in the database, and then records it for the attendance management. The program will check the database if the data received is valid or not. If not, it will ask again for the data. If the data is in the database, it will check the whether the student absent or not. Each student attendance must not less than 80 % for every semester. So, they can only absent not exceeding 20% per semester. When the program detects that student absent for 10%, it will automatically give message to lecturer at panel massage of the system. Lecturers can warn the student about their attendance. If a student absent for 15%, the software will automatically create warning letter. The letter created can be sent to student manually or through email by lecturer. If a student absent for 20%, the lecturer can delete student profile from the database. But, if the lecturer wants to insert the student back to the course, they can do it.

3.4 Studies on Methodology

The methodology development is the focus of discussion in this third chapter. The selection of appropriate methodology in the development of this system is very important to the smooth development of the next system. The methodology was selected will explain how the system will be developed in various phases of specific such as the planning phase, requirements analysis, design, testing, and maintenance.

This phase is the basic phase in system development life cycle and should be developed based on the specific model. Two categories model for the methodologies was discussed that are the waterfall model and the rational model Unified Process (RUP). Different models have different phase sequence specific. Studies on the suitability of the methodology needs to be done so that the phases and the framework of system development can be implemented.

3.4.1 Studies on Waterfall Model

This approach is called the Waterfall Model as starting with the early stages of planning and continuing in sequence on the level of analysis, design, coding, testing and maintenance. Waterfall model is one of the earliest methods used in the early stages of software engineering and its use is widespread due to its project management tools. Basically, this model will start at the phase of analysis and statement of need and will continue in sequence to the system and software design phase, implementation phase and testing unit, integration and system testing phase, and finally, operation and maintenance phase. The next phase cannot be started until the previous phase has been completed. Project management activities become easier as the time to start and end of a phase can be clearly defined.

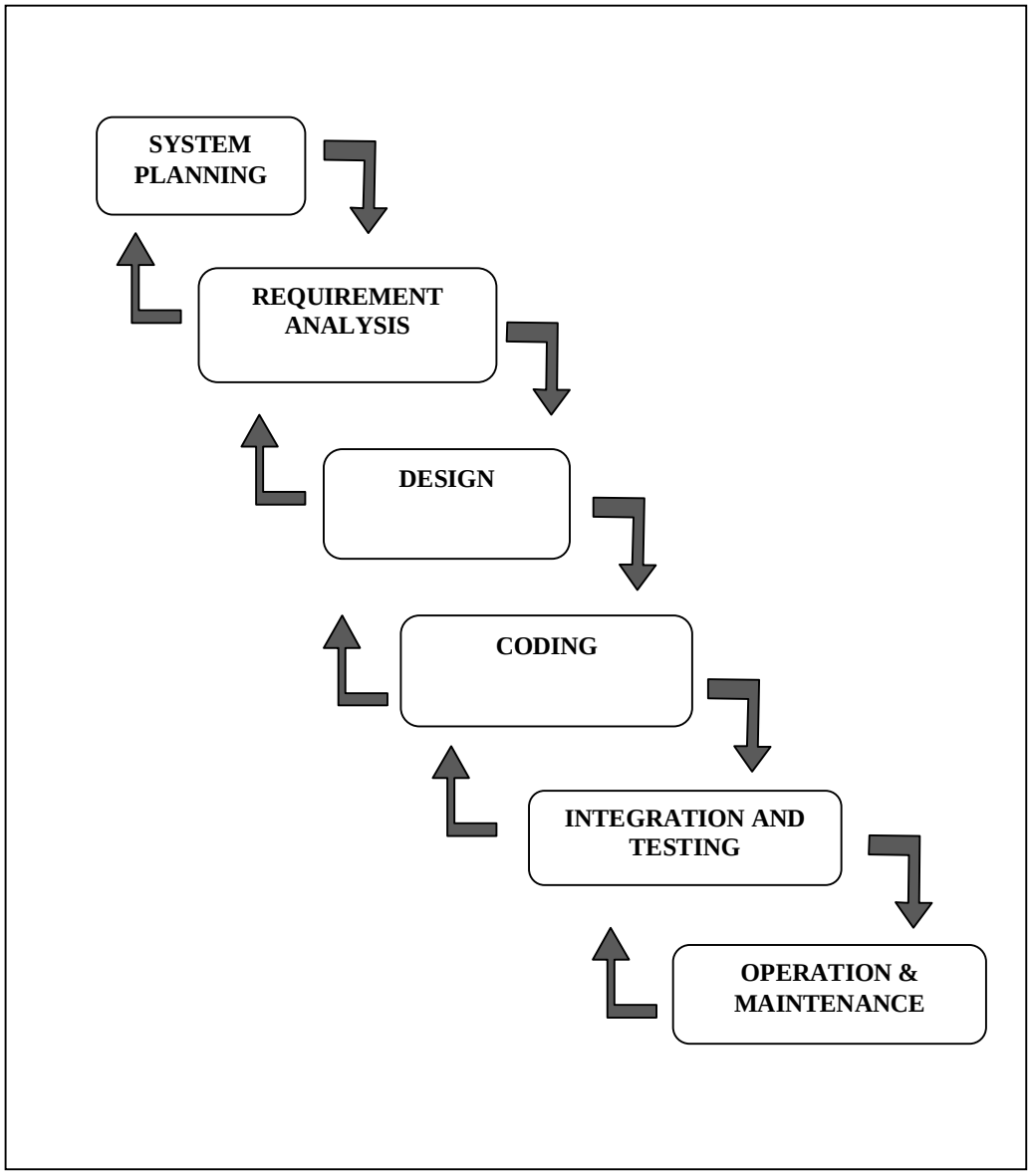

Figure 3.5: SDLC Waterfall Model

Here are details on the phases in the waterfall model:

i. System Planning

Observe that the initial stage of the planning system is the system development process. In this stage, a preliminary study involving a major objective, scope, cost, schedule and staffing needs are determined.

ii. Requirements Analysis

Consult with customers and users of systems performed to determine the system requirements, such as services, constraints and goals that the system has been developed. This requirement will be stated later in more depth and will act as system specifications.

iii. Design

This phase involves the design of the overall framework. Features and basic design of the system are identified and relationships established.

iv. Coding

During this phase, the coding will begin to produce a set of program or a number of programs. Testing the unit will test and verify that each unit meets the required specifications.

v. Testing

Separate program units or programs that have produced and tested as a complete unit of the system to determine whether or not the system requirements are met. After testing, the system that was completed will be sent to the customer.

vi. Operation and maintenance

In this phase, the complete system was installed to the client and used in practice. System maintenance will be done to correct any errors and problems that are not found in the early stages of testing during the development of the system. Function and service system will also be updated with the new requirements that required the customer.

Software development activities occur linearly from one phase to the next phase. This means that the phase of analysis can be done only after all activities in the planning system was completed properly. Activity in the design phase cannot be done so long as the analysis phase has not been completed, and so on.

The results of a phase of work will influence the next phase. Therefore, it should be reviewed and evaluated before proceeding to the next phase. For example, a user requirements specification will be produced at the end of the requirements analysis phase. Specifications must be confirmed by the user before it is made input to the design phase. The error occurred on the specification requirements although it will cause a major error in the system design. The problem will become more difficult to repair if the design is not exactly used as input to the coding phase.

During phase and maintenance, the system has been used by the user. If there are any errors in the system, the error should be corrected. Apart from improving the error, if there are additional functions in the system that has been completed, the repetition of several phases or all phases to be done to enable the system to function as intended.

An advantage of waterfall model is the documentation that was produced during each phase of system development. Typically, the waterfall model has been used when the customer needs and the system has been known and understood as a whole. Priority use of waterfall model is also suitable for implementation of small projects and medium-sized sub-systems to larger systems.

3.5 Comparative Studies

Each model has been investigated the advantages and disadvantages respectively. The selection of an appropriate process model is essential to facilitate the development of the system without any problems. Therefore, the selection of models will be based on the effectiveness of the methodology and the methodology of the model capability to make a more effective system development.

Waterfall process model is one of the most widely used models for the earliest models produced. Advantages of waterfall model are the documentation will be produced at each phase of system development. Typically, the waterfall model will be used when the customer needs and the system has been known and understood in depth. Priority use of waterfall model is also suitable for implementation of projects of small and medium-sized sub - system of a larger system. Disadvantages of this process model, it is necessary to complete the previous phase before entering the next phase. With in other words, the next phase cannot be implemented until the previous phase is not realized. As a result, delays occurred because the jobs will require a determination to complete the first phase and this model does not allow the implementation of two different work phases in time. This will give problems to the development of systems to be developed.

3.6 Analysis of System Requirements

To develop this system, analysis of system requirements such as hardware and software needed to process development and use the system to run smoothly. In addition to the specification of input and system output should be determined before the system can be developed.

3.6.1 Justification Hardware

Hardware required in the development of the system is follows: -

(i) Personal computer with minimum specifications as follows:

- Processing of Pentium IV 1.3GHz computer
- 256MB RAM of memory
- Hard disk: Minimum 10 GB free space
- Input Device: Mouse, keyboard and CD drive
- Output devices: monitors

(i) Hardware RFID as follows:

Figure 3.6: RFID Reader

Description

- Fully-integrated, low-cost solution of reading passive RFID transponder tags.
- 9600 baud RS232 serial interface (output only) to PC.
- Requires single +5VDC supply.
- Buzzer for sound indication of activity.
- Bi-color LED for visual indication of activity.
- Standard RS232 serial cable (female) cable for PC.
- PS2 for power source.
- 2 cm reading range.
- 0.1s response time.

Figure 3.7: RFID Card

Description:

RFID Proximity Card is a very thin, truly credit card thickness of proximity passive card. It has very flat surface to print any photo ID directly on both sides of card with a direct image or thermal transfer printers.

3.6.2 Justification Software

Software justifications that will be applied in this development process system as follows:-

Table 3 : Software justifications

Software	Function
Microsoft Windows 7 Starter	Operation systems
Microsoft Office Word 2007	Project documentation writing
Macromedia Dreamweaver 8	Text editor that can be used for codification
NetBeans IDE 6.1	Java Programming language compiler
MySQL	Database
Java Server Pages (JSP)	Web Java Programming Language
Apache Tomcat	Browser
Java Development Kit 6 update 2	Java Framework
Mozilla Firefox	Web browser
Rational Rose 2000 Enterprise Edition	Build UML models

3.6.3 Input Specification

Input specification for this RFID base systematic attendance management system involved input from actor into system. Student that wearing RFID tag would be detected by RFID scanner and ID from tag would be sent to the system for process. This system would still have interface for access by administrator. Through this interface, the administrator can enter data related to the system such as student name, student faculty, address, course and other. Each student will have their own profile and the profile can be updated by the administration.

3.6.4 Output Specification

There are several outputs that will be accessible from this system. When RFID reader scans the matrix card, this system will display attendance record for the student. When lecturer log in to this system, they can know all their student attendance with percentage of attendance and this system will alert the lecturer which student who absent more than 10%. Therefore, the lecturer can take action for this student.

3.7 UMP Regulation of Attendance

The system developed was based on UMP regulation of attendance. The regulation states that:

Regulations on Students with less than 80% Attendance

1. Students who do not attend classes without any valid reason must be reminded or given warning letters by the subject lecturer.

2. When the absence of a student is more than 20%, the Faculty that offers the subject can take the following actions:

- The student is not allowed to follow or continue any form of study (tutorial/practical/studio and so forth)
- The student is not allowed to sit for any upcoming assessment (quiz, test, examination and so forth)
- The student will be given zero (0) mark for that particular subject and he or she must repeat the subject.
- The faculty needs to inform of the action taken by writing to the student.

NOTE:

Any actions taken by the Faculty on the student need not be informed to the Senate.

3.7.1 Examination Regulation

In implementing the power granted under University of Malaysia Pahang (Examination), the Senate of UMP decides the following:

Conditions on Taking the Final Examination

- All registered and active students are required to sit for the final examination for all subjects set by the faculty, under the condition that the students have registered for the subjects and have fulfilled the Regulation for Students with less than 80% attendance.

According to the regulation above, maximum hours the student can absent for the lecture was calculated and shown in figure below:

For 2 credit hours:

2 hours meeting x 14 weeks = 28 hours

80% attendance to qualify for examination

28 x (80/100) = 22.4 hours

= 28 – 22.4

= 5.6 hours

Student can absent for 5 hours only

Percentage of absent: (5.6/28) x 100=20%

For 3 credit hours:

3 hours meeting x 14 weeks = 42 hours

80% attendance to qualify for examination

42 x (80/100) = 33.6 hours

= 42 – 33.6

= 8.4 hours

Student can absent for 8 hours only

Percentage of absent: (8.4/42) x 100 = 20%

This system was developed based on UMP regulation of attendance. This system will analyze attendance of the student according to percentage they absent.

3.8 Software Part

A software part containing modules was designed to read from a contactless tag (transponder) or write data to a contactless data carrier using the reader as the interface. Write and read operations involving a contactless data carrier was designed based on master-slave principle as shown in Figure 3.6. This system contains an application as the master while the reader acts as the slave and is only activated when write or read commands are received from the application master. The database is developed using MySQL which is integrated with the system and data communicator.

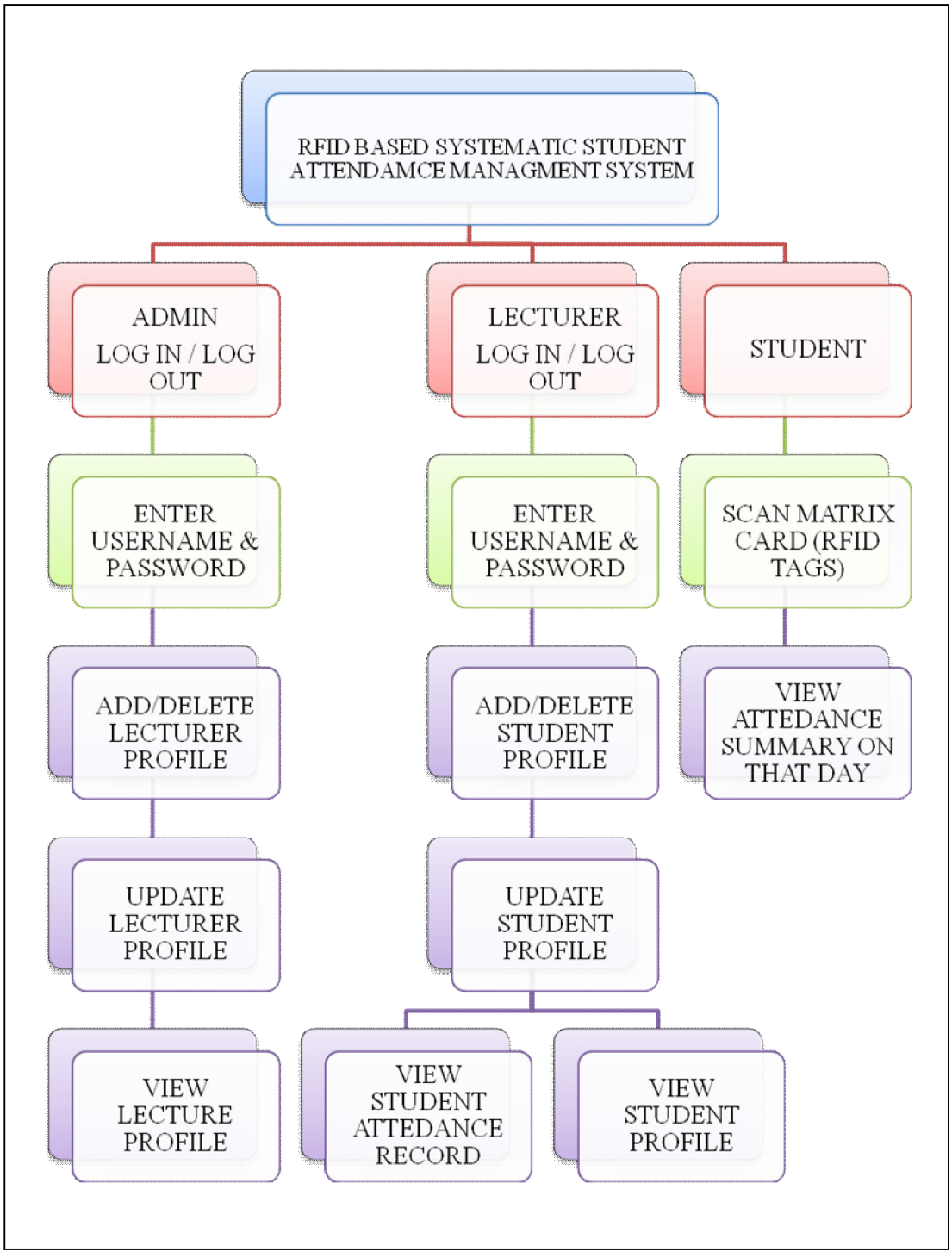

Figure 3.8: Module of the system

Figure 3.6 illustrates the modules involved in this system which are lecturer, administrator and student. The administrator only can add, delete and update lecture data and also can view the data while lecturer only can view the student profile and attendance record for every semester. Student only can view summary of their attendance on that day after scan their matrix card using RFID reader near their classes.

3.9 Use case system

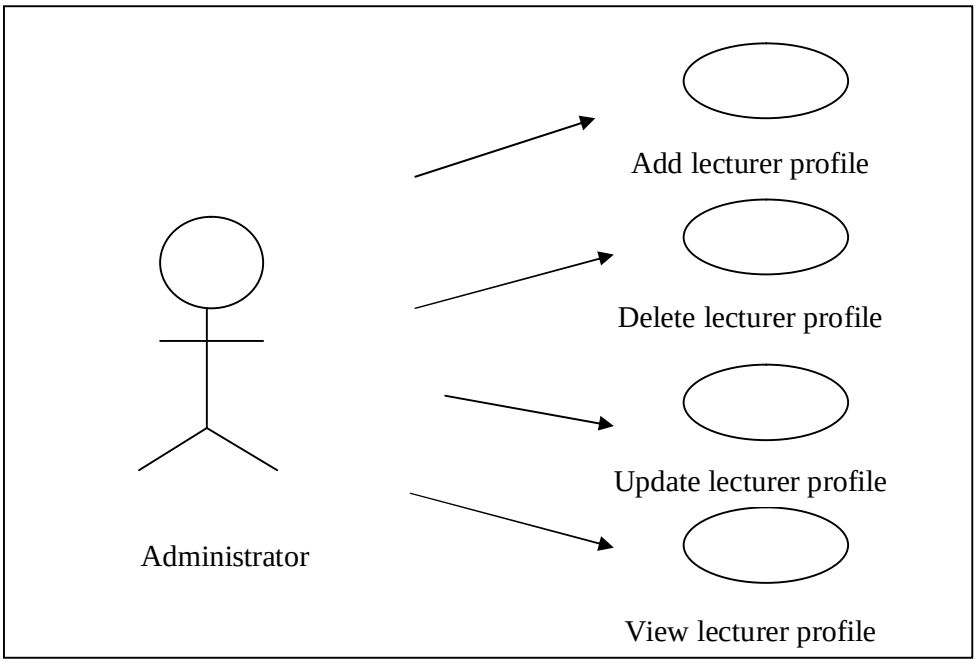

Figure 3.9: Use case diagram for the administrator

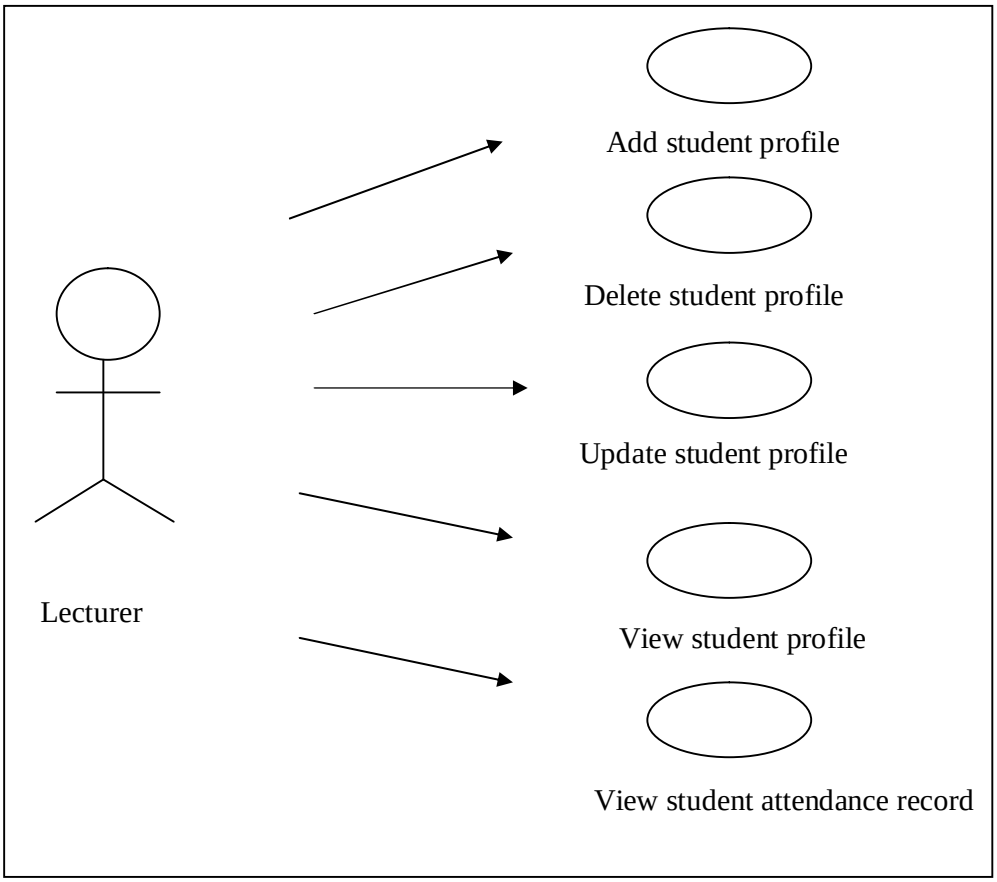

Figure 3.10: Use case diagram for the lecturer

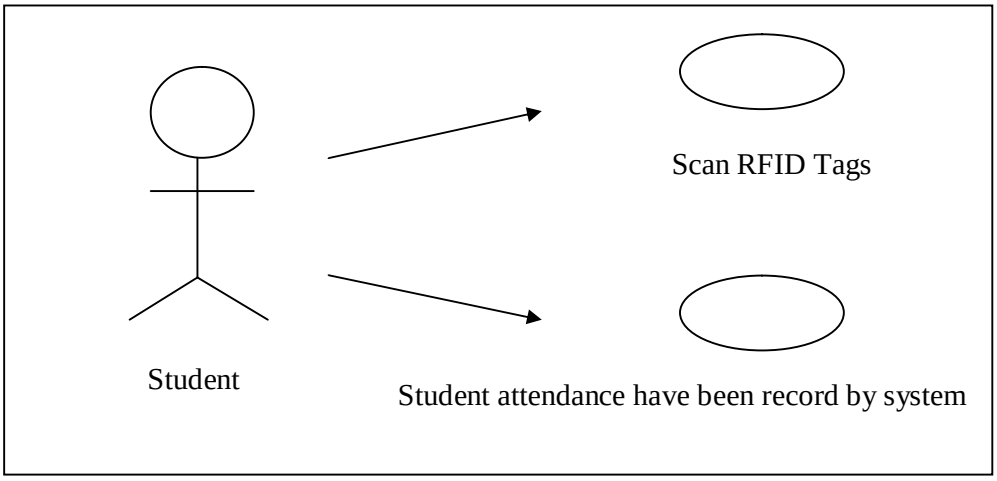

Figure 3.11: Use case diagram for the student

Figure 3.9, 3.10 and 3.11 was show the use case diagram for administrator, lecturer and students. The three figures show the relationship between administrator, lecturer and student with applications that has been developed. UML techniques was applied to describe the interaction between the class consists of process and the actors and the relationships between them. Students were the actors directly involved in the attendance system for this web-based. Through this function, student only have to scan their matrix card to record their attendance. The administrator can add, delete and update student data and also can view the data while lecturer only can view the student profile and attendance record for every semester.

3.10 Software Implementation

Implementation of this system was done by using three computer tools. My SQL was used to build the database that stores the student data. While Graphical User Interface (GUI) was created by using Macromedia Dreamweaver MX 2004 and NetBeans IDE 6.1.

3.10.1 Creating database using MySQL

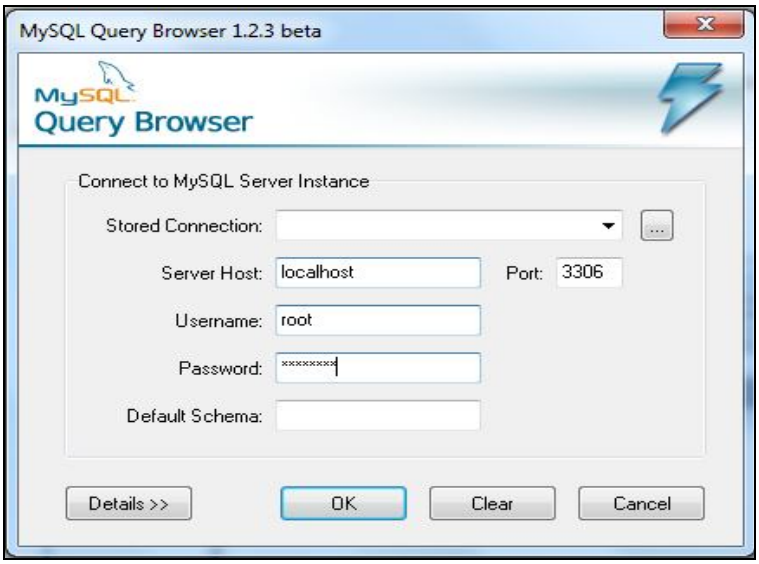

Figure 3.12: Mainframe of the MySQL Logon interface.

Compare to other Database tools like Microsoft access, MySQL required authentication session for development and it is mandatory for logon process. This is one of the security apply for system data integrity. Therefore, developer system needs to log in MySQL first, before proceed with the database construction. Figure 3.12 shows the Mainframe of the MySQL Logon interface.

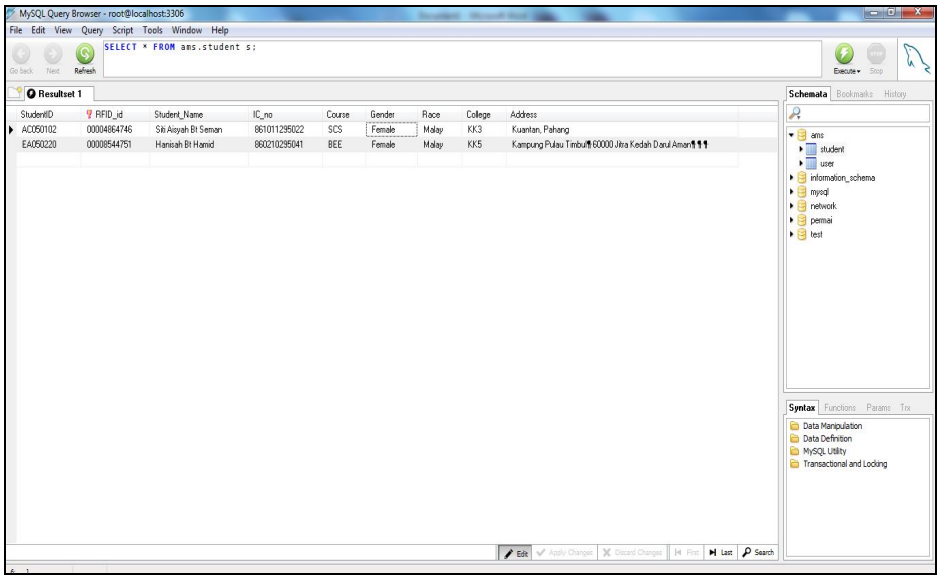

Figure 3.13: Mainframe of the MySQL

First of all, database that contains student database was created. Figure 3.13 shows the mainframe of the MySQL.

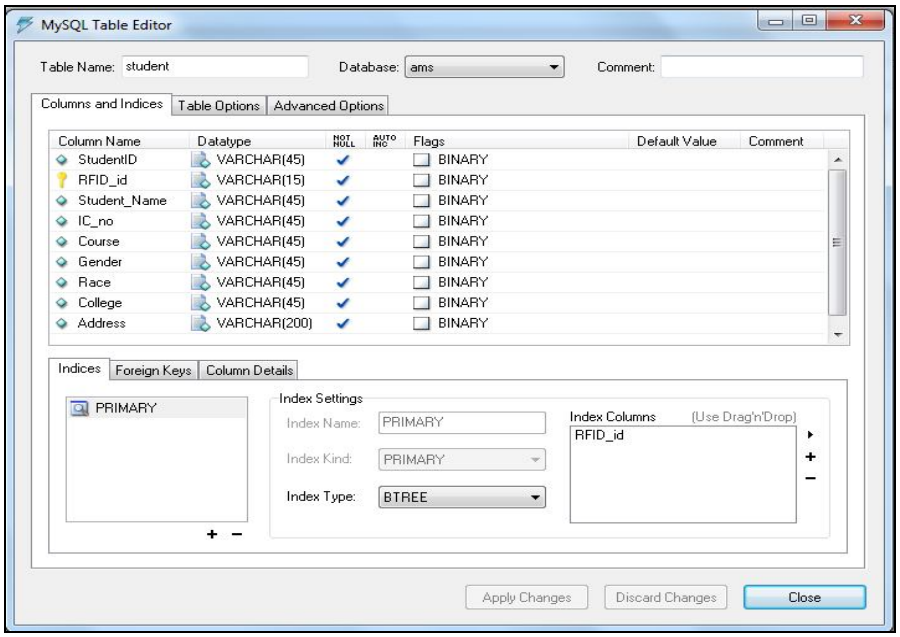

Figure 3.14: MySQL table editor

Figure 3.14 show table editor which list each column with their respective data type. Developer will determine which data type will be selected according to the system requirement.

StudentID	RFID_id	Student_Name	IC_no	Course	Gender	Race	College	Address
AC050102	00004864746	Siti Aisyah Bt Seman	861011295022	SCS	Female	Malay	KK3	Kuantan, Pahang
EA050220	00008544751	Hanisah Bt Hamid	860210295041	BEE	Female	Malay	KK5	Kampung Pulau Timbul, Kedah Darul Aman¶¶¶

Figure 3.15: Database created

Student database was created using the required specification. Figure 3.15 was shows the created database.

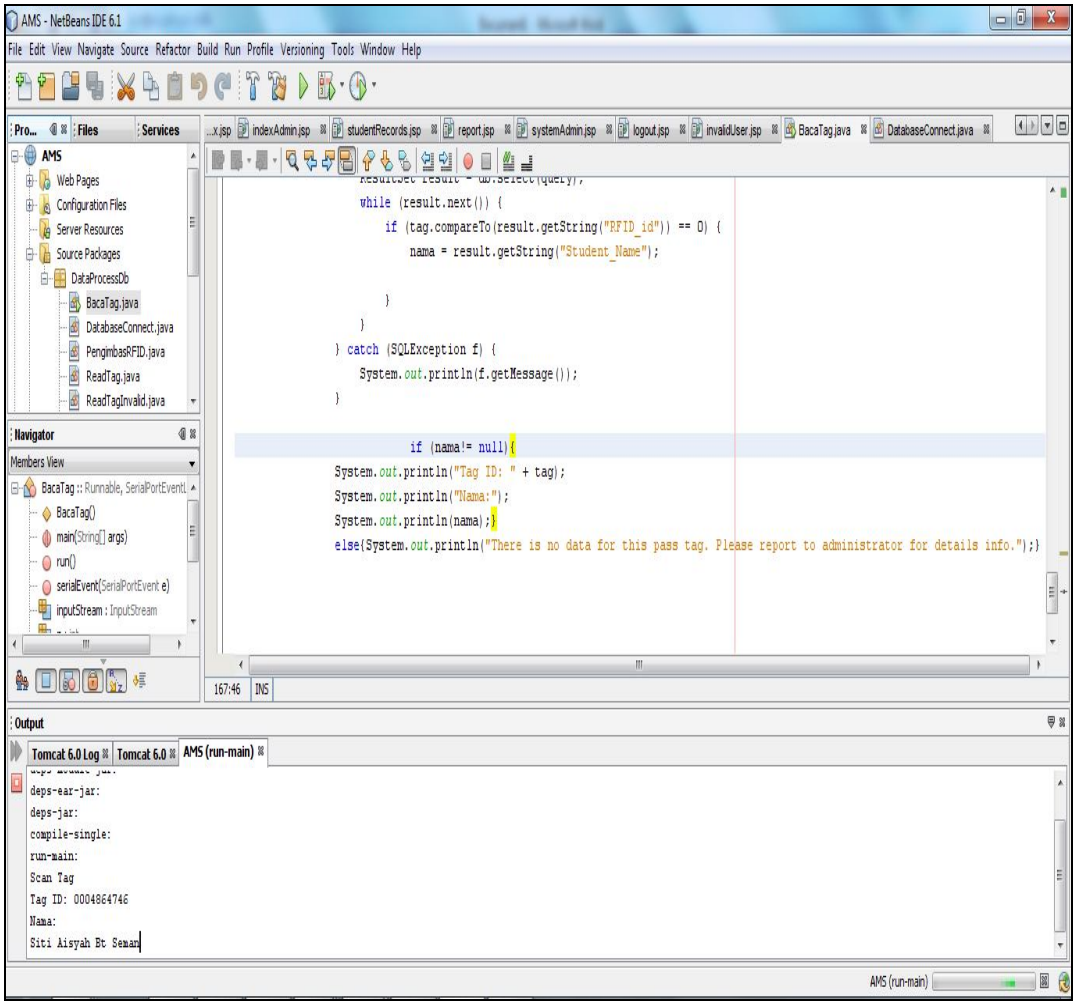

Figure 3.16: Check the RFID scan detection using Java programming

The figure 3.16 was shown the RFID scan was detected using Java programming language. This action was doing to check whether the connection between software and hardware were connected. For testing, the RFID scan will be display in Ide Netbeans 6.1 software. This action was doing for testing only but in the real system the data will display in the internet browser.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

By using this system, the attendance of students can be taken easily and quickly. Student only have to scan their matrix card through the RFID reader to fill their attendance which will be located inside the classroom. After that, their attendance will be recorded. This system will provide more convenience to the lecturers. Lecturers only need to log in on the web site and student attendance records will be displayed. With this system, lecturers do not have to analyze the student attendance manually and it will do automatically by the system.

4.2 Database

Database is the information involved in the RFID based systematic student's attendance management system. In this system development process, MySQL has been used to build database and tables involved. Data and information such as student table is attached in Appendix B.

4.3 System function

The "RFID Based Systematic Student Attendance Management System" is an application for this project's database server. This application maintains the attendance record against unique IDs assigned to RFID card holders and also provides facility to add or edit the user profile specified in Log in Menu.

4.4 RFID Based Systematic Student Attendance Management System Main Features

- This system will continuously read data which is provided by the RFID reader.
- It maintains the attendance in database made on MySQL.
- It maintains profiles against unique Ids. The profile has various fields such as:
    - Name, ID number, Address, Gender, Race, and information about the student.
- It maintains the daily record of attendance
- It provides option of search profiles by sorting the student name or sorting the information about the student such ID number, Email and information that was enter by lecturer.

4.5 System Log in Menu

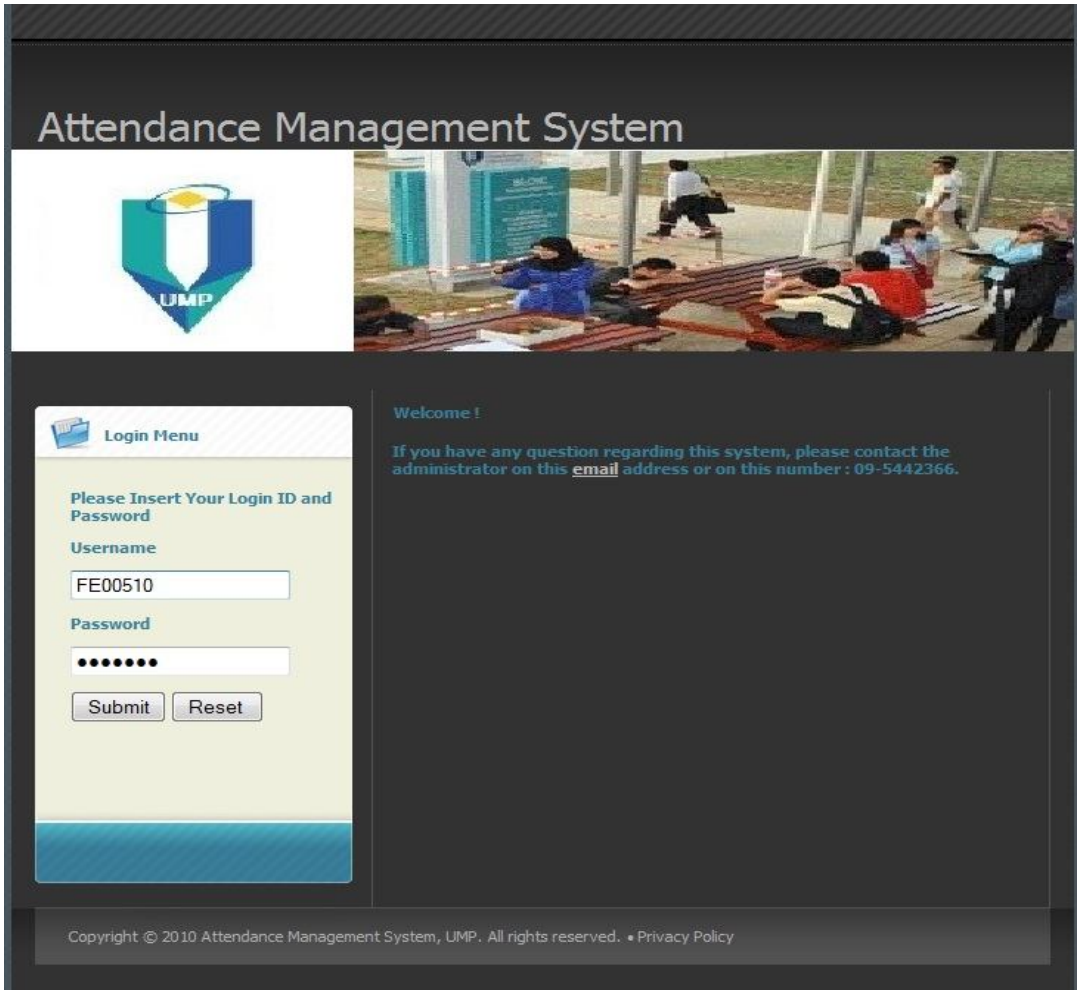

Figure 4.1: Interface log in menu for user

The figure 4.1 was shown log in menu for user during use this system. For admin, when they log in into this system they can add, delete and update lecturer profile and also view the lecturer profile. When lecturer log in into this system, they can add, delete and update student information for their class. They also can view student information and attendance record for one semester.

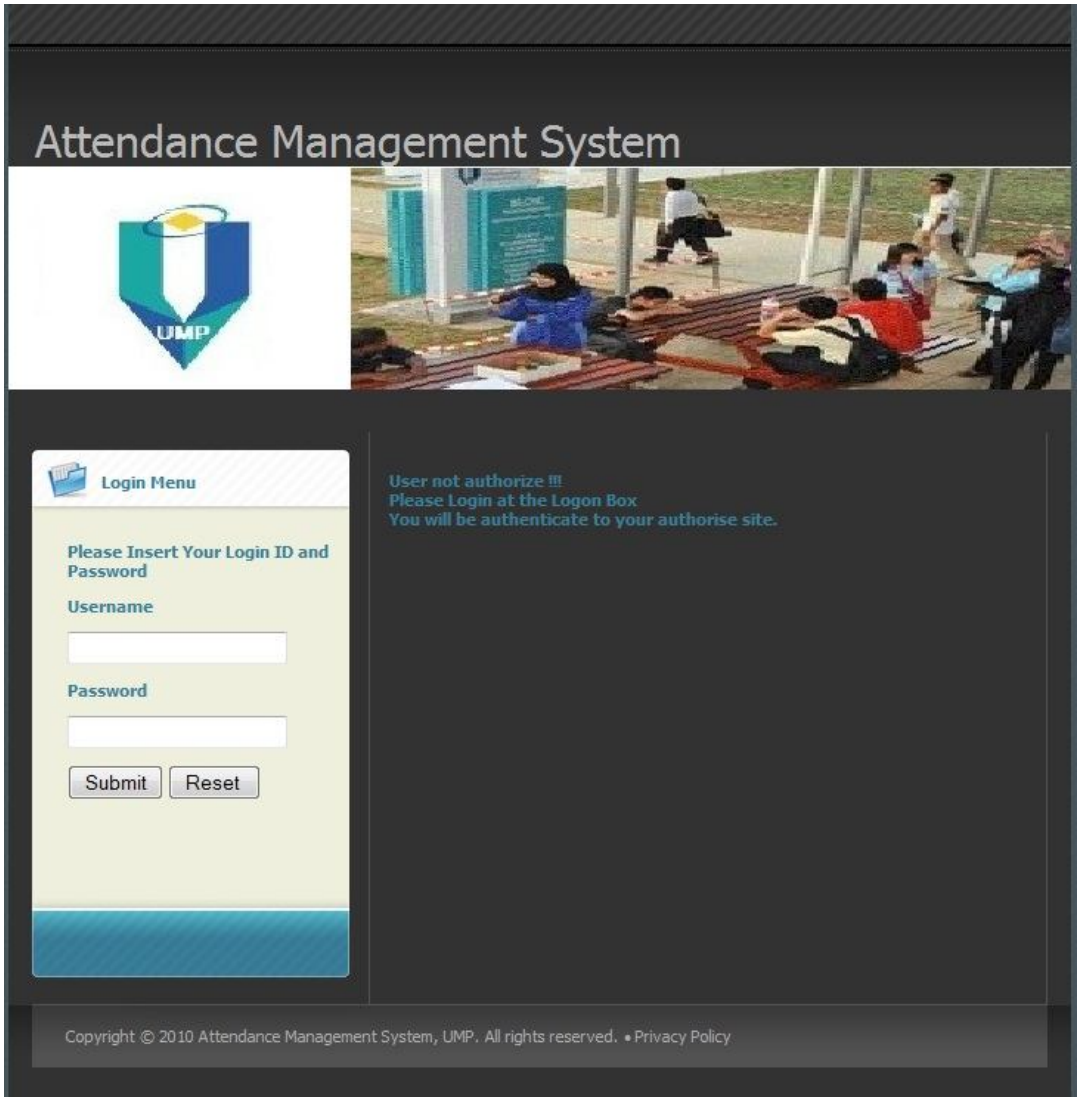

Figure 4.2: Log in blocked

This system will be used mainly by the lecturers to manage the attendance of the students. Therefore for the security reason, the login form blocked as shown in figure 4.2 was created. If the password or username incorrect, the system cannot be access and the message will be display to user. This can prevent the data from messed by the students.

4.6 Working of System

This system has two modes of operation that are admin and lecture mode.

4.6.1 Administrator Mode

The administrator mode was use by admin to manage the lecturer profile. By using this mode, admin can easily add, delete and update the lecturer profile. This menu was displayed total user that can access to this system at the right side. For this system currently total users are three including two lecturers and one admin. The figure 4.3 shows the interface menu for administrator.

Figure 4.3: Interface menu for administrator

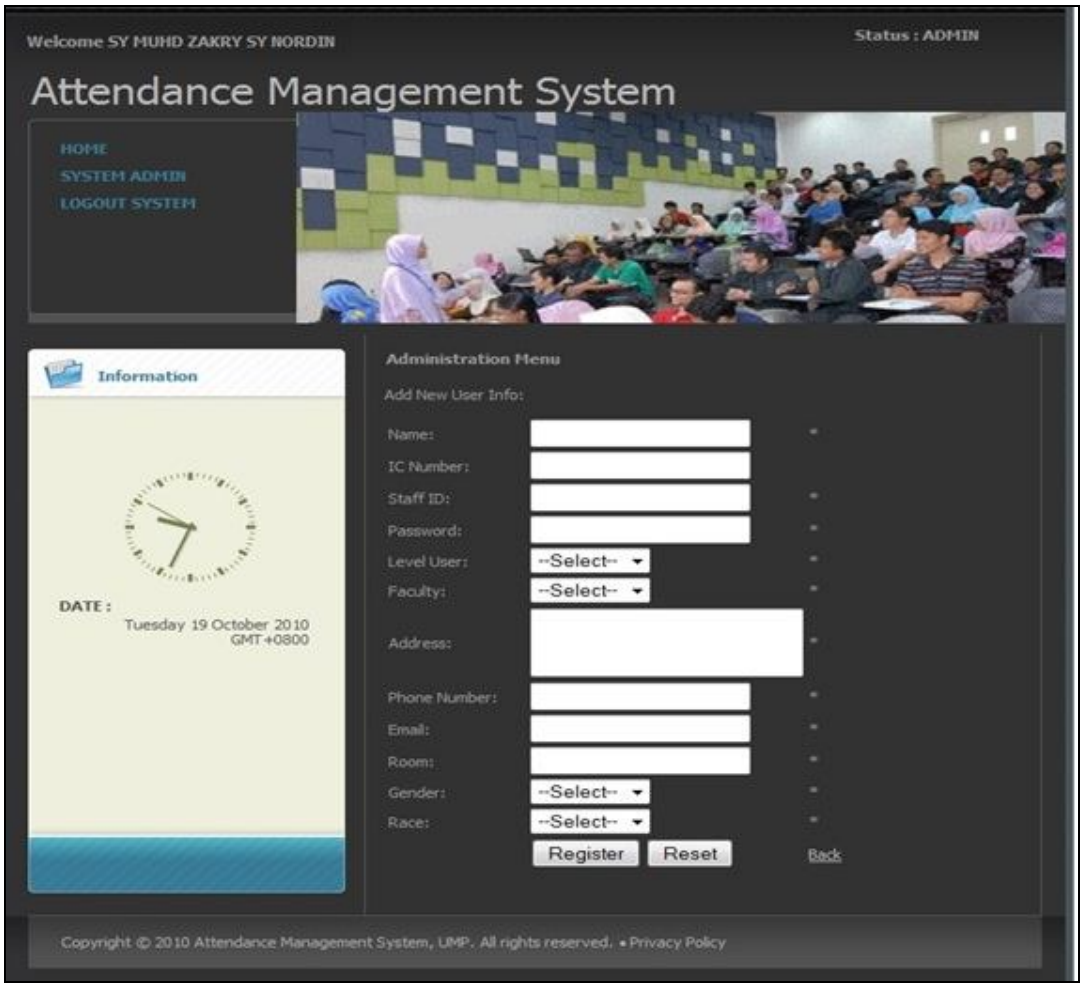

Figure 4.4: Interface to add new lecturer

The figure 4.4 shows the interface to add new lecturer by admin. The admin have to enter the data such us name, IC number, Staff ID and other information to create the user profile. If the data not fully entered, the user profile cannot be created. The user for this system including lecturer and admin. Admin for this system can be more than one.

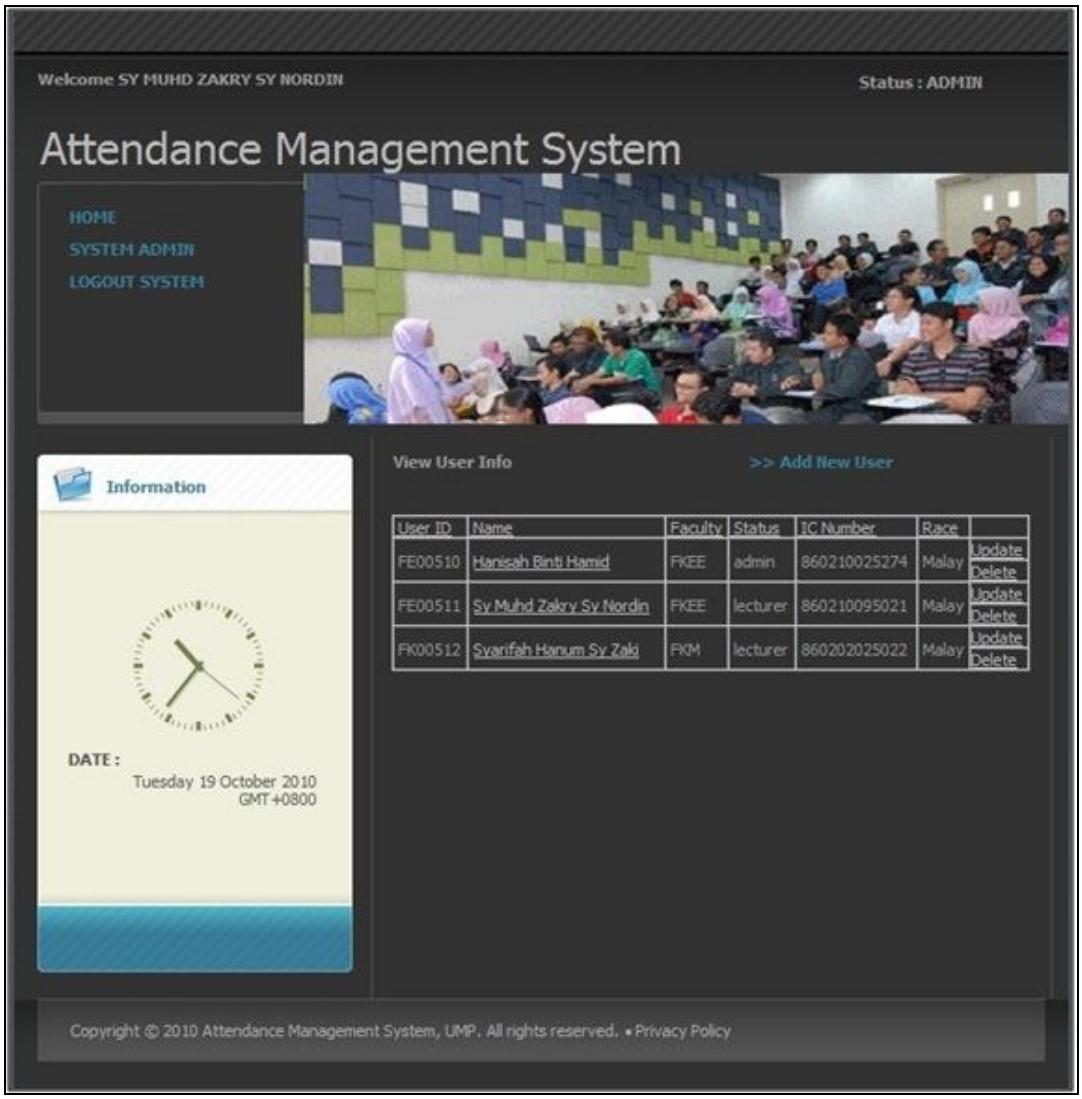

Figure 4.5: The new user was created

The figure above shows the new user was created by admin. This menu will display the information about the user and the data can be delete and update by the main admin if have any correction. After the lecturer data was created, the lecturer can use this system to manage their student attendance record.

4.6.2 Lecturer mode

This mode was provided to lecturer to view their student's attendance list per week, per month and per semester. By using this system, lecturer can manage their student attendance automatically and easily.

4.6.2.1 Main Menu for Lecturer

Figure 4.6: Main menu for lecturer

This is the first window will appear after the lecturer log in for this system. This interface was displayed menu student profile, attendance records, view their profile, total student and attendance alert record to alert lecturer about the percentage student absent for their class. This menu will be used by lecturer to manage their student attendance easily.

4.6.2.2 Add New Student

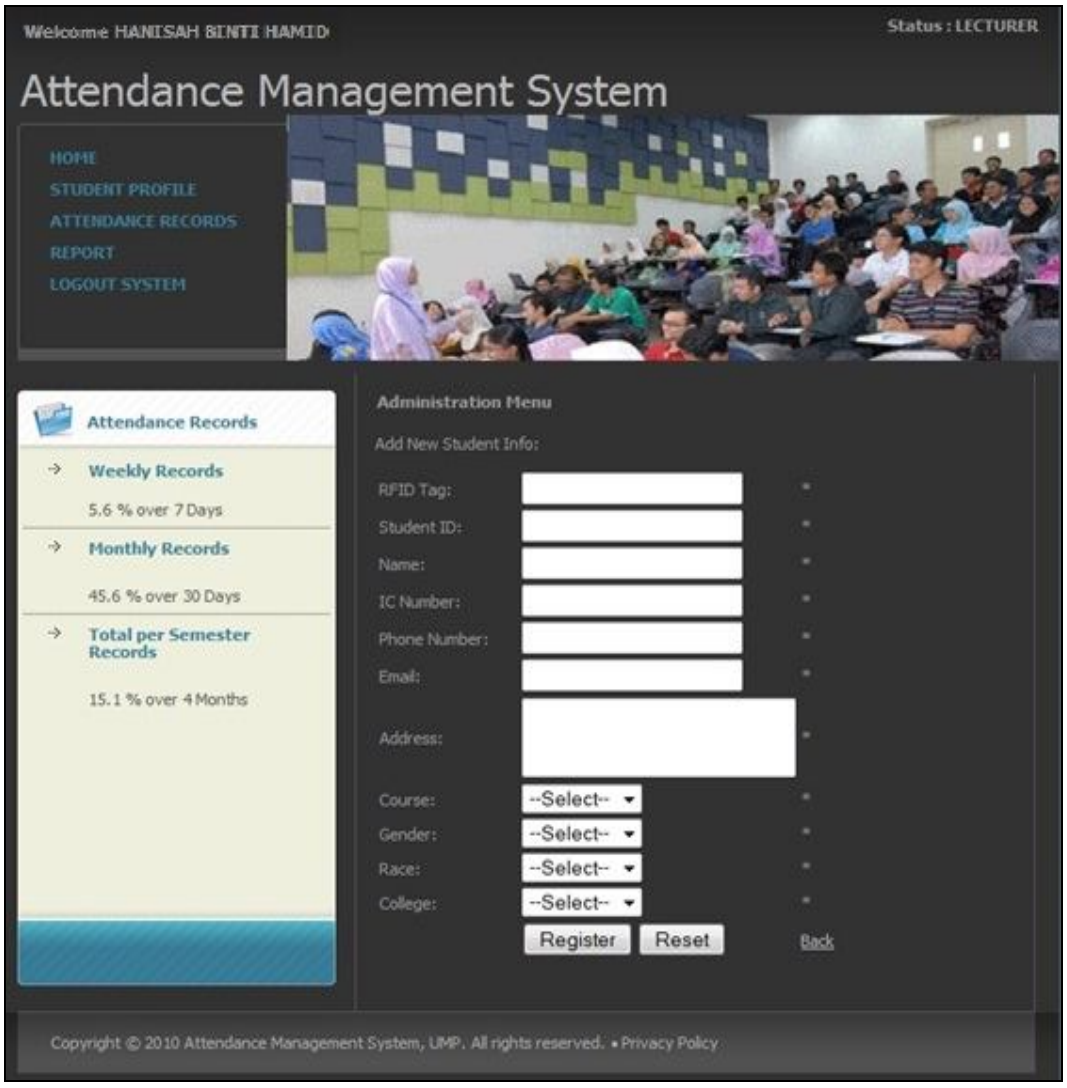

Figure 4.7: Interface to add new students

Figure 4.7 shows the interface to add new student data. There are possibilities some student wish to enroll for certain course when the semester started. Therefore this function can be used to add new student information and it will update in the database. Lecturers have to scan their student matrix card and insert the necessary information.

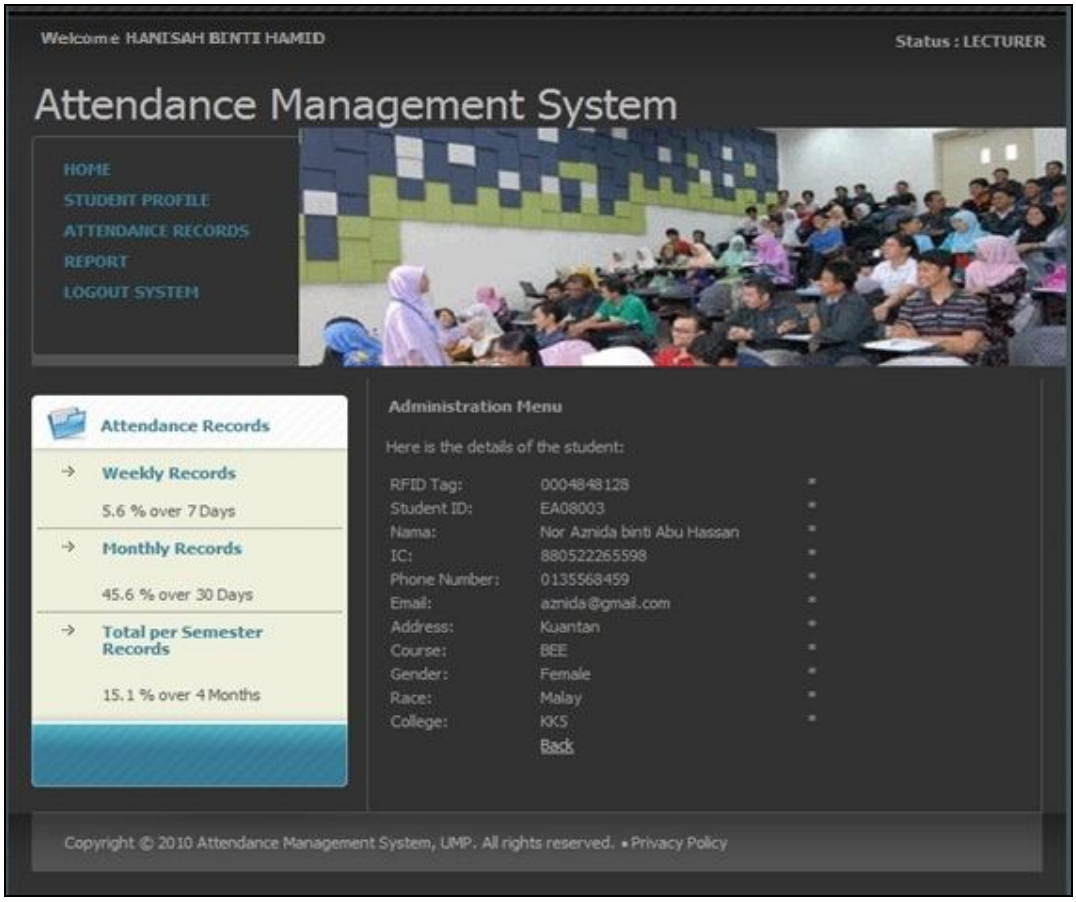

Figure 4.8: View student profile

Lecturer can view the student profile after entering the data of the student. This function can help lecturer easily to contact their student if have any problem because the data provide information of the student such us phone number, email and address.

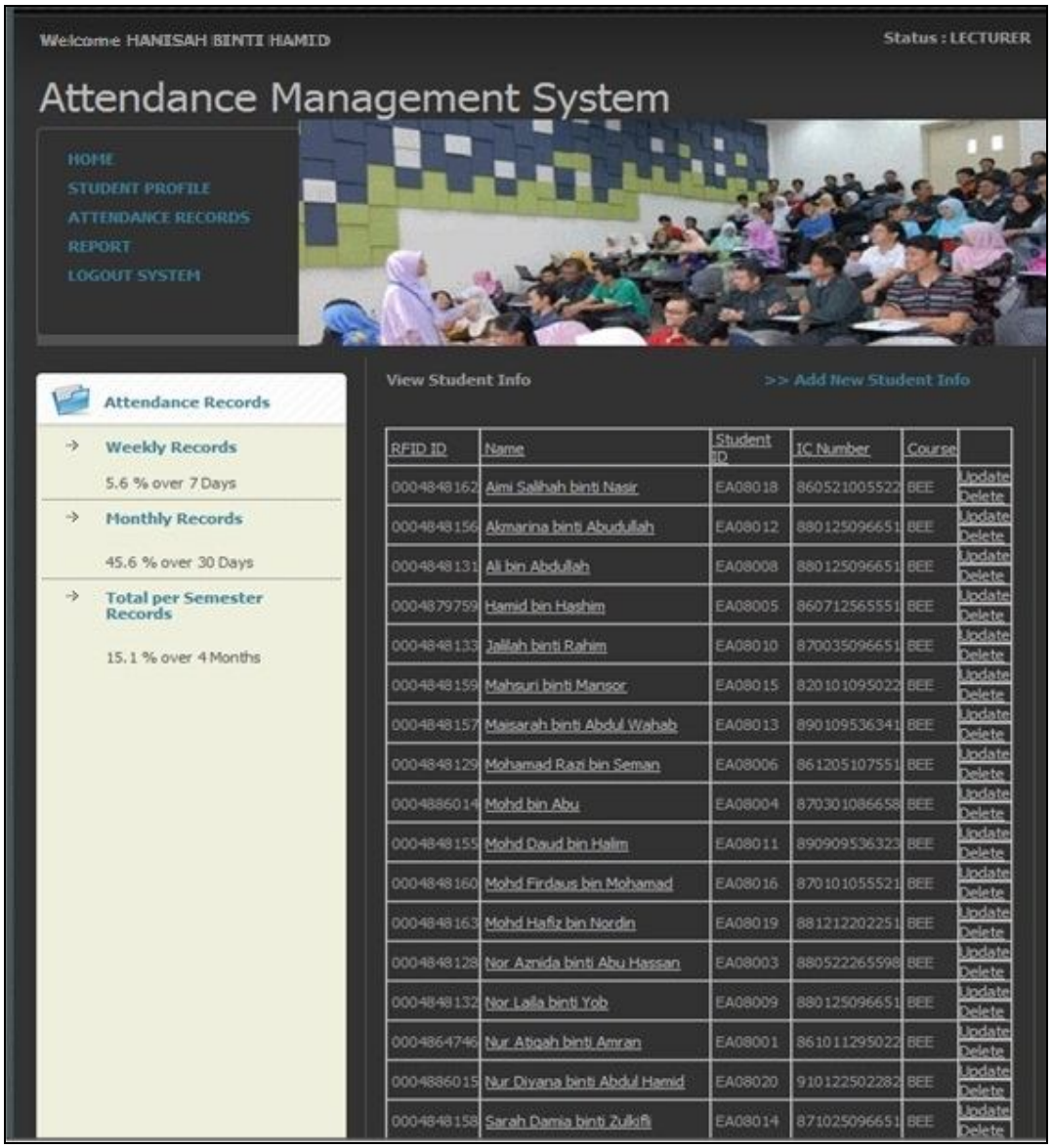

Figure 4.9: Sorting student profile by name

The figure 4.9 shows the sorting student profile by name. This can help lecturer to search student name easily. The lecturers also can sort by RFID tags number, student ID number, IC number and course depend on data that was entered by lecturer during register the student name. This function make easily to lecturer to manage the student data.

4.6.2.3 Delete Student

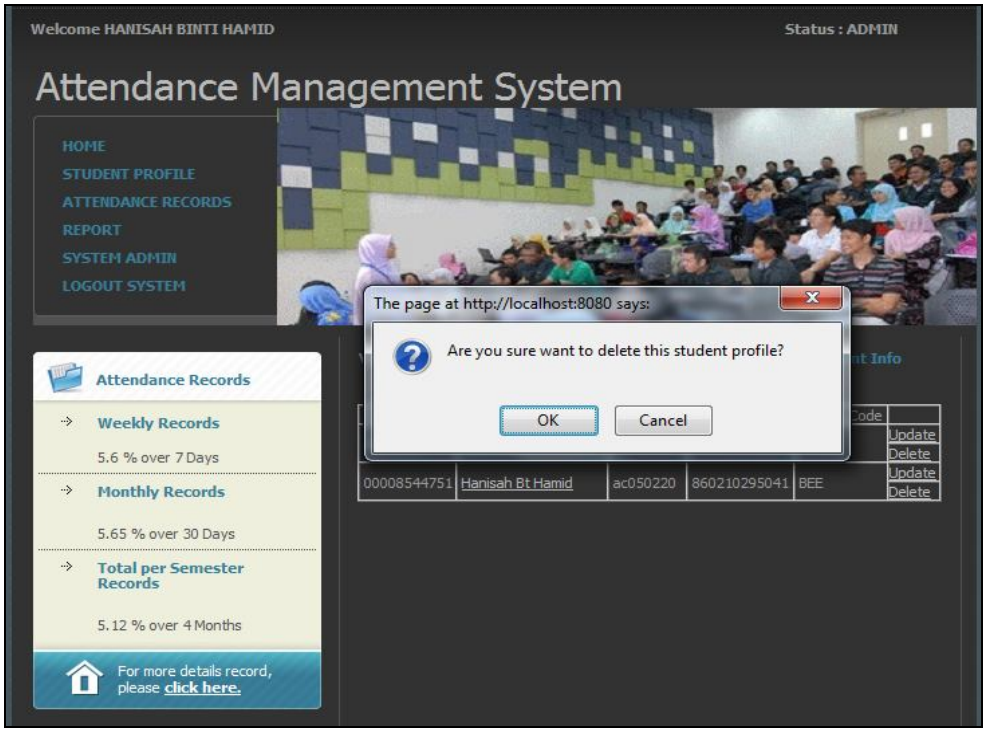

Figure 4.10: Interface to delete student

Figure 4.10 shows the interface to delete student data. This system can delete if any students want to withdraw their subject by lecturer. For security, the message 'Are you sure want to delete this student profile' will appear after the lecturer click the button delete. The lecturer will click ok if they sure want to delete the student profile and clicks cancel if not sure to cancel the student profile. This menu provides option for lecturer so that the lecturer can take action carefully.

4.6.2.4 Student Attedance Record

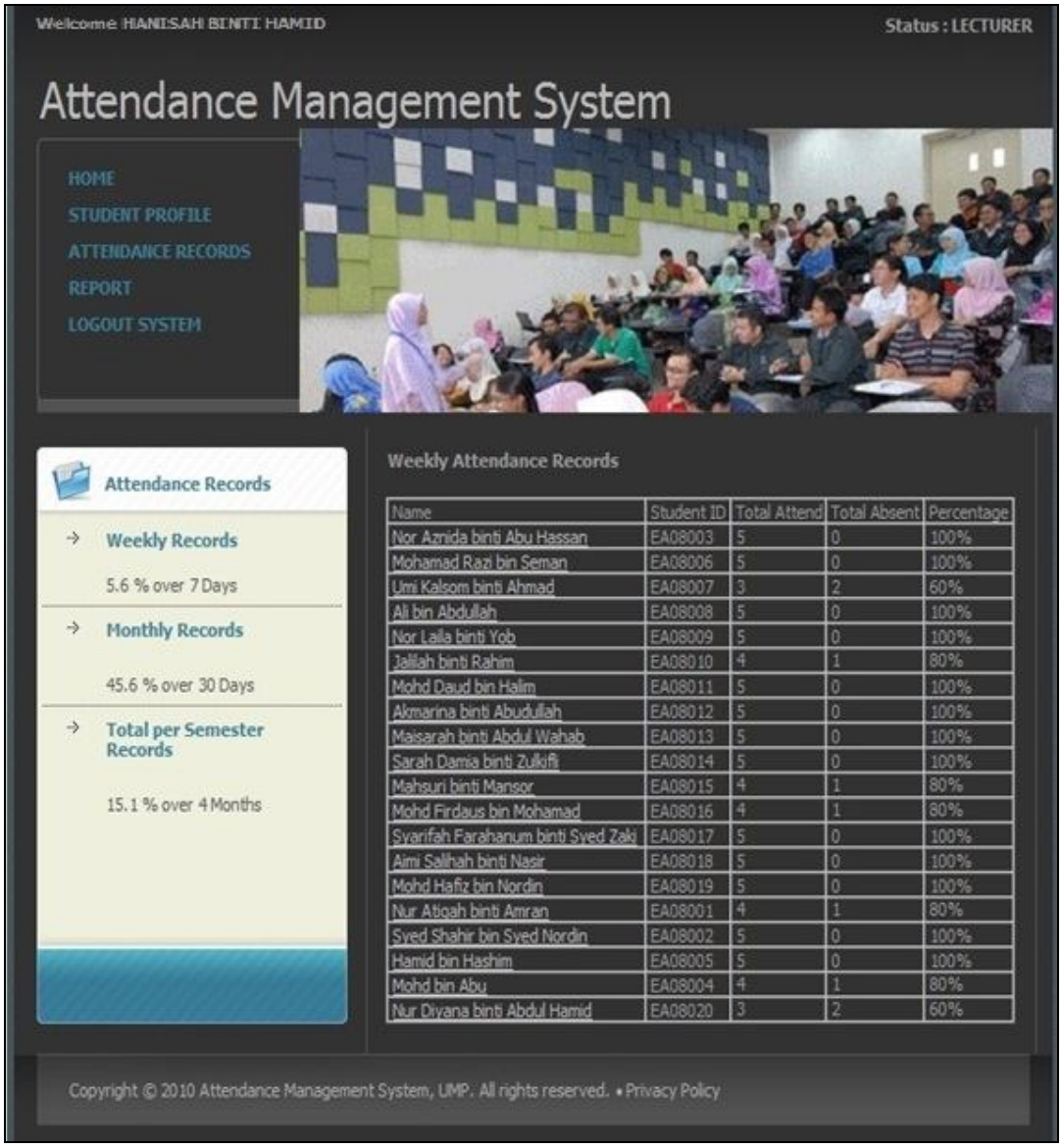

Figure 4.11: Weekly attendance student's record.

The figure 4.10 shows weekly attendance student's record for register students. This attendance record was calculated according to total of attend over total of absent for weekly student's attendance percentages. The lecturer can view their student's attendance record by sorting name or ID number in this page.

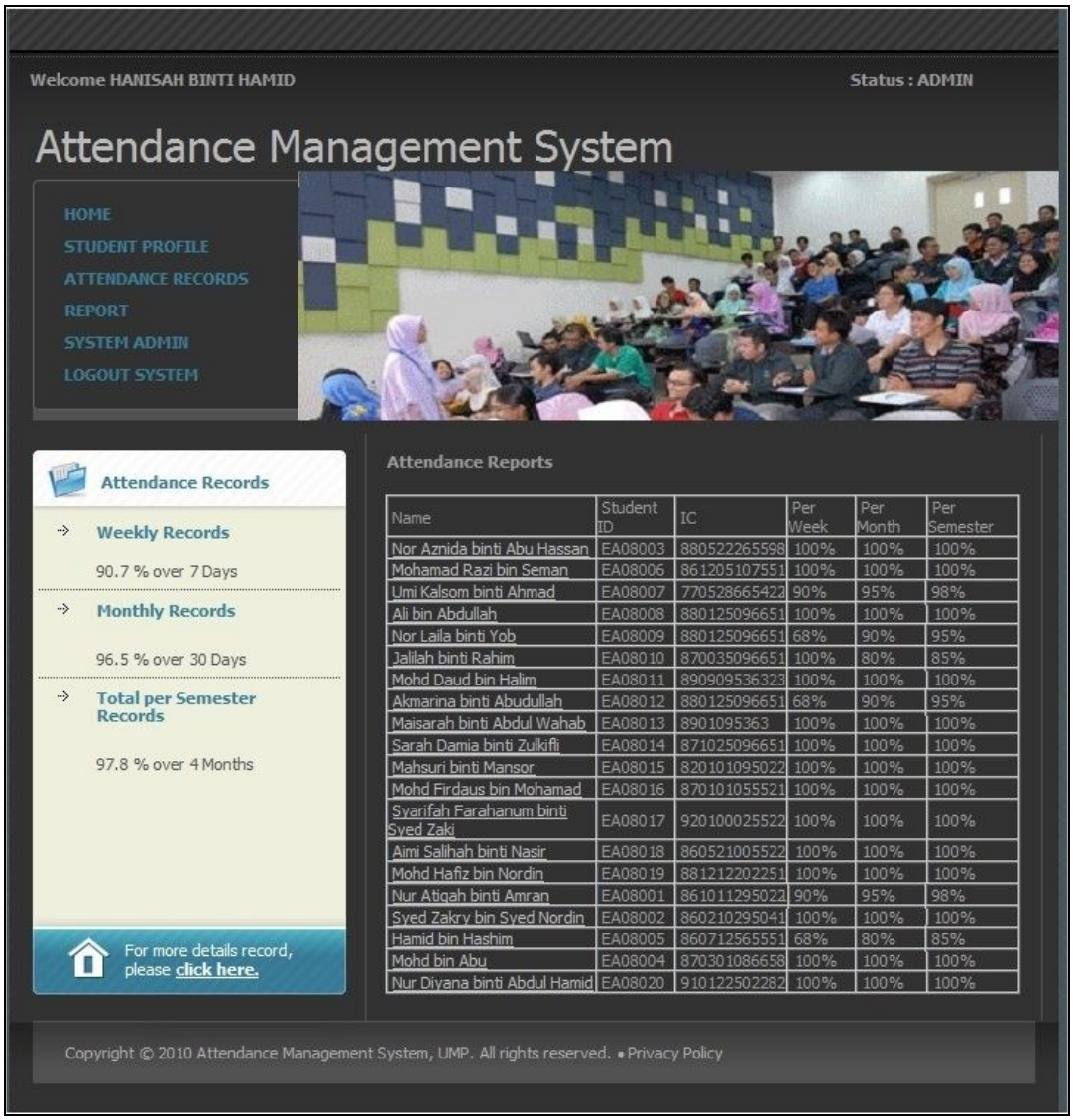

Figure 4.12: Student attendance record

The overall percentage attendance record will be display on the report page. Figure 4.12 show overall student attendance record for one semester. The details of the report are per weekly, per monthly and total attendance for one semester.

4.6.2.5 Attendance Alert

Figure 4.13: Attendance record alert

The figure 4.13 was show the attendance record alert. This system will alert lecturer if any percentage of student was reached to 10%, 15% and 20% absent for their class. If the student was absent 10 %, the system will display the list of student name at the first table. This will notify the lecturer to take appropriate action to alert the student. If the student was absent 15%, the system will display the list of student name at the second table and also generate the warning letter so that the lecturer can take action to give the warning letter through email or directly give to the student during the class lesson. For 20% absent, the list of student name will display at the third table and the delete button was appearing at the side of the student name. The lecture can click the delete button to delete the student name but before that, they can make sure the student was absent with reason or without reason.

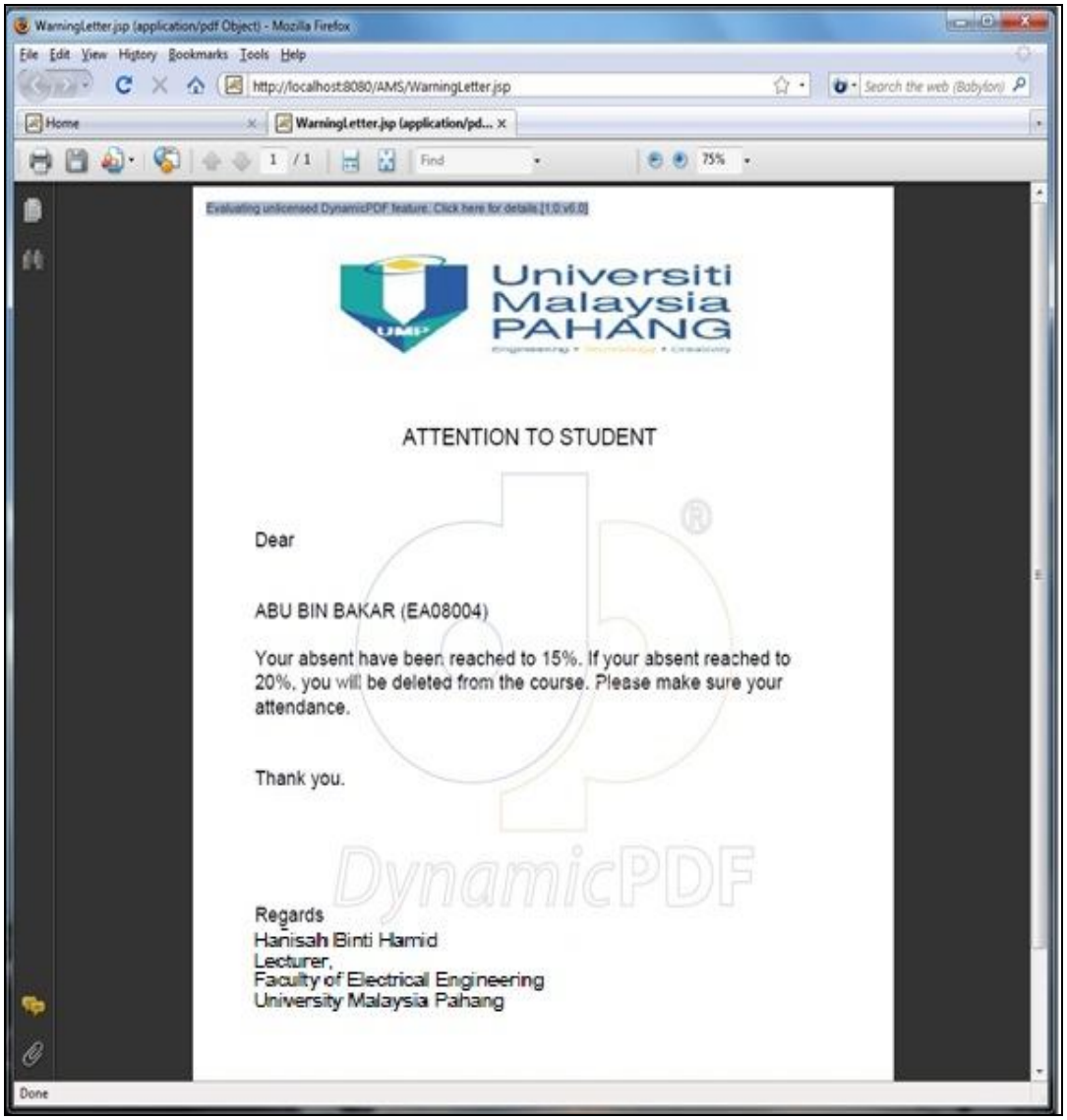

Figure 4.14: Warning letter to student

Figure 4.14 shows the system creates the warning letter that has been sent to student named ‘Abu bin Bakar’ because her absent was reached to 15%. Lecturers can either send manually to student or through their email. The warning letter was the last action that will be taking to the student. If the student still hesitates to come to the class, lecturer can delete the student name from the course because the attendance for the student is not reach 80% according to UMP academic regulation.

4.7 System Log Out

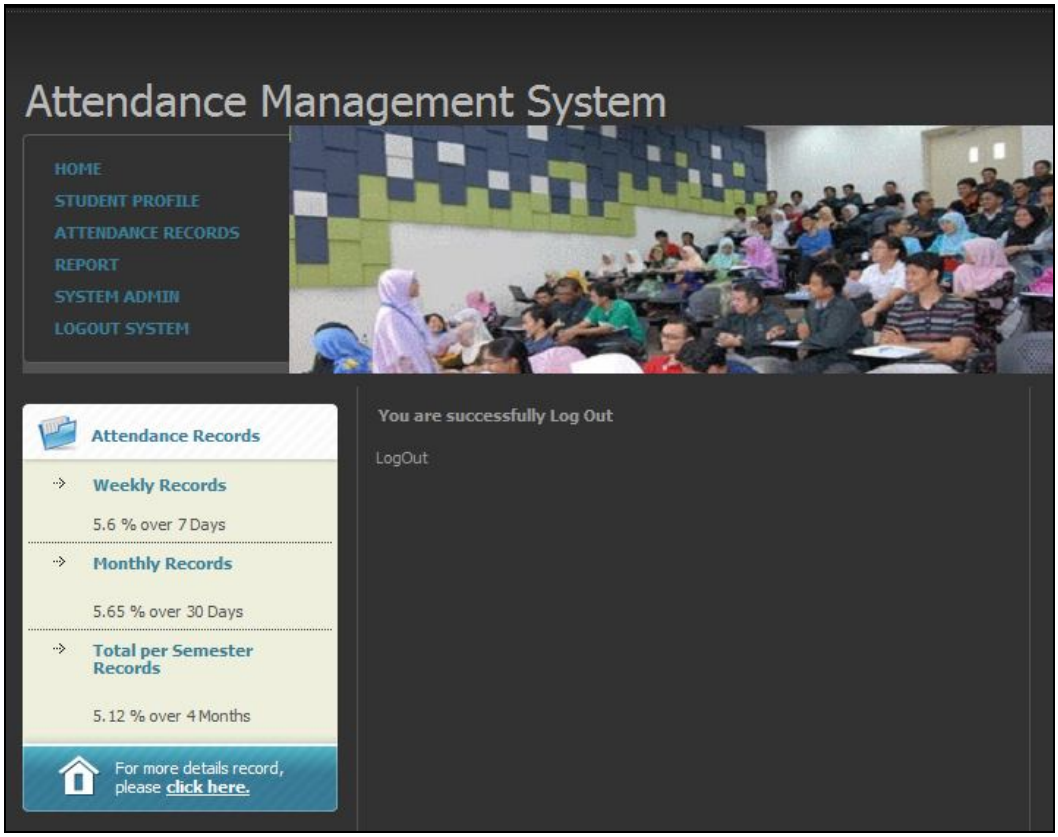

Figure 4.15: Interface Log out Menu

Figure 4.15 shows the interface log out menu. When user successfully log out from this system, the system will redirect user to log on page in 5 seconds. This is last step after finishing using this system by lecturer or admin.

4.8 Attendance Scanning

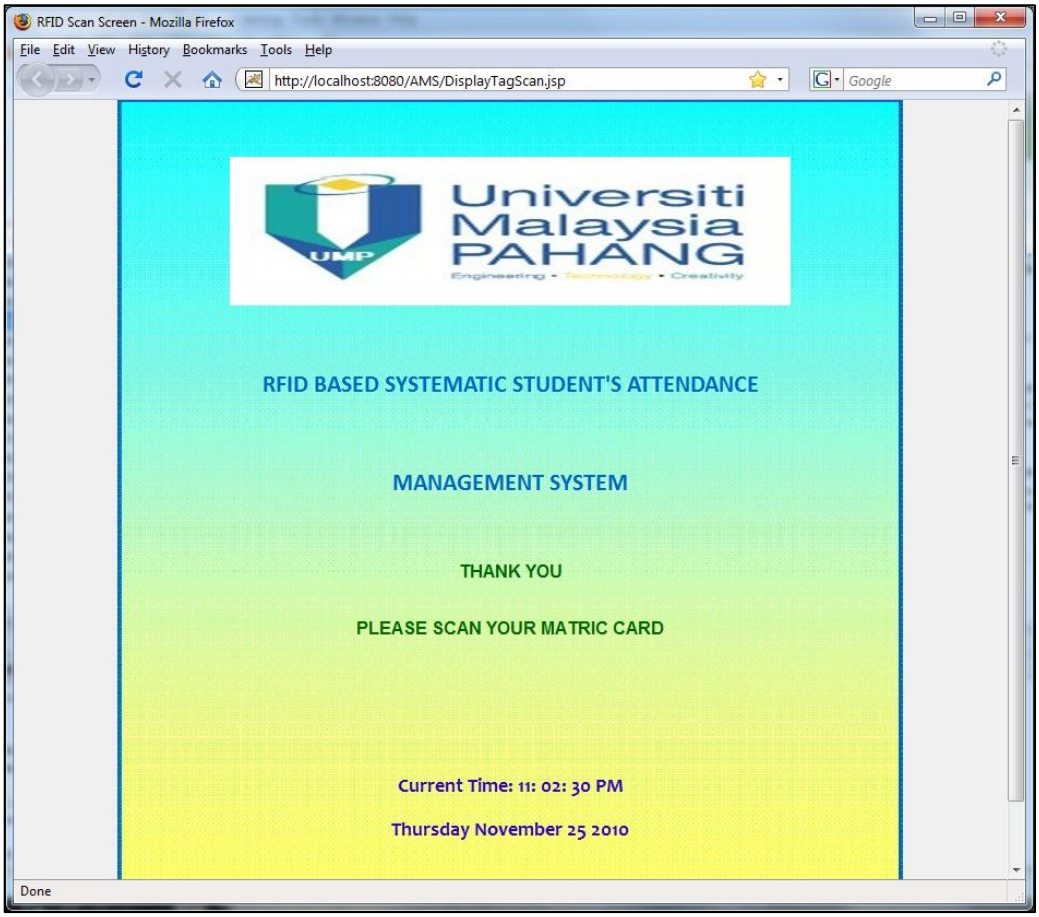

Figure 4.16: The form displayed after student scanning their matrix card

This message will display after the student scan their matrix card. RFID tags cannot be detected if the student data is not match with the database record. The message "No data within our records, please report to lecturer responsible if you are registered in this class" will be display for unmatched data. If the database was matched, the message will be display ‘Your attendances have been recorded’. This form was display date and time during the scanning of the matrix card.

4.9 Discussion

The conventional method of taking attendance by calling names or signing on paper is very time consuming and insecure, hence inefficient. Radio Frequency Identification (RFID) based systematic student's attendance management system is one of the solutions to address this problem. This system can be used to take attendance for student in school, college, and university. It also can be used to take attendance for workers in working places. Its ability to uniquely identify each person based on their RFID tag type of ID card make the process of taking the attendance easier, faster and secure as compared to conventional method. Students or workers only need to place their ID card on the reader and their attendance will be taken immediately.

The advantage of the system over other similar product available is very vital and can usually affect the consumer decision in choosing a product. The system developed in this project also has some advantages over other similar market products. It is cheaper compare to those systems current in the market. This system was used open source software to develop it. Open source software is free software and user can use it without buying license and it will reduce cost development process.

This attendance management system is a simple technology that provides an easy way for student in taking attendance. Student did not have to sign the attendance sheet during class lecture. This system also gives the benefit to the lecturer. The lecturer can manage and do not have to analyze the data by themselves. The system will do all the managing part automatically. This system is easy to manage and also user friendly. Lecturers do not have to study deeply in order to understand the system because it is simple. Security also provided by this system as it cannot be disturbed by students. This system also can be enhanced by many factors to make it more useful to lecturer. For example, each time the student enters the lecture, it can trace the student that are late to class.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

RFID based Systematic Student Attendance Management System (RBSSAMS) has been developed using JSP and Java programming languages. The database support for this software is using MySQL and the software to develop this system using NetBeans IDE 6.1. All software that use for developing this system are open source and it can reduce cost during development process. In order to have complete system functionality, this system was needed to integrate with RFID database handling system. This will fetch the appropriate information data such as reader ID from RFID database in order to execute the attendance taking process. Furthermore, RBSSAMS also can increase the percentages of student's attendance by alert the lecturer about the absences of student more than 20% via the web site when they log in. RBSSAMS can be deployed in Apache Tomcat Server or Internet Information Server and viewed by the user using today's internet browsers such as Internet Explorer or Firefox.

In this developing country, various use of RFID already being implemented. This project can be considered as small part of the RFID application that can be used to take attendance in more convenient method. Even though there are lot of attendance taking system that can also provides great security such as eye detection attendance, and thumbprint type attendance, this software still can be used in small institutes, laboratory, schools, and other related places. As the conclusion, this project fulfilled the objectives and hopefully it will be used by the lecturers in coming days.

5.2 Recommendation

Future improvement and enhancement can be carried out on various areas to improve the Student Attendance Management System. Better designed database, query and integration among the pages could be improving the efficiency of the system. In future, a technique has been to develop using information visualization to graphically render complex, multidimensional student attendance data. So far, this system only can alert lecturer about the student attendance below percentage of attendance should be when they log in to the system. For recommendation, it able to send e-mails to lecturers a list of students who have not enough percentage of attendance (less than 80%). If possible, the e-mail should be sent directly to the students. In future, the system should be able to notify them through SMS as almost 99% students have a hand phone to stay communicated.

This system also should be able to operate fully automatic. It means that lecturers do not have to touch the equipment such as mouse and keyboard. They just have to initiate the software, and do not have to worry about it. After close the software, they only have to see which action was to be taken. This software also can be connected to other flash device that stores data, and data taken from the storage device, not directly from the RFID Tag. This will make the attendance taking lot more easy, and the software developed can be used even when lecturer at their house.

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APPENDIX A

GANTT CHART PSM 1

PSM 1																
Month		JAN 10				FEB 10				MAR 10				APR 10			
	Project Activity/Week	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16
1.0	PSM 1 Briefing Session																
2.0	a. Find Supervisor and Project title a. Register title and submit abstract																
3.0	Literature Review a. Constructing research RFID b. Selecting suitable components c. Preparing a budget for the project																
4.0	Software Design a. Selecting the best software to be use b. Understanding the software																
5.0	Submit abstract and presentation slide																
6.0	PSM 1 Seminar a. Presentation the project proposal to Panel																
7.0	Project data management a. Preparing project proposal b. Logbook update																
8.0	Submit project proposal and log book																

GANTT CHART PSM 2

PSM 2																				
Month		JULY 10				AUGUST 10				SEPT 10				OCT 10				NOV 10			
Project Activity/Week		W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20
1.0	Literature Review a. Constructing research RFID b. Collecting information about project on thesis c. Preparing detail about project on thesis																				
2.0	Hardware a. Purchasing the component (RFID) b. Understanding the speciation c. Constructing connection follow the manual guide																				
3.0	Submit draft 1																				
4.0	Software Design a. Selecting the best software to be use b. Understanding the software c. Writing programs for the system																				
5.0	Submit draft 2																				
6.0	Project data management a. Preparing thesis and logbook update b. Submit final draft																				
7.0	Submit abstract and presentation slide																				
8.0	PSM 2 Seminar and demo a. Presentation the project to Panel																				
9.0	Submit thesis for binding																				

APPENDIX B

DATABASE TABLE

Student Table

Attribute	Data Type	Size	Description
Student ID	varchar	14	Example : EA08018
Student_Name	varchar	35	Example : Hanisah binti Hamid
IC_no	int	12	Example : 861201095021
Phone number	int	12	Example : 013var7906153
Email	varchar	14	Example: honey_hanis2000@yahoo.com
Address	varchar	14	No.14, Kg Pulau Timbul, Mukim Jeram, 06000 Jitra, Kedah.
Course	varchar	14	Course Code Example: BEE
Gender	varchar	14	Gender Example : Female/Male
Race	varchar	14	Example : Malay/Chinese/ India
College	varchar	14	Example : KK1/KK2/KK3/KK4/KK5

RFID Table

Attribute	Data Type	Size	Description
RFID_ID	varchar	14	**Primary Key** – RFID ID Example : 100025a2e
Student_ID	varchar	14	Student Name Example1 : Hanisah binti Hamid

User Table.

Attribute	**Data Type**	**Size**	**Description**
User Name	varchar	35	Lecturer / admin name Example : Mohd. Hisyam Mohd Ariff
IC number	varchar	14	Example : 760918-05-5432
Staff ID	varchar	14	**Primary Key** – Lecturer ID Example : ST12345
Password	Varchar	14	Password for system: Example : FKEE 123
Level User	Varchar	14	Example : Admin / Lecturer
Faculty	varchar	14	Faculty Code Example : FKEE
Address	varchar	14	Example: Kuantan, Pahang
Phone number	varchar	14	Example : 012-5347398
Email	varchar	14	Example : hisyam@ump.edu.my
Room	varchar	1	Example : A1-602
Gender	varchar	14	Gender Example : Male/ Female
Race	varchar	14	Example : Malay/Chinese/ Indian

Records Table

Attribute	**Data Type**	**Size**	**Description**
RecordID	Varchar	14	**Primary Key** – Record ID Example : tb1
StudentID	Varchar	14	Student ID Example : EA08018
SubjectID	varchar	14	Subject ID Example :
TotalWeekly	int	13	Total Count by Weekly for Attendance records. Example : 4
TotalMonthly	int	13	Total Count by Monthly for Attendance records. Example : 16
Total semester	int	13	Total Count for Attendance records. Example : 46

APPENDIX C

SOURCE CODE FOR THIS SYSTEM

```jsp
<%
        String RFID_id = request.getParameter("RFID_id");
        String StudentID = request.getParameter("StudentID");
        String Student_Name = request.getParameter("Student_Name");
        String IC_no = request.getParameter("IC_no");
        String Address = request.getParameter("Address");
        String Course = request.getParameter("Course");
        String Gender = request.getParameter("Gender");
        String Race = request.getParameter("Race");
        String College = request.getParameter("College");

        DatabaseConnect db = new DatabaseConnect();
        String sql = "INSERT INTO student VALUES('"+ StudentID +"','"+ RFID_id +"'," +
        "'"+ Student_Name +"','"+ IC_no +"'," +
        "'"+ Course +"','"+ Gender +"'," +
        "'"+ Race +"','"+ College +"','" + Address +"')";
        db.update(sql);
%>
```

Insert student _jsp code

```java
DatabaseConnect db = new DatabaseConnect();

try {
   String query = "SELECT * FROM user ";
   ResultSet result = db.select (query);

   while(result.next()){
       if (UID.compareTo(result.getString("iduser")) == 0 && PWD.compareTo(result.getString("pwd")) == 0) {
           UID = result.getString("iduser");
           STAT = result.getString("Level");
           NAMA = result.getString("Name");
           validUser = true;
       }
   }
} catch(SQLException e){
   out.println(e.getMessage());
}
```

Login validate user_Java code

```
<%! RFIDTagRead read; %>
<%! static String sound; %>
<%
    // yang ini kalau layout.jsp AJAX tak hantar variable 'action'
    if (request.getParameter("action") == null) {
        out.println("Halaman ini untuk kegunaan sistem sahaja.");
    }

    // yang ini check kalau2 dah ader session 'read'
    if (session.getAttribute("read") != null) {
        read = (RFIDTagRead)session.getAttribute("read");
    }

    // yang ini untuk bukak port (COM1)
    if (request.getParameter("action").equalsIgnoreCase("open")) {
        read = new RFIDTagRead();
        session.setAttribute("read", read);
        read.openCommPort(request, response, "COM1");
    }

    // yang ini untuk paparkan bacaan tag RFID terkini
    else if (request.getParameter("action").equalsIgnoreCase("read")) {
        int j=0;
        try {
            j = Integer.parseInt(String.valueOf(session.getAttribute("n")));
        } catch (NumberFormatException nfe) {
            j = 1;
        } catch (Exception e) {
            j = 1;
        }
        if (session.getAttribute("tag") != null) {
            // kat utk paparkan yang diperlukan
            //out.println("Tag: " + session.getAttribute("tag"));
            String sql_ = "SELECT * FROM student WHERE student.Student_Name = student.RFID_id  '" + session.getAttribute("tag") + "' ";
            //out.println(sql_);
            DatabaseConnect db = new DatabaseConnect();
            ResultSet result_ = db.select(sql_);
            while (result_.next()) {
%>
```

Connect Java to jsp _scan ID code

```
// method untuk bukak port
public void openCommPort (HttpServletRequest request, HttpServletResponse response, String comm) {

    session = request.getSession();
    session.removeAttribute("tag");

    //Enumerate a list of available ports
    portList = CommPortIdentifier.getPortIdentifiers();

    // Identify the ports. I connected the reader with COM1
    while (portList.hasMoreElements()) {
        portId = (CommPortIdentifier) portList.nextElement();
        if (portId.getPortType() == CommPortIdentifier.PORT_SERIAL) {
            if (portId.getName().equals(comm)) {
                System.out.println("The port is: " + portId.getName());

                // panggil method initialize, untuk proses bukak port
                this.initialize();
            }
        }
    }
}
```

Open RFID com port_Java code

```
// method untuk bukak port
public void initialize () {
    try {
        //Open the COM1 port and name it MicroReader with timeout 2000ms
        serialPort = (SerialPort) portId.open("SimpleReadApp", 2000);
    } catch (Exception e) { System.out.println("Port Error"); }

    try {
        outputStream = serialPort.getOutputStream();
        // Write the stream of data conforming to PC to reader protocol
        outputStream.write(bytearray);
        outputStream.flush();
        System.out.println("Tag will be read when its in the field of the reader");
    } catch (IOException e) {}

    // Set Serial Port parameter
    try {
        serialPort.setSerialPortParams(9600,
            SerialPort.DATABITS_8,
            SerialPort.STOPBITS_1,
            SerialPort.PARITY_NONE);
    } catch (UnsupportedCommOperationException e) {}

    try {
        //Register an event listener object to the port
        serialPort.addEventListener(this);
    } catch (TooManyListenersException e) { System.out.println("Too Many Listeners"); }

    //Specify an event type. On data availability, triggers serialEvent method
    serialPort.notifyOnDataAvailable(true);

    try {
    //Associate an InputStream object with this port.
        inputStream = serialPort.getInputStream();
    } catch (IOException e) {}

    //Start a thread to handle the time-to-read the tag
    readThread = new Thread(this);
    readThread.start();
}
```

Open RFID com port_Java code_continue

```
<script type="text/javascript">
function validate_login(field,alerttxt){
with (field)
{
if (value==null||value=="")
{
alert(alerttxt);
return false;
}else{return true;}
}
}

function validate_form(thisform)
{
with(thisform)
{
if(validate_login(iduser,"Please insert your username !")==false)
{iduser.focus();return false;}

if(validate_login(pwd,"Please insert your password !")==false)
{pwd.focus(); return false;}
}
}
</script>
```

Prompt script input_log in

```
<script type="text/JavaScript">
<!--
function MM_findObj(n, d) {
  var p,i,x;  if(!d) d=document; if((p=n.indexOf("?"))>0&&parent.frames.length) {
    d=parent.frames[n.substring(p+1)].document; n=n.substring(0,p);}
  if(!(x=d[n])&&d.all) x=d.all[n]; for (i=0;!x&&i<d.forms.length;i++) x=d.forms[i][n];
  for(i=0;!x&&d.layers&&i<d.layers.length;i++) x=MM_findObj(n,d.layers[i].document);
  if(!x && d.getElementById) x=d.getElementById(n); return x;
}

function MM_validateForm() {
  var i,p,q,nm,test,num,min,max,errors='',args=MM_validateForm.arguments;
  for (i=0; i<(args.length-2); i+=3) { test=args[i+2]; val=MM_findObj(args[i]);
    if (val) { nm=val.name; if ((val=val.value)!="") {
      if (test.indexOf('isEmail')!=-1) { p=val.indexOf('@');
        if (p<1 || p==(val.length-1)) errors+='- '+nm+' perlu mempunyai alamat email.\n';
      } else if (test!='R') { num = parseFloat(val);
        if (isNaN(val)) errors+='- '+nm+' perlu mengandungi nombor.\n';
        if (test.indexOf('inRange') != -1) { p=test.indexOf(':');
          min=test.substring(8,p); max=test.substring(p+1);
          if (num<min || max<num) errors+='- '+nm+' must contain a number between '+min+' and '+max+'.\n';
    } } } else if (test.charAt(0) == 'R') errors += '- '+nm+' is needed.\n'; }
  } if (errors) alert('Sorry! There is required info for new registration:\n'+errors);
  document.MM_returnValue = (errors == '');
}
//-->
</script>
```

Prompt script input_mandatory

```
<%

            DatabaseConnect db = new DatabaseConnect();
            String query = "SELECT * FROM student WHERE total_absent <= 10";
            ResultSet rst = db.select(query);

            String query2 = "SELECT * FROM student WHERE total_absent => 15";
            ResultSet rst2 = db.select(query2);

            String query3 = "SELECT * FROM student WHERE total_absent >20";
            ResultSet rst3 = db.select(query3);
%>
```

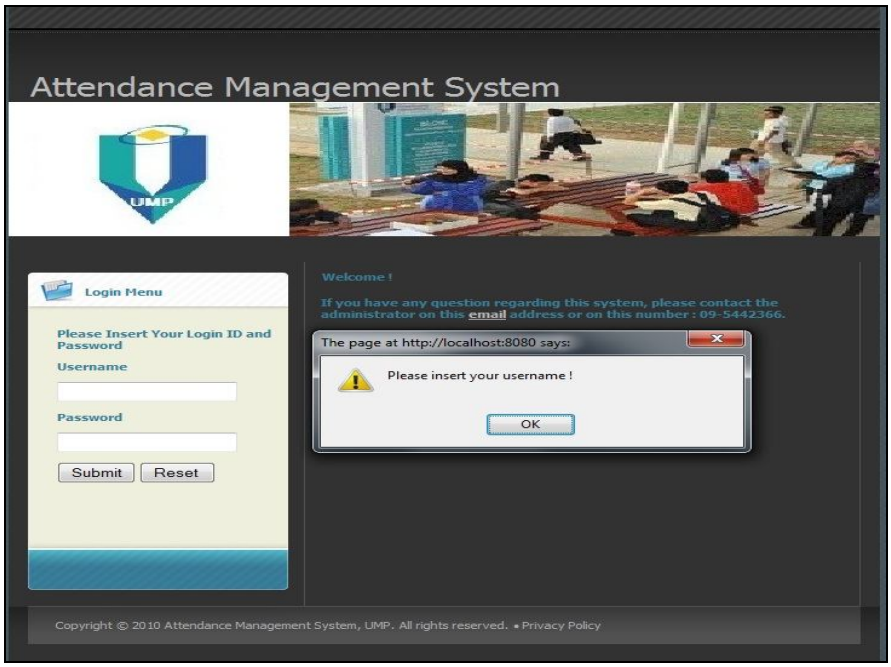
Calculation percentage absent_jsp code in SQL statement

```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@page import="DataProcessDb.*" %>
<%@page import="java.sql.*" %>
<%@include file="conn.jsp" %>

<% ValidateUser validate = new ValidateUser(request, response);%>
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">

<%

            Statement s = con.createStatement();

            DatabaseConnect db = new DatabaseConnect();


            ResultSet rc = s.executeQuery("Select count(datetime) from 0004848128 ");
            rc.next();
            out.println("Weekly Percentage : " + rc.getInt(1)/5 + " ");

%>
```

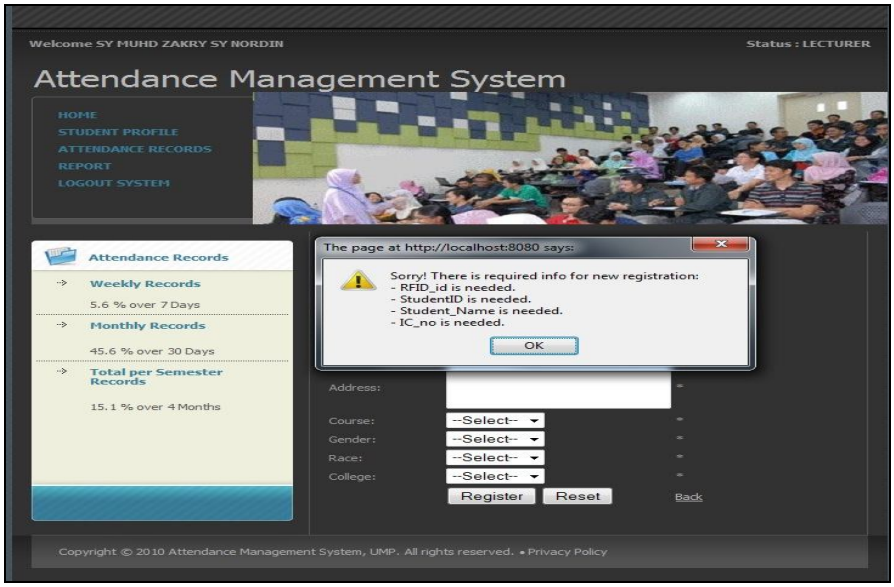
Calculation percentage absent weekly_jsp code in SQL statement

APPENDIX D

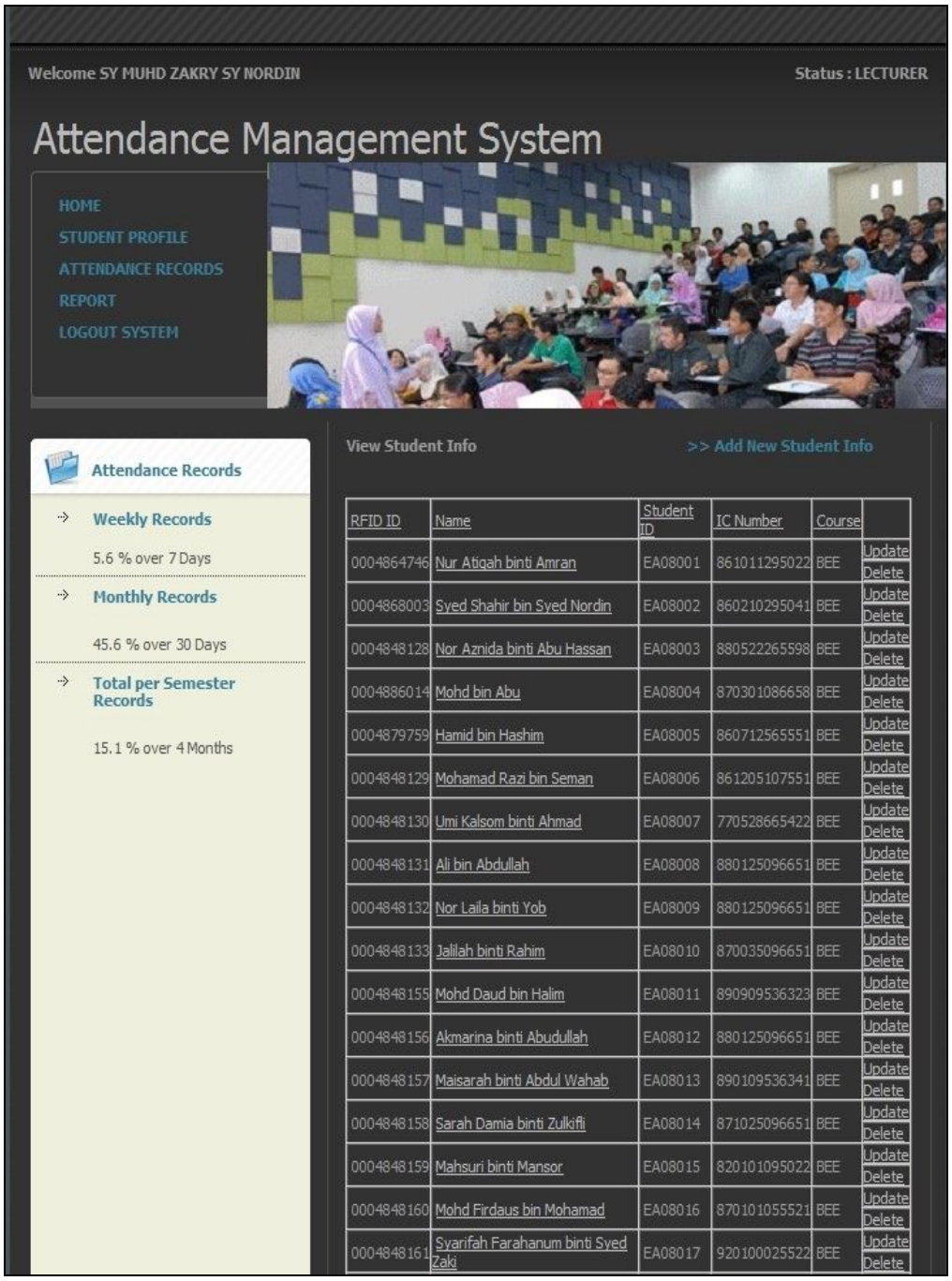
INTERFACE THE SYSTEM



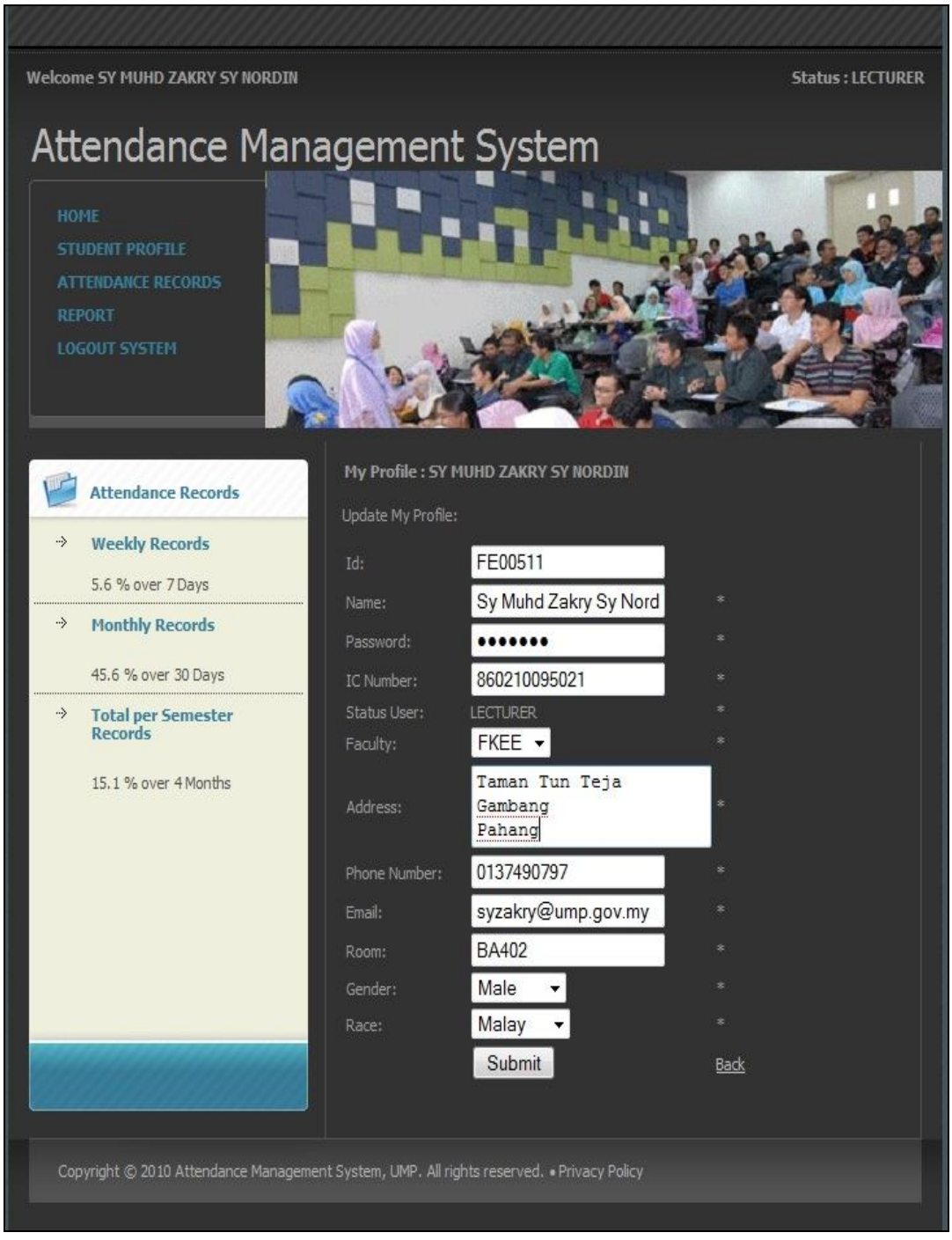
Message box display when wrong Username or Password



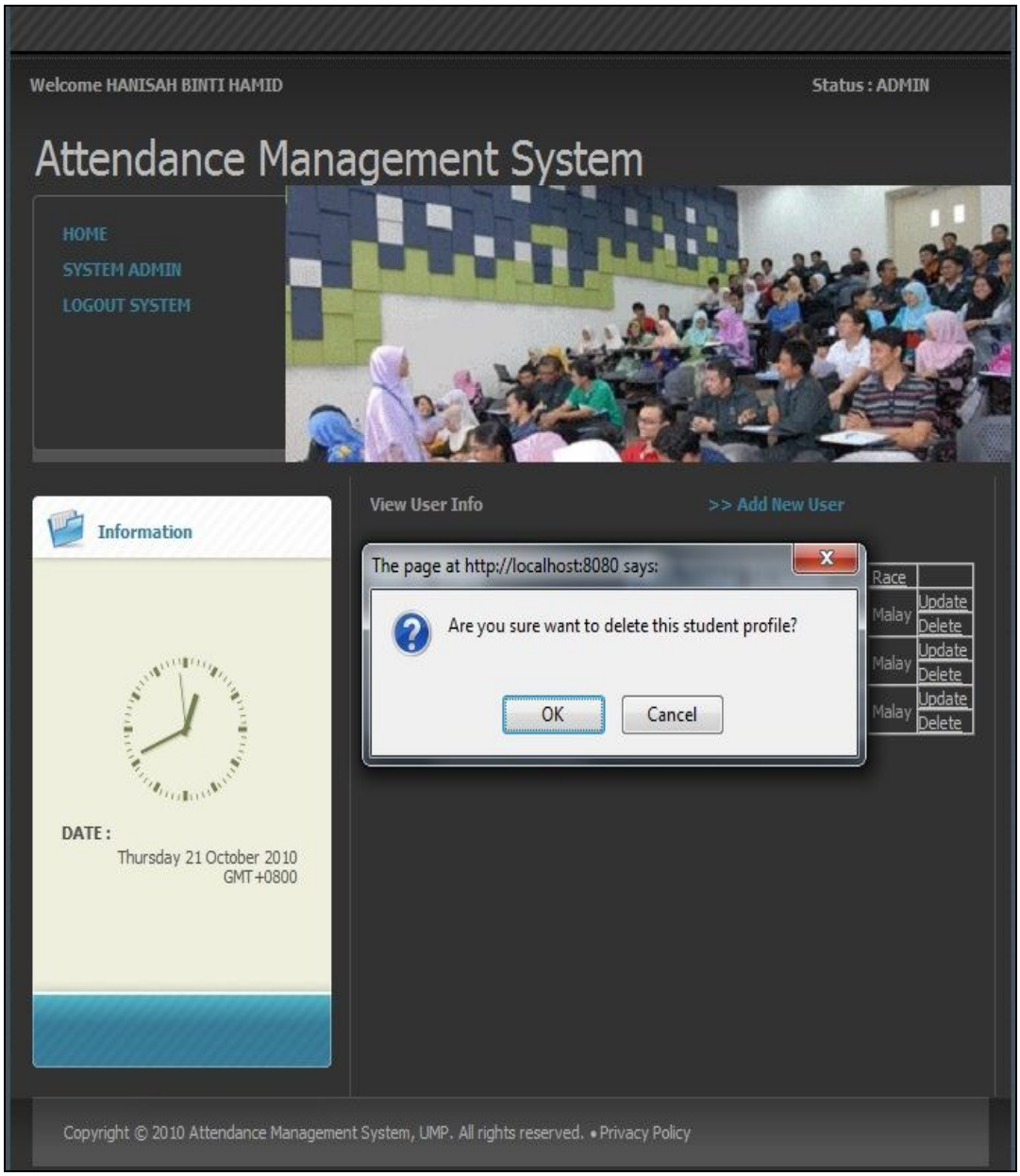
Message box display when the data not fully insert



Sorting student profile by student ID number



Interface to update lecturer profile



Interface to delete user profile

APPENDIX E

STUDENT'S ATTENDANCE LIST FOR SEMESTER I SESSION 2010/2011

Lecturer: Cik Hanisah Binti Hamid
Course: Digital Signal Prosessing
Course Code: BEE 4413

Bil.	ID Num	Name	Percentage attendance		
			Weekly	Monthly	1Semester
1	EA08001	Nur Atiqah Binti Amran			
2	EA08002	Syed Shahir bin Syed Nordin			
3	EA08003	Nor Aznida Binti Abu Hassan			
4	EA08004	Mohd bin Abu			
5	EA08005	Hamid bin Hashim			
6	EA08006	Mohamad Razi bin Seman			
7	EA08007	Umi Kalsom Binti Ahmad			
8	EA08008	Ali bin Abdullah			
9	EA08009	Nor Laila Binti Yob			
10	EA08010	Jalilah Binti Rahim			
11	EA08011	Mohd Daud bin Halim			
12	EA08012	Akmarina Binti Abudullah			
13	EA08013	Maisarah Binti Abdul Wahab			
14	EA08014	Sarah Damia Binti Zulkifli			
15	EA08015	Mahsuri Binti Mansor			
16	EA08016	Mohd Firdaus Bin Mohamad			
17	EA08017	Syarifah Farahanum Binti Syed Zaki			
18	EA08018	Aimi Salihah Binti Nasir			
19	EA08019	Mohd Hafiz bin Nordin			
20	EA08020	Nur Diyana Binti Abdul Hamid			