

BORANG PENGESAHAN STATUS TESIS*

JUDUL: STUDENT EXAMINATION ATTENDANCE SYSTEM VIA RADIO-FREQUENCY IDENTIFICATION SIMULATOR

SESI PENGAJIAN: 2004 - 2007

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**STUDENT EXAMINATION ATTENDANCE SYSTEM VIA RADIO-
FREQUENCY IDENTIFICATION (RFID) SIMULATOR**

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This report is submitted in partial fulfillment of the requirements for the
Bachelor of Computer Science (Computer Networking)

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

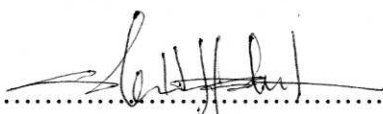
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DECLARATION

I hereby declare that this project report entitled

STUDENT EXAMINATION ATTENDANCE SYSTEM VIA RADIO-FREQUENCY IDENTIFICATION SIMULATOR

is written by me and is my own effort and that no part has been plagiarized
without citations.

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DEDICATION

Special thanks to my beloved family and person who always supports me for complete this project to gather to achieve the Bachelor of Computer Science. Besides, I also would like to special thanks to my supervisor who is also my P.A for supervising my project all this semester.

ACKNOWLEDGEMENT

Assalamualaikum W.R.T.

The Projek Sarjana Muda is a subject that pulls over all the idea, knowledge and skill that I have gain during studying in University Teknikal Malaysia Melaka (UTeM). Thus, I would love and like to thankful to; firstly my own supervisor, Puan Aslinda Binti Hassan who is also my personal assistant since my first year in this university. Next I would like to thanks to all BITC's lecturers who always support me, brainstorming their idea to gain my knowledge. Besides, I also would like to thanks to all the FTMK's lecturer, and my friends. Throughout the completing this PSM I and II, a lot of experience had I gained in writing this documentation. Hence, I would like to express my appreciations to everyone that have contributed towards the success my PSM I and II.

I hope that by complete this project, I manage to develop myself to become a person that not only in IT related field, but also become a person that may pass through all the living survive. Thank you again to all.

Assalamualaikum.

ABSTRACT

RAFIDAS01 is a code name for the Radio-Frequency Examination Attendance System for this project. The main reason for RAFIDAS01 is replace the manual technique for the attendance data collection for the examination candidates. In the manual system, the process use paper-based form to ensure whether the students present or absent during the examination. These forms will then be collected by the examination officer. RAFIDAS01 is a digital system that combines the web-based system, database, and the RFID technique as the main structure of the system. RFID will detect all the RFID tags that will embedded on the student (candidate)'s metric card. Finally, examination officer only need to access the system to retrieve the final result of the examination attendance.

ABSTRAK

RAFIDAS01 adalah kod nama bagi *Sistem Kehadiran Peperiksaan Menggunakan Pengesanan Radio-frekuensi* dalam projek ini. Tujuan utama system ini adalah untuk menggantikan teknik manual bagi proses pengambilan data kedatangan calon-calon peperiksaan. Dalm teknik manual, proses ini akan menggunakan cara berasaskan borang kertas untuk menilai kehadiran dan ketidakhadiran dalam peperiksaan. Borang tersebut akan dikumpul oleh pengawas peperiksaan. RAFIDAS01 adalah sebuah sistem digital yang menggabungkan aplikasi berteraskan-web , pangakalan data, dan teknik pengesanan Radio-frekuensi (RFID) sebagai struktur utama sistem. RFID akan mengesan mikrochip yang terselit di atas kad matrik calon-calon dari jarak jauh. Di akhir keputusan, pengawas peperiksaan hanya perlu menggunakan sistem ini untuk menganbil keputusan keseluruhan kedatangan bagi satu peperiksaan.

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CHAPTER I

INTRODUCTION

1.1 Project Background

Radio-Frequency identification (RFID) is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transponders. An RFID tag is an object that can be attached to or incorporated into a product, animal, or person for the purpose of identification using radio waves. All RFID tags contain at least two parts. The first part is an integrated circuit (microchip) for storing and processing information, modulating and demodulating a radio frequency (RF) signal and perhaps other specialized functions. Second part is an antenna for transmitting and receiving the signal.

The examination attendance system is a web based system that will process the data given by the information from the microchip that contains the candidate information. The system that uses a PHP Script also holds all the data of each student, and then it will compare with the data that it captures using the RFID. If the comparing process shows a different, it means that some candidate might absent for the exam.

The type of RFID that will be use inside this project is a passive RFID. The passive RFID tags have no internal power supply. The antenna will transmit the signal to

the microchip that will embed on the candidate metric card, and then the microchip will rebound the signal back to the antenna. The antenna might be situated at the entrance of the examination hall.

The code name for the prototype of the system is **RAFIDAS01**.

1.2 Problem Statement

There are some problem occurs during the normal technique of collecting the data for the present examination candidates. The major problem is the technical problems.

The technical problem is there is no digital system that can evaluate the presence or absence of the candidates during the examination process. To overcome the problem, one system that can evaluate the presence or absence of students needs to be developed.

In addition, during the technical process of collecting data, the data are exposed to a human technical error. For example, data might be missing during the filling out process, attendance form might missing during the collecting process and the data has to be arrange according to the candidate's faculty or matrix number.

The attendance of the examination candidates is very important to prove that the candidate has taken the exam. The system is also needed to ensure the accuracy of the data that it will collect.

1.3 Project Objective

The main project objective is:

- To create an RFID Simulator
- To create a web-based system which will integrate with RFID Simulator
- The system will use Radio-Frequency Identification (RFID) Simulator as the main input to collect candidate's attendance during the examination
- The system also able to compare the data that it has collected during the examination hour and the existing data inside the database
- The system also should able to display the result of the attendance

1.4 Project Scope

The scopes of the project are:

- To develop an RFID simulator using the PHP script to simulate the process of RFID
- To develop a web-based system using a PHP scripting which is the script will be type using the Macromedia Dreamweaver MX 2004.
- The existing data will be stored inside one database which is a MySQL database as the database server. The database will have dummy data which will simulate the Student Information System (SMP) data.
- Then, after the data has successfully compared, the details of present and the absent examination candidates will be displayed as the final result and the system also will provide the brief statistic of the examination candidates. Next, the statistic of the result will be able to print out from the system.

1.5 Project Significance

This system should be able to overcome the technical human error during collecting database candidate attendance and to create a centralized candidate attendance data inside a database system. Besides, the system also helps user to use paperless environment and save the candidate's times for filling the examination attendance form.

1.6 Expected Output

Based on the first planning, the expected result is to make sure all the result that the system give are 100% true because the information of the attendance for the examination candidates is a very high priority, important, and abstruse. Beside, the system should replace the manual process for collecting the candidate attendance to avoid the existing problems.

1.7 Conclusion

Developing RAFIDAS01 is a step further to enhance from the technical technique to automatic technique when collecting the important data during the examination. The important data is the attendance for the examination candidates. RAFIDAS01 is a web based system that will communicate with the RFID module for the main device to collect the candidate's attendance. RAFIDAS01 also will give the result for the student who are present or absent student during the examination. Using the Radio-Frequency, the RFID module can capture candidate's data from the client microchip which is embedded on the candidate matric card.

The next activity is to collect the project data requirement such as the literature review, project methodology, hardware and software requirement. This data will help the project development process and analysis.

CHAPTER II

LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

Literature review is a process to find, search, collect, analyze and concluded all debates and issues raised for developing the final product of the project. Besides, it also provide examples of what other experts have or researcher has found in the last time and that idea could be a benefit for the next development process. That information will use to overcome the current problems and try to investigate the solution to give the best result for the project. The literature reviews are focuses on the various theory and basic network knowledge used in the project. The sources of the information are able to grab from the books, magazine, articles, web pages, or testing result. Project methodology will discuss detail about type of methodology, techniques, hardware or software requirements and project planning to develop the project, so that the planning for the project proposed to meet project objectives, scopes and requirements.

2.2 Fact and Finding

There is lot of techniques used to gather information that related to the project through Internet, book etc. These initial documents will provide some valuable information to determine the basic view for the project. The theory and concept from the past research, references, case study and other can be applied in order to understand the thesis.

2.2.1 Domain

The domain for this project is ICT in Network Application. RFID module is one of network tools and the system that will communicate the RFID module will generate a network application.

2.2.1.1 History RFID

According to Landt J. (2001), "In 1906, the first continuous wave (CW) radio generation and transmission of radio signals has demonstrated by Ernst F.W. Alexanderson. The work in radar during World War II was as significant a technical development as the Manhattan Project. Radar sends out radio waves for detecting and locating an object by the reflection of the radio waves. This reflection can determine the position and speed of an object. Radar's significance was quickly understood by the military, so many of the early developments are very secret." This straightly shows that the RFID technology has been develop around 1900's. Since one form of RFID is the combination of radio broadcast technology and radar, it is not unexpected that the convergence of these two radio disciplines and the thoughts of RFID occurred on the heels of the development of radar.

The 1960s were the prelude to the RFID explosion of the 1970s. R.F. Harrington studied the electromagnetic theory related to RFID in his papers including “Theory of Loaded Scatterers” in 1964. Commercial activities were beginning in the 1960s. Sensormatic and Checkpoint were founded in the late 1960s. These types of systems are often use 1-b tags; only the presence or absence of a tag could be detected, but the tags could be made inexpensively and provided effective antitheft measures. These types of systems used either microwave (generation of harmonics using a semiconductor) or inductive (resonant circuits) technology.

Tags containing multiple bits were generally experimental in nature and were built with discrete components. In the 1970s developers, inventors, companies, academic institutions, and government laboratories were actively working on RFID, and notable advances were being realized at research laboratories and academic institutions such as Los Alamos Scientific Laboratory, Northwestern University, and the Microwave Institute Foundation in Sweden. Large companies were also developing RFID technology, such as Raytheon’s Raytag in 1973 and Richard Klensch of RCA developing an electronic identification system in 1975.

The 1970s were characterized primarily by developmental work. Intended applications were for animal tracking, vehicle tracking, and factory automation. Examples of animal tagging efforts were the microwave systems at Los Alamos and Identronix and the inductive systems in Europe. Interest in animal tagging was high in Europe. Alfa Laval, Nedap, and others were developing RFID systems. Transportation efforts included work at Los Alamos and by the International Bridge Turnpike and Tunnel Association (IBTTA) and the United States Federal Highway Administration. This is an important decision since it would permit a variety of systems to develop, which was good, because RFID technology was in its infancy. Research efforts continued as well. R.J. King authored a book about microwave homodyne techniques in 1978. This book is an early compendium of theory and practice used in backscatter RFID systems. Tag technology had improved with reductions in size and improvements in functionality. Below table will shows the decades of RFID which is the chronology of the RFID progress.

Table 2.1: RFID Chronology

| Decade | Event |
|-------------|--|
| 1940 - 1950 | Radar refined and used major World War II development effort. RFID invented in 1948. |
| 1950 - 1960 | Early explorations of RFID technology, laboratory experiments. |
| 1960 - 1970 | Development of the theory of RFID. Start of applications field trials. |
| 1970 - 1980 | Explosion of RFID development. Tests of RFID accelerate. Very early adopter implementations of RFID. |
| 1980 - 1990 | Commercial applications of RFID enter mainstream. |
| 1990 - 2000 | Emergence of standards. RFID widely deployed. RFID becomes a part of everyday life. |

2.2.1.2 RFID as Network Application

A Radio-Frequency Identification system has three parts

- i. A scanning antenna
- ii. A transceiver with a decoder to interpret the data
- iii. A transponder which is the RFID tag that has been programmed with information

The scanning antenna puts out radio-frequency signals in a relatively short range. The RF radiation does two things:

- i. It provides a means of communicating with the transponder (the RFID tag) AND
- ii. It provides the RFID tag with the energy to communicate (in the case of passive RFID tags).

The main key part of the technology is the RFID tags. The passive RFID tags do not need to contain batteries, and can therefore remain usable for very long periods of time or even decades.

The scanning antennas can be permanently affixed to a surface; handheld antennas are also available. They can take whatever shape you need; for example, you could build them into a door frame to accept data from persons or objects passing through.

When an RFID tag passes through the field of the scanning antenna, it detects the activation signal from the antenna. That "wakes up" the RFID microchip, and it transmits the information on its microchip to be picked up by the scanning antenna.

In addition, the RFID tag may be of one of two types. Active RFID tags have their own power source; the advantage of these tags is that the reader can be much farther away and still get the signal. Even though some of these devices are built to have up to a 10 year life span, they have limited life spans. Passive RFID tags, however, do not require batteries, and can be much smaller and have a virtually unlimited life span.

RFID tags can be read in a wide variety of circumstances, where barcodes or other optically read technologies are useless.

- i. The tag need not be on the surface of the object (and is therefore not subject to wear)
- ii. The read time is typically less than 100 milliseconds
- iii. Large numbers of tags can be read at once rather than item by item.

According to Turner F. (2005), "InCom is the developer of the first contactless attendance taking system (patent pending), which also compiles the average daily attendance requirements for public schools. The RFID system requires only a 16 - 24 digit number, assigned during tag production, to identify a student, thus enhancing speed and accuracy, without sacrificing privacy."