

**SMART COMPLAINT SYSTEM (SCS)  
(MAINTANANCE SYSTEM USING RFID)**

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**This report is submitted in partial fulfillment of the requirements for the award  
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FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

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Dedicated to my family, lectures and to all my friends,  
My appreciation to all of you for providing me assistance and encouragement throughout  
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## ABSTRACT

This project deals with the design and implementation of a complaints system. For example, if there any damages, a lecturer can easily send reports of damage by touching the Radio Frequency Identification (RFID) card and press the button according to type of damage found on the console. Once the process is done, the maintenance group of the building will get the report directly on their computer. After the repair work done, the technician should notify lecturers who make reports of damage. Only the lecturer can only delete the records. How to delete a record is by touching the Radio Frequency Identification (RFID) card back. This can only be accessed by the cardholder to avoid a false complaint to the technician. The objective of this project is intended to facilitate the process of reporting damage and shorten the time taken from the report until the repairs. In addition, this project application can also be applied in other situations. This project is a combination between 'software' and 'hardware' of the 'serial port' Radio Frequency Identification (RFID).

## ABSTRAK

Projek ini membincangkan tentang rekabentuk dan pelaksanaan satu sistem aduan. Sebagai contoh, apabila terdapat kerosakan pada sesuatu fasiliti, pensyarah dapat menghantar laporan kerosakan secara mudah dengan menyentuh kad Pengesan Frekuensi Radio (RFID) dan menekan butang mengikut jenis kerosakan yang terdapat pada konsol. Setelah proses itu dilakukan, maka pihak penyelenggaraan bangunan akan mendapat laporan tersebut secara terus di dalam komputer mereka. Setelah kerja-kerja pembaikan dilakukan, maka pihak penyelenggaraan perlu memberitahu pensyarah yang membuat laporan kerosakan. Hanya pensyarah itu sahaja yang dapat memadam rekod tersebut. Cara memadam rekod adalah dengan menyentuh kembali kad RFID. Hal ini hanya dapat di akses oleh pemegang kad bagi mengelakkan aduan palsu di hantar kepada juruteknik. Objektif projek ini adalah bertujuan untuk memudahkan proses laporan kerosakan dan memendekkan masa yang perlu diambil dari tempoh laporan sehingga tempoh pembaikan. Selain itu, aplikasi projek ini juga dapat diaplikasikan di situasi-situasi yang lain. Projek ini adalah kombinasi peyambungan perisian dan peranti keras yang menggunakan 'serial port' RFID.



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**LIST OF SYMBOLS**

VB	-	Visual Basic
DAQ		Data Acquisition
PSM		Projek Sarjana Muda

## CHAPTER I

### INTRODUCTION

This chapter will discuss the overview process that involved for this project; the aims and specific objectives of the project, problem statements, work scope and methodology. The end of this chapter the thesis outline will be listed.

#### 1.0 Project Background

Many public and private institutions have a problem when there is damage to the facilities of building. Every user does not know that the management of complaint system is very important to ensure the daily operations become smoothly operated.

Therefore, I prefer to create a system where any complaints can be reported on the spot. RFID cards are commonly used in many areas like access control, security, and for other identification purposes <sup>[1]</sup>. A lecturer can easily send reports of damage by touching the RFID card and press the button of type of damage on the console.

Once the process is done, the maintenance technician of the building will get report directly in their personal computer or desktop. When the repairs were done, then the technician should be notifying the lecturer who was report the complaint. At the end of the process, the lecturer only can delete the record of complaint by touching the RFID card again.

## 1.1 Problem Statement

Often happen damage and problem involving lecture room or laboratory, it will be inconvenienced and disturb teaching process and learning. Among which often happened involving computer, LCD monitor, air-conditioner and others. Hid refractivity any complaint would de reported by telephone call to technician. Complaint information also obliged jot down manually and does not get recorded directly into the system. When the problem occur, the user only required to touch the RFID card and press the button of type of damage on the console where have been programmed. Complaint will continue to be sent to technician for further action. Any complaint information also automatically will be recorded for reference in the future.

The problems are:-

- a) There is no simple system of complaint system in lecture room or laboratory.
- b) The maintenance system does not provide a first in first out (FIFO) where there are delays in management.

The servicer or technician does not seriously address the report because there is no “follow up” done



## 1.2 Objectives

There are few objective that need to be consider in this project :

- a) Seeks to facilitate the process of reporting damage.
- b) Shorten the time taken from the report until the repairing process done without any delays.
- c) Learn how to make connection between the RFID reader and visual basic.
- d) This concept will be applied to other situations.

## 1.3 Scope of Work

The scopes of work of this project are:

- a) Connectivity between software and hardware using serial port.
- b) RFID cards only operate at distance of 5mm.
- c) The distance between personal computer (PC) and report console should be in the standard of RS232.
- d) The cards used in this project are weigand 32 format.
- e)

## 1.4 Expected Results

The expected outcome for this project:

- a) The RFID reader will be beep when the card touches in distance 5mm.
- b) Every RFID card will send different ID data.
- c) When we try to use the Hyper Terminal, the information of ID card will be display on the screen of Hyper Terminal.
- d) The voltage on the legs 11 and 32 at the Microcontrollers are 5 volts DC.
- e) Every database can be deleted by using command CTRL-Z.

## **1.5 Brief Methodology**

Methodology discusses the steps of work engaged in developing the project. It started with gathering information and research that is related to this project. The information searching process and researching process are done by referring to the websites, journals and books available electronically. Based on information gathered, we try to combine technique software and hardware using serial to complete the project. Thus, the software developed is trained and tested before synchronize the software visual basic communication. After that, by using RFID cards that only operate at distance of 5mm we can start using the system. Finally, the outputs are discussed and analyze to check the function and effectiveness of the system.

## **1.6 Report Structure**

This report discusses overall the development of the smart complaint system. This report is consisting of five chapters, which will cover all the matter that should be discussed in developing this project.

Chapter I give out the information of the introduction to this project. It is including the project background, objectives to achieve from this project, the project problem statement, scope of work and project methodology.

Chapter II contains literature review. It discusses the literature review of the background that is needed in this project. It is about all the study that has been made for this project. It will explain the techniques used in gathering the information, the theory and the case study of previous projects. The literature review will produce a work concept to show the connection between the project with theory and concept.

Chapter III is about project methodology. It will explain the implementation and solution in doing this project. It consist the overall system and the structure needed in the system. Methods used in this project are clearly pointed out such as data collection, data process and

analysis, system model, flowchart and et cetera. Factors that were weighed out in selecting the methods and the advantages are also pointed out.

Chapter IV presents the result of this project. This chapter also includes the analysis of this system development. This chapter will discuss the result accordingly to the objective stated earlier in this project.

Chapter V, is the final chapter which summaries the research findings. This chapter also identifies problems and obstacles throughout this research. Some suggestions for future work is discussed which might be useful for further development and improvement to the system and also the implementation of the system.

## CHAPTER II

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter concludes all the techniques used for research and fact finding. Sources are obtained from various media by including keywords such as “smart complaint system”, “card holder using RFID”, “Connectivity between software and hardware using serial port”, “RS232”, “Visual Basic” and “C compiler”. From these, information is gathered from previous projects.

Relevant case studies are essential to carry out the similar yet a better system. Previous projects, studies and et cetera help in analyze, compare and providing guidelines in producing this project. Theories and concepts that are related to the project development are also being studied here in order to petition for wise idea on construction of this project for a better outcome. Based on the review of the various supervised learning methods, the advantages and disadvantages of each approach and technique are discussed.

## **2.2 Fact-findings and Research**

In this section, various method of fact finding is covered in collecting relevant information that has been used in project development. The significant and contributions of conducting research on the related survey areas are also outlined.

### **2.2.1 Fact-finding techniques**

In software development, all the previous similar software should be review and study. Sampling of documentation or article of existing similar software is a good start in knowing deeper to the core of the software. Research is carried out at this stage.

In research, any related information is collected using the fact finding techniques to collect information on the C# abilities, comparison between C# and Visual Basic, synchronization, system problem, opportunities and directives. This information is very important to verify the functional requirement of the software at the early phase of the project development.

Documentation or articles of previous studies are also searched via Internet. Most of the documents such as articles, white papers, thesis or journals were obtained from Institute of Electrical and Electronics Engineers (IEEE) website. This is helpful in gaining more information, solutions and idea that are relevant to this project.

### **2.2.2 The Important Of Research.**

Research is very important in developing a system. Through research, all needed information can be study, analyze and compare in providing better system and develop its own criteria that will extinguish this project above others. Through research, all the impairments or the future study of the previous project should be consider in creating a similar system but better and has its own advantages.

## 2.3 Theory

There is always a theory lies behind every work that we do. Theory is the fundamental knowledge that should be learned in order to understand the application of the certain thing. This section will line out the theory that is fundamentals for this project.

### 2.3.1 Serial Communication



Figure 1 : A male DE-9 connector used for a serial port on a IBM PC compatible computer

In computing, a serial port is a serial communication physical interface through which information transfers in or out one bit at a time (contrast parallel port). Throughout most of the history of personal computers, data transfer through serial ports connected the computer to devices such as terminals and various peripherals. While such interfaces as Ethernet, FireWire, and USB all send data as a serial stream, the term "serial port" usually identifies hardware more or less compliant to the RS-232 standard, intended to interface with a modem or with a similar communication device.

In modern personal computers the serial port has largely been replaced by USB and Firewire for connections to peripheral devices. Many modern personal computers do not have a serial port since this legacy port has been superseded for most uses. Serial ports are commonly still used in applications such as industrial automation systems, scientific

analysis, shop till systems and some industrial and consumer products. Server computers may use a serial port as a control console for diagnostics. Network equipment (such as routers and switches) often use serial console for configuration. Serial ports are still used in these areas as they are simple, cheap and their console functions are highly standardized and widespread. A serial port requires very little supporting software from the host system.

Early home computers often had proprietary serial ports with pinouts and voltage levels incompatible with RS-232. Inter-operation with RS-232 devices may be impossible as the serial port cannot withstand the voltage levels produced and may have other differences that "lock in" the user to products of a particular manufacturer.

Low-cost processors now allow higher-speed, but more complex, serial communication standards such as USB and FireWire to replace RS-232. These make it possible to connect devices that would not have operated feasibly over slower serial connections, such as mass storage, sound, and video devices.

Many personal computer motherboards still have at least one serial port. Small-form-factor systems and laptops may omit RS-232 connector ports to conserve space, but the electronics are still there. RS-232 has been standard for so long that the circuits needed to control a serial port became very cheap and often exist on a single chip, sometimes also with circuitry for a parallel port.

### **2.3.2 Connectors**

While the RS-232 standard originally specified a 25-pin D-type connector, many designers of personal computers chose to implement only a subset of the full standard: they traded off compatibility with the standard against the use of less costly and more compact connectors (in particular the DE-9 version used by the original IBM PC-AT). Starting around the time of the introduction of the IBM PC-AT, serial ports were

commonly built with a 9-pin connector to save cost and space. However, presence of a 9-pin D-subminiature connector is neither necessary nor sufficient to indicate use of a serial port, since this connector was also used for video, joysticks, and other purposes.

### 2.3.3 Common applications for serial ports

The RS-232 standard is used by many specialized and custom-built devices. This list includes some of the more common devices that are connected to the serial port on a PC. Some of these such as modems and serial mice are falling into disuse while others are readily available.

- a) Computer terminal
- b) Dial-up modems
- c) Printers
- d) Networking (Macintosh AppleTalk using RS-422 at 230.4 kbit/s)
- e) Serial mouse
- f) Older Joysticks
- g) GPS receivers (typically NMEA 0183 at 4800 bit/s)
- h) Older GSM mobile phones
- i) Satellite phones, low-speed satellite modems and other satellite based transceiver
- j) devices
- k) Microcontroller, EPROM and other programmers
- l) Microprocessor development boards
- m) Bar code scanners and other point of sale devices
- n) LED and LCD text displays
- o) Flat-screen (LCD and Plasma) monitors to control screen functions by external
- p) computer.