

**Title: LAMP-FAILURE NOTIFICATION SYSTEM VIA  
MOBILE (SMS)**

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**In partial fulfillment of requirement for the  
BACHELOR OF SCIENCE (Hons) IN DATA COMMUNICATION AND  
NETWORKING**

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## **DECLARATION**

I hereby declare that the work in this project paper is on my own except for those quotations and summaries which have been acknowledged.

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## **ABSTRACT**

Lamp-failure Notification System is a system that will send message to the maintenance when a report of dysfunctional lamp is made. The message will be notify via Short Message Service or SMS. This notification system is a web based system where the complaint form can be access by user in the computer. This system eliminates the use of paper and space for storing the reports. In order to develop this system, phases by phases of development stage in System Development Life Cycle is followed. This system has made the way of taking, storing and reporting complaint become easier and more systematically. Furthermore it eliminates and increases the capabilities of current system. User acceptance towards this system is gathered by distribute a set of questionnaire to user at FTMSK. The questionnaire contains 14 items and there are questions in Likert scale, which are ranging from Strongly Disagree to Strongly Agree. The overall results of this study indicate that user agreed and accept to use this system because of the effectiveness of its usage. In conclusion, this system has a great potential to enable faster communication with maintenance and provide effective way of record, store and retrieve data.

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## LIST OF ABBREVIATIONS

FTMSK	Fakulti Teknologi Maklumat dan Sains Kuantitatif
PC	Personal Computer
PHP	Hypertext Preprocessor
SDLC	System Development Life Cycle
SMC	Short Message Centre
SMS	Short Message Services
SMSC	Short Message Service Centre
UiTM	Universiti Teknologi Mara

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# CHAPTER I

## INTRODUCTION

### 1.1 BACKGROUND

The rapid changes in communication paradigm have lead people to change the way of their communications too. If a few last decades, people use fixed line telephone, telegram, and mail as the way of communications. However nowadays there are a lot of ways to communicate which is faster and more reliable. For example mail has been changed to e-mail, and fixed line telephone has been change to mobile phone which is more convenient and sophisticated.

Short Message System (SMS) which is one of the mobile phone services has become popular nowadays as one of the way of communication. SMS was created by a standardization organization called ``Groupe Speciale Mobile" (GSM). The mandate of this group was to develop a standard to be common for the countries that created it. The GSM is a fully digital system, allowing both speech and data services and allowing roaming across networks and countries. Today GSM is the largest system for mobile communications in the world, and exist on all continents. The GSM consist the point-to-point short message service.

The point-to-point short message service let the user send short messages to other users.

Nowadays, contacting people via SMS is more preferred compared to contacting people via telephones, fax or paging due to time consuming and cost. Whereas, a simple SMS takes seconds to create and deliver and has proved to be a very inexpensive means of communication, reliable and trust worthy method of communication (Connor, 2003). Therefore, SMS is an effective communication medium in all areas of society against e-mail, telephone, fax, paging and so on. Via the SMS application announcements on events like tournaments, exhibits, deadlines or billing reminders can be sent accurately and efficiently

With regard to the rapid technological development, a notification system called Lamp-Failure Notification System via Mobile (SMS) is developed for the benefits of management staff of FTMSK.

Lamp-Failure Notification System is a system that will take the report of dysfunctional of facilities at the FTMSK and all the information is save in a database and then send to the maintenance through SMS for further action.

The web based system and short message system (SMS) will be the two important mechanisms in order to make this project run successfully. The information saved in system and then sends information to target via SMS.

## 1.2 PROBLEM STATEMENT

Lamp and other facilities that provided at faculty Of Information Technology and Quantitative Sciences or FTMSK are very important to every residents of FTMSK. However, not all the facilities are functioning properly. This can be seen clearly especially class that take place at the Theatrett.

The problem can be solved if someone complaint the problems to the maintenance. However many student and staff not interested to complain the problem to management because of the process which take many procedures. There are some cases where people don't realize that FTMSK had provided a form to make complaint. Even the complaint is made, there is no guarantee that the report will be sent to maintenance by management office on that day.

Officially, to report it, someone has to fill up a form and then submit it at management office. Then the officer at the management office will inform the problem to maintenance office. The report form then stored in a file and will open back as a reference when the problem solved by maintenance. There is another problem arise due this method. The form may be loss and the way of file is store is not reliable. Further more, the officer will take a few of time to search the form back.

Sometimes the officer will keep the complaining form and wait until there are a few more of complaints before they report it to the maintenance. On the

behalf of users who make the complaint, this is so unfair because they need to use the facilities as soon as possible.

*Lamp-Failure Notification System via Mobile SMS* is the answer for all the problems stated above. All the complaint make by the user will be inform to the maintenance on the spot. This project will focus on how to take, to store and to retrieve information of the malfunction lamps and other facilities in systematic way, reliable and faster. Then the complaint can be sending in text message format via mobile devices to the maintenance so that the maintenance can get the information on the spot when the complaint is made. In future may be the user can report directly to maintenance any malfunction facilities if the system implement through online system.

### **1.3 OBJECTIVES OF THE PROJECT**

The objectives of the project have been identified as follows:

- a) To develop a prototype of Lamp-Failure Notification System via Mobile (SMS).
- b) To analyze user acceptance towards this system.

## 1.4 SIGNIFICANCES OF THE PROJECT

This project basically gives benefits to four different groups of people which can be categorized as follows:

*i) Researcher*

Researcher can gain knowledge about SMS technology and how to develop a system. Besides, researcher can enhance her skills in develop and implement a new system. This project also will challenge her physical and mental ability and test her knowledge that she had learned at UiTM.

*ii) Maintenance of FTMSK*

This project will help maintenance of FTMSK to receive the information of the malfunction lamp and other facilities more effectively. They can have the lamp failure's information on the spot when the report is made. This could reduce time of receiving information which is faster than manual method.

*iii) Faculty of Information Technology and Quantitative Science*

Faculty of Information Technology and Quantitative Science or FTMSK can gain benefit through this project if this project run successfully. This project

will convince user at FTMSK especially staff because they have a systematical way of receive and store the complaint and this will eliminate the paper usage. In future, FTMSK will be the first faculty in UiTM that implements maintenance system via technology. Furthermore, FTMSK can have a better management especially to manage its facilities.

*iv) Future Researcher*

Future researcher can use this project as a stepping stone to enhance this system or at least can give him/her an idea to do something similar like this project. Future researcher also can use other technology such as GPS or 3G Technology.

## **1.5 SCOPE AND LIMITATION OF THE PROJECT**

The scopes for this project are indicated as below:

1. This project is implemented for the use of FTMSK staff only. Thus this research will be covered area of the Faculty of Information Technology and Quantitative Science only. Other faculty is not considered.



2. The efficiency of this system only focused on the active mobile devices of maintenance. Since this project will involve the use of a mobile phone, only active mobile phone is considered. Inactive mobile phone such as the phone is switch off or outside the coverage area will not consider.
  
3. Researcher will develop a prototype of Lamp-Failure Notification System via Mobile SMS.

## **1.6 PROJECT TIME LINE**

This project has a year to be completed. A proper time line is crucial to make sure that all the objectives can be achieved. Please refer Gantt Chart for this project at *Appendix I*.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

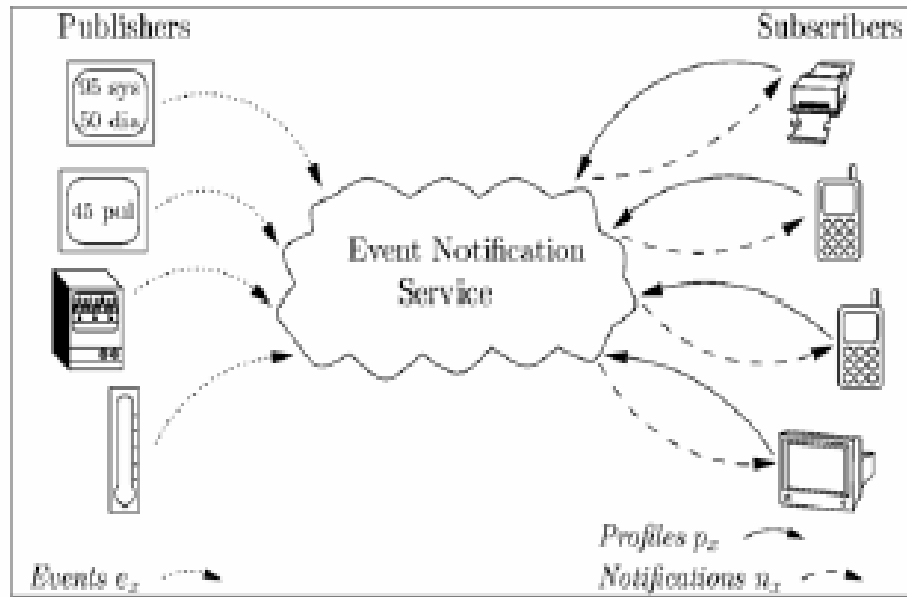
This chapter discusses the definition of term used in this study, which includes the terms of notification system, Mobile Technology, Global System for Mobile Communication (GSM) and SMS services. It also discusses a review of some related works on SMS application

#### **2.2 NOTIFICATION SYSTEM**

##### **2.2.1 Introduction**

Notification system is a system allows for broadcasting of messages to multiple people, via multiples mediums - including SMS, Email, Fax and Voice. Notification System Via mobile normally uses SMS as the medium. Besides, voice mail, pager and PDA are other examples of mobile medium.

According to Doris Jung and Annika Hinze (2000) *Event Notification Services: Analysis and Transformation of Profile Definition Language*, event notification services are systems that inform subscribers of an event notification service about certain facts they are interested in. The knowledge about these facts is provided by publishers, which send information about these facts. Events are changes of the state of an object such as sensor. The interests of subscribers are defined in profiles and registered with the event notification service. Whenever the event notification service receives an event which can be matched by one or several profiles, the respective subscribers are notified by a notification. Event notification services find their application in many areas such as medicine, logistics, quality and product management, the stock market, digital libraries or in traffic systems.



**Figure 2.1: Overview of an event notification service**

(Source - Doris Jung and Annika Hinze (2000))

### 2.3 NOTIFICATION SYSTEM FEATURES

According to *www.wikipedia.com*, a modern notification system is a combination of software and hardware that provides a means of delivering a message to a set of recipients. For example, notification systems can send an e-mail when a new topic has been added to certain application. The complexity of the notification system is often reflected in the types of messages that must be sent. However, notifying individuals when a building is on fire would require real-time interaction, escalation, scheduling, rosters, and fail-over scenarios.

### **2.3.1 Real-time Interaction**

Any emergency situation that requires human intervention, notification systems must provide a way of accepting feedback. The feedback can be used to determine what tasks the system should perform. For example, a chief firefighter, when notified of a pending fire, must acknowledge that the truck is en route, thus eliminating the need for further notifications.

### **2.3.2 Escalation**

The criticality of an event might change before the event is finally resolved. Sometimes a small failure may trigger a chain of failures that can lead to events that require immediate attention. For example, an e-mail that fails to send is not a significant error, and may be classified as a *warning*. However, the original incident that noted the e-mail failure may spawn a *ping* of the mail server responsible for relaying the e-mails. If the *ping* fails, the event may be escalated to a *severe* level, to indicate that a more important issue requires resolution.

### **2.3.3 Scheduling**

When deciding the list of recipients to notify of an event, a notification system might take into consideration the hours in which a recipient can be notified. Someone working a midnight shift may be available for handling emergencies between 11:00pm and 7:00am. The system should make no attempt to notify this person outside of those hours. A notification system could take into

consideration vacation times, weekends, holidays, and so forth, to prevent notifying people when they are not available.

### **2.3.4 Rosters**

If a notification system cannot contact the intended party, often it is not sufficient to let the matter drop. In the previous example, the chief firefighter was informed of a pending fire. However, if the chief was assisting a tree-bound cat, the notification might not reach its target. Consequently the system must find another person to notify, typically by scanning a predefined roster.

### **2.3.5 Fail-over Scenarios**

High availability means that a system must be up and running 99.999% of the time. The only acceptable downtime is for upgrades, which must be kept to an absolute minimum. To achieve the goal of high availability (*HA*), software-based notification systems must take into consideration the failure of hardware upon which they are running. The hardware failure could be as simple as someone accidentally unplugging a network connection, or as messy as a hard drive crash. The "brains" of the notification systems are often distributed across separate physical machines to ensure that if one machine is no longer available, another system can handle sending and resolving new events.

## **2.4 TYPES OF NOTIFICATION SYSTEM**

The number of ways a person can interact with technology increases with each passing year. Advanced notification systems support at least one, sometimes all, of the following communications media:

- Voice (telephone, cellphone, VoIP)
- Pager (SMS, SNPP)
- Instant Messaging (Jabber, MSN, ICQ)
- E-mail (POP, IMAP, SMTP)
- Fax

### **2.4.1 Notify via mobile**

Notification System can be implemented through varies medium. According to Neseem Al-Rawi, *Computer Event Communication via Mobile SMS*, notification can be made through pagers, e-mail, mobile telephony and Short Message Services. Neseem Al-Rawi had made comparison between the different communication methods as below:-

	<b>Pager</b>	<b>E-mail</b>	<b>SMS</b>	<b>Mobile</b>
<b>Alert</b>	✍	-	✍	✍
<b>Descriptive (voice/text)</b>	✍	✍	✍	✍
<b>Mobile</b>	✍	-	✍	✍
<b>Message size</b>	100ch	?	160ch	?
<b>Message stored by medium</b>	-	✍	✍	✍
<b>Cost to send message</b>	30	Free	30	30ppm

**Table 2.1 Comparison between different communication methods**

(Source-Neseem Al-Rawi, *Computer Event Communication via Mobile SMS*,)

From the table, it clearly can be seen that SMS is method that suitable for notification system since it is cheap, it has alert system, it is mobile and easy to bring anywhere through its devices such as mobile phone.

According to Hallfield Primary School [1999-2004] *Case Study - Hallfield Primary School and ActiveXperts SMS and Pager Toolkit*, there are a few characteristic that the notification system via SMS must fulfill in order to make it implementation more efficiency. They stated that:

- i. SMS must become the primary notification message type.
- ii. SMS must be retrieved from Active Directory;



- iii. It may not take more than 5 minutes to send out SMS message respondent
- iv. The system must be easy to add new features.

#### **2.4.2 Notify via e-mail**

One of the notification channels that can be used is via e-mail. The e-mail system is bi-directional and is able to convey any kind of information to and from any person or service equipped with an e-mail address. With e-mails capable of being practically infinite in size, it would not be too difficult a task to have a set of pre-written error messages which could be sent to the appropriate person, with full details passed into the message before it gets sent out. The only drawback is that people can't check their e-mail on the move, without a laptop and phone line and if they could, would they do so every minute of the day. E-mail can't really 'alert' users. (<http://dsg.port.ac.uk/projects,2000>)

#### **2.4.3 Notify via Pager**

One of the usual methods to notify alert to people is by pager. This method is quite famous. Pagers have been used since the late 80's to convey a simple message to those people who carry them. Originally used by doctors, nurses and other professionals they are now used widely by people on many

walks of life (BWS99). They are very cheap, small in size and do not incur any rental costs once the initial purchase payment is made. Each pager is assigned a telephone number, dialing this number allows a message to be sent to the pager. Numerical messages are entered using the phone keypad. With text messages, the person wishing to send the message dials the pager number they speak to an operator who types in the message at the other end of the phone line. The message will then be transmitted. Pagers however, have a limited message size before the message is fragmented (about 100 chars) and if the pager is out of reception range or if the pager is switched off the message will be lost in the airwaves and the recipient will be unaware of any message sent. Also numerical pagers cannot accept text messages. The medium is only one-way, once a message has been received there is nothing more that can be done except try and get to where the problem is, or find a phone to call someone to sort things out. (<http://dsg.port.ac.uk/projects,2000>)

#### **2.4.4 Notify via Winpopup message**

Winpopup message is more method that used for notify problem especially in network problem. This way is not often used to alert people because they are not sitting in front of the computer all the time. If there are popup message they will not realize about it.

#### 2.4.5 Notify via Instant Message

Instant message also one of the suitable method to sent notification message to user. Instant messaging typically boosts communication and allows easy collaboration. In contrast to e-mails or phone, the parties know whether the peer is available. Most systems allow the user to set an *online status* or *away message* so peers get notified whenever the user is available, busy, or away from the computer. On the other hand, people are not forced to reply immediately to incoming messages. This way, communication via instant messaging can be less intrusive than communication via phone, which is partly a reason why instant messaging becomes more and more important in corporate environments. Also, the fact that instant messages typically get logged in a local message history closes the gap to the persistent nature of e-mails, facilitating quick, safe, and persistent exchange of information such as URLs or document snippets, which can be a pain when done using inappropriate media such as phone.(<http://en.wikipedia.org>, 2006). This method also not efficient because there are some of them not login in instant message in work hour. The examples of instant message are Qnext, MSN Messenger, AOL Instant Messenger, Yahoo! Messenger, Skype, Google Talk, .NET Messenger Service, Jabber, QQ, iChat and ICQ.

## **2.5 OVERVIEW OF MOBILE COMMUNICATION**

Nowadays, mobile telephone is one of the most demanding telecommunications applications. Through the mobile phone people can get connected directly at any time, any places or situation. According to a study conducted by Malaysian Communications and Multimedia Commission (MCMC), entitled *The Handphone Users Survey 2005*, as at 31 May 2005, there were 16,243,337 hand phone subscriptions on the 5 digital networks operating in the country.

State	Percentage share of hand phone subscriber base
Selangor	24.7
Johor	13.7
WP KL	9.7
Pulau Pinang	7.4
Perak	7.3
Sabah	6.4
Kedah	5.9
Sarawak	5.9
Pahang	4.5
Negeri Sembilan	3.9
Kelantan	3.7
Melaka	3.0
Terengganu	2.9
Perlis	0.8
WP Labuan	0.2

**Table 2.2 : Percentage share of hand phone subscriber base in Malaysia** (Source-Malaysia Communications and Multimedia Commissions May 2005)

In the early 1980s, most mobile telephone systems were analog rather than digital systems. However, analog systems have inability to handle the growing capacity needs in a cost-efficient manner. So, digital system was introduced to solve this problem (<http://www.iec.org/online/tutorials/gsm/topic01.html>). The benefits of digital mobile systems include ease of signaling, lower levels of interference, integration of transmission and switching, and increased ability to meet capacity demands.

## **2.6 GLOBAL SYSTEM FOR MOBILE (GSM)**

The Global System for Mobile is the most popular standard used in mobile telephone around the world. Over a billion people across 200 countries used mobile telephone supported by GSM (<http://en.wikipedia.org/wiki/GSM>).

In the beginning of the 1980s several different systems for mobile communications were developed in Europe. The need for a common system that allowed roaming between countries was early recognized. In 1982 a number of European countries created a new standardization organization called "Groupe Speciale Mobile" (GSM). The mandate of this group was to develop a standard to be common for the countries that created it.

The GSM is a fully digital system, allowing both speech and data services and allowing roaming across networks and countries. Today GSM is the largest system for mobile communications in the world, and exist on all continents. The GSM consist the point-to-point short message service. The point-to-point short message service let the user send short messages to other users. These messages are relayed via a Short Message Centre (SMC), whose address has to be coded in the Mobile Station. Short messages may be sent separately or concurrently with speech transmission

According to EACOMM Corporation ([www.eacomm.com](http://www.eacomm.com)), the primary appeals of the GSM network are in its following qualities:

- i. **Digital Transmission.** The GSM Network is inherently digital which makes it secure, relatively error-free, and jamming-proof.
- ii. **Nationwide coverage.** The GSM networks offer nationwide access at a fixed fee regardless of location.
- iii. **Future-proof.** The GSM network is designed to be compatible with future technology upgrades such as GPRS and third generation (3G) cellular telephony. Thus, investments in this area are relatively safe in the medium to long term.
- iv. **Cheap.** GSM technology in terms of hardware and fees paid to providers will get cheaper as it grows more popular and as the technology matures.
- v. **Mobile.** GSM technology allows for a roaming system, where in both transmitter and receiver can be move around the cellular network.

There are a variety of applications wherein the GSM network can be useful for industrial use and most of these are in the realm of Data Transmission. This can be in the form of: telemetry systems, remote access and control systems, remote display systems and others. Being inherently digital, sending digital data with the GSM network is very simple and easy. Information transmission through the GSM network can be in the form of:

**i. Voice Channel Transmission.**

Much like how a regular fixed line modem works, data can be transmitted to the cell phone's voice channel at speeds comparable to a fixed line modem.

**ii. GPRS transmission.**

The "2.5 G" GPRS technology that is slowly gaining popularity in the Philippines allows for high-speed data transmission for the newest cell phone models.

**iii. SMS transmission.**

Using a 160- character text message, short commands can be sent via SMS and decoded by a receiver. This is ideal for intermittent small packet data transmission. (EACOMM Corporation ([www.eacomm.com](http://www.eacomm.com))).

**2.6.1 External Short Messaging Entities**

An ESME is a device that may receive or send short messages. The short message entity (SME) may be located in the fixed network, a mobile device, or another service center.

- i. **VMS**—The VMS is responsible for receiving, storing, and playing voice messages intended for a subscriber that was busy or not available to take a voice call. It is also responsible for sending voice-mail notifications for those subscribers to the SMSC.



- ii. **Web**—The growth of the Internet has also affected the world of SMS. Therefore, it is almost mandatory to support interconnections to the World Wide Web for the submission of messages and notifications. The increasing number of Internet users has a positive impact on the SMS traffic increment experienced in the last few years.
- iii. **E-Mail**—Probably the most demanded application of SMS is the ability to deliver e-mail notifications and to support two-way e-mail, using an SMS-compliant terminal. The SMSC must support interconnection to e-mail servers acting as message input/output mechanisms.
- iv. **Others**—There are several other mechanisms to submit short messages to the SMSC that include, but are not limited to, paging networks, specialized software for PC-based messaging and operator bureaus.

### 2.6.2 SMSC

SMSC is a combination of hardware and software responsible for the relaying and storing and forwarding of a short message between an SME and mobile device.

The SMSC must have high reliability, subscriber capacity, and message throughput. In addition, the system should be easily scalable to accommodate growing demand for SMS in the network.

Normally, an IN-based solution will allow for a lower entry cost compared pointing solutions because it can support other applications on a single hardware platform and share resources, thereby spreading the deployment cost over several services and applications.

Another factor to be considered is the ease of operation and maintenance of the application, as well as the flexibility to activate new services and upgrade to new software releases. (*www.iec.org*)

## **2.7 SHORT MESSAGE SYSTEM**

According to Internet.com [[www.internet.com](http://www.internet.com)] SMS is the transmission of short text messages to and from a mobile phone, fax machine and/or IP address. Messages must be no longer than 160 alpha-numeric characters and contain no images or graphics. Once a message is sent, it is received by a Short Message Service Center (SMSC), which must then get it to the appropriate mobile device. The SMSC transfers the message in a Short Message Delivery Point to Point format to the serving system. The system pages the device, and if it responds, the message gets delivered. The SMSC receives verification that the message was received by the end user, then categorizes the message as "sent" and will not attempt to send again.

### 2.7.1 Basic Network Architecture for SMS

According to *www.iec.org* SMS provides a mechanism for transmitting short messages to and from wireless devices. The service makes use of an SMSC, which acts as a store-and-forward system for short messages. The wireless network provides the mechanisms required to find the destination station(s) and transports short messages between the SMSCs and wireless stations. In contrast to other existing text-message transmission services such as alphanumeric paging, the service elements are designed to provide guaranteed delivery of text messages to the destination. Additionally, SMS supports several input mechanisms that allow interconnection with different message sources and destinations.

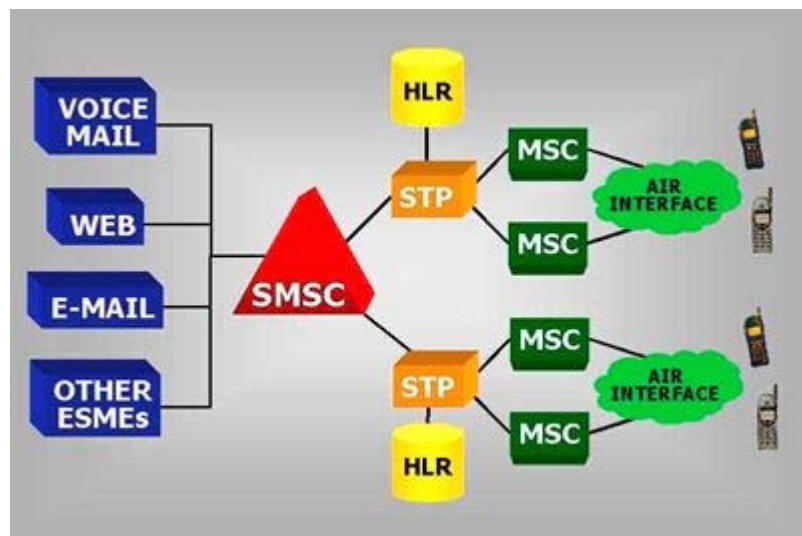


Figure 2.2. Basic Network Architecture for an SMS Deployment (IS-41)

(source-www.iec.org)

### **2.7.2 Advantages of using SMS technology**

In today's competitive world, differentiation is a significant factor in the success of the service provider. Once the basic services, such as voice telephony, are deployed, SMS provides a powerful vehicle for service differentiation. If the market allows for it, SMS can also represent an additional source of revenue for the service provider.

According to *www.iec.org*, the benefits of SMS to subscribers' center are convenience, flexibility, and seamless integration of messaging services and data access. From this perspective, the primary benefit is the ability to use the handset as an extension of the computer. SMS also eliminates the need for separate devices for messaging because services can be integrated into a single wireless device—the mobile terminal. These benefits normally depend on the applications that the service provider offers. At a minimum, SMS benefits include the following:

- i. Delivery of notifications and alerts
- ii. Guaranteed message delivery
- iii. Reliable, low-cost communication mechanism for concise information
- iv. Ability to screen messages and return calls in a selective way
- v. Increased subscriber productivity

More sophisticated functionality provides the following enhanced subscriber benefits:

- i. Delivery of messages to multiple subscribers at a time
- ii. Ability to receive diverse information
- iii. E-mail generation
- iv. Creation of user groups
- v. Integration with other data and Internet-based applications

The benefits of SMS to the service provider are as follows:

- i. Ability to increment average revenue per user (due to increased number of calls on wireless and wireline networks by leveraging the notification capabilities of SMS)
- ii. An alternative to alphanumeric paging services, which may replace or complement an existing paging offer
- iii. Ability to enable wireless data access for corporate users
- iv. New revenue streams resulting from addition of value-added services such as e-mail, voice mail, fax, and Web-based application integration, reminder service, stock and currency quotes, and airline schedules
- v. Provision of key administrative services such as advice of charge, over-the-air downloading, and over-the-air service provisioning

- vi. Protection of important network resources (such as voice channels), due to SMS' sparing use of the control and traffic channels
- vii. Notification mechanisms for newer services such as those utilizing wireless application protocol (WAP)

All of these benefits are attainable quickly, with modest incremental cost and short payback periods, which make SMS an attractive investment for service providers.

### **2.7.3 Popularity of SMS**

SMS is particularly popular in Europe, Asia (excluding Japan and Korea) and Australia. Popularity has grown to a sufficient extent that the term texting (used as a verb meaning the act of mobile phone users sending short messages back and forth) has entered the common lexicon (<http://www.answers.com/topic/short-message-service/>). According to [www.wikipedia.com](http://www.wikipedia.com), the most frequent SMS'ers is found in south-east Asia. In Singapore, hundreds of messages can be sent per month for free, after which messages cost between SGD 0.05 and SGD 0.07 each to send. The same pricing format is followed in the Philippines where the average user sent 2,300 messages in 2003, making it the world's most avid SMS nation. Nowadays, SMS is a part in almost all marketing campaigns, advocacy, and entertainment and so on.

The growth of text messaging is phenomenal given that it has been less than three years since cellular operators rolled out the inter-operator SMS in October 2001. The biggest contributor to this increase is the growing number of mobile phone users. There were 10 million subscribers of mobile phones in 2003 (42.4% of the total population, 36.9% in 2002 and 30.8% in 2001) and 97% users know how to use SMS. (T. Ramayah et al, 2006).

According to a study conducted by Malaysian Communications and Multimedia Commission (MCMC), entitled *The Handphone Users Survey 2005*, reported that 84.9% of cell phone users sent at least one SMS a day and 49.6% sent out at least five daily. This is an increase from the previous year where only 74.9% sent at least one SMS a day, and 31.7% sent at least five a day. The sharp growth in SMS usage suggests that the public is very comfortable with the use of this service because it is a very affordable medium of communication and easy to use (<http://star-techcentral.com>, 2006).

SMS Per Day	Percentage share of hand phone subscriber base
Zero	15.1
One	7.6
Two	8.1
Three	9.2
Four	3.0
Five	7.4
More than 5	49.6

**Table 2.3 Percentage of SMS per Day in Malaysia** (Source- Malaysian Communications and Multimedia Commission (MCMC))

## 2.8 SIMILAR PROJECT

### 2.8.1 NETSIZED SMS Online

This white paper is done by Netsized S.A. This project is about a soft drinks company needs to communicate and receive information from its vending machines as well as its delivery technician. As soon as a vending machine is empty or out of order, it sends a message to the company's information system via a GSM modem. This information is stored in a database and is used for stock control. The technician contacted reaches the vending machine and sends the



company a SMS message via his mobile phone once the intervention has been completed.

The similarity of this project is usage of SMS application as a notification tools to notify target person. However this system able to alert the target person automatically while Lamp-failure Notification System, target person is alert from computer.

### **2.8.2 SMS Employee Interface by Lee Stuart, 2002**

This project seeks to utilize SMS technology to deliver a single text message to multiple employees simultaneously. The system built will allow an Information System (IS) Manager to contact Information Technology (IT) Support staff. This system provides cost effective, able to use in any location with a guarantee of delivery. The system is online and incorporates a server side database of employee details which can be edited, added to and deleted by the user.

The similarity of this project is usage of SMS application to broadcast information effectively. However, this project uses Microsoft Access as database and Internet Information Service (IIS) as web server. Besides that, he uses the

ASP and VB Script as programming language to develop the system and Simple Wire Active X Software Development for message structure, address format and encoding.

### **2.8.3 Case Study - St. Joseph College and ActiveXperts SMS Messaging Server**

This Case Study concentrates on a sending out small notification messages to students and teachers, via SMS and via e-mail. St. Joseph College has an old-fashioned way of notifying students via e-mail. It is done by an MS Excel macro. So they decided to change to notification system via SMS. Goals of the new system are SMS must become the primary notification message type. It must still be possible to notify students with an e-mail message; SMS and e-mail addresses must be retrieved from Active Directory; No more Excel macro's for the notification system; It must be possible to schedule message broadcast hours and days in advance; It may not take more than 5 minutes to send out SMS messages to a hundred students;

Similarity of this project with Lamp-failure Notification System is the use of SMS as tools of notification system. However the application is written in Visual Basic 6 and use ActiveXperts SMS Messaging Server database to retrieve student contact information and store messages.

#### **2.8.4 An Analysis on Performance Measurement of GSM Modem in FTMSK Event Notification Interchange System by Aslinda Alwi, 2005**

This thesis project was done by Aslinda Alwi (2005) with the purpose to solve the problem in sending the latest information to students, lecturers and management staffs at FTMSK. She suggests to use notification system via SMS which is supported by GSM Modem. In this project, she used Microsoft Visual Basic 6.0 to develop this system and Microsoft Access as the database.

The similarity of this project compared to Lamp-failure Notification System is the used of SMS as the notification tools. However there are some differences between the Lamp-failure Notification System with this project where the types of programming language used in Lamp-failure Notification System are PHP and Java and MySQL as the database.

## **CHAPTER III**

### **METHODOLOGY**

#### **3.1 SYSTEM DEVELOPMENT METHOD**

Methodology plays an important role in doing research or project. A proper approach of methodology will determine a good output for the research or project. There are many approaches of doing research or project methodology.

The objective of this project is to develop a new system. In order to make sure that the objectives of the project achieve, the researcher choose the System Development Life Cycle (SDLC) methodology. This concept is under structure analysis method. The SDLC describes activities and functions. Researcher had identified several phases of methodology in order to achieve objectives of this project.

### 3.2 SYSTEMS PLANNING

A successful research is determined from the proper planning. The time allocation is done before one can begin the project. This can be achieved by allocating specific time by using Gantt chart. This will be a guideline in achieving project goal.

The system planning phase begins with a system request that describes problems or desired changes in an information system. This project actually based on the observation of researcher with the way of complaint of the malfunction lamp and other facilities that occur at FTMSK.

A preliminary investigation is done to identify the nature and scope of problem. The preliminary investigation is a critical step because the outcome will affect the entire development process.

There are few steps involved during the preliminary investigation. The steps as stated below:

- 1. Understand the problem*

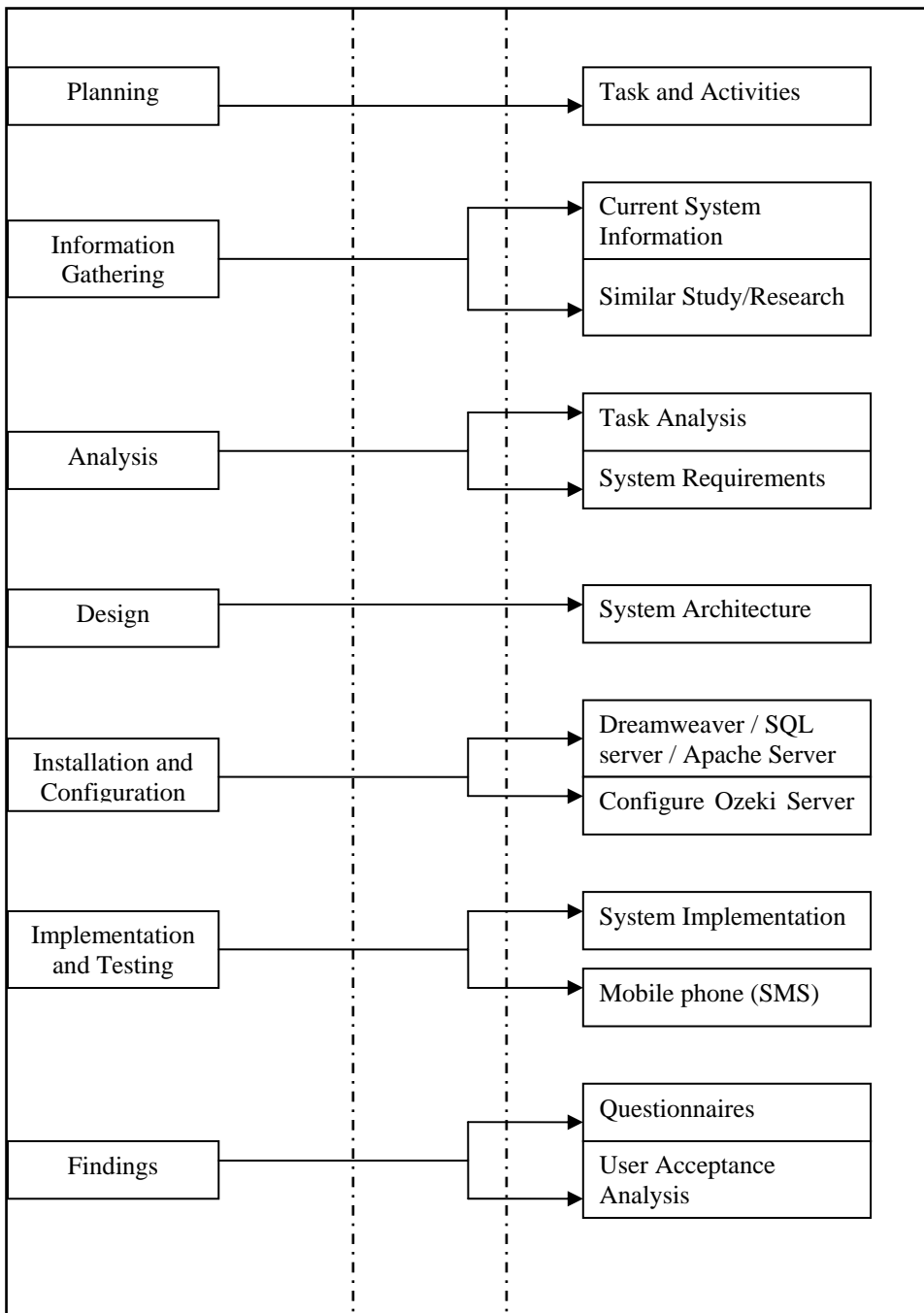
First of all, the researcher understands the problem that exists in current situation. The system of making complaint and sending report of dysfunctional facilities were studied. From that study, the problems and weakness of the current system were identified and will be use as guidance in new system.

2. *Define the scope project and constraints*

Then, researcher defines the boundaries of the project. The scope of the project establishes the boundaries of the preliminary investigation.

3. *Perform fact-finding*

Researcher had made observation to the current system operation. The information collected valuable to understand the nature of the problem.



### **3.3 INFORMATION GATHERING**

Researcher starts collecting all related information. The first information gathered was about the current system operation. The information was gathering from the management office of FTMSK. A manual form of complaint is taken as a reference. Basic steps of making complaint with the current system are also gathered. All the information about the current system is gathered.

### **3.4 SYSTEMS ANALYSIS**

After all the information gathered, the data are analyzed. The data those being analyzed are very important to researcher in order to identify the appropriate system that wants to develop. The name of the project is identified and researcher had chosen to develop a notification system. Then the objectives, scopes, limitations and significances are identified. Then researcher starts to analyze the most suitable method of notification system to overcome the weakness of the current system. Researcher choose to make a notification system via mobile (SMS) as the solution. As a result, a few weeks were spent to get an overview about the issue of notification system from Internet, online forum, online journals and from the past research. In this phase researcher found that



notification system via SMS has advantages and disadvantages which will become guidance for the project.

### 3.4.1 System development requirement

After getting all information needed and design the workflow, the next step is to find the tools that can be used to develop the system for this project. The appropriate hardware and software are very important to make this project run successfully.

### 3.4.2 Hardware Requirement

No	Name of Devices	Usage	Qty
1.	Personal Computer (PC)	To install Apache Web Server, PHP4, MySQL, Macromedia Dreamweaver MX, Ozeki Server Manager	1
2.	Mobile Phone	Act as GSM modem to send SMS	1
3.	Data Cable (RS-232)	To connect PC with mobile phone to send data	1

**Table 3.2 List of Hardware**

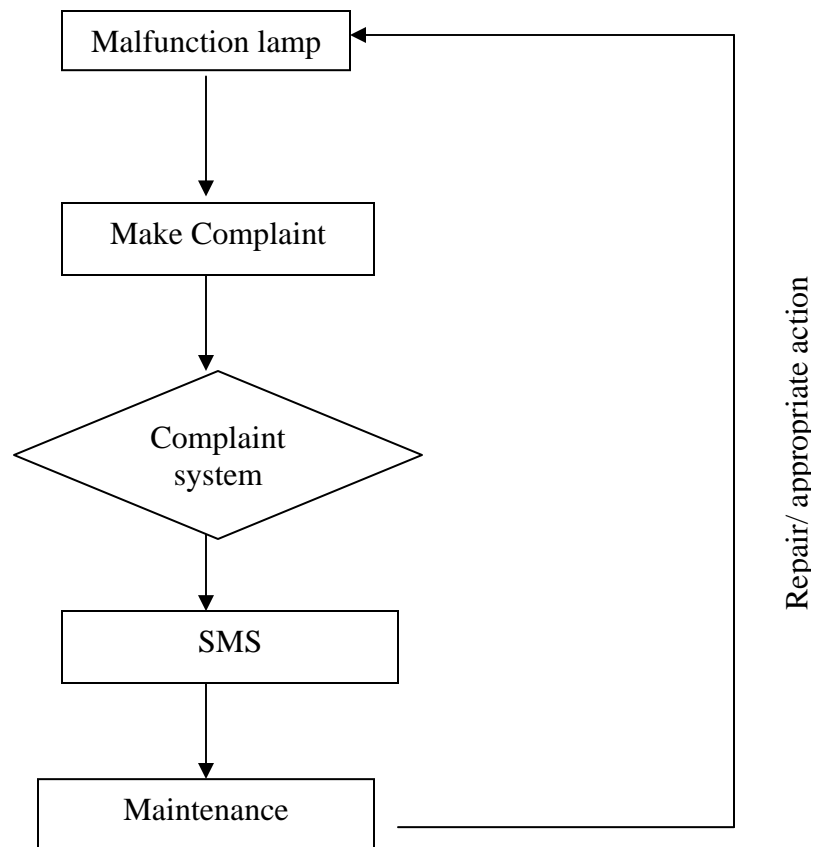
### 3.4.3 Software Requirement

No	Name of Software	Usage	Qty
1.	Apache	As a web server	1
2.	PHP 4	As application server	1
3.	phpMyAdmin	Use MySQL language as database management	1
4.	Macromedia Dreamweaver MX	To help create webpage with PHP coding	1
5.	Ozeki Server Manager	As a server to send SMS	1

**Table 3.3 List of Software**

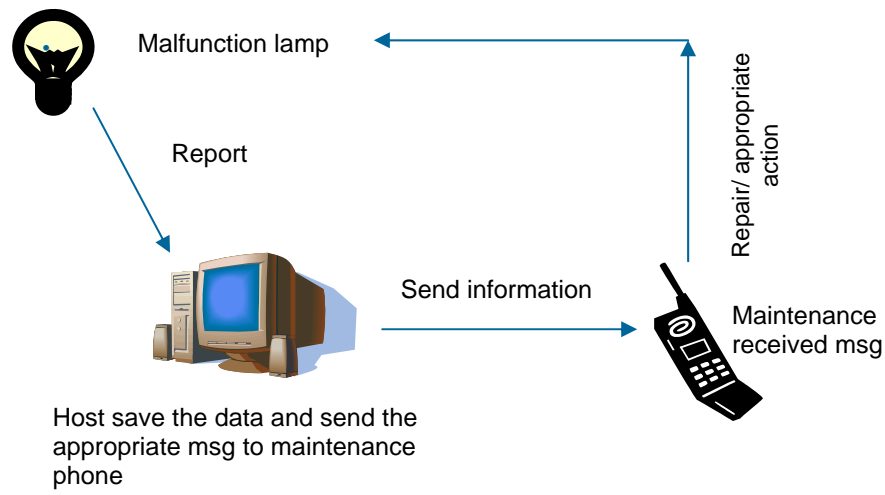
### 3.5 SYSTEMS DESIGN

In this phase, the outline design of the system is made. The design of workflow, database and interface of the system are determined. The workflow of the Lamp-failure Notification System via Mobile is identified as below:



**Figure 3.2: Lamp Failure Notification System via Mobile SMS**

**workflow**



**Figure 3.3: Lamp Failure Notification System via Mobile SMS**

### 3.6 SYSTEM INSTALLATION AND CONFIGURATION

Before the project can be start, the configuration must be done. Below are the steps of installation and configuration for hardware and software.

#### 3.6.1 System Installation

Project installation covered from hardware installation and software configuration. The installation steps including install Window XP as the operating system. To create web page, the Macromedia Dreamweaver MX has been installed. The server also installed such as Apache and Ozeki Server Manager.

### **3.6.2 Configuration**

- Configure Ozeki Server Manager

## **3.7 SYSTEMS IMPLEMENTATION AND TESTING**

### **3.7.1 Implementation**

After the entire requirement needed is installing and configure, the development of the web page begin. At this stage, the project was separated into two main tasks:

- i. Developed webpage using Macromedia Dreamweaver MX with PHP as the language.
- ii. Build the database in MySQL using phpMyAdmin to manage the database.

### **3.7.2 Testing**

To ensure that this project is done on Windows based, all the software that is used must be compatible with Windows. The connection between Apache Web Server, PHP and MySQL are tested to make sure it can work properly. If everything is fine, the prototype can be tested at FTMSK.

### **3.8 FINDINGS**

A set of questionnaire are distributed in order to analyze user acceptance towards this system. Respondent comments will be use to improve the system. All the findings are analyzed and documented in properly way.

#### **3.8.1 Research on Evaluation of User Acceptance**

Lamp Failure Notification System via Mobile (SMS) is evaluated by receiving comments and feedbacks from the end-users.

This section explained the research design, participants, data collection methods, and data analysis techniques relevant to this study.

##### **3.8.1.1 Research Design**

To ensure that this research to be conducted successfully, the qualitative research methodology for collecting accurate data about the research topic has been chosen. Under this methodology, a set of questionnaire has been distributed to the user.

i. **Sampling Questionnaire**

The questionnaires have been designed and distributed to the user from Faculty of Information Technology and Quantitative Sciences (FTMSK), Universiti Teknologi MARA (UiTM). There are 12 respondents have been selected to use the system. Then, they evaluate their opinion and satisfaction towards the system.

ii. **Literature Study**

A study have been done towards the implementation of this system and found the data about SMS application concept, mobile technologies, issues and its benefits and any measurement on system's user acceptance.

### **3.8.1.2 Instrumentation and Data Collection**

The questionnaires divided into two sections: Section 1 and Section 2. Questions at section 1 are to gather the demographic data about particulars users, like gender, age and academic background. Notwithstanding that, the questions are also being set to gather user's opinion towards Lamp Failure Notification System via Mobile (SMS). Meanwhile, questions at section 2 are used to investigate student's reactions towards implementation of this system application. Section 2 use Likert-Scale for all items where each item has five possible responses ranging from Strongly Disagree to Strongly Agree.

## **CHAPTER IV**

### **CONFIGURATION AND IMPLEMENTATION**

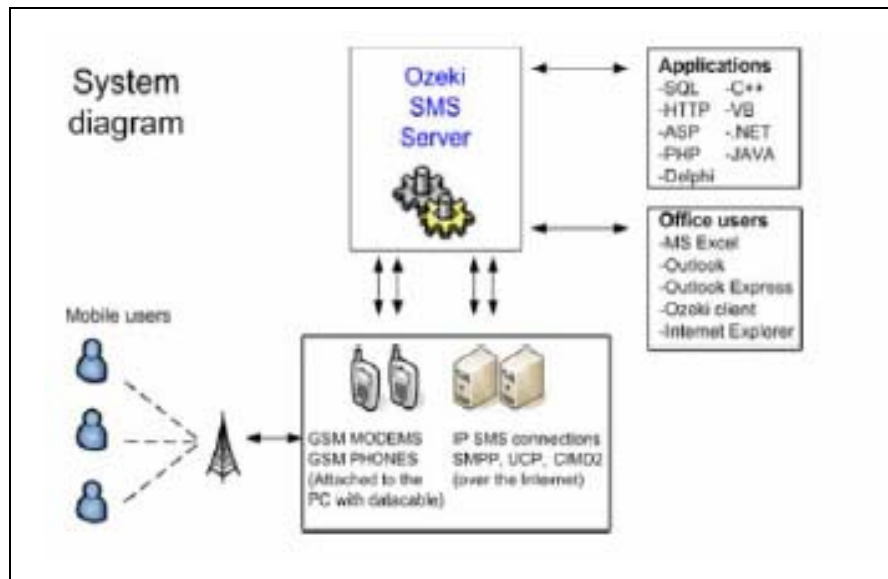
#### **4.1 INTRODUCTION**

In order to build up the SMS system, configuration of the server of the SMS is critically needed. This server will allow the data enter in the system can be send to the target mobile phone. The server that used is Ozeki Server Manager.

##### **4.1.1 About Ozeki Message Server 6**

Ozeki Message Server 6 - SMS Server is a powerful, flexible SMS Gateway application that enables user to send/receive SMS messages to mobile devices with user computer. It has an easy to use user interface, and an excellent internal architecture. The application can use a GSM mobile phone attached to the PC with a phone-to-PC data cable or IP SMS technology to transmit and receive the messages. Ozeki Message Server works on Microsoft Windows XP, 2000, 2003 operating systems.





**Figure 4.1 Ozeki Server Manager Workflow (www.ozeki.hu)**

#### **4.1.2 Installation of Ozeki Server Manager**

##### **Step 1: Setting up the GSM phone**

In order for the message server to work properly the following settings should be made on the mobile phone, prior to installation:

- All the PIN codes and security locks should be switched off
- The voice and data calls should be redirected to another phone number
- All SMS messages stored in the phone or the SIM card should be deleted.
- The SMS Service Center should be set
- When all these settings are done, you should test your GSM device by sending and receiving SMS messages manually.

### **Step 2: Connecting the GSM phone to the PC**

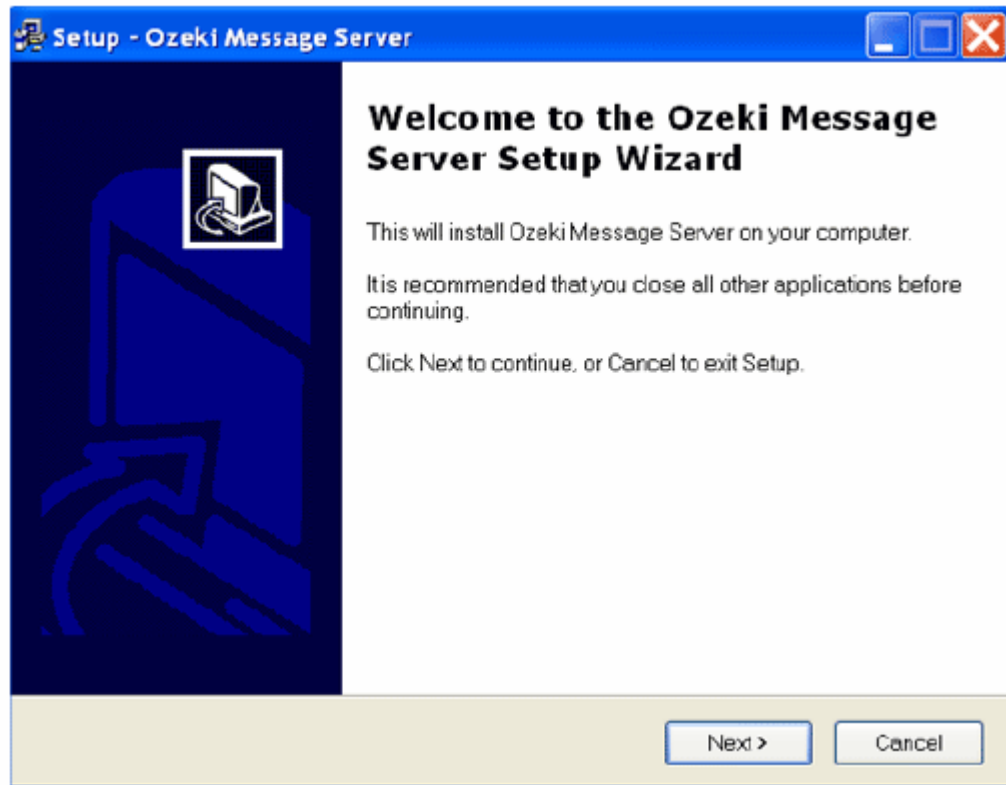
In order to send or receive SMS messages from your PC, you need to attach your phone to the PC with a phone-to-pc data cable (Figure 4.2). The cable is attached to the serial port of your computer. The serial port is located on the back side and has 9 pins.



**Figure 4.2 Attaching the device to the PC with a phone-to-pc data cable**

### **Step 3: Installing the application**

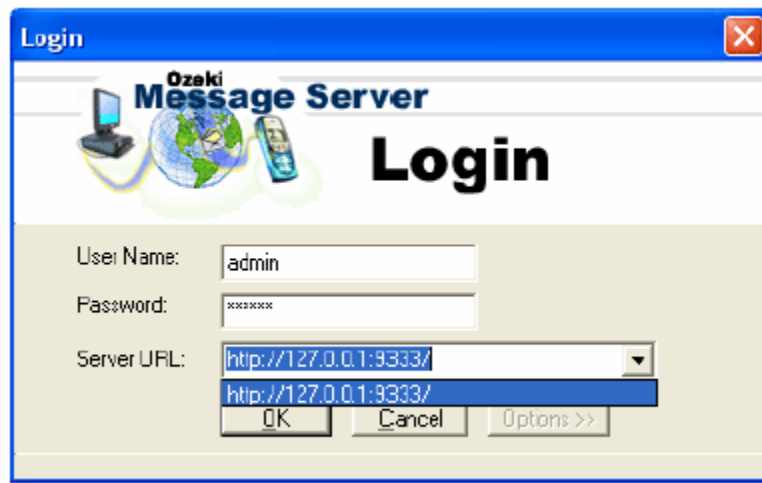
The Ozeki Message Server installation is similar to any Windows applications. Before do the installation, exit all Windows applications. Start **OzekiMessageServer.exe** by double-clicking on the icon.



**Figure 4.3** Starting the installation of Ozeki Message Server

#### **Step 4: Logging in to configure the service**

By clicking on the menu item, a login window comes up. This login window requires a user name and a password.



**Figure 4.4 Login**

### **Step 5: Installing drivers**

Once have logged into the Server manager, one or more drivers can be installed. A driver in Ozeki Message Server gives handles the attached GSM phones and GSM modems and the IP SMS services. Install the GSM modem driver, because we want to set up a GSM phone attached to the PC.



**Figure 4.5 Installing GSM Modem**

### **Step 6: Configuring the driver**

After the driver installation has completed **GSM Modem 1** section will appearing on the list of drivers in the "Currently installed drivers" screen. On this page start the configuration by clicking on the Configure link (Figure 4.6).

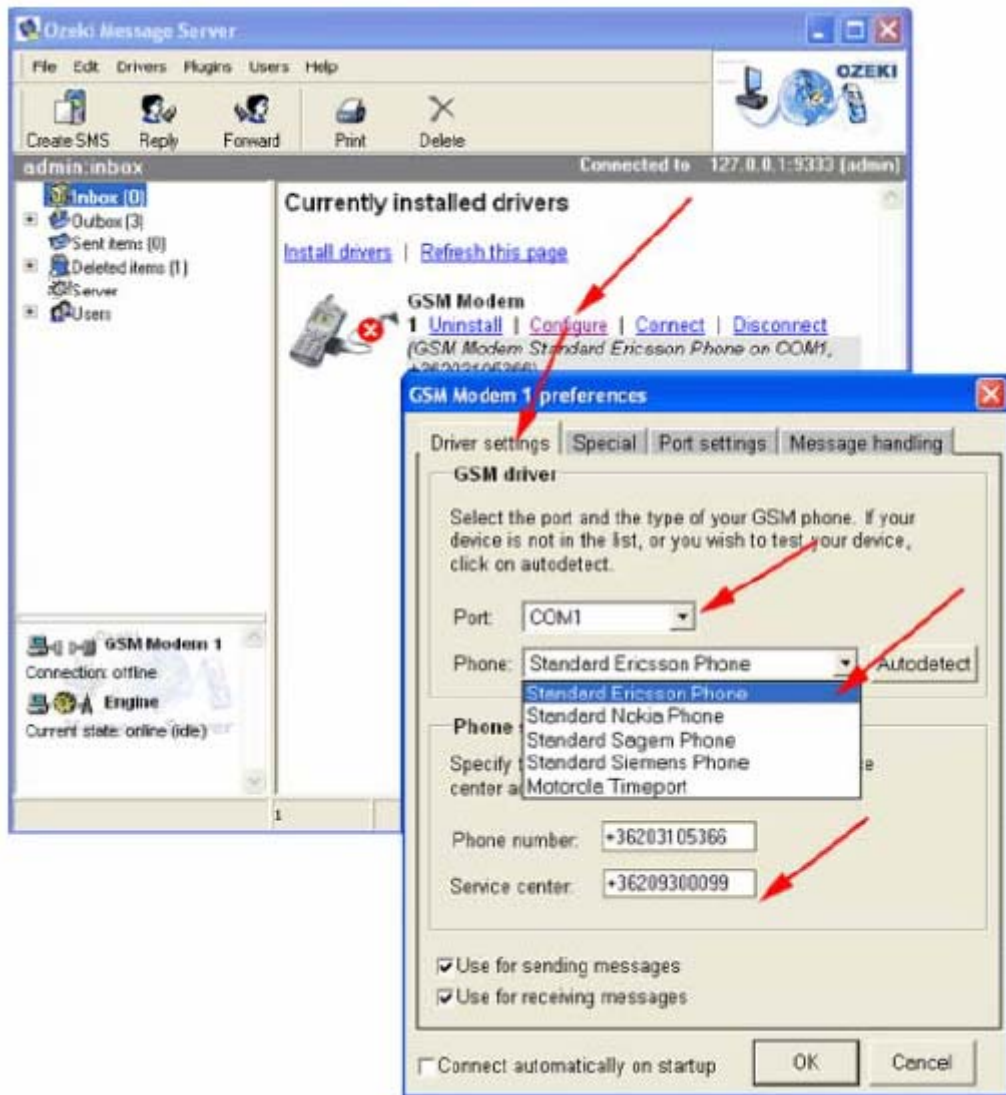
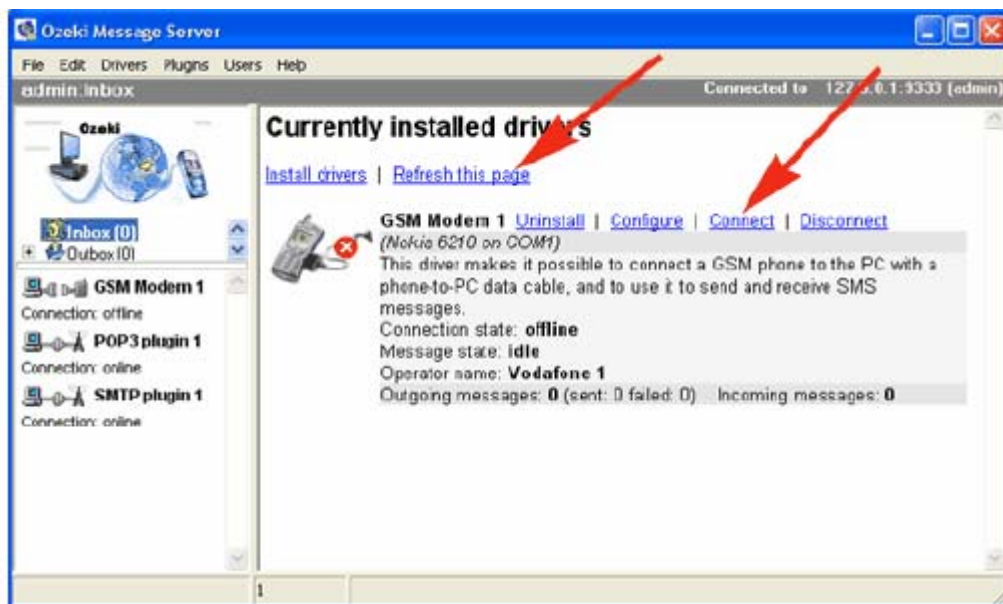


Figure 4.6 GSM Modem Configurations

## Step 7: - Starting the GSM modem connection

After the driver has been installed, start it. The startup process means that the driver connects to the configured mobile phone. Start the Ozeki Message Server GSM driver by clicking on "Connect" in the "Currently installed drivers" screen.



### 4.7 Connection of GSM Modem

If all the steps are configured completely, the server is ready to be used to send SMS.

## **CHAPTER V**

### **RESULTS AND FINDINGS**

#### **5.1 INTRODUCTION**

After all the method has been taken, the final step is the output or the result. In this chapter, researcher will explain the result and findings. All the work are analyzed and summarized.

#### **5.2 RESULT AND FINDING**

The implementation of Lamp-Failure Notification System via Mobile (SMS) would alleviate problems in storing data compared to conventional system which is unsystematically and unreliable. Further more it provide faster way to report the complaint to the maintenance.

#### **5.3 RESULT OF SYSTEM**

First of all, to make the web page run successfully, SQL server is activate. This is done to active the database.



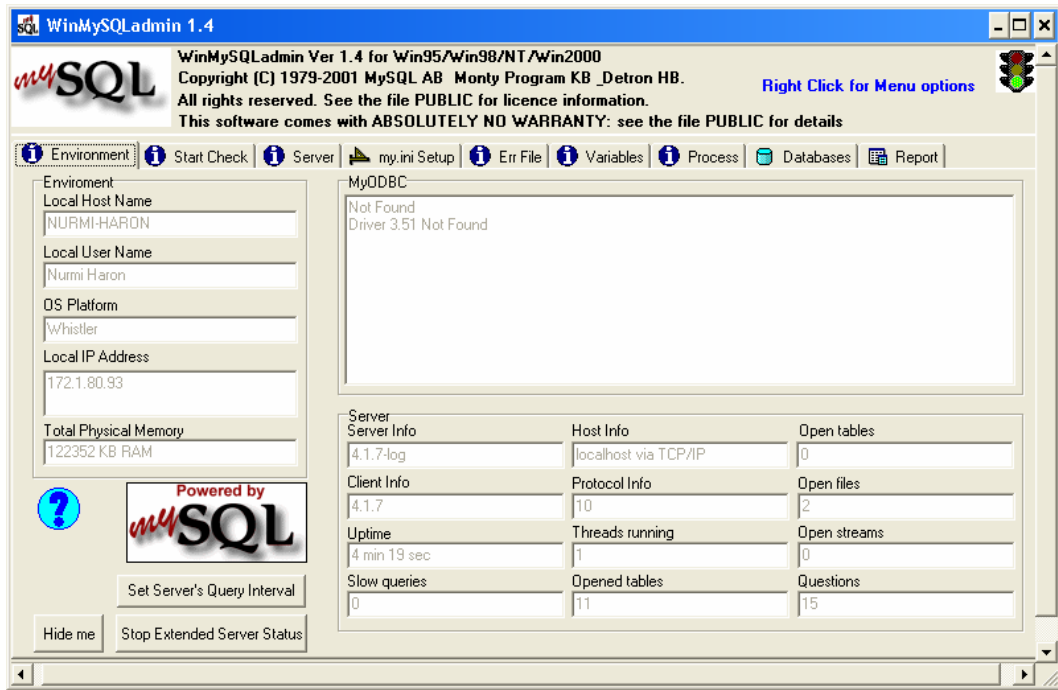
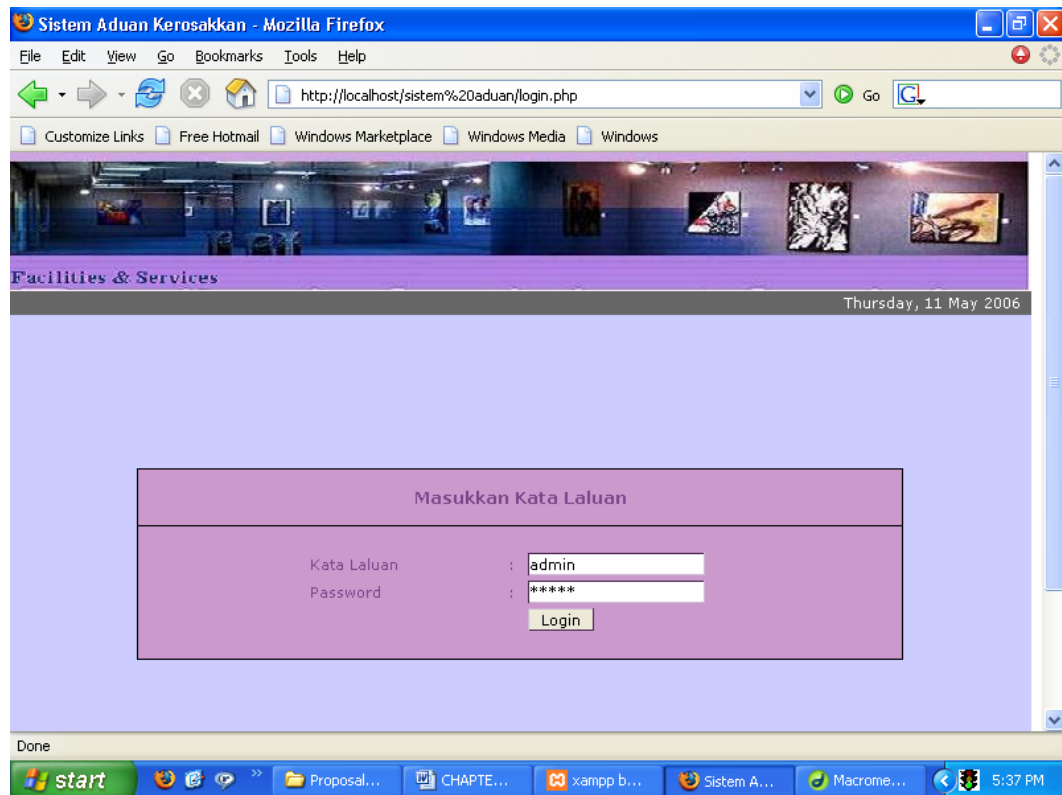


Figure 5.1 SQL server is activate

1. Login- first of all, user need to login into the system. Only the authorized user can access the system. Security is very important to make sure that all information store and send in this system is true.



**Figure 5.2 Login Form**

2. This is the main page of the system. User chooses “Borang Aduan” from the menu to open the form and start to key in the complaint.

The screenshot shows a Mozilla Firefox browser window with the title "ADUAN DAN MAKLUMBALAS PELANGGAN". The address bar shows the URL "http://localhost/sistem%20aduan/main.php?mod=borang-aduan". The browser's menu bar includes "File", "Edit", "View", "Go", "Bookmarks", "Tools", and "Help". The browser's toolbar includes "Customize Links", "Free Hotmail", "Windows Marketplace", "Windows Media", and "Windows". The main content area has a purple header with "Facilities & Services" and "Thursday, 11 May 2006". A search bar is present with the text "No Siri. : [input field] Cari". A sidebar on the left is titled "Menu Utama" and contains links for "Home", "Borang Aduan", "Maklum Balas", "AMP", and "Logout". The main content area is titled "Borang Aduan" and contains the following form fields:

- No Siri : [input field]
- Nama Pengadu : [input field]
- No Matrik : [input field]
- Fakulti : Fakulti Teknologi Maklumat dan Sains Kuantitatif [dropdown menu]
- Jenis Kerosakkan : Aircond [dropdown menu]
- Lokasi Kerosakkan : TH1 [dropdown menu]
- Tarikh Aduan : [input field] (ex: tahun-bulan-hari[2006-03-17])
- No SMS : +60125708661 [dropdown menu]

A "Save" button is located at the bottom of the form.

Figure 5.3 Form of report

3. This page is appear when the user enter the Save button. Here, the user can made modification onto the form. If user wants to edit or delete the data, appropriate button should be entering. If user satisfies with the information entered previously then user can enter button Send SMS to send the information to the maintenance.

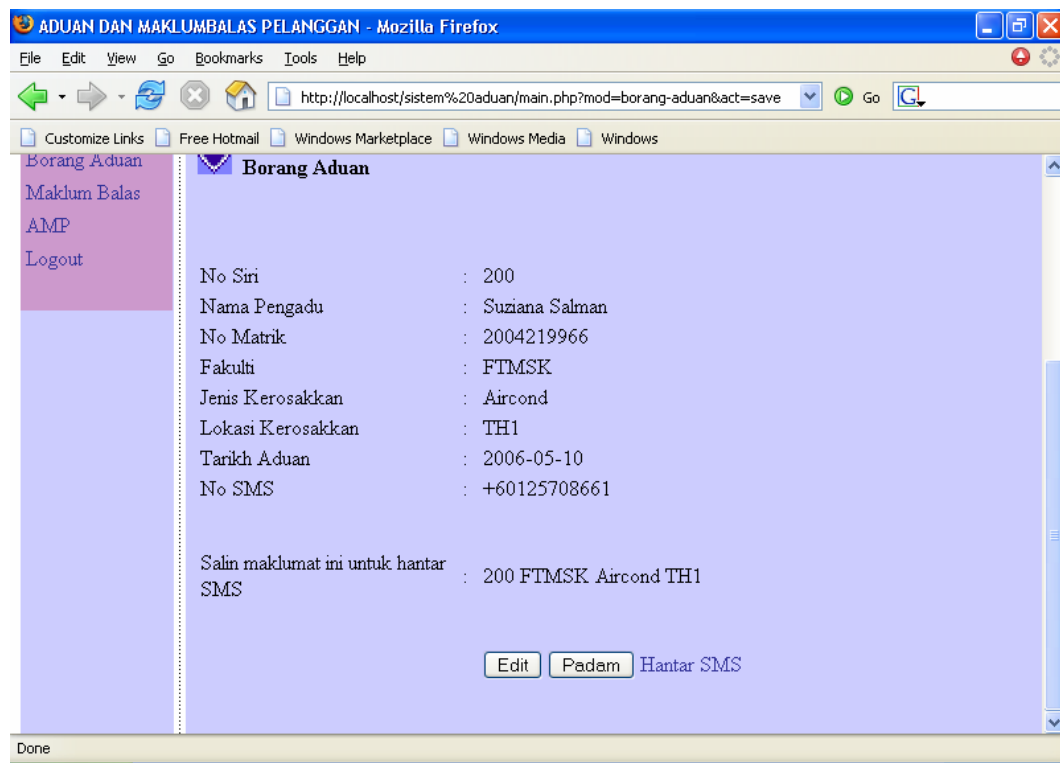


Figure 5.4 User action button

4. Once the Send SMS button is chosen, user should fill the form as shown with appropriate mobile number of recipient. The message then sends to maintenance.

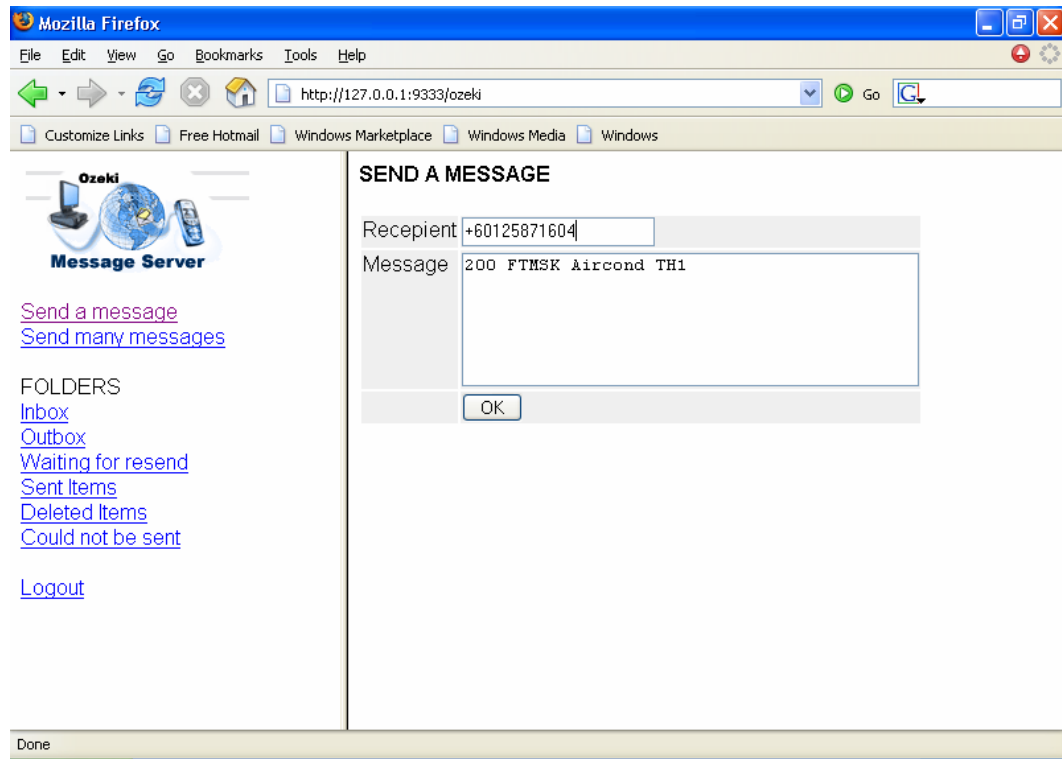


Figure 5.5 Send SMS page

5. If the user enters the button edit, this form will appear. User can modify the information except for serial number.

The screenshot shows a Mozilla Firefox browser window titled "ADUAN DAN MAKLUMBALAS PELANGGAN". The address bar shows the URL: `http://localhost/sistem%20aduan/main.php?mod=borang-aduan&act=editpdr`. The page content is titled "Edit Maklumat Aduan" and features a form with the following fields:

No Siri	:	<input type="text" value="200"/>
Nama Pengadu	:	<input type="text" value="Suziana Salman"/>
No Matrik	:	<input type="text" value="2004219966"/>
Fakulti	:	<input type="text" value="FTMSK"/>
Jenis Kerosakkan	:	<input type="text" value="Aircond"/>
Lokasi Kerosakkan	:	<input type="text" value="TH1"/>
Tarikh Aduan	:	<input type="text" value="2006-05-10"/> (ex: tahun-bulan-hari[2006-03-17])
No SMS	:	<input type="text" value="+60125708661"/>
Nama Penerima	:	<input type="text"/>
Penambahbaikan	:	<input type="text"/>
Tarikh Terima	:	<input type="text"/> (ex: tahun-bulan-hari[2006-03-17])
Penambahbaikan	:	<input type="text"/>
Punca Kerosakkan	:	<input type="text" value="Manusia"/>
Ulasan Tindakan	:	<input type="text"/>
Densakan Tindakan	:	<input type="text" value="Memuaskan"/>

Figure 5.6 Modification Form

6. If user makes a mistake during filling the form, the error message will be appear.

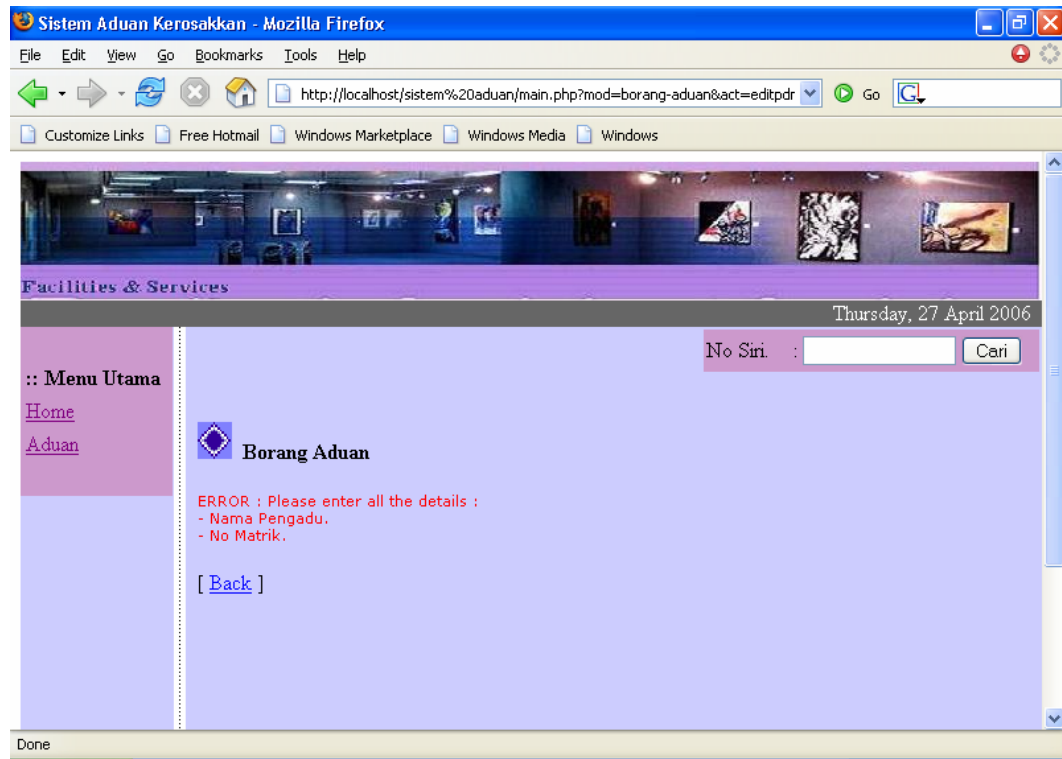
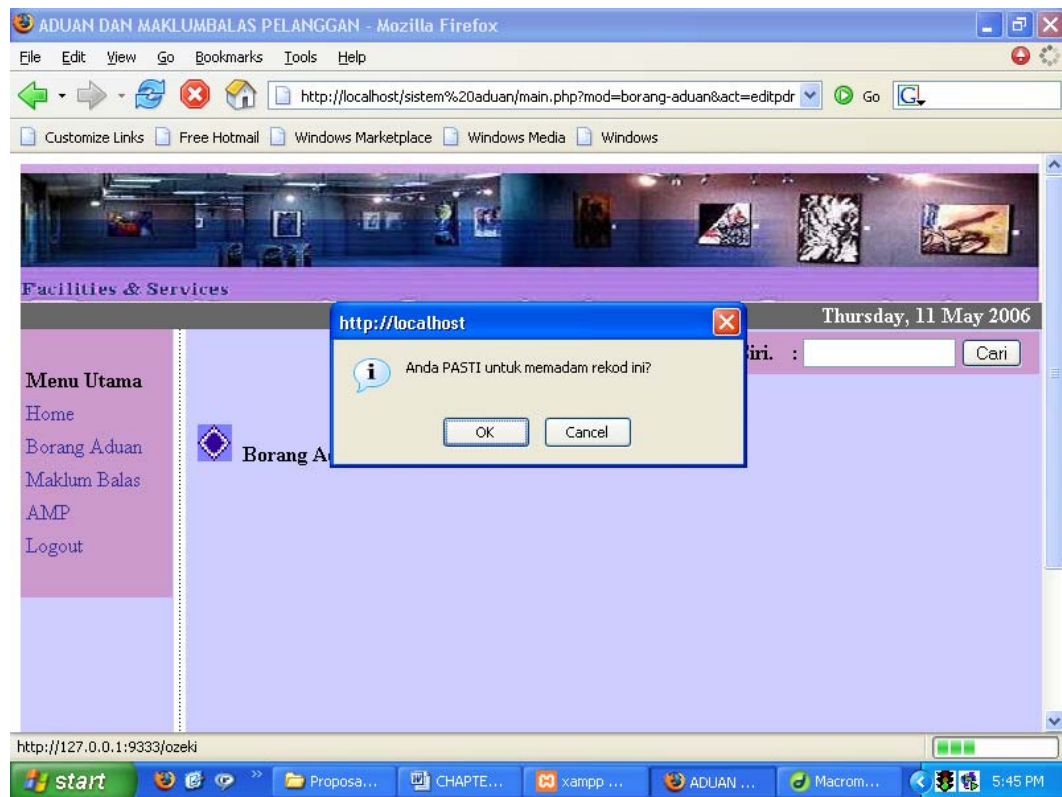


Figure 5.7 Error Message

7. If user chooses to delete the data, the popup message will appear to ask confirmation from the user.



**Figure 5.8** Popup window



8. When user key in the serial number and enter the search button, the information about the previous report will be showed

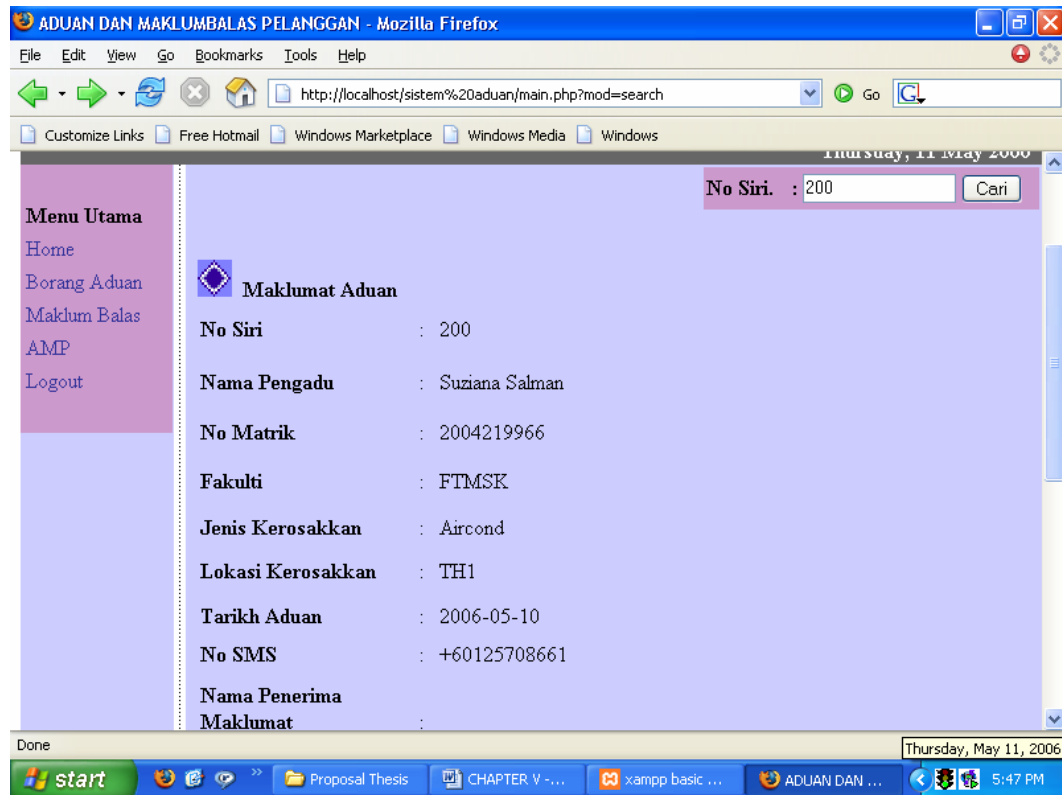


Figure 5.9 Search Information

9. When maintenance finished repairing the malfunction facilities, user searches the serial number of the cases and enter Edit button to fill up the response forms in order to give response to maintenance's work.

The screenshot shows a Mozilla Firefox browser window titled "ADUAN DAN MAKLUMBALAS PELANGGAN". The address bar shows the URL: `http://localhost/sistem%20aduan/main.php?mod=borang-aduan&act=editpdr`. The page content is a form with the following fields:

No Siri	:	<input type="text" value="5"/>
Nama Pengadu	:	<input type="text" value="Salehuddin Al Ayubi"/>
No Matrik	:	<input type="text" value="2004219966"/>
Fakulti	:	<input type="text" value="FTMSK"/>
Jenis Kerosakkan	:	<input type="text" value="Aircond"/>
Lokasi Kerosakkan	:	<input type="text" value="TH1"/>
Tarikh Aduan	:	<input type="text" value="2006-05-11"/> (ex: tahun-bulan-hari[2006-03-17])
No SMS	:	<input type="text" value="+60125708661"/>
Nama Penerima	:	<input type="text"/>
Penambahbaikan	:	<input type="text"/>
Tarikh Terima	:	<input type="text"/>
Penambahbaikan	:	<input type="text"/> (ex: tahun-bulan-hari[2006-03-17])
Punca Kerosakkan	:	<input type="text" value="Manusia"/>
Ulasan Tindakan	:	<input type="text"/>
Pengesahan Tindakan	:	<input type="text" value="Memuaskan"/>

At the bottom of the form is a "Save" button. The browser's taskbar shows the Windows start button and several open applications, including "report 2...", "CHAPTE...", "ADUAN ...", and "xampp b...". The system clock shows 7:12 PM.

Figure 5.10 Response Form

10. This is the database structure used to store all the data

```
--
-- Table structure for table `adu`
--

CREATE TABLE `adu` (
  `no_siri` int(7) NOT NULL auto_increment,
  `nama_adu` varchar(100) default NULL,
  `no_matrik` varchar(10) default NULL,
  `fakulti` varchar(100) default NULL,
  `jen_rosak` varchar(50) default NULL,
  `lokasi_rosak` varchar(50) default NULL,
  `tarikh` varchar(10) NOT NULL default '',
  `telefon` varchar(12) NOT NULL default '',
  `nama_penerima` varchar(50) default NULL,
  `tarikh_terima` varchar(10) NOT NULL default '',
  `punca` varchar(100) default NULL,
  `ulasan` text,
  `pengesahan` varchar(100) NOT NULL default '',
  PRIMARY KEY (`no_siri`),
  UNIQUE KEY `no_siri` (`no_siri`)
) ENGINE=MyISAM DEFAULT CHARSET=utf8 AUTO_INCREMENT=10040 ;

--
-- Table structure for table `login`
--

CREATE TABLE `login` (
  `11` varchar(15) NOT NULL default '',
  `12` varchar(15) NOT NULL default '',
  `13` char(1) default NULL,
  PRIMARY KEY (`11`)
) ENGINE=MyISAM DEFAULT CHARSET=utf8;
```

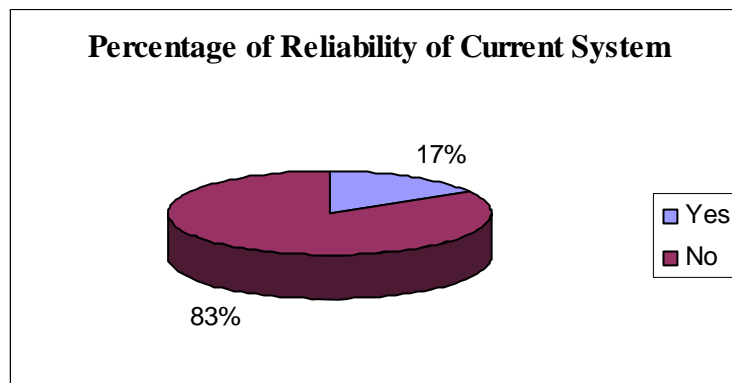
**Figure 5.11 Database**

## 5.4 FINDINGS

This section discussed the respond retrieved from the questionnaire distributed to users. All the users were asked to use the system before answering the questionnaire which consist 14 questions in three sections. The numbers of respondents are 12.

### 5.4.1. Reliability of current system

In question number 6, users are asked about the reliability of current system. Figure 5.12 shows the percentage of user view toward reliability of current system.



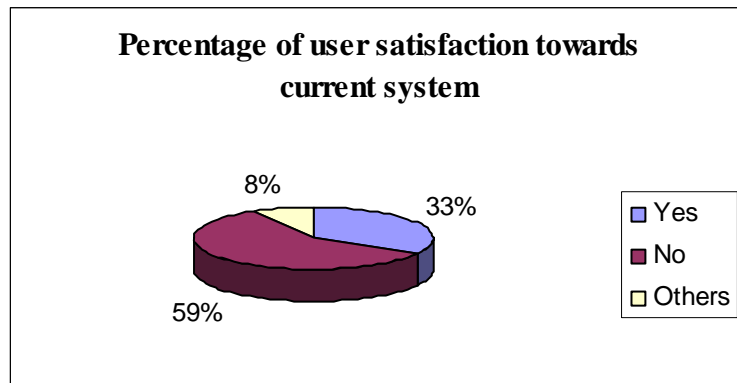
**Figure 5.12: Percentage of reliability of current system**

From Figure 5.12, 17 percent of the respondent or 2 respondents state that the current system is reliable while other 83 percent or 10 respondents state that

the current system is unreliable. Some of the reasons why the current system said to be unreliable are the complaint form may loss, the forms are unsystematic store and hard to retrieve back the form when the cases wants to refer back.

#### 5.4.2 User satisfaction towards current system

In question number 8, respondents are asked about their satisfaction towards the current system.

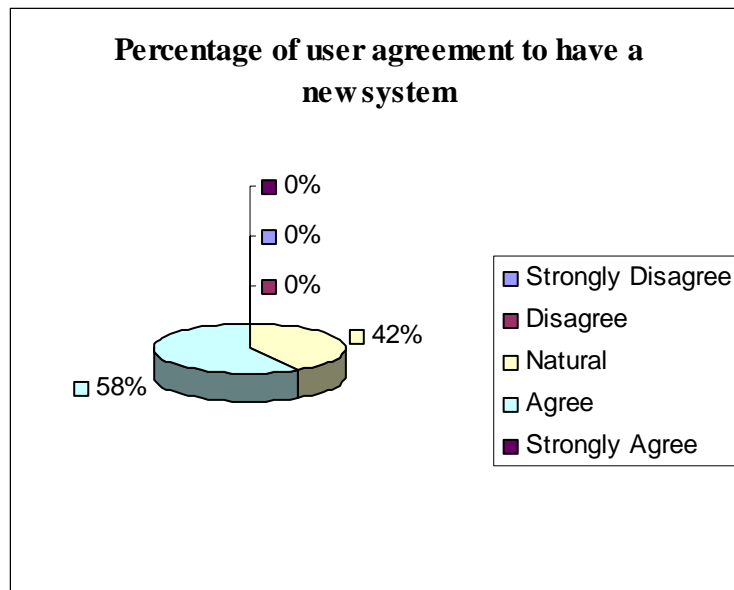


**Figure 5.13 Percentage of user satisfaction towards current system**

Figure 5.13 shows the percentage of user satisfaction towards current system. From the figure it shows that 59 percent of respondents or users state that they are not satisfy with the current system. Other 33 percent of respondents satisfy with the current system while 8 percent of the respondents have no comment about the current system.

### 5.4.3 The needs of a new computerized system which is more efficient and systematic

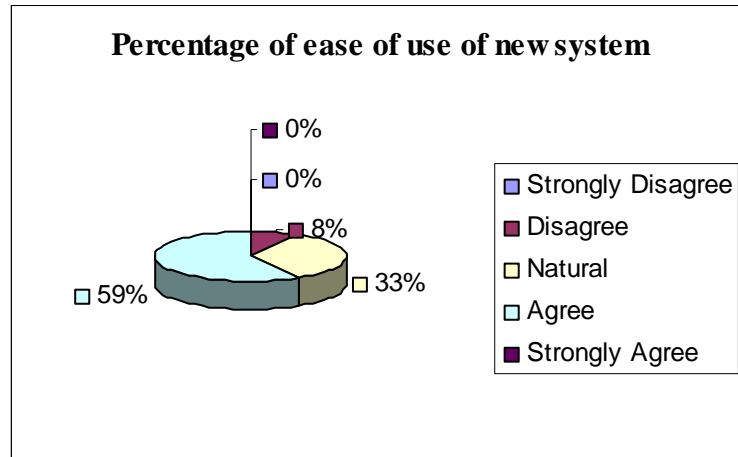
In question number 9 in questionnaire set, the respondents are asked about their opinion of having a new computerized system which is more efficient and systematic. Figure 5.14 show the user percentage towards the suggestion.



**Figure 5.14 Percentage of user agreement to have a new system**

From the Figure 5.14, 58 percent of the respondents or 7 respondents agree to have a new system to replace the current system with the computerized system which is more efficient and more systematic. 5 respondents or 42 percents state natural towards having a new system.

#### 5.4.4 Ease of use of new system

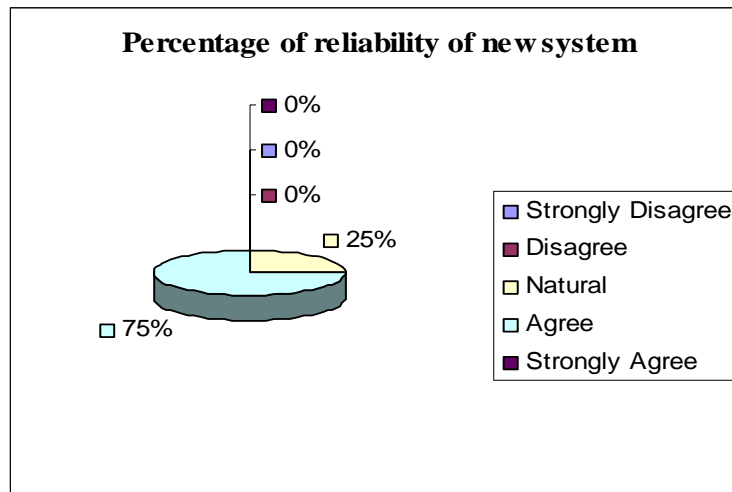


**Figure 5.15 Percentage of ease of use of new system**

The pie chart in Figure 5.15 shows that 59 percents of the respondents agree that the new system is easy to use while 33 percents of respondents state natural about the ease of use of new system. There is one respondent or 8 percents states disagree about the ease of use of new system. The respondent have problem during using the new system.

#### 5.4.5 Reliability of new system

In question number 12 in questionnaire set, respondents are asked about the reliability of the new system. The summarized of respondents towards the topic as showed in Figure 5.16.



**Figure 5.16 Percentage of reliability of new system**

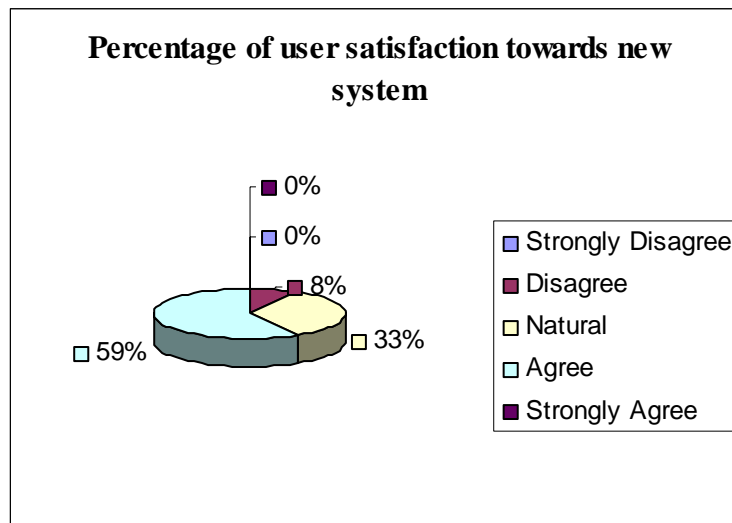
Figure 5.16 shows that 25 percents or 3 respondents state natural about the reliability of the new system while 75 percents or 9 respondents agreed that the new system is more reliability. The terms reliability include the way of data storing and data retrieving.

#### **5.4.6 User satisfaction towards new system**

Respondents are asked about their satisfaction towards the new system.

Figure 5.17 shows the percentage of user satisfaction towards the new system.



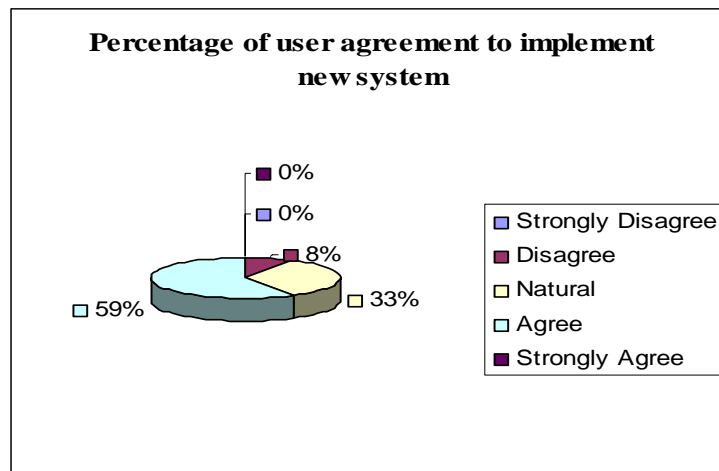


**Figure 5.17 Percentage of user satisfaction towards having new system.**

The figure shows that 59 percent of respondents agree that they satisfy with the new system while 33 percents of the respondents natural towards this issue. There are 8 percents or 1 respondent not satisfy with the new system. The only one respondent is respondent who having problem while using this new system.

#### **5.4.7 User opinions of implementation of new system**

Figure 5.18 shows that 59 percent of the respondents agree to implement the new system at FTMSK while 33 percents of the respondents feel natural to implement the new system. There is one respondent disagree to implement the new system at FTMSK.



**Figure 5.18 Percentage of user agreement to implement new system**

### 5.5 SUMMARIZATION

From the questionnaire distribute to respondents, it can be conclude that the users acceptance towards the new system are positive. Respondents agreed that the new system is better than the current system. The new system can address and enhanced the capabilities of current system.

## **CHAPTER VI**

### **CONCLUSION AND RECOMMENDATION**

#### **6.1 INTRODUCTION**

This chapter explains about the suggestion and recommendation to upgrade this project in the future.

#### **6.2 CONCLUSION**

Lamp-Failure Notification System is the better alternative to change the nature of storing and reporting information of the malfunction facilities at FTMSK. This system will increase the efficiency the way of data being keeping and lead to systematical of management.

The system is easy to implemented and very user friendly. There is no additional expense needed because the system is just use the present computer at the management office. Using this system, the report about the malfunction lamp can be faster send to maintenance and the appropriate action can be taken. It also save space and cost on paper since it use computer and data stored in the database.

As a conclusion, it is found that respondents are positively accepting the use of Lamp-failure Notification System via Mobile. This has been proven from the results of the research that was done. IT can say that this system has the

potential to remain as one of the important feature at FTMSK and helping users to store, retrieve and send information in efficient way. However, there are certain aspects that need to be improved such as security.

### **6.3 RECOMMENDATION**

Through the project that has been done, some of the recommendations that can be implemented for future researcher are listed. Some of the recommendations are:

1. Develop more attractive and effective system with more user-friendly. The enhancement of the system must provide more utility so it cans benefits the user.
2. Security of the system should be enhanced. Security important to allow only authorized user to access the system to prevent false reports is being made.
3. This system should use as one of the additional menu at FTMSK web page so that students or lecturer who wants to make a report does not need to go to office. However the appropriate action such as security should be considered to avoid user from misuse this services.

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## APPENDICES

### Questionnaire



### SOAL SELIDIK

Assalamualaikum w.b.t

Tuan/Puan,

Saya, Nurmi binti Haron pelajar Universiti Teknologi Mara sedang menyiapkan projek akhir. Projek akhir saya bertajuk “ Lamp-Failure Notification System via Mobile (SMS)” di mana ia merupakan sebuah sistem yang menerima dan menyimpan laporan kerosakkan dan seterusnya menghantar laporan tersebut dengan menggunakan teknologi khidmat pesanan ringkas (SMS). Kerjasama daripada pihak anda untuk menjawab soalan ini adalah dihargai. Maklumat yang diperolehi adalah penting untuk membantu saya menyiapkan projek akhir ini.

Diharap tuan/puan dapat meluangkan sedikit masa untuk menjawab beberapa soalan dalam soal selidik ini.

### **Bahagian A: Profil Responden**

1. Jantina:  L  P
2. Tahap pendidikan:  SPM  Diploma  Ijazah  Lain-lain

### **Bahagian B: Sistem Sedia Ada**

3. Berapa kerap anda menggunakan sistem ini?  
 Tidak Pernah  Kadang-kadang  Selalu
4. Adakah anda menghadapi masalah dengan sistem ini?  
 Ya  Tidak

Jika Ya, jawab soalan no.5. Jika Tidak terus ke soalan no.6.

---

---

5. Apakah masalah yang anda hadapi?

---

---

6. Adakah sistem sedia ada ini boleh dipercayai?

Ya  Tidak

Jika Tidak, terus ke soalan no.7. Jika Ya, terus ke soalan no.8.

7. Pada pendapat anda, mengapa sistem sedia ada ini tidak boleh dipercayai?

---

---

8. Adakah anda berpuas hati dengan sistem sedia ada ini?

Ya  Tidak

### **Bahagian C: Sistem Baru**



Untuk soalan no.9 - 14, sila gunakan skala yang berikut untuk maklum balas anda.  
Bulatkan jawapan anda.

- |          |                     |
|----------|---------------------|
| <b>1</b> | Sangat tidak setuju |
| <b>2</b> | Tidak setuju        |
| <b>3</b> | Natural             |
| <b>4</b> | Setuju              |
| <b>5</b> | Sangat setuju       |

- |     |  |   |   |   |   |   |
|-----|--|---|---|---|---|---|
| 9.  | Sebagai pemegang sijil ISO, FTMSK<br>seharusnya mempunyai satu sistem<br>menyimpan maklumat berkomputer yang<br>lebih cekap dan sistematik | 1 | 2 | 3 | 4 | 5 |
| 10. | Sistem baru ini mudah digunakan.   | 1 | 2 | 3 | 4 | 5 |
| 11. | Saya tidak menghadapi masalah<br>menggunakannya.   | 1 | 2 | 3 | 4 | 5 |
| 12. | Sistem ini boleh dipercayai dalam aspek<br>meyimpan data.  | 1 | 2 | 3 | 4 | 5 |
| 13. | Saya berpuas hati dengan sistem ini.   | 1 | 2 | 3 | 4 | 5 |
| 14. | Sistem baru ini sesuai digunakan untuk<br>menggantikan sistem sedia ada.   | 1 | 2 | 3 | 4 | 5 |